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Article

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ORIGINAL ARTICLE

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Do firms make greater use of training and temporary employment when labor adjustment costs are high?

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Abstract

In this paper, we present evidence on how employers in developing and emerging economies perceive employment regulations and react to them. We use harmonized surveys of about 10,800 firms around the world, supplemented by indicators of the stringency of employment protection that summarize detailed aspects of the labor legislation. We find that firms facing tight employment protection invest more in training, but also use temporary contracts to enhance labor flexibility. Using a difference-in-difference approach to control for unobservable characteristics, we find that small firms and those in sectors characterized by greater job reallocation are the most directly affected by employment protection.

JEL codes: J23, J65, K31

Keywords: Employment protection indicators; Firm surveys; Training; Temporary employment

1. Introduction

Economists and policy makers have long debated the effects of hiring and firing regulations on workers' and firms' behavior. Policy intervention in this area is clearly justified by the need to protect workers from arbitrary actions and the fact that imperfections in financial markets limit their ability to insure themselves against the risk of dismissal (see *e.g.* Pissarides 2010; Blanchard and Tirole 2004). There could also be efficiency considerations to the extent hiring and firing regulations promote long-lasting work relationships that encourage firms' investment in human capital (see *e.g.* Akerlof 1984; Piore 1986). However, as with the majority of labor regulations, onerous employment protection legislation (EPL) can have negative effects on labor reallocation and allocative efficiency. By raising labor adjustment costs, employment protection regulations tend to reduce job destruction but also job creation (Bertola 1992) thereby weakening the ability of firms to take advantage of the opportunities offered by new technologies and access to new markets that often require a change in the skill composition of the workforce and, overall, hindering the required reallocation of labor from less to more productive activities. This is all the more important as many countries, including a growing number of developing and emerging economies, have introduced reforms in their labor regulations in the past years in an attempt to promote labor market adaptability and job creation.

Several models predict that employment protection reduces gross job flows (e.g. Bertola 1992; Hopenhayn and Rogerson 1993; Koeniger and Prat 2007) and there is a growing empirical literature supporting this prediction (from the original work of Bentolila and Bertola 1990 and Nickell and Layard 1999, to the most recent contributions at the industry and firm-level by Micco and Pagès 2008; Haltiwanger *et al.* 2008, 2013; Bassanini *et al.* 2010).¹ At the same time, however, it is not clear whether onerous employment protection legislation should lead to a lower equilibrium level of employment. Hopenhayn and Rogerson (1993), using a general equilibrium model with entry and exit of firms, show that a tax on job destruction can reduce employment rate significantly. However, Alvarez and Veracierto (2001), extending their model to include frictions and imperfect insurance markets, suggest that severance payments may be welfare improving insofar as the reduction in firms' layoffs and stronger search efforts by the unemployed reduce unemployment enough to compensate for lower consumption levels due to higher costs for firms. Not surprisingly, the cross-country empirical literature does not offer clear cut evidence of the impact of EPL on employment and unemployment (see Addison and Teixeira 2003 for a review of the literature).

This paper contributes to this debate by presenting empirical evidence on how employers use strategies to overcome the potential costs associated with employment regulations. In particular, we assess whether employers tend to hire more temporary workers when employment regulations on permanent contracts are constraining; or whether they invest more in training to enable their existing workforce to adjust to new technologies, instead of changing the skill composition of the workforce by recurring to the external labor market.

Our data are drawn from surveys of employers conducted by the World Bank in the past few years (see the *Enterprise Surveys*, World Bank 2004a). Our sample includes 10,800 firms in 44 developing and emerging economies. We supplement these data with indicators of the stringency of employment protection legislation constructed on the basis of detailed aspects of the labor legislation for about 140 countries around the world over the same period (*Doing Business* Database, World Bank 2004b; Botero *et al.* 2004).

To anticipate our results we observe that *de jure* employment regulations and perceptions of regulations vary significantly across developing and emerging economies and affect firm's behavior in terms of provision of training and use of temporary employment. When employment protection for permanent workers is relatively strict, firms tend to use training to accommodate the workforce to the needs of new technologies, but are also more likely to use temporary employment to enhance labor flexibility.² The impact of regulations on firms' behavior also varies a lot depending on salient firms characteristics. Using a difference-in-difference approach to control for unobservable country and industry-specific factors, we find that small firms and those in sectors characterized by greater job reallocation are the most directly affected by regular contracts regulations.

The paper is organized as follows. In Section 2 we review the theoretical and empirical literature on the impact of strict employment protection legislation on the composition of labor demand and training strategy and report on the limited evidence available for developing countries. This provides the motivation of our study and guidance for how to model these issues and analyze them empirically. In Section 3 we present the micro

data used in our empirical analysis as well as the indicators of Employment Protection Legislation, while in Section 4 we discuss the empirical model of the behavioral responses of employers to EPL. Section 5 discusses the empirical results while Section 6 provides the concluding remarks.

2. Employment protection, training and temporary employment

By raising labor adjustment costs, strict employment protection legislation is likely to push firms towards two main strategies: make greater use of temporary employment to increase the overall adaptability of the workforce to changes in demand and/or re-train their internal workforce. Facing greater integration in the global economy and rapid technological changes, many developed and developing countries have eased regulations on temporary contracts. They have extended the range of jobs that can be offered on a temporary basis, prolonged the maximum cumulated duration of contracts and allowed Temporary Work Agencies (TWA) to intermediate between demand and supply (OECD 2008, 2013). The share of temporary employment has increased in many countries, in some cases to approach one-third of the total workforce (as in Japan and Spain). In our survey data, about 45% of all firms declare to use temporary workers.

Evidence from France, Spain, Argentina, Peru, and Colombia also suggests that the asymmetric liberalization of temporary contracts, while leaving in place strict regulations for regular contracts, has led to significant shifts of labor demand in favor of temporary employment. In Argentina and Spain the liberalization of temporary employment was partially reversed after a few years because of the large expansion of temporary employment and, in Spain, net job creation really picked up only after the government reformed regular contracts in the mid-1990s. In Japan, non-regular employment increased dramatically during the lost decade of the 1990s to promote adaptability of labor among firms but it has been associated with greater dualism and a trend decline in labor productivity.³

Training the internal workforce is another option to adapt the workforce without recurring to possibly onerous firing costs (e.g. Cappelli 2000; Young 2003). However, training is a valid alternative to replacing workers through firing and re-hiring only under certain conditions. In particular, the training option is particularly viable if wages are fairly compressed because there is a greater wedge between productivity gains through training and the wage.⁴ The combination of wage compression and high labor adjustment costs tends to favor a process of competence accumulation based on firm-supported training and on-the-job learning. In this context, training may compensate for the negative effect that employment protection legislation may have on the optimal allocation of workers (as illustrated in the case of Germany in Acemoglu and Pischke 1998). In addition, firms may use training to make sure workers have adequate skills to be able to adopt flexible work practices (Gittleman et al. 1998; Belot *et al.* 2007; and Acharya et al. 2010).⁵ In turn, internal flexibility is a strategy which can be a substitute as well as a complement to a strategy of involuntary turnover within firms (Cappelli and Neumark 2001).

3. The data

For our empirical analysis, we rely on two main sources of data. First, we use the detailed information on labor legislations in about 140 countries that is available in

the World Bank *Doing Business Database*.⁶ On the basis of this information, we construct synthetic indicators of the stringency of employment protection legislation by country.⁷ Second, we use firm-level information on firm characteristics, their perceptions about employment regulations and their responses in terms of employment composition (temporary *vs.* permanent) and provision of training from the *World Bank Investment Climate surveys*.⁸

Measuring the stringency of employment protection legislation (see Pierre and Scarpetta (2004), World Bank (2004c) for more details)

Regulation of permanent employment

We focus on the following variables to characterize individual protection against dismissal for workers with regular contracts:

- *Procedural requirements.* They refer to the process that firms have to follow from the decision to lay off a worker to the actual termination of the contract. They include: 1) the grounds for dismissal; 2) the delay before the notice of dismissal can start; 3) whether a third party must be notified or consulted; and whether dismissal cannot proceed without the approval of a third party; 4) whether the law mandates retraining or replacement prior of dismissal; 5) whether there are priority rules to dismissal or layoffs; 6) and whether there are priority rules applying to re-employment.
- *Notice period* required by law for the dismissal of one redundant worker in manufacturing with twenty years of tenure.
- *Severance payment* (including mandatory indemnity) for the dismissal of one redundant worker in manufacturing with twenty years of tenure.

Regulation of temporary employment

Indicators of the stringency of EPL for temporary contracts refer to: 1) the “objective” reasons under which they could be offered; 2) the maximum cumulated duration of a contract.

Detailed indicators for the different components of employment protection have been first normalized from 0 to 1 from the least to the most restrictive in the country sample. They have then been aggregated into two synthetic indicators for regular and temporary contracts and an overall indicator of EPL. The aggregation process follows previous studies (e.g. OECD 2008, 2013) and is largely based on simple averages of detailed regulatory aspects (see Additional file 1 for details). The two synthetic indicators pass simple validation tests: for example they correlate well with similar indicators constructed by the OECD for its member countries, which are arguably the most complete measures available.⁹

Our synthetic indicators of the stringency of employment protection legislation are presented in Figure 1 aggregated at the regional level. Bearing in mind that there are also large variations within each region (see Pierre and Scarpetta 2004), the Figure suggests that the European and Central Asian region – which includes all central-planned economies -- South Asia and Latin America have the highest incidence of countries with fairly rigid regulations on regular contracts, often above the OECD average. Many low-income countries also have employment protection legislation that



mimics or even exceeds that of industrial economies—even if the latter have approached these conditions only gradually during their process of development.¹⁰

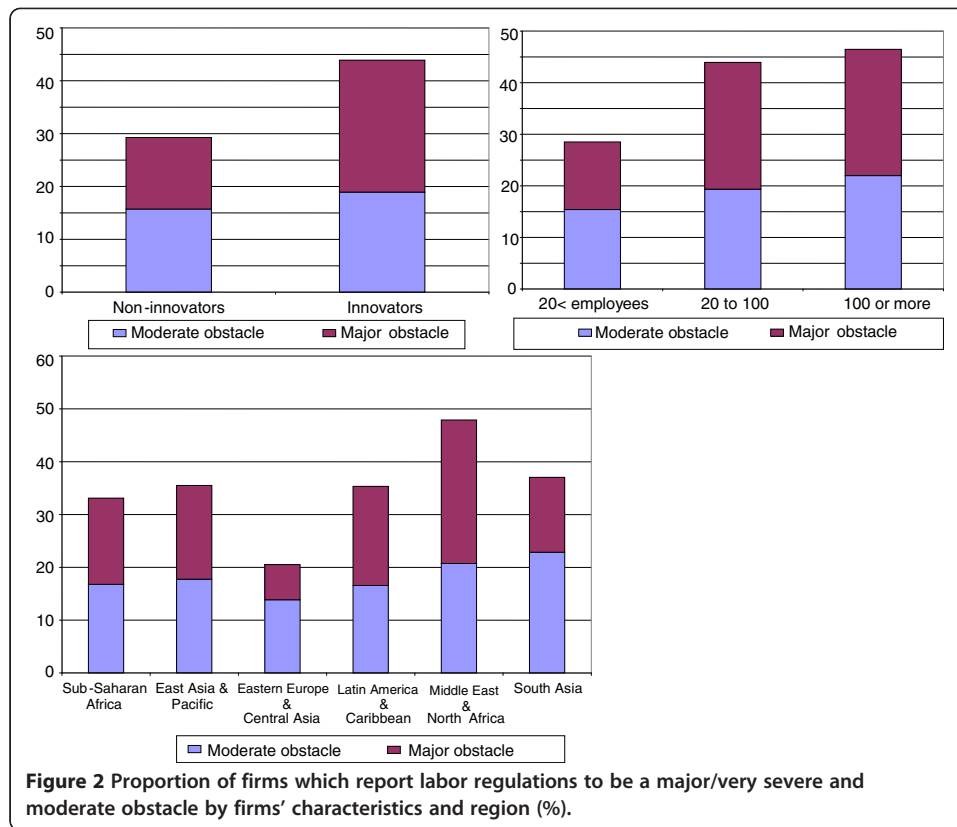
Employers' perception of the stringency of employment protection legislation

Micro level data on firm characteristics, employers' perception about labor regulations and their behavior are drawn from the Investment Climate Survey (ICS) conducted by the World Bank (World Bank 2004b). Overall, we have an estimation sample of a cross-section of 44 developing and transition countries for which we have both regulatory indicators of regulations and survey data.¹¹ The aim of the ICS is to provide quantitative data on investment climate which are comparable at the international and regional levels. The survey is normally carried out under the auspices of national stakeholders, which vary depending on the country. Because the priorities of these surveys vary across countries, ICS are not all exactly the same. However, in order to make these as comparable as possible, a set of criteria were defined, in particular a set of core questions – with the same wording - are asked in the same way in all countries.¹²

From the ICS database we have extracted responses on a specific question concerning labor regulations: *“Please tell us if any of the following issues are a problem for the operation and growth of your business. If an issue poses a problem, please judge its severity on a four-point scale”*.¹³ Eighteen issues are proposed including labor regulations.¹⁴

The two other variables of interest are whether firms hire temporary workers (based on a constructed dummy variable which equals 1 if firms employ temporary workers, 0 otherwise); and whether firms provide training to their workers (based on the question *“Do you offer formal (beyond “on-the-job”) training to your permanent employees?”*).

Figure 2 shows how perceptions vary according to firms' characteristics and regions. Innovating firms and medium and large firms appear to perceive labor regulations as a greater obstacle to business than other firms. Around 7 percent of firms in Eastern Europe and Central Asia up to nearly 30 percent in Middle East and North Africa report that labor regulations are a major or very severe obstacle to doing business. A



further 14 percent of firms in the former region and 21 percent in the latter report that they labor regulations are a moderate obstacle.¹⁵

4. Modeling firms' behavior

Our empirical investigation is aimed at testing the assumption that firms that face more stringent employment legislation tend to adjust the structure of their employment in ways that differ from firms that face more flexible legislations. In other words, employment regulations, whether or not they have an impact on the level of employment, are going to have a direct impact on the composition of employment, on the type of staff and contracts that are used by firms.

In particular, we look at strategies that firms can use to overcome constraining employment regulations, and that affect the composition and the quality of employment. These strategies are: making greater use of training to adapt the workforce to changes in technology instead of resorting to the external labor market (an improvement in the quality of jobs); and using of temporary employment to increase labor flexibility when regulations of regular contracts are too constraining (a worsening of employment contracts terms).

Whether or not employment regulations are constraining depends on a host of factors, besides the strictness of the regulation itself. In particular, the impact of regulations on employment is going to depend on the way they are implemented, as well as on the characteristics of firms.

Firms' perceptions regarding labor regulations implicitly measure the combined stance of *de jure* regulations, and their enforcement, and the characteristics of firms. Pierre and Scarpetta (2006) show that there is a significant cross-country correlation between *de jure* and perception indicators of the stringency of employment protection legislation, once they control for firm characteristics, as well as for income per capita and other basic country characteristics that tend to be correlated with the degree of enforcement of laws and regulations.¹⁶ These two types of measures therefore show consistency and can both be used as complementary indicators of EPL.

We therefore investigate the issue at hand in two ways. First, we estimate the link between perceptions and firms behavior. Second, we take a difference-in-differences approach, comparing the behavior of different firms across different levels of the employment regulation index.

Basic estimation model

The propensity to provide training or use temporary workers is not observed, we only observe whether firms have actually provided training or employed temporary workers. Moreover, the use of temporary instead of permanent employment and the provision of training are not independent choices for firms. Depending on the regulatory environment in which firms operate, the underlying technology of the firm and its size and other salient characteristics, training may be an alternative to the use of temporary workers – e.g. when training allows skills adjustment which can alternatively be obtained by recruiting temporary workers, or even as a complement, when it is difficult to recruit skilled workers on a temporary basis.

We therefore test the hypothesis that these two decisions are correlated and use a *bivariate probit model* that considers training provision and the use of temporary employment simultaneously. In other words, we model the reaction of firms in a two-equations model:

$$y_1^* = X_1\beta_1 + \varepsilon_1, y_1 = 1 \text{ if } y_1^* > 0, 0 \text{ otherwise} \quad (1)$$

$$y_2^* = X_2\beta_2 + \varepsilon_2, y_2 = 1 \text{ if } y_2^* > 0, 0 \text{ otherwise}$$

Where $y_{1,2}^*$ are two unobservable latent variables representing the propensity to provide training and employ temporary workers, and $y_{1,2}$ the observable reactions of firms, namely providing training and employing temporary workers. The random error terms, $\varepsilon_{1,2}$ are normally distributed with $E[\varepsilon_1] = E[\varepsilon_2] = 0$, and $var[\varepsilon_1] = var[\varepsilon_2] = 1$ but they could be correlated, i.e. $cov[\varepsilon_1, \varepsilon_2] = \rho$. If a Wald test shows that ρ is not statistically different from zero then the two models can be estimated separately as standard probits. If however ρ is significantly different from zero and the log-likelihood of the bivariate estimate is significantly less than the joint binomial probit log-likelihoods, then y_1 and y_2 are joint processes (Bertaut 1998; Greene 2003). The Wald tests all show that the two processes considered here are indeed correlated (they reject the hypothesis that ρ is equal to zero). We therefore present results only for the bivariate probit models.

Specifications

We first include the degree to which firms find employment regulations to be an obstacle to their business operation and growth prospect as the independent variable of interest

(Table 1 below); second, we use our *de jure* index of labor regulations (Table 2). As mentioned above, by using this index, we can disentangle the impact of regulations for temporary and regular contracts. This is interesting because they are likely to have different effects on the provision of training and the use of temporary workers.

The other control variables are as follows in both specifications: (i) firms' characteristics (age, size of firm, industry, whether the firm has upgraded its products or production line in the previous three years and ownership); and (ii) country's income level. Table 3 presents descriptive statistics of all the variables.

Limited inference can be made from a cross-country analysis, as other country-specific factors may be influencing the results. We therefore use a difference in differences approach whereby we use an interaction of our measure of employment legislation with: (i) the size of firms; and (ii) the degree of job flow "required" for the particular sector of the firm.

With the former interaction, we analyze whether different types of firms, which are affected differently by given employment regulations (see Pierre and Scarpetta 2004), react differently. Small firms, which are the least affected by regulations, can be taken as the reference category and the approach finds out whether larger firms have a different behavior at given levels of employment regulation index. Moreover, as shown by Haltiwanger et al. (2008), firms in industries that have different propensity to job reallocation tend to be affected differently by labor regulations. We take this into account by interacting the indicator of employment regulations with the industry-size job reallocation propensity indicator drawn from US data. Under the assumption that regulations in the labor and product markets in the United States are among the least restrictive, variation in job reallocation across industry-size cells in the United States should proxy for the technological and market driven differences in job reallocation in the absence of policy-induced adjustment costs. If we also make the additional assumption that these technological and market driven differences in the demand for job reallocation carry over to other countries, we can test whether firms belonging to different industry-size cells with different propensity for job reallocation react differently to employment regulations that raise adjustment costs. In both cases, the difference-in-difference approach allows to control for country and industry-size effects, thereby minimizing problems of omitted variable bias and other misspecifications.

Clustering

Including employment protection legislation, a national level variable, in our models means that standard errors can be seriously biased downwards (see Moulton 1990). This is because standard errors are likely to be correlated for observations within each country, especially when the explanatory variable is auto-correlated over time and/or across different units within one country. All the estimations of this paper therefore assume that observations are independent across countries, but not necessarily across firms in the same country. In addition, the estimations assume that observations may not be identically distributed.¹⁷

5. Do firms use training and temporary employment to overcome strict EPL?

Before looking at the impact that labor regulations have on the behavior of firms, it is interesting to review how this behavior changes according to firms' characteristics. The

Table 1 Perceptions of employment protection legislation and firms' behavior

	Provides training	Hires temporary workers	Provides training	Hires temporary workers
	(1)	(2)	(3)	(4)
<i>Perceptions (No obstacle)</i>				
Minor obstacle	0.009 (0.015)	0.020 (0.020)		
Moderate to very severe obstacle	0.046 (0.027)+	0.061 (0.027)*		
<i>Perceptions (no or minor obstacle)</i>				
Moderate to very severe obstacle			0.043 (0.026)+	0.055 (0.024)*
<i>Age (Less than 5 years old)</i>				
5 to 15 years old	0.010 (0.021)	0.050 (0.018)**	0.010 (0.021)	0.049 (0.018)**
16 or more	-0.031 (0.033)	0.074 (0.039)	-0.032 (0.033)	0.073 (0.036)*
<i>Size (Less than 20 employees)</i>				
20 to 99 employees	0.165 (0.028)**	0.056 (0.026)*	0.165 (0.028)**	0.057 (0.026)*
100 or more employees	0.305 (0.027)**	0.040 (0.044)	0.306 (0.027)**	0.043 (0.043)
Publicly owned	0.053 (0.039)	0.018 (0.039)	0.053 (0.039)	0.018 (0.039)
Innovator	0.158 (0.034)**	0.065 (0.028)*	0.158 (0.034)**	0.065 (0.028)*
Manufacturing sector	-0.056 (0.042)	0.097 (0.047)*	-0.056 (0.043)	0.096 (0.047)*
Domestic ownership	-0.107 (0.016)**	-0.055 (0.025)*	-0.107 (0.016)**	-0.056 (0.025)*
<i>Country income level (Low income)</i>				
Lower Middle income	0.219 (0.075)**	0.092 (0.086)	0.219 (0.075)**	0.092 (0.086)
Upper Middle income or high income	0.414 (0.056)**	0.205 (0.083)**	0.414 (0.056)**	0.206 (0.082)*
Observations (number of countries)			10771 (45)	
Wald test for rho = 0		chi2(1) = 7.065 Prob > chi2 = 0.008	chi2(1) = 7.115 Prob > chi2 = 0.008	
Predicted probability at the mean	0.535	0.450	0.535	0.450

Marginal effects from bivariate probit model. Robust standard errors in parentheses (and adjusted for clustering on country). + = significant at 10%; * = significant at 5%; ** = significant at 1%. Where relevant, base categories of dummies are indicated in parentheses in italics.

Data source: Investment Climate Surveys (World Bank).

latter have a strong impact on the decision to provide training and use temporary contracts. In particular, medium and large firms are more likely to provide training than small firms (Table 1). Everything else being constant at their actual values, large firms

Table 2 Actual employment protection legislation and firms' behavior

	Provides training	Uses temporary workers	Provides training	Uses temporary workers
<i>Firms characteristics</i>				
<i>Age (Less than 5 years old)</i>				
5 to 15 years old	0.010 (0.019)	0.045 (0.018)*	0.008 (0.021)	0.053 (0.019)**
16 or more	-0.024 (0.027)	0.075 (0.033)*	-0.034 (0.031)	0.099 (0.039)*
<i>Size (Less than 20 employees)</i>				
20 to 49 employees	0.212 (0.045)**	-0.005 (0.051)		
49 to 99 employees	0.311 (0.048)**	0.164 (0.074)*		
100 or more employees	0.457 (0.051)**	0.182 (0.121)		
Publicly owned	0.028 (0.037)	0.007 (0.035)	0.060 (0.040)	-0.031 (0.048)
Innovator	0.174 (0.023)**	0.073 (0.026)**	0.167 (0.028)**	0.099 (0.029)**
Manufacturing sector	-0.037 (0.044)	0.112 (0.046)*		
Domestic ownership	-0.094 (0.019)**	-0.046 (0.026)+	-0.093 (0.019)**	-0.039 (0.023)+
<i>Country income level (Low income)</i>				
Lower Middle income	0.244 (0.071)**	0.108 (0.081)	0.250 (0.072)**	0.137 (0.074)+
Upper Middle income or high income	0.439 (0.049)**	0.230 (0.083)**	0.447 (0.047)**	0.225 (0.067)**
<i>Labor regulations indexes</i>				
Regular employment regulations	0.888 (0.229)**	0.468 (0.199)*		
Regular employment regulations* 20 to 49 employees	-0.329 (0.154)*	0.099 (0.140)		
Regular employment regulations* 49 to 99 employees	-0.419 (0.219)+	-0.265 (0.216)		
Regular employment regulations* 100 or more employees	-0.611 (0.204)**	-0.423 (0.354)		
Regular employment regulations* US job flow			1.720 (0.440)**	0.845 (0.440)+
US job flow			-1.350 (0.169)**	-0.478 (0.181)**

Table 2 Actual employment protection legislation and firms' behavior (Continued)

Observations (number of countries)	10894 (43)		10512 (43)	
Wald test for $\rho = 0$	chi2(1) = 4.999		chi2(1) = 2.821	
	Prob > chi2 = 0.025		Prob > chi2 = 0.093	
Predicted probability at the mean	0.534	0.449	0.538	0.446

Marginal effects from bivariate probit model. Robust standard errors in parentheses (and adjusted for clustering on country). + = significant at 10%; * = significant at 5%; ** = significant at 1%. Where relevant, base categories of dummies are indicated in parentheses in italics.

Data source: Investment Climate Surveys (World Bank).

have a probability of providing formal training to their permanent employees about 30 percentage points higher than small firms. On average, about 50 percent of firms provide formal training.

Firms that have recently upgraded their production process or introduced new product lines are more likely to use temporary employment and especially to provide training: *ceteris paribus*, they are about 16 percentage points more likely to offer training than other firms, and about 6 percentage points more likely to use temporary workers than other firms (Table 1).

Domestic firms are less likely to provide training than foreign owned ones and slightly less likely to use temporary workers (Table 1). Older firms (5–15 years old) tend to rely more on temporary workers than young firms (Table 1). We also find evidence that firms in the manufacturing sector tend to rely more on temporary workers than other firms (Table 1).

Turning to the link between firm's perceptions and behavior, the results suggest that firms that report being more constrained by labor regulations are more likely to provide formal training to their permanent staff, as well as to use temporary workers. Firms that find labor regulations to be a moderate or worse obstacle to their business are about 4 percentage point more likely to use training than other firms and 6 percentage points more likely to use temporary workers.

When we use *de jure* regulations instead of the perception of regulations (Table 2), we find that EPL for regular contracts has a strong effect on firms' decision to provide training and make greater use of temporary employment. By contrast, EPL for temporary contracts does not discriminate firms' behavior significantly (results not shown).¹⁸

Distinguishing by firms' size, we find that despite being the ones more concerned about labor regulations,¹⁹ large firms are only slightly more likely to provide training as EPL become stricter, while small firms are very much affected and much more likely to provide training. This is not the case for the use of temporary work, where no statistically significant difference can be found across firms of different sizes, although small firms also become more likely to use temporary workers.

The results suggests further that firms that belong to sectors/size cells that require greater job reallocation (and therefore are more effected by labor regulations) are more likely to change their provision of training than firms in sector/size cells that require less job reallocation. This results in a convergence of the training provision of firms with high and low job turnover. In particular, the gap of training provision between firms requiring low and high turnover decreases from 46 percentage points in a country with low regular EPL index to 7 percentage points in a country with high regular EPL index.²⁰

It is interesting to put these results in parallel because, in our sample, it happens that all small firms require high labor turnover, while larger firms tend to require lower labor turnover. Overall, the results suggest that even though large firms may be complaining more about labor regulations, because they tend to require lower job turnover, they will only be slightly more likely to provide training when EPL is stricter. On the other hand, small firms, which are less concerned about labor regulations but belong to sectors that require high labor turnover, will be much more likely to provide training when EPL is stricter.

The results suggest that large firms, which have low labor turnover, are unlikely to have different human resources strategies when regular employment legislations are more or less flexible. This is true, despite the fact that large firms tend to report being more constrained by labor regulations when these are less flexible. When facing strict labor regulations, large firms are therefore likely to resort to other strategies, which may or may not alter the composition of their employment. For example, they may hire cheaper staff, or staff that are not affected by specific regulations. On the other hand, small firms, which face high labor turnover, are shown to change drastically their

Table 3 Descriptive statistics

Variable	Number of observations	Mean	Std. Dev.	Min	Max
Firm provides formal training (0/1)	10894	0.527	0.499	0=no	1=yes
Firm uses temporary workers (0/1)	10894	0.451	0.498	0=no	1=yes
<i>Perceptions (No obstacle)</i>					
Minor obstacle (0/1)	10771	.227	.419	0=no	1=yes
Moderate to very severe obstacle (0/1)	10771	.315	.464	0=no	1=yes
<i>Age (Less than 5 years old)</i>					
5 to 15 years old (0/1)	10894	.540	.498	0=no	1=yes
16 or more (0/1)	10894	.308	.462	0=no	1=yes
<i>Size (Less than 20 employees)</i>					
20 to 100 employees (0/1)	10894	0.322	0.467	0=no	1=yes
More than 100 employees (0/1)	10894	0.301	0.459	0=no	1=yes
Publicly owned (0/1)	10894	0.121	0.327	0=no	1=yes
Innovator (0/1)	10894	0.645	0.478	0=no	1=yes
Manufacturing sector (0/1)	10894	0.588	0.492	0=no	1=yes
Domestic ownership (0/1)	10894	0.822	0.382	0=no	1=yes
<i>Country income level (Low income)</i>					
Lower Middle income (0/1)	10894	0.660	0.474	0=no	1=yes
Upper Middle income or high income (0/1)	10894	0.130	0.336	0=no	1=yes
<i>Labor regulations indexes</i>					
Regular employment index	10894	0.341	0.132	0.09	0.68
Temporary employment index	10894	0.402	0.356	0.00	0.95

human resources strategies, being more likely to provide training and also to use temporary workers when labor regulations are stricter.

Sensitivity analysis

To assess the robustness of our results, we have run two main sensitivity checks.²¹ First, we have tested whether the decisions to provide training to permanent workers or hire more workers on a temporary basis are related to the changes in employment of the firm. The results of interest are not affected by using this extended model (results not shown).

Available data for a sub-set of countries also allow controlling for two other possible factors influencing the decision to provide training or use temporary employment. First, in many developing countries even registered firms may under-report their employment. Underreporting may be substitute or complement to training and temporary employment. Obviously it is not possible to control for underreporting directly. But the Investment Climate Survey contains an indirect question that can be used to gauge the extent of underreporting and informal employment in registered firms: *“Recognizing the difficulties many enterprises face in fully complying with taxes and regulations, what percentage of total sales would you estimate the typical establishment in your area of activity reports for tax purposes?”*. Second, the need for training and temporary workers in a given firm is likely to depend on the level of technology it uses, which can be proxied by the skill content of its workforce. We therefore calculate the share of skilled workers among permanent workers in the firm. Introducing these variables – i.e. the extent of underreporting and the skill content of the workforce -- in our models does not affect significantly our main empirical results. Therefore, to maximize the number of countries and firms in our sample we preferred to omit them from the analysis presented above.²²

6. Conclusions

In this paper we have presented evidence on the decision of firms to provide training and hire temporary workers in countries characterized by different labor regulations that affect labor adjustment costs. In particular, we have looked at whether firms in the sample make greater use of on-the-job training to upgrade the skills of the workforce instead of hiring and firing workers, and whether they are more likely to use temporary employment to enhance the adaptability of the workforce to the evolution of demand. We have drawn our results from harmonized firm surveys covering 11,872 firms in 44 developing and emerging economies, and combined them with indicators of *de jure* labor laws.

Overall, the findings suggest that labor regulations on regular employment contracts have a significant impact on the decisions of firms to provide training and to recruit workers on a temporary basis. Firms tend to use more both training and temporary employment in countries where labor regulations are strict. This is particularly true of small firms that require high job turnover.

All in all, this paper suggests that labor laws have an impact on firms' behavior. Training and temporary employment are used to circumvent the costs associated with strict employment regulations for regular contracts, although not all firms use these strategies.

Although our empirical analysis shows that the structure of employment is likely to be affected by stringent labor regulations, it does not permit to conclude on the overall optimality of these strategies or to balance their costs and benefits. They may for example turn out to be costly in terms of level of employment; the share of temporary employment in firms' employment may be suboptimal. The cost of training may have a negative effect on investment in other areas; spending on training may divert resources at the expense of other investment. These are issues that deserve a closer look in future empirical work.

Endnotes

¹Kugler (2007) also provides evidence from a series of empirical studies that have looked at the effects of reform episodes on job flows in Italy, France, Spain, Germany and the United States. These episodes provide "natural experiments" that allow comparing groups of workers targeted by the reform with groups of workers not directly affected by the reform before and after the policy change in what is otherwise the same macroeconomic and regulatory environment. The main conclusion of these studies is that increasing the strictness of employment protection legislation reduces job (and worker) flows, while the composition of employment is also swayed against young and female workers.

²We use the terms permanent employment and regular contracts to identify a typology of employment that is distinct from a legal and regulatory point of view from temporary employment, i.e. a contract that has a clear closing date.

³See Blanchard and Landier (2002) for France; Hopenhayn (2004) for Argentina; Dolado et al. (2002) for Spain; Saavedra and Torero (2004) for Peru; Kugler (2004) for Colombia.

⁴Lynch (1994), Blinder and Krueger (1996) and Acemoglu and Pischke (1999) offer some evidence of more firm-sponsored training in countries with greater wage coordination and wage compression.

⁵Flexible work practices include movement away from hierarchical management structures e.g. through improving workers' input into managerial decisions, workers' coordination through occupational lines, etc. (see Gittleman et al. 1998).

⁶<http://www.doingbusiness.org/>. Given the wide country coverage of the dataset used in this paper, we could not use the more detailed OECD indicators of employment protection legislation that indeed focus on OECD and key emerging economies (see OECD 2013).

⁷Unfortunately, the information does not permit to have a more disaggregated measure of legislation. For example, it is not possible to find out whether it varies across regions, or whether it applies differently to different firms.

⁸<http://www.enterprisesurveys.org/>.

⁹In order to check the reliability of our synthetic indicators of the stringency of employment protection legislation, we compare them with those produced by the OECD (OECD 2008). We have used, to the extent possible, the same underlying aspects of the legislation and the same aggregation procedure. The comparison can be made for 15 industrial and transition countries: Canada, Czech Republic, France, Germany, Hungary, Italy, Mexico, Poland, Slovak Republic, Spain, Sweden, Turkey, United Kingdom

and United States. The correlation between our weighted index for overall employment regulation with the relevant overall OECD index is statistically significant at 1 per cent level (correlation coefficient= 0.82).

¹⁰Indeed, while one might have expected a positive relation between the level of mandated employment protection and income across countries (i.e. employment protection is a normal good), the relationship is in fact weakly negative across our sample of countries.

¹¹*Sample of 43 countries* (Tables 1, 2 and 3): Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Brazil, Bulgaria, Cambodia, China, Croatia, Czech Republic, Ecuador, El Salvador, Estonia, Georgia, Guatemala, Honduras, Hungary, Indonesia, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Macedonia, FYR, Mali, Moldova, Nicaragua, Oman, Philippines, Poland, Romania, Russian Federation, Serbia and Montenegro, Slovak Republic, Slovenia, South Africa, Syrian Arab Republic, Tanzania, Thailand, Turkey, Ukraine, Uzbekistan, Zambia. In addition, Tajikistan is in the sample for the model with perceptions, and Nepal is in the sample for the model with *de jure* regulations.

¹²These common questions constitute a well-tested product of past surveys having been pooled and consolidated from instruments of FACS, WBES and RPED surveys. Together they constitute 50 to 60 percent of the full survey instrument, the rest being items generating information for analyzing more specialized policy issues.

¹³Where 0 = no obstacle, 1 = minor obstacle, 2 = moderate obstacle, 3 = major obstacle, 4 = very severe obstacle. For our purpose, we merge responses 3 and 4 into the category "major".

¹⁴The eighteen issues are the following: Telecommunications, electricity, transportation, access to land, tax rates, tax administration, custom and trade regulations, labor regulations, skills and education of available workers, business licensing and operating permits, access to financing, cost of financing, economic and regulatory policy uncertainty, macroeconomic instability, corruption, crime, theft and disorder, anti-competitive or informal practices, and legal system/conflict resolution.

¹⁵Comparing the characteristics of this dataset with another survey (with a larger number of countries, including industrial countries): the World Business Environment Survey (World Bank 2000), we have found that, despite the different country coverage, they do not differ substantially. For example, close to 70 percent of respondents in WBES (60 percent in ICS) reported that labor market regulations represented an obstacle (minor, moderate, major) to their operation and expansion. Around 16 percent report that these regulations are a major obstacle to the operation and growth of their business in ICS (14 percent in WBES).

¹⁶In particular, Pierre and Scarpetta (2006) found that medium and large firms are the ones most severely affected. This is probably because in many countries where enforcement of regulations is limited small firms do not comply, remaining invisible to regulators and inspectors. By contrast, larger firms are visible to the authorities and thus unable to avoid regulations. Moreover, firms that have upgraded their production process or their products are more likely to face severe constraints from strict employment protection legislation. This suggests the importance of employment regulations for the adoption of new technology and potentially long-term growth.

¹⁷The cluster adjustment made to the variance-covariance matrix is standard and described in Rogers (1993) and Williams (2000).

¹⁸This shows that what matters for the decision to provide training and using temporary workers is the stringency of the regulations affecting regular workers, as should be expected. This may also be due to the fact that our indicators for temporary EPL are limited and do not cover certain aspects of the regulatory system (e.g. they do not consider temporary work agencies and procedural inconveniences for setting up a temporary contract).

¹⁹Pierre and Scarpetta (2006) find that large firms are more likely than small firms to report being constrained by labor regulations when these are less flexible.

²⁰The predicted probability that firms that require high labor turnover (highest value of index) provide training increases from 17 percent to 68 percent as the index of regular EPL goes from its minimum value to its maximum value, while for firms that require low labor turnover (Lowest value of index), this probability goes from 63 percent to 75 percent.

²¹We also tried adding changes in employment in previous years – this variable is of course endogenous because it is likely to be highly correlated with current changes in employment which depend on the choice to provide training or use temp workers -- and found that the effect is generally not statistically significant in the training equation while it is statistically significant in the temporary employment equation; in the latter the inclusion of previous changes in employment does not affect the EPL results of the difference-in-difference using firm size but does reduce the statistical significance of the results using the difference-in-difference with US job flows.

²²Full results are available from the authors.

Additional file

Additional file 1: Construction of employment protection legislation indexes.

Competing interests

The IZA Journal of Labor Policy is committed to the IZA Guiding Principles of Research Integrity. The authors declare that they have observed these principles.

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