
Abstract

Employment protection legislation is present worldwide, being more stringent mainly in developing countries. While these laws are positive for short-term job stability, they can hinder enterprises’ ability to optimally adjust when facing negative shocks, which may harm their efficiency and long-term economic growth. This paper analyzes the impact of stringent employment protection legislation on the propensity to downsize, exploiting the heterogeneity of productivity levels of firms within various sectors. Using a parsimonious theoretical model and an empirical application for panel data of manufacturing plants in Chile between 1980 and 1994, the evidence presented in this paper strongly supports the idea that when firing costs are higher, the probability of downsizing will decrease but will do so heterogeneously. The differences arise from sectors’ price growth rates, firm productivity, and the labor wedge.

Keywords: Employment protection legislation, Downsizing, Developing economies

Introduction

In the 20th century, employment protection legislation (EPL) was put in place to protect the interests of workers worldwide. During the early 1980s, successive reforms extended EPL, and the subsequent debt crisis led to more pro-liberalization economic policies that relaxed employment protection. As a result, less developed economies have more stringent labor protection laws than industrialized countries. In fact, Latin American economies are among the most protected, surpassed only by Eastern Europe and Central Asia (Pagés, 2004).

Although Chile is one of the three developing Latin American economies with less stringent employment protection, during the past 30 years, firing costs have increased. This, together with firm-level data availability during the period, creates an attractive opportunity to analyze the effects of higher firing costs on firms’ optimal labor decisions, particularly with regard to practices like employment downsizing.

Formally, downsizing is defined as “an intentional event involving a range of organizational policies and actions undertaken to improve firm performance through reduction in employees.”1 The main purpose of this practice is to reduce costs associated with employment and improve productivity.2 One of the restrictions firms face when attempting to downsize is EPL. The essence of this regulation is to increase the stability of employment, generating firing costs to firms in the form of severance payments. Autor, Kerr, and Kugler (2007) argue that “dismissal protections altered short-run production choices and caused employers to retain unproductive workers, leading to a reduction in technical efficiency.” Therefore, due to the presence of EPL, firms face a tradeoff between productivity gains from workforce reorganization and firing costs. The firm will downsize if the productivity gains associated with this practice make up for the firing costs.

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1 This definition was presented by Datta et al. (2010), who review studies associated with downsizing in all disciplines (e.g., economics, finance, organizational behavior, organization theory, human resources, and sociology)

2 Cameron and Freeman (1993)
This paper takes a closer look at the impact of EPL on the propensity to downsize, exploiting the heterogeneity of firms’ productivity levels and their labor wedges within each various sectors. There are significant differences in the productivity level of firms throughout sectors, which have not been sufficiently analyzed in previous literatures (Alvarez and Crespi, 2003). The mechanism is the following: given a distribution of productivity across firms, an increase in firing costs will lower the cutoff productivity level that makes downsizing profitable. In other words, firms with higher average productivity levels will tend to keep excess employment, and only firms with low levels of productivity will pursue downsizing. By including firms’ labor wedges in the analysis, firms’ unproductive worker accumulation before downsizing can be measured.

We will use panel data of manufacturing plants in Chile. The dataset covers a 14-year time period from 1980 to 1994 and includes 20 sectors at the three-digit level of the International Standard Industrial Classification (ISIC) code. The Chilean manufacturing sector is interesting to study because job security protection became more stringent during the period under analysis and also because the empirical literature on downsizing, such as Coucke et al. (2007) for Belgian firms and Budros (2002) for U.S. firms, suggest that downsizing is more prevalent in manufacturing firms than in firms in other sectors.

Moreover, Chile experienced three legal modifications that affected firing costs in two ways. The first has to do with the compensation workers receive for years of service. Before 1981, when a company fired an employee who had been with the company for 15 years, the compensation for years of service corresponded to a 15-month salary. Between 1981 and 1990, this same employee would have received a five-month salary. Lastly, if this person had been fired in 1991, he/she would have received an 11-month salary. The second result of these legal modifications relates to the definition of “justified firing” and the position of the court as a mediator between the employee and the firm. Before 1990, firms did not compensate employees if the firing was unjustified, but after 1990, firms’ economic conditions were considered a justified reason for firing, although the firm needed to pay one month’s worth of salary for each year the worker was employed up to 11 years.

We find evidence for Chile that on average, an increase in the EPL index of one point reduces the probability of downsizing by 0.24 percentage points. This effect can be attenuated by the previous level of the firm’s productivity in line with the idea of changing the cutoff point that makes downsizing profitable. An increase of one point in the EPL index makes firms in the lower part of the productivity distribution (i.e., the 25th percentile) reduce the index’s effect on the probability of downsizing to 0.14 percentage points. However, firms in the 75th percentile of the TFP distribution that face increased firing costs reduce the probability of downsizing in 0.33 percentage points. Therefore, firms with higher productivity will keep more excess employees in presence of higher firing costs.

We find a similar effect in the case of labor wedges. As the distance between the desired and the actual level of employment increases, the marginal effect of an increase in the EPL index is magnified. This means that the probability of downsizing increases as the level of unwanted employees increases.

The research on downsizing has focused either on the causes or on the effects of downsizing on firms’ performance. This paper belongs to the former branch of the literature, specifically to the one that emphasizes environmental factors, such as demands in stability and growth, industry concentration, technological and capital intensity, and organizational factors (e.g., firm’s governance, reputation, and managerial strategies).

The main contribution of this work is the analysis of how the interaction between increasing EPL and firms’ attributes affects downsizing decisions—an issue that to the best of my knowledge has not been addressed by the literature so far. By doing so, this work expands the current understanding of EPL and its effects on firm practices, such as downsizing in an emerging economy.

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3 This database has been used by Cerda and Larraín (2010), Alvarez and Crespi (2003), Petrin and Sivadasan (2011), and Pavnick (2002), among other authors.
4 Employment protection measure, as elaborated by Heckman and Pages (2000).
Methodology

Data

The empirical analysis is based on statistical information from the National Annual Industrial Survey (ENIA) implemented by the National Institute of Statistics (INE according to its Spanish acronym). The goal of the ENIA is to gather information annually from all manufacturing establishments in Chile that have 10 or more employees. Using these surveys, firms can be followed over time. These surveys include companies that come into the sample and then also leave the sample during the period studied, so it is an unbalanced panel of companies.

In this paper, the relevant period of study is between 1980 and 1994 mainly due to data availability. The ENIA was conducted between 1979 and 2007, but the INE changed plants’ identification numbers. We have been working on matching plant identification number to construct the entire time series from 1979 to 2007, but the results have been unsatisfactory in terms of plant coverage. There are a significant number of plants for which the matching is imperfect. We decided to use the first period since during these years, three changes were made to EPL, and in between 1995 and 2007, only one change was made that affected firing costs (in 2001).

The size of the panel is 53,274 observations. We eliminated those firms that entered and left the sample more than one time since they correspond to errors in the measurement or they are below the threshold of 10 employees. After eliminating these, there were a total of 43,838 observations. We restricted the analysis to 12 three-digit sectors in order to concentrate the analysis on sectors characterized by competition and representation in terms of the number of observations. One of the aims of this paper is to analyze firms’ downsizing decisions, which are not the same as the death of a firm. Downsizing practices are not regular layoffs made by firms before exiting the market but represent a practice that firms do to improve their efficiency. Therefore, the main empirical analysis will only consider firms that do not exit the sample, which represents more than 62% of the observations. As a robustness check, we will enlarge the sample (using all firms) in order to contrast the results.

The firms that exit the sample are smaller than the continuing firms (31 vs. 40 employees) and also have a median TFP\(^5\) that is 5.7% smaller than the continuing firms.

Baseline Regression

In order to study the characteristics that predict downsizing, we use a traditional fixed-effect logit regression, for which the dependent variable is the downsizing event, which takes a value 1 if done by firm \(i\) at time \(t\). The probability of downsizing is modeled as a function of two sets of variables (prior to downsizing): firm-level characteristics (\(E_{\text{t-1}}\)) and environmental factors (\(E_{\text{t-1}}\)):

\[
\Phi[\alpha^{'} t^{-1} \quad t^{-1}],
\]

where \(\mu_i\) is the unobserved firm characteristics. In order to avoid potential endogeneity problems, all variables are included as one-year lags. Firm characteristics include the following:

1. Firm size in relation to the average sectors size (RFS\(_{\text{avg}}\)). Downsizing has been described as a practice that is more likely to happen in large firms (Baily et al., 1996; Ahmadijan et al., 2001). One reason larger firms downsize is because they have higher visibility. Therefore, if a firm announces a downsizing for efficiency reasons, it will give a positive signal to the market. Another reason is that downsizing in the presence of firing costs requires that firms pay a large amount of money all at once, and bigger firms have better access to liquidity from financial institutions.

\(^5\)The information provided by the ENIA enables the estimation of TFP for firm-level data using the methodology developed by Olley and Pakes (1996) and extended by Levinsohn and Petrin (2003). This estimation was done previously for the Chilean manufacturing industry by Bergoeing et al. (2006) and Alvarez and Fuentes (2011)
2 Productivity level (TFP_t). It is expected that firms engage in downsizing strategies when they have low productivity (Marquez, 2011; Abowd et al., 2009; Ahmadjian et al., 2001; Love, 2005). They downsize to increase efficiency, eliminate redundancies, and therefore increase productivity.

3 Labor share cost (LSC_t). It is expected that higher wages relative to sales leads to higher cost savings as labor is fired (Boone, 2000; Baily et al., 1996).

4 Human capital dependence (high_skill_t) is the ratio of high-skilled to low-skilled employees at firm i in time t. This variable should negatively affect the likelihood of downsizing for two reasons. Firstly, it is more expensive to fire workers that receive higher incomes because the firing costs are associated to their wages and also because retraining high-skilled employees is also expensive (Hamermesh and Pfann, 1996). Secondly, variation in the workforce is an important instrument to change the output and production in low-skilled dependent firms, so downsizing would be a more cost-effective practice in these firms (Pfann and Verspagen, 1989).

5 Labor gap (GAP_t) is the difference between the desired and the real level of employment for firm i at time t. The methodology to construct this variable is based on Petrin and Sivadasan (2011). The incorporation of this variable follows the “wedge” concept developed by Caballero, Engel, and Micco (2004). The bigger the GAP_t, the bigger the probability of adjusting labor in the presence of a shock. In this case, the probability of downsizing increases with the GAP.

The variables for the environmental factors are linked to changes in the macroeconomic conditions or changes in industry-specific characteristics (Datta et al., 2010). Time dummy variables are included to capture changes in the macroeconomic conditions that affect all firms simultaneously. The variable of interest included in the environmental factors is the job security protection index (Index_t), which measures a firms’ firing costs. It is expected that high firing costs “alter short run production choices and cause employers to retain unproductive workers” (Autor et al., 2007).

The last variable—relative price growth (RPG_t)—is related to changes in the industry-specific demand characteristics and is calculated as the growth rate of the relative price between the manufacturing sectors’ three-digit ISIC^6 deflators and the industrial price index. RPG_t is calculated for each sector between 1980 and 1994. A negative demand shock represents a reduction in the sectors relative price. In the previous model, firms’ downsizing decisions came from a reduction in the final product price. Indeed, employee downsizing has been linked to demand declines, with firms seeking to reduce labor costs (Cameron et al., 1993; Budros, 2002; Datta et al., 2010).

Preliminary Results

In order analyze at the impact of EPL on the propensity to downsize, exploiting the heterogeneity between firms and sectors, the first column of Table 1 includes the interaction between the EPL index and other explanatory variables.

It can be seen that an increase of one point in the index implies a decrease of 0.32 percentage points in the likelihood of downsizing. Because the variables are expressed in deviations with respect to their means, the impact of the EPL index is evaluated considering.

Three interaction terms affect the EPL index’s effect. The first is the relation with RPG, which means that an increase in the sectors’ prices lowers the negative impact of EPL. Second, for firms with higher levels of TFP, the impact of an EPL increase on the probability of downsizing is even lower. Finally, the negative effect on downsizing probability from an increase in the index will be attenuated for firms with bigger labor gaps (GAP).

In general, the literature about downsizing is focused on larger firms because this practice is associated with large U.S. corporations. As pointed out by Baumol (2003), many corporations in the United States are often paternalistic toward their workers and are characterized as “fat and mean.” To study downsizing in large and

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^6 The deflators where calculated for the Chilean manufacturing firms by Andrea Repetto, who made them available to me.
small firms in the context of a developing country, we divide the sample in two groups: small firms (with an average of less than 100 workers) and large firms (with an average of more than 100 workers).

The second and third columns of Table 1 show these results. In small and large firms, the downsizing likelihood is affected negatively by raises in the EPL index. The negative effect is slightly smaller in large firms. It is interesting to see that the likelihood of downsizing in small firms is highly driven by changes in price (i.e., demand shocks), while larger firms’ likelihood of downsizing relies strongly on their productivity level. For both samples, the presence of higher wedges for their desired and real labor (GAP) increases the likelihood of downsizing. This means that history matters in the sense that “fat” accumulation gets to a point where downsizing needs to occur.

### Table 1: Probability of downsizing, logit estimation marginal effects reported. All the explanatory variables used are from t-1 and are deviations from their means.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPG</td>
<td>-0.708 *</td>
<td>-0.880 *</td>
<td>-0.145</td>
</tr>
<tr>
<td>TFP</td>
<td>-0.549 ***</td>
<td>-0.295 ***</td>
<td>-0.417 ***</td>
</tr>
<tr>
<td>RFS</td>
<td>-0.466 ***</td>
<td>(0.040)</td>
<td></td>
</tr>
<tr>
<td>High skilled</td>
<td>0.779 ***</td>
<td>-0.16</td>
<td>-0.196</td>
</tr>
<tr>
<td>LSC</td>
<td>-0.0664 *</td>
<td>-0.0844 **</td>
<td>-0.126 *</td>
</tr>
<tr>
<td>GAP</td>
<td>0.256 ***</td>
<td>0.211 ***</td>
<td>0.245 ***</td>
</tr>
<tr>
<td>EPL Index</td>
<td>-0.323 ***</td>
<td>-0.291 ***</td>
<td>-0.227 **</td>
</tr>
<tr>
<td>index*RPG</td>
<td>-1.585 ***</td>
<td>-1.167 **</td>
<td>-2.445 ***</td>
</tr>
<tr>
<td>index*TFP</td>
<td>-0.178 ***</td>
<td>-0.220 ***</td>
<td>-0.123 **</td>
</tr>
<tr>
<td>index*RFS</td>
<td>-0.0271</td>
<td>(0.038)</td>
<td></td>
</tr>
<tr>
<td>index*High skilled</td>
<td>-0.201</td>
<td>-0.183</td>
<td>-0.791 *</td>
</tr>
<tr>
<td>index*LCS</td>
<td>-0.0689</td>
<td>-0.0879 *</td>
<td>-0.0113</td>
</tr>
<tr>
<td>index*GAP</td>
<td>0.082 **</td>
<td>0.038</td>
<td>0.109 **</td>
</tr>
</tbody>
</table>

Observations: 21360 16035 5325
Number of padded: 2371 1847 524

| Down_20 | Down_20: takes value 1 if the firm does downsizing of more the 20% of its workforce in period t, RPG: sectors price growth rate, TFP: firms total factor productivity, RFS: Relative firms size, High_skilled: ratio of skilled workforce, LSC: Labor share cost, GAP: wedge between actual and desired labor in absolute value, EPL Index: employment protection legislation index. Standard errors in parenthesis. *** p<0.01,** p<0.05, * p<0.1 |

### Conclusions

The aim of this paper is to investigate the impact of stringent EPL on firms’ optimal labor decisions, particularly in terms of their likelihood of downsizing.

The results from the empirical model robustly show that higher firing costs increase the “price” of downsizing, and this practice is done less frequently; however, less productive firms have a higher probability of downsizing when facing a negative demand shock (i.e., environmental factor). Considering that a firm in the 25th percentile TFP distribution reduces the probability of downsizing by 0.23 percentage points, a firm in
the 75th percentile significantly reduces the probability of downsizing by 0.43 percentage points (almost the double effect) after facing the same increase of one point in the EPL index.

The evidence presented in this paper strongly supports the idea that when firing costs are higher, the probability of downsizing will decrease but will do so heterogeneously. The differences arise from sectors’ price growth rates, firm productivity, and labor wedges. The first two channels attenuate the effect of the EPL index, while the labor wage magnifies the effect.

This study’s results go beyond the traditional literature, showing that the effect of EPL on the likelihood of downsizing is highly robust to different controls, such as sectors’ price growth rates, firms’ productivity, firm size, the workforce’s skill level, labor share costs, and labor wedges. In addition, the literature has focused mainly on investigating large firms because downsizing is a practice associated with large U.S. corporations. This study investigates both small and large firms and shows that the results are highly robust to firm size.

References


