6-1-2009

Firing cost and firm size: a study of Sri Lanka's severance pay system

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Sri Lanka's Termination of Employment of Workmen Act (TEWA) requires that firms with 15 or more employees justify layoffs and provide generous severance pay to displaced workers, with smaller firms being exempted. Although formally subject to TEWA, firms in Export Processing Zones (EPZs) may have been partially exempt from TEWA due to lax enforcement in that sector. A theoretical model shows that firms subject to TEWA will tend to mass at or below the threshold of 14 workers until they get an atypically large productivity shock that would propel them beyond the threshold. EPZ firms will be largely unaffected by the law. In addition, EPZ firms receive preferential tax treatment and exemptions from customs duty. Consequently, firms that anticipate rapid growth will have an incentive to locate in the EPZ sector. We test these predictions using 1995-2003 panel data on the universe of all private, formal sector firms in Sri Lanka. We find that at all sizes, EPZ firms are more likely to add employees than nonEPZ firms. Above the threshold, nonEPZ firms are more likely to shed workers while EPZ firms are more likely to add workers. Once passing the threshold, nonEPZ firms grow faster than nonEPZ firms below the threshold, consistent with a theoretical prediction that only atypically productive nonEPZ firms would cross the threshold. Finally, evidence is consistent with the hypothesis that TEWA restrictions retard the growth of nonEPZ firms below the threshold, but only some of the evidence passes tests of statistical significance. The combined impacts of retarded growth below the threshold, the need for a large productivity shock to cross the threshold, and slower employment growth above the threshold suggest that the TEWA failed to lower unemployment. Instead, it slowed employment growth of nonEPZ firms and induced other firms to seek the EPZ sector in order to evade the law.

Keywords
severance, firing costs, layoff restrictions, Sri Lanka, employment growth, export promotion, threshold

Disciplines
Economics

IOWA STATE UNIVERSITY

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April 2008

Working Paper # 08014

Department of Economics Working Papers Series

Ames, Iowa 50011

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The authors wish to thank the Central Bank of Sri Lanka for providing data, and to Ramani Gunatilaka and Donald Parsons for providing useful comments to earlier drafts of the paper.

1 Introduction

Consistent with its focus on social policies, Sri Lanka has devoted significant attention to worker protection. One of the main pillars of its worker protection policy is the Termination of Employment of Workman Act (TEWA) introduced in 1971. The act aims to limit unemployment by raising the cost of layoffs. The act requires that each layoff of a covered worker, whether individual or as a part of a mass layoff, must be approved by the government. Until recently, the government also decided on a case-by-case basis the level of severance pay the firm had to pay to the laid off workers.

Since its introduction, critics have argued that the TEWA's non-transparent, discretionary, and costly regulations discourage employment growth, hinder reallocation of labor from inefficient firms to more profitable sectors, slow the introduction of new technologies, and increase unemployment. Defenders including trade unions and the government argue that on the contrary, severance pay promotes longer-lasting employment relationships that improve incentives for training and enhance cooperation and trust between employers and workers.

Recent microeconometric analyses have shown that labor market regulations can produce important efficiency losses. For example, Heckman and Pages (2000) show that in Latin America, more stringent job security laws are associated with lower employment and higher unemployment, particularly among young workers. Similarly, Besley and Burgess (2004) find that labor regulations in India had important adverse effects on output and employment. Ahsan and Pages (2007) report that regulations concerned with labor disputes and job security hurt covered workers. Bassanini and Duval (2006) find that changes in tax and labor policies explain about half of the 1982-2003 changes in unemployment among OECD countries. Other studies using macroeconomic data have also found negative efficiency effects of severance pay

including Nickell and Layard (1999), Haffner et al (2001), and the OECD (1999). Nevertheless, these negative findings from labor market regulations are not universal, particularly those based on cross-section analysis (Baker et al, 2005).[2]

This paper adds to this literature by identifying the impact of the TEWA on firm employment growth in Sri Lanka. We exploit two sources of variation in the way firms are treated. First, the law only applies to firms with more than 14 workers, and so smaller firms need not comply. Second, firms in Export Processing Zones (EPZ) are said to face lax policy enforcement which should lower their firing costs compared to non-EPZ firms. A third source of variation must also be kept in mind: that EPZ firms receive favorable tax benefits and export market access that may lead to more rapid firm growth in the EPZ sector. Consequently, firms anticipating rapid growth have an incentive to sort into EPZ status.

To guide the empirical analysis, we construct a theoretical model showing that firms subject to the TEWA will tend to mass at the threshold of 14 workers. Firms must experience an atypically large productivity shock to cross the threshold. We test these predictions using 1995-2003 panel data set collected by the Employees' Provident Fund composed of the employment histories of every private formal sector firm in Sri Lanka. We employ a difference-in-differences method to identify the effects, using firms at or above the threshold as the treatment group, and those with fewer than 14 workers and those in EPZs as control groups.

Consistent with our theoretical predictions, we find that the likelihood of employment growth for nonEPZ firms at the threshold is smaller than for those nonEPZ firms above the threshold. In fact, nonEPZ firms that cross the threshold are more likely to shrink while EPZ firms above the threshold are more likely to add workers. Consistent with the prediction that an

[2] Freeman (2007) presents a review of both theoretical and empirical effects of labor market institutions. Addison and Teixeira (2001) review findings regarding the effects of employment protection legislation

atypically large productivity shock is required for a nonEPZ firm to cross the employment threshold, nonEPZ firms that cross the threshold have more rapid employment growth compared to nonEPZ firms below the threshold, and the increase in employment growth is greater for nonEPZ firms than for EPZ firms that do not face the tax. Consistent with selection into EPZ firms, we find that EPZ firms grow faster than nonEPZ firms regardless of firm size. However, we only find weak evidence of differential growth at the threshold: EPZ firms with 14 employees are 7% more likely to add the 15th employee, but the point estimate is not significant. Therefore, the evidence is stronger that advantages accorded EPZ firms help them grow faster and they sort faster growing firms into the EPZ sector. However, the weight of the evidence is also consistent with the conclusion that TEWA firing costs constrain growth of nonEPZ firms also.

The paper is organized as follows. Section 2 provides an institutional background, highlighting the intensions of the TEWA at its introduction, and its the provisions and procedures. Section 3 presents the theoretical framework and formulates hypotheses to be empirically tested. Section 4 describes the data and the identification strategy devised to identify the employment effects of TEWA. Section 5 presents the empirical results based on the estimation of the multinomial model of employment growth of firms. Section 6 concludes with a summary and policy recommendations.

2 Institution Background on the TEWA

The TEWA was enacted at a time when Sri Lanka was pursuing inward-looking economic policies, characterized by an import-substitution industrialization policy, stringent exchange controls, price controls of many commodities, and a program of nationalization of a

wide-range of establishments (Ranaraja 2005).[3] Its introduction was intended to arrest the rising rate of unemployment which resulted from these policies, as many industries could not operate in the restrictive environment and had to reduce or retrench workers. All terminations of private sector workers for any reason other than discipline are covered under the TEWA, including redundancies arising from organizational restructuring and financial or economic constraints, temporary lay-off, termination as a result of the closure of the business, and even incompetence.[4] TEWA applies to all firms employing 15 or more workers in the 6 month period preceding the termination. A worker qualifies as long as he worked at least 180 days in the 12 month period preceding the termination. Although all workers in the private sector, subject to eligibility criteria, are legally covered by the TEWA, its provisions are difficult to enforce in the informal sector.

The TEWA requires that covered employers must seek the consent of the Commissioner General of Labor (CGL) before they are allowed to dismiss a worker, even if it concerns a single worker. The CGL may refuse to sanction the layoff or, if permission is granted, the employer will be required to pay severance in an amount determined by the CGL. Over the sample period, the procedure by which the severance is determined was not specified in law but was subject to a lengthy and seemingly arbitrary deliberation. In December 2003, the TEWA switched to a formula-based severance payment that is uniformly applied to all firms. While that amendment eliminated the ad hoc severance,he other elements of the policy including the need for prior

[3] The rationale for the policy as stated in the Industrial Policy of Ceylon (1971*)* was that "….the [Government] is pledged to the establishment of a socialist society. This commitment calls for major changes in industrial policy to eliminate some of the social and economic consequences of the policy followed in the past few years [such as] the concentration of monopoly power in the hands of a few investors, leading to gross inequalities in the distribution of income and the entrenchment of privileged groups in society … [and] the heavy reliance of local industry on imported raw material, components and technology. . . .".

[4] If termination is the result of misconduct or poor discipline, the employer must inform the worker in writing of the reasons for such termination before the second day after such termination, failing which, the worker is entitled to seek redress under the TEWA on the basis that the termination of his services was not for disciplinary reasons.

approval of layoffs are still in place.

In dealing with termination applications by employers or complaints by workers, the CGL has the power of a District Court to conduct inquiries, such as summoning and compelling the attendance of witnesses, production of records, and recording testimony. The employer must –satisfy the CGL that terminating the identified group of workers is in the best interest of the employer. While the ebvaluation is going on, the workers continue to be paid wages and other benefits until the CGL makes a decision, even where there is no work to be done.[5] The final order of the CGL does not take into consideration the wages paid by the employer during the inquiry period. Data for 2003 confirm that the TEWA procedure is a very lengthy one - the average processing time of employers' applications was 9.8 months, and it exceeded one year in more than 25 percent of cases (World Bank 2007).

Severance pay was quite generous. During 2002-03, the severance averaged nearly 2 times the monthly salary per year of service, and the multiple could rise as high as 6 times the monthly salary (Figure 1). Judged by international standards, this level of TEWA severance is extremely high. Using 2002 data, a year for which we have some data on individual compensation, we can infer the relationship between generosity of payments and years of service with the firm. As shown in Figure 2, a Sri Lankan worker with 20 years of service received an average severance package equal to 29 months of wages. In contrast the average severance was 16 months of wages in other Asian countries, 12 months in Latin America, 7 months in Africa, 6 months in the OECD, and 4 months in transition countries. Sri Lankan workers with shorter duration of prior service were also awarded much more generous level of severance pay than workers in other countries. Since the switch to the fixed severance formula in December 2003, the program became has become even more generous (World Bank, 2002).

The high turnover costs imposed by the TEWA have led to a relatively small number of applications for separations by employers. Between 2000 and 2003, the number of employer applications ranged from 71 to 105 per year (World Bank 2007). Less than half of these cases were concluded by the order of the commissioner because they were settled " voluntarily" , whether because the firm withdrew the application or allowed the worker to retire. Moreover, according to a survey of the Employers' Federation of Ceylon (2004), 27 of a total of about 400 of its private sector members entered voluntary retirement agreements with 3263 workers during 2001-03 without having first applied for separations through the TEWA. Nevertheless, the expected cost of the compensation package that would result from a TEWA proceeding heavily influences the terms of these retirement packages. These voluntary retirement packages ranged from 6 to 45 months of wages.

A small number of processed applications for separations do not necessarily mean that the TEWA has curtailed separations. Firms may also try to sidestep TEWA obligations by contriving disciplinary grounds that would justify firing a worker or else by harassing workers to make them quit. Alternatively, they could outsource work to avoid having to take on more workers. While it is difficult to assess how frequently these options are used, there are reasons to believe that firms have only limited ability to avoid the costs of the TEWA. Inflexible labor regulations were one of the five most commonly cited business challenges reported by urban firms in Sri Lanka.[6]

It is often alleged that TEWA system has not been enforced for firms in Export Promotion Zones (EPZs) or that its enforcement for these firms has been lax. If true, then the patterns of employment growth and decline would differ between EPZ and non-EPZ firms, a

[5] See Appendix 1 for an example of a protracted retrenchment process in one of the Sri Lankan firms.
[6] The others were an unreliable supply of electricity; uncertain government policy; macroeconomic instability; and

possibility we test empirically below. Furthermore, EPZ firms have other advantages that may induce their more rapid growth. AS EPZ firms get larger, they qualify for tax holidays, preferential tax rates, and exemtions from customs duties and foreign exchange limitations. All of these advantages may cause EPZ firms to grow faster, but they may also induce firms with better growth prospects to sort into the EPZ group.

3 Theoretical Framework

We frame our analysis with a model that captures how firms select employment under the TEWA system. The firm pays an exogenously set wage w_t to its workers. The firm also needs to plan for possible severance and related firing costs, and so we assume it sets aside a proportional markup over the wage each period, $\delta_t \geq 0,$ so that the total per worker cost is $w_t(1+\delta_t).$ For simplicity, we assume $\delta_t = \delta$ for all $L_t > 14$ and 0 otherwise. For firms that are not covered by the TEWA system, $\delta_t = 0.$

The firm produces output using a short-run decreasing return to scale Cobb-Douglas technology. L_t represents number of workers and A represent other fixed inputs that are used to produce output Q_t. The production function takes the form

$$Q_t = A(\tau_t L_t^{\alpha}). \tag{1}$$

The variable τ_t is a permanent exogenous technology shock to labor productivity that is a function of past shocks and a random technology innovation variable η_t, so that

$$\tau_t = \tau_{t-1} \exp(\eta_t) \tag{2}$$

The η_t is assumed to have mean zero and variance σ_η^2 and is an unforeseeable firm-specific

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the high cost of obtaining external financing.

technological innovation. The specification for τ is chosen such that the growth of technology shocks to labor is a random process that the firm cannot control. In every period, the firm's profit-maximization problem is to select employment so that

$$Max: \Pi_t = A\tau_t L_t^{\alpha} - w_t(1+\delta_t)L_t \tag{3}$$

with first order condition:

$$\frac{\partial \Pi_t}{\partial L_t} \equiv A\alpha\tau_t L_t^{\alpha-1} - w_t(1+\delta_t) \geq 0 \tag{4}$$

The optimal number of workers at time t for a given productivity level is defined when the condition in (4) holds with equality

$$L_t^* = \left(\frac{A\alpha\tau_t}{w_t(1+\delta_t)}\right)^{\frac{1}{1-\alpha}} \tag{5}$$

The optimum number of workers increases in the permanent technology shock τ_t and decreases in wage and severance costs. Firms will adjust their employment by comparing their previous employment level to the new optimum

$$\text{if } L_{t-1} \begin{cases} > \left(\frac{A\alpha\tau_t}{w_t(1+\delta_t)}\right)^{\frac{1}{1-\alpha}}, \text{the firm will want to reduce employment below } L_{t-1} \\ = \left(\frac{A\alpha\tau_t}{w_t(1+\delta_t)}\right)^{\frac{1}{1-\alpha}}, \text{the firm will want to stay at } L_{t-1} \\ < \left(\frac{A\alpha\tau_t}{w_t(1+\delta_t)}\right)^{\frac{1}{1-\alpha}}, \text{the firm will want to expand employment beyond } L_{t-1} \end{cases}$$

Thus, the condition for the firm to expand employment from period $t-1$ to t is:

$$\ln\left(\frac{L_t}{L_{t-1}}\right) \geq \frac{1}{1-\alpha}\eta_t - \frac{1}{1-\alpha}\ln\left(\frac{w_t(1+\delta_t)}{w_{t-1}(1+\delta_{t-1})}\right) \tag{6}$$

This expression shows that firms will decide to increase employment depending on the

realizations of the random technology innovation variable η_t and an expression that captures the change in the cost of hiring labor.

The TEWA severance cost is illustrated in Figure 3. The first graph shows the total annual cost of the severance package as a function of firm employment in period t, $S_t = L_t \delta w_t$. The severance cost in period t is zero for firms with less than 15 workers. At 15 workers, the firm becomes responsible for turnover costs, and so S_t jumps to $15\delta w_t$. Beyond 15 workers, the severance cost rises at δw_t per worker. The second graph shows the marginal change in the severance cost as the number of workers changes. Below 15 workers, the cost is zero. At the 15th worker, the marginal cost spikes to $15\delta w_t$, and then falls to a constant δw_t thereafter.

Expression (6), coupled by the distribution of severance costs as imposed by the TEWA, allows us to distinguish the following cases.

Case 1: $L_{t-1} = 14$. Consider a firm whose optimal employment in $t-1$ is at the threshold point of $L^*_{t-1} = 14$. The firm would decide to expand in period t if:

$$\frac{1}{1-\alpha}\eta_t - \frac{1}{1-\alpha}\ln\left(\frac{w_t(1+15\delta)}{w_{t-1}}\right) \geq 0 \qquad (7)$$

$$\Rightarrow \eta_t \geq \ln\left(\frac{w_t(1+15\delta)}{w_{t-1}}\right)$$

So nonEPZ firms that expand past 14 workers require an unusually large unobserved technological innovation for them to decide to employ the additional worker. This is because the marginal cost of adding the 15th worker is atypically large. Because the firm has to make severance payment for all 15 workers in case of mass retrenchment or firm dissolution, the marginal cost of adding the 15th worker includes the TEWA tax of $\delta_t = 15\delta$. At $L_{t-1} = 14$, the

TEWA tax was $\delta_{t-1} = 0$.

Note that many firms will be caught by the inequality in (7) because $\eta_t < \ln\left(\frac{w_t(1+15\delta)}{w_{t-1}}\right)$. They will remain at 14 workers until some future period t^* at which they have accumulated enough positive technological innovation to cross the threshold, that is:

$$(\ln \tau_{t^*} - \ln \tau_{t-1}) \equiv \sum_{i=t}^{t^*} \eta_i > \ln\left(\frac{w_{t^*}(1+\delta_{t^*})}{w_{t-1}}\right) \tag{8}$$

This will not be true for the EPZ firms that may avoid the severance tax. Consequently,

Hypothesis 1A: For nonEPZ firms at the threshold employment size, $L_{t-1} = 14$, the likelihood of employment growth is smaller than for nonEPZ firms above the threshold.

Hypothesis 1B: At the threshold employment size, $L_{t-1} = 14$, the likelihood of employment growth is greater for EPZ than for nonEPZ firms.

Two caveats are warranted. First, the optimum firm size for nonEPZ firms under the constraint that employment will be less than 15 due to TEWA costs. Therefore, we do not add the prediction that the likelihood of nonEPZ employment growth at $L_{t-1} = 14$, will be less than employment growth at $L_{t-1} < 14$. We discuss the role of constrained optimal employment under Case 4. Second, the nonEPZ firms with optimal employment above the hurdle of the 14th worker will have to experience the large productivity shock shown in equation (8) and therefore, these firms will be expected to be more productive on average than EPZ firms at the time they pass that hurdle. We will comment on the importance of this observation in our discussion of Case 5..

Case 2: $L_{t-1} < 14$. For a non-EPZ or EPZ firm with less than 14 workers, the firm would decide to expand in period t if

$$\eta_t > \ln\left(\frac{w_t}{w_{t-1}}\right) \tag{9}$$

This is the usual value of marginal productivity condition where the firm will decide to hire if the value of the marginal product of the extra worker is higher than the cost to the firm. Therefore, in the absence of the constraints mentioned above, we have

Hypothesis 2: At $L_{t-1} < 14$, the likelihood of employment growth is the same for EPZ and nonEPZ firms.

Case 3: $L_{t-1} > 15$. The condition for firm size expansion is similar to that of case 1. With constant severance tax $\delta_t = \delta_{t-1} = \delta$, the productivity shock needed to hire an extra worker is

$$\eta_t > \ln\left(\frac{w_t(1+\delta_t)}{w_{t-1}(1+\delta_{t-1})}\right) \equiv \ln\left(\frac{w_t}{w_{t-1}}\right) \tag{10}$$

Therefore the probability that a given firm will increase employment is the same under cases 1 and 3. This is true even for EPZ firms. The reason is that EPZ firms have a lower average level of productivity in period $t-1$ than do equally sized nonEPZ firms according to equation (8). The same magnitude multiplicative productivity shock is required for employment growth for both EPZ and nonEPZ firms. This implies:

Hypothesis 3: At $L_{t-1} > 14$, the likelihood of employment growth is the same for EPZ and nonEPZ firms.

These hypotheses are derived from a highly stylized set of assumptions regarding production and costs that presume capital is Hicks neutral and that costs per unit of labor are unaffected by the existence of the constraint. Relaxing these assumptions yields weaker hypotheses that may better reflect better the Sri Lankan reality:

Case 4: The employment tax at $L_t \geq 15$ limits capital investments for nonEPZ firms, but tax and export advantage raise capital investments for EPZ firms .

It is possible that the large tax imposed as firms grow beyond 14 workers serves as an effective constraint on firm size, but it does not follow that the constrained optimum employment will be at $L_t = 14$. Prohibited from growing beyond 14 workers, the optimal nonEPZ firm size may be anywhere in the range $[1,14]$. As a result, nonEPZ firms may stop growing at employment levels below 14 workers.

This tendency is reinforced by the sorting effect of the TEWA legislation. If firms whose capital investment would optimally utilize more than 14 workers have an incentive to locate in the Export Processing Zones, fast growth firms will sort disproportionately into the EPZ sector. These effects are reinforced by the other advantages given EPZ firms that raise returns to capital in that sector. As a result, we can modify our hypotheses:

Hypothesis 2A : *At* $L_{t-1} < 14$ *, EPZ firms grow faster than nonEPZ firms.*

Hypothesis *3A* : At $L_{t-1} > 14$ *, EPZ firms grow faster than EPZ firms.*

Case 5: Serially correlated technology shocks ($cov(\eta_t, \tau_{t-1}) > 0$)

In the world of technology, luck may beget luck. Firms that attracted positive technology shocks in the past may be more likely to experience them again in the future. For example, Rose and Joskow (1990) show that the largest firms tend to introduce new technologies earlier, one possible source of their growth thus being the serial correlation in technology shocks. This suggests that if $cov(\eta_t, \tau_{t-1}) > 0$, then

Hypothesis 4: For both nonEPZ and EPZ firms, employment growth is faster above than below $L_{t-1} = 14$.

Note that serial correlation in technology shock introduces a new form of sorting for nonEPZ firms. While firms that expect to grow beyond 14 workers would sort into the EPZ sector, nonEPZ firms that grow beyond 14 workers face a much larger technology hurdle than their EPZ counterparts in order to pay the TEWA imposed 15δ tax. As noted above, nonEPZ firms that pass the threshold will have an atypically large draw on τ compared to nonEPZ firms below the threshold, and they would be expected to grow atypically rapidly as a result. EPZ firms that do not face the 15δ tax would grow more rapidly because of the serial correlation in productivity, but the *increase in the growth rate* would be larger among nonEPZ firms.

Hypothesis 5: If $cov(\eta_t, \tau_{t-1}) > 0$, *then the difference in employment growth between the firms above the employment size threshold, and at or below the threhsold, is greater for nonEPZ than for EPZ firms.*

4 Estimating the threshold effect

With the guidance provided by the above theoretical framework, below we describe the available data on Sri Lankan firms and present the strategy to identify the effects of the TEWA system.

4.1 Data Description

In our empirical analysis, we make use of a unique panel data set that includes annual employment data for 80,560 firms in Sri Lanka over the 1995-2003 period. The period coincides with a consistent set of restrictions on layoffs. Those policies were relaxed modestly at the end of 2003. The data are compiled by the Sri Lanka Employees' Provident Fund (EPF) on all private sector firms and workers paying contributions to the fund. The data are maintained by the Central Bank of Sri Lanka. All registered firms regardless of size are required to pay contributions for their workers. The data are quite limited, however. Apart from the number of

workers employed during the year, the only other information contained in the database is the firm's name and region: each firm is designated as having a base in one of 24 regions. The name allows us to identify which firms belong to an export processing zone. The Sri Lankan Board of Investment provided us a list of names for firms that operate in EPZs. We matched these names with 1,124 firms in the EPF list, and these firms comprise our EPZ group.

The EPF data are not free of problems. The data set only contains workers for whom the firm paid contributions during the year. If for whatever reason such contributions are not paid, the true number of workers in the firm will deviate from the number reported to the EPF. The most frequent reason for such discrepancies is the presence of financial difficulties that prevent a firm from paying contributions in the current year. Even delayed payments are not used to correct the data retrospectively. Therefore, these employment numbers will only reflect the contemporaneously reported number of workers for whom the firm is making an EPF contribution. The frequency or magnitude of this measurement error is not known.

The nature of the data does not allow us to differentitate between quits and layoffs and so we assume that any net loss of workers is due to layoffs. This seems reasonable as workers who quit will presumably be replaced, resulting in no employment loss. Our empirical work focuses on the direction of change in employment (i.e. falling, staying the same, or rising) rather than the reported change in the number employed. We expect that the direction of change will be subject to less error than the number, although we have no way of validating that presumption. In addition, as will be made apparent, the dichotomous or trichotomous indicators of employment change will fit the theoretical model more closely than would the change in employment because of the role of the marginal cost of increasing workers. The threshold matters for whether the firm increases employment at all, but less so for employing additional workers beyond the threshold.

Table 1 provides summary information on the size distribution of firms in EPZ and nonEPZ regions. The differences are striking. Only 22.5% of EPZ firms have fewer than 14 workers compared to 75.6% of nonEPZ firms! In contrast, the EPZ firms are over 3 times more likely than nonEPZ firms to have grown beyond the threshold employment level. It certainly appears that the incentives to grow must differ between the two groups of firms.

There are also apparent differences in the probability that firms will increase or decrease their workforce. NonEPZ firms are much more likely than EPZ firms to reduce or maintain their current employment level, regardless of size. EPZ firms are much more likely to add to their employment base. The largest contrast in probability of growth is below the threshold: the smallest EPZ firms are twice as likely to increase employment compared to nonEPZ firms.

Comparing the distribution of employment by firm size in Sri Lanka with that in other developing countries (Table 2) also shows evidence consistent with atypically large barriers to employment or firm growth in nonEPZ regions. Of 15 countries for which we can find comparable data, Sri Lanka has the fifth highest proportion of workers in firms with fewer than ten workers and the second lowest fraction of workers in firms with over 49 workers. The reason for the relatively large employment share for Sri Lanka's small firms lies entirely in the nonEPZ regions. In fact, the distribution of employment across Sri Lanka's EPZ firms is in marked contrast to the overall pattern: of all the countries for which we have size-distribution information, Sri Lanka's EPZ firms have the smallest fraction of workers in firms with fewer than 10 workers and the largest fraction of workers in firms with over 49 workers.

Tables 1 and 2 reveal substantial differences in average firm size and growth patterns consistent with differences in the marginal cost of hiring across the EPZ and nonEPZ regions. To evaluate the strength of that correlation more formally, we next propose and implement an

empirical test that is consistent with the theoretical model presented above. Table 2 presents the percentage distribution of employment by firm size in the formal sector for Sri Lanka and some other countries.

4.2 Identification Strategy

To isolate the effects of severance pay on employment growth of firms, we employ a difference-in-differences method, using firms at or above the severance threshold as the treatment group, and those with fewer than 14 workers and those in EPZs as control groups. The first control group follows naturally from the design of the TEWA system, because the regulations do not apply to firms employing less than 15 workers. The second control group is formed based on the assumption that enforcement is ineffective in EPZs, allowing firms to escape paying separation costs as dictated by TEWA -- the assumption tested empirically below.

Before formulating precise empirical tests, it is instructive to examine the distribution of firms by size and by growth rates in the neighborhood of the employment threshold of 14. Figure 4 shows the average number of firms covered by the TEWA law by employment size. In general, the number of firms decreases as employment size increases. The pattern of data in Figure 4 does not support an undue cost of hiring the 15th worker in that we might have expected a spike at 14 workers. Instead, there are fewer firms at 14 workers than at 13 workers.[7]

To better isolate a potential effect of the TEWA, it is thus useful to study the fraction of firms which are growing by firm size, as shown in Figure 5. While the likelihood of employment growth rises as firm size increases from 12 to 17 workers, it falls to 33 percent for firms with 14 workers, compared to 35 percent for firms with 13 workers and to 36 percent for firms with 15 workers. This graphical representation gives an indication that firms at the 14 worker threshold

[7] This pattern of the size distribution of firms holds generally across regions that are covered by the TEWA law, and

may be refraining from growing in order to avoid the severance cost.

Figure 5 illustrates the identification method of TEWA effects we formulate below. We can also utilize EPZ firms that are potentially exempt from the policy as additional controls.. Our theoretical model suggests that firm emplyment growth depends on the magnitude of a random productivity shock compared to the change in the cost of hiring labor. Presumed differences in the marginal cost of increasing employment by prior firm size and by whether the firm is inside or outside an EPZ region underlie the hypotheses laid out above. Straightforward tests of these hypotheses can be conducted by examining the differences in probability of employment growth across firm sizes and across the two regions. By equation (6), a firm will expand if

$$(1-\alpha)\ln\left(\frac{L_{it}}{L_{it-1}}\right) > \eta_{it} - \ln\left(\frac{w_{it}}{w_{it-1}}\right) - \ln\left(\frac{(1+\delta_{it})}{(1+\delta_{it-1})}\right) \tag{11}$$

where $\eta_{it} = \ln(\frac{\tau_{it}}{\tau_{it-1}})$ is assumed to be random. Suppose also that a firm pays exogenously determined wages whose logs evolve according to a random walk process[8] so that

$$\ln(\frac{w_{it}}{w_{it-1}}) = \omega_{it} \tag{12}$$

For ease of notation, let $\Delta l_{it} = (1-\alpha)\ln\left(\frac{L_{it}}{L_{it-1}}\right)$ and define the composite error term as $\varepsilon_{it} = \eta_{it} - \omega_{it}$. We can derive our indicator function as

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so we report the pattern for the country as a whole.

[8] Ashenfelter and Card (1982) showed that wages evolve according to an AR(1) process with first-order coefficient insignificabntly different from 1, and so the random walk assumption is not a radical departure from reality.

$$\Delta I_{it} = \begin{cases} 3 : \text{when } \Delta l_{it} + \ln\left(\frac{(1+\delta_{it})}{(1+\delta_{it-1})}\right) > \varepsilon_{it} \\ 2 : \text{when } \Delta l_{it} + \ln\left(\frac{(1+\delta_{it})}{(1+\delta_{it-1})}\right) = \varepsilon_{it} \\ 1 : \text{when } \Delta l_{it} + \ln\left(\frac{(1+\delta_{it})}{(1+\delta_{it-1})}\right) < \varepsilon_{it} \end{cases} \tag{13}$$

We estimate two variants of (13). In MODEL 1, we examine the choice to grow ($\Delta I_{it} = 3$) versus the alternative to decrease employment or stay the same ($\Delta I_{it} < 3$).[9] In MODEL 2, we further differentiate between the last two options, ($\Delta I_{it} = 2$) versus ($\Delta I_{it} = 1$). MODEL 2 allows us to investigate whether firms above the threshold are more likely to shed workers in order to fall back into exempt status compared to workers who are below the threshold.

To operationalize (13), we assume that the cumulative distribution of ε_{it} is logistic. We also need to specify the marginal cost of increasing employment. We assume that

$$\ln\left(\frac{(1+\delta_{it})}{(1+\delta_{it-1})}\right) = \beta_0 + \sum_{k=1}^{n}\beta_k D(k)_{it-1} + \beta_{EPZ}(EPZ_i) + \sum_{k=1}^{n}\gamma_k D(k)_{it-1} * EPZ_i. \tag{14}$$

This specification relates to the theoretical marginal cost in (6) as follows: The constant β_0 corresponds to the base case which is conveniently set to be $L_{it-1} = 14$ in a nonEPZ region. That is the case with the highest marginal cost of employment $\delta_t = 15\delta$. The $D(k)_{it-1}$ are dummy variables indicating the number of workers at firm i in year $t-1$, ranging from one to more than five hundred workers. We would expect that dummy variables corresponding to

[9] We could also derive a continuous rather than a discrete empirical model of employment growth, but the discrete

$L_{it-1} < 14$ would be cases with low marginal costs of raising employment and dummy variables corresponding to $L_{it-1} > 14$ would be cases with marginal costs of employment $\delta_t = \delta$. The coefficient β_k determines whether the firm of size *k* are more likely to add workers relative to firms with 14 workers. We use the notations β_{k^-} and β_{k^+} to designate employment changes made below and above the threshold respectively. `EPZ' indicates the firm is in an export promotion zone with an associated coefficient β_{EPZ} that measures the difference in employment growth for EPZ relative to nonEPZ firms. Similarly, γ_k measures any added employments effect for EPZ firms in a particular size class k. Coefficient notation γ_{k^-} and γ_{k^+} correspond to below and above the 14 worker threshold. Table 3 summarizes the identification and interporetation of the coefficients. The first column shows the parameters describing firm growth for EPZ firms below, at and above the threshold. The second column shows the corresponding parameter estimates for nonEPZ firms. The first differences of the nonEPZ estimates allow us to identify β_{k^-} and β_{k^+}. The double difference allows us to identify γ_{k^-} and γ_{k^+}.

$\beta_{k^-} > 0$ indicates faster growth than the base case for nonEPZ firms below 14 workers. Similarly, $\beta_{k^+} > 0$ indicates faster employment growth than the base case for nonEPZ firms above 14 workers. $\beta_{EPZ} + \gamma_{k^-} > 0$ indicates that EPZ firms are growing faster than nonEPZ firms below 14 workers and $\beta_{EPZ} + \gamma_{k^+} > 0$ indicates that EPZ firms are growing faster than nonEPZ firms above 14 workers. The coefficient β_{EPZ} tells us if EPZ firms grow faster than nonEPZ firms at the threshold. These coefficient estimates form the basis of our hypothesis tests.

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formulation better matches the the marginal decision of whether to add a worker.

5 Results

In Tables 4 and 5, we present the results of the estimation of Model 1 which compares the decision to increase employment $\{\Delta l_{it} = 3\}$ against the option to either retain or lower employment from current staffing levels $\{\Delta l_{it} = 1,2\}$. We treat the latter as the base case. All coefficients are converted into marginal effects to aid interpretation. Table 4 presents the most detailed sets of results, while Table 5 presents a more parsimonious representation that averages decisions below and above the threshold employment level of 14 workers. The conclusions are consistent across the two tables, and so we will focus our comments on the more abbreviated set of results from Table 5.

It is convenient to discuss the results of Model 2 at the same time as we discuss the related issues using the results from Tables 4 and 5. Because Model 2, which contrasts the decision to increase employment $\{\Delta l_{it} = 3\}$ versus not changing employment $\{\Delta l_{it} = 2\}$ versus lowering employment $\{\Delta l_{it} = 1\}$, is quite complex, it is more difficult to interpret. Therefore, we convert the results to their implied transition probabilities which are reported in Table 6. The original coefficient estimates for Model 2 are reported in the Appendix.

Result 1: NonEPZ firms above the threshold are 5.4% more likely to add workers than are nonEPZ firms at the threshold employment size, $L_{t-1} = 14,$ and so Hypothesis 1A is confirmed. The employment growth advantage for firms above the threshold ranges from 3 percentage points for firms with 15 to 20 workers; 5-6 percentage points for firms with 21-35 workers; 6-8 percentage points for firms with 36-249 workers, and to 3 percentage points for firms above 250 workers.

EPZ firms at the threshold have a 6.9 percentage point higher likelihood of employment growth relative to nonEPZ firms at the threshold, consistent with Hypothesis 1B, but the estimate

is imprecise. Because we cannot reject that $\beta_{EPZ} = 0$, we cannot confirm Hypothesis 1B.

Our test of Hypothesis 1B is compromised by the very small number of EPZ firms observed at the threshold, Nevertheless, as shown in Table 4, there is substantial evidence consistent with slower growth of nonEPZ firms at the threshold than for EPZ firms at 15, 16, 17, and 18 employess. The growth advantage of EPZ firms above 14 employees relative to nonEPZ firms at the threshold is 12.6% and highly significant. Furthermore, the pattern of predicted transition probabilities in Table 6 suggests sharp differences in employment growth between EPZ and nonEPZ firms. EPZ firms at the threshold are 23% more likely to add employment and 15% less likely to shrink compared to their nonEPZ counterparts at the threshold.

Result 2: At $L_{t-1} < 14,$ the likelihood of employment growth is statistically significantly higher for EPZ than nonEPZ firms, $(\gamma_{k^-} + \beta_{EPZ}) > 0$. Therefore, Hypothesis 2 is rejected but Hypothesis 2A is confirmed. As shown in Table 5, EPZ firms below the threshold are 21 percentage points more likely to add workers compared to nonEPZ firms below the threshold. In Table 6, nonEPZ firms below the threshold are 11% more likely to keep employment at the same level or shrink in the following year, while in contrast, EPZ firms below the threshold are 10% more likely to grow.

The slower growth of small nonEPZ firms suggests that the large cost imposed by TEWA for hiring 15 or more workers can constrain employment growth at all levels of employment below 15 and not just the choice of hiring the 15th worker per se. As discussed in Case 4, the constrained employment optimum may not be at 14 woprkers but can be anywhere in the range [1, 14]. Our findings suggests that the TEWA has retarded employment growth for nonEPZ firms at all employment levels below 15.

Result 3: At $L_{t-1} > 14$, EPZ firms grow faster than nonEPZ firms $\{(\gamma_{k^+} + \beta_{EPZ}) > 0\}$.

Hypothesis 3 is rejected, but hypothesis 3A is confirmed. EPZ firms above the threshold have employment growth probabilities 12.6 percentage points greater than for similarly sized nonEPZ firms. Turning to Table 6, we find that EPZ firms grow with probability 0.52, while nonEPZ firms grow with probability 0.39. Interestingly, 56% of nonEPZ firms above the threshold shed workers compared to only 45% of EPZ firms, suggesting that nonEPZ firms may have a greater incentive to drop back below the threshold in order to avoid the tax.

Result 4: Combining Results 2 and 3, we have that EPZ firms are more likely to grow than are nonEPZ firms of all sizes. This is most easily apparent in the comparisons between EPZ and nonEPZ firms in the right-most column of Table 6. Regardless of firm size, the probability of employment growth is largest for EPZ firms. That explains why in Table 1, firms are much more likely to exceed 14 employees in the EPZ than in the nonEPZ sector.

Result 5: For both nonEPZ and EPZ firms, employment growth is faster above than below the employment threshold size, $L_{t-1} = 14$ $\{\beta_{k^+} > \beta_{k^-}$ and $(\beta_{k^+} + \gamma_{k^+}) > (\beta_{k^-} + \gamma_{k^-})\}$. Hypothesis 4 is thus confirmed. Table 5 shows that, once passing the threshold, nonEPZ firm employment growth is nearly 17 percentage points greater than for nonEPZ firms below the threshold. EPZ firms above the threshold have employment growth probabilities 8 percentage points above that of EPZ firms below the threshold. Both results are consistent with the existence of serial correlation in the productivity shock that would lead to more rapid expansion as firm size increases, at least in the range of firm sizes below 500 workers.

Result 6: The difference in employment growth between the firms above versus below the threshold is greater for nonEPZ than for EPZ firms. Hypothesis 5 is confirmed.The increase in employment growth rate between firms above and at the threshold is 8.6 percentage points larger for nonEPZ than for EPZ firms. . Our results support the hypothesis that nonEPZ firms below

the threshold are atypically hindered from growing and that those that pass the threshold require an atypically large draw on τ that enables them to grow more rapidly after passing the threshold. Importantly, these results are consistent with the existence of real effects of the TEWA threshold tax retarding growth of nonEPZ firms below the threshold. Even though we cannot reject that $\beta_{EPZ} = 0$, the weight of the other evidence confirms that nonEPZ firm growth is constrained by the TEWA law.

6 Conclusion

Numerous studies have explained the effect of labor market restriction on unemployment, employment growth and wage inequality in OECD countries. This study extends this inquiry to the case of the TEWA program imposing severance costs on firms with 15 or more workers in Sri Lanka. Our theoretical framework provides valuable insight into how firms behave when faced with EPL.

Using a discrete choice framework to analyze Sri Lanka's severance pay system (TEWA), our results show that the presence of firing cost significantly distorts hiring decisions. Covered firms appear to have retarded employment growth at or below 14 workers compared to exempt firms. NonEPZ firms that manage to pass the 14 worker threshold grow faster, consistent with a presumption that only atypically productive nonEPZ firms can afford to employ more than 14 workers. EPZ firms exempt from the TEWA grow faster than nonEPZ firms at all levels of employment, presumably because they are not constrained by the law and/or the firms anticipating rapid employment growth atypically enter Export Processing Zones. The only departure from expectations is that at the threshold, the employment growth advantage for EPZ over nonEPZ firms is not statistically significant, although the point estimate is positive as

expected.

The evidence that the TEWA system affects vital aspects of firm behavior suggests that the system negatively affects the growth of firms subject to the law. In doing so, the law fails in its goal of increasing employment by imposing large layoff costs and severance taxes. These results suggest that several aspects of the TEWA system need to be reexamined. Options to be evaluated include (i) reducing the generosity of the severance package as well as regularizing the amount; (ii) allowing firms to lay off workers without prior consent of the Commissioner; and (iii) excluding the coverage of worker incompetence under the TEWA. In addition, the positive effects of EPZ tax and export benefits on firm employment growth suggest that these benefits should be made generally available to all firms rather than limiting their application to only a subset of firms.

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Table 1: Distribution of Sri Lanka firms by initial size, change in employment over the years, and EPZ status, 1995-2003

EPZ Firms	**Percent of sample**	**Shrink**	**Stay**	**Grow**	**Total**
Less than 14 employees	22.5%	29.3%	26.7%	44.0%	100.0%
14 employees	1.1%	45.8%	13.6%	40.7%	100.0%
More than 14 employees	76.4%	45.4%	2.2%	52.4%	100.0%

N=5,441

non EPZ Firms	**Percent of sample**	**Shrink**	**Stay**	**Grow**	**Total**
Less than 14 employees	75.6%	37.2%	40.8%	22.0%	100.0%
14 employees	1.2%	53.9%	13.2%	32.9%	100.0%
More than 14 employees	23.2%	55.8%	5.1%	39.1%	100.0%

N=320,866

Table 2: Percent distribution of employment by firm size in formal sector firms, Sri Lanka and various other countries

Sri Lanka, 1995-2003	**<10 employees**	**10 to 49 employees**	**>49 employees**
Total	**68**	**20**	**12**
NonEPZ firms only	**69**	**20**	**11**
EPZ firms only	**17**	**26**	**57**
Other countries			
Sierra Leone – 1974[a]	90	5	5
Ghana – 1970[a]	84	1	15
Zambia[a]	83	1	16
Indonesia[a]	77	7	16
Honduras – 1979[a]	68	8	24
Philippines – 1974[a]	66	5	29
Nigeria – 1972[a]	59	26	15
Thailand – 1978[a]	58	11	31
Tanzania – 1967[a]	56	7	37
Colombia – 1973[a]	52	13	35
Kenya – 1969[a]	49	10	41
India-1971[a]	42	20	38
Korea – 1975[a]	40	7	53
Jamaica – 1978[a]	35	16	49
Venezuela (1998)[b]	0.20	3.90	95.8
Slovenia (2000)[b]	12.9	14.7	72.4
Romania (2000)[b]	12.5	14.7	72.8
Mexico (2000)[b]	13.8	17.6	68.5
Latvia (1998)[b]	18.2	23.4	58.3
Hungary (2000)[b]	12.8	20.3	66.7
Estonia (2000)[b]	15.1	29.1	55.8
Brazil (2000)[b]	9.3	21.3	69.4
Argentina (2001)[b]	18.1	22.4	59.5

Note: Sri Lanka based on authors' computations.

a- Data from Liedholm and Mead (1987, Table 3).

b- Data from HSS.

Table 3: Parameters controling the probability of employment growth by type of firms

Employment in period $t-1$.	Type of firm		
	EPZ	Non EPZ	Difference
≤ 13	$\beta_0 + \beta_{k^-} + \beta_{EPZ} + \gamma_{k^-}$	$\beta_0 + \beta_{k^-}$	$(\beta_{EPZ} + \gamma_{k^-})$
14	$\beta_0 + \beta_{EPZ}$	β_0	β_{EPZ}
Difference	$(\beta_{k^-} + \gamma_{k^-})$	β_{k^-}	γ_{k^-}
$\leq$ 15	$\beta_0 + \beta_{k^+} + \beta_{EPZ} + \gamma_{k^+}$	$\beta_0 + \beta_{k^+}$	$(\beta_{EPZ} + \gamma_{k^+})$
14	$\beta_0 + \beta_{EPZ}$	β_0	β_{EPZ}
Difference	$(\beta_{k^+} + \gamma_{k^+})$	β_{k^+}	γ_{k^+}

Table 4. Parameter estimates of the likelihood that the firm will increase employment compared to reducing it or keeping it unchanged.				
			Model 1	
Variables			y_{it}=3 vs 1 or 2	
No. of workers (*k*)			Coefficient (β_k)	Std. errors
$\beta_{k=1}$			**-.1795**	**.0045**
$\beta_{k=2}$			**-.1282**	**.0050**
$\beta_{k=3}$			**-.0897**	**.0056**
$\beta_{k=4}$			**-.0759**	**.0058**
$\beta_{k=5}$			**-.0545**	**.0063**
$\beta_{k=6-7}$			**-.0338**	**.0066**
$\beta_{k=8-9}$			-.0140	.0071
$\beta_{k=10-11}$			0.0020	.0076
$\beta_{k=12}$			0.0040	.0089
$\beta_{k=13}$			0.0147	.0094
$\beta_{k=14}$			-	-
$\beta_{k=15}$			**0.0264**	**.0102**
$\beta_{k=16}$			**0.0269**	**.0106**
$\beta_{k=17}$			**0.0300**	**.0109**
$\beta_{k=18-20}$			**0.0345**	**.0089**
$\beta_{k=21-25}$			**0.0472**	**.0089**
$\beta_{k=26-35}$			**0.0616**	**.0087**
$\beta_{k=36-99}$			**0.0802**	**.0082**
$\beta_{k=100-249}$			**0.0619**	**.0084**
$\beta_{k=250-499}$			**0.0256**	**.0087**
$\beta_{k>500}$			**0.0321**	**.0090**
β_{EPZ}			0.0682	.0580
k≤11 in EPZ (γ_{11-})			0.0995	.0626
k=12 in EPZ (γ_{12})			0.0849	.0795
k=13 in EPZ (γ_{13})			0.0799	.0802
k=15 in EPZ (γ_{15})			0.0578	.0861
k=16 in EPZ (γ_{16})			0.1645	.0939
k=17 in EPZ (γ_{17})			0.0996	.0906
k=18 in EPZ (γ_{18+})			0.0413	.0558
Test for differences in employment growth rate between groups.				
Hypothesis	Estimate	p-value	Hypothesis	p-value
$(\beta_{EPZ} + \gamma_{11-}) = 0$	**0.1677**	**0.000**	$(\beta_{11-} + \gamma_{11-}) = 0$	0.7344
$(\beta_{EPZ} + \gamma_{12}) = 0$	**0.1531**	**0.002**	$(\beta_{12} + \gamma_{12}) = 0$	0.2212
$(\beta_{EPZ} + \gamma_{13}) = 0$	**0.1481**	**0.003**	$(\beta_{13} + \gamma_{13}) = 0$	01949
$\beta_{EPZ} = 0$	**0.0682**	**0.240**	-	-
$(\beta_{EPZ} + \gamma_{15}) = 0$	**0.126**	**0.039**	$(\beta_{15} + \gamma_{15}) = 0$	0.2905
$(\beta_{EPZ} + \gamma_{16}) = 0$	**0.2327**	**0.000**	**$(\beta_{16} + \gamma_{16}) = 0$**	**0.0203**
$(\beta_{EPZ} + \gamma_{17}) = 0$	**0.1678**	**0.006**	$(\beta_{17} + \gamma_{17}) = 0$	0.1102
$(\beta_{EPZ} + \gamma_{18+}) = 0$	**0.1095**	**0.000**	$(\beta_{18+} + \gamma_{18+}) = 0$	0.0804
Note: Dependent variable: Indicator variable taking the value of 1 if employment increases and o otherwise. Logistic regression estimates given. Marginal effect with the size of employment equal to 14 and being a nonEPZ firm as the baseline. Bold values are significant at 5%.				

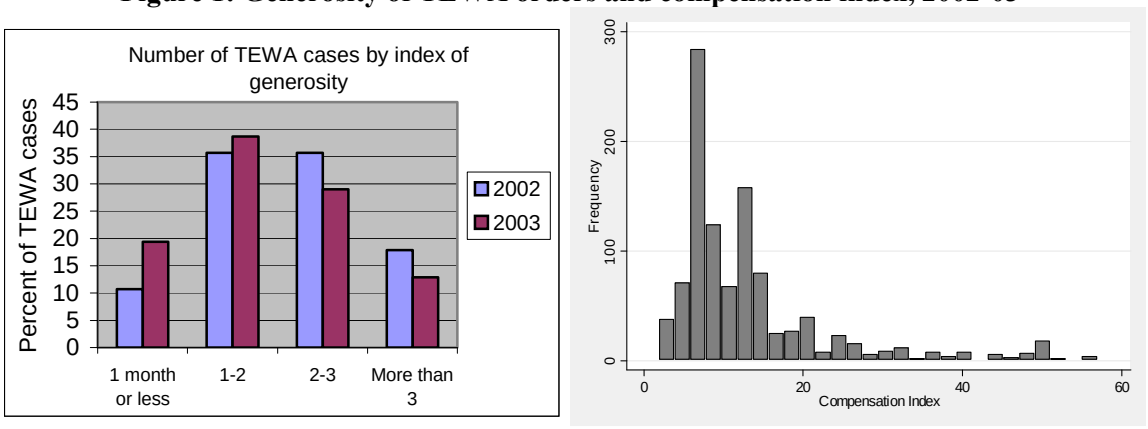
Table 5: Estimate for MODEL 1 regrouped to test for differences in employment growth rate below and above the threshold.

Variables	Marginal Effect	std. errors
$L_{t-1} \leq 13$ in EPZ $(\beta_{k^-} + \gamma_{k^-} + \beta_{EPZ})$	**0.0996**	**0.0155**
$L_{t-1} \leq 13$ in nonEPZ (β_{k^-})	**−.1127**	**0.0076**
$L_{t-1} = 14$ in EPZ (β_{EPZ}) - Hypothesis 1B	0.0693	0.0590
$L_{t-1} = 14$ in nonEPZ (β_{14}) (reference).	–	–
$L_{t-1} \geq 15$ in EPZ $(\beta_{k^+} + \gamma_{k^+} + \beta_{EPZ})$	**0.1802**	**0.0115**
$L_{t-1} \geq 15$ in nonEPZ (β_{k^+})	**0.0538**	**0.0073**
Test of Hypothesis		
Hypothesis	Estimate	P-value
Hypothesis 1A: H0: $(\beta_{k^+} > \beta_{14})$	**0.0538**	**0.0073**
Hypothesis 1B: $H0:(\beta_{EPZ} = 0)$	0.0693	0.24
Hypothesis 2A : $H0:(\gamma_{k^-} + \beta_{EPZ}) = 0$	**0.2123**	**0.998**
Hypothesis 3A: $H0:(\gamma_{k^+} + \beta_{EPZ}) = 0$	**0.1264**	**0.999**
Hypothesis 4: $H0: (\beta_{k^+} > \beta_{k^-})$	**0.1665**	**1.0**
Hypothesis 4: $H0: \{(\beta_{k^+} + \gamma_{k^+}) > (\beta_{k^-} + \gamma_{k^-})\}$	**0.0806**	**1.0**
Hypothesis 5: $H0:(\gamma_{k^+} - \gamma_{k^-}) < 0$	**-0.0859**	**0.999**

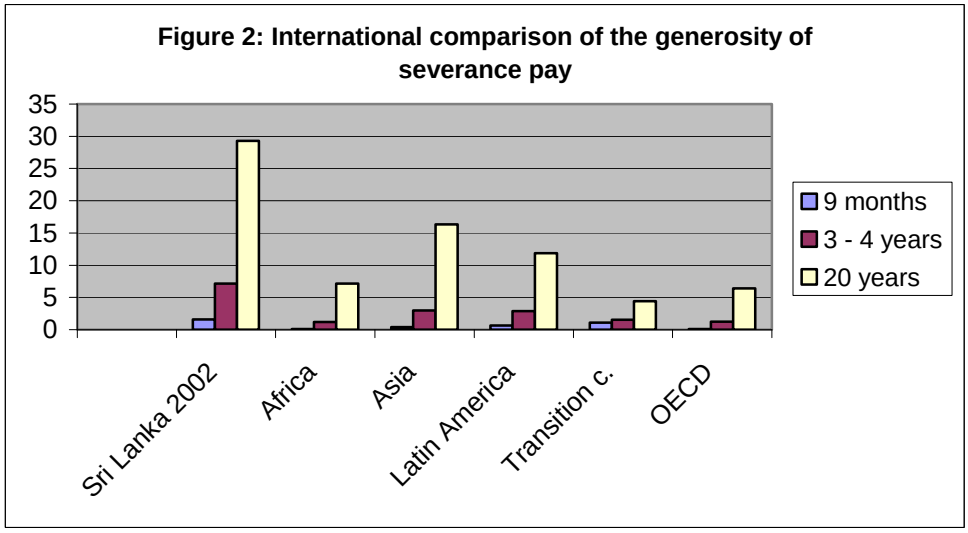
Note: Dependent variable: Indicator variable taking the value of 1 if employment increases and 0 otherwise. Logistic regression estimates given. Logistic regression estimates give. Base case is 14 workers for a nonEPZ firm. Bold values are significant at 5%.

Table 6. Predicted transition probability at each employment category.			
Group	Shrink	Stay the same	Grow
EPZ below the threshold	0.293 [0.268,0.318]	0.267 [0.242,0.29 2]	0.440 [0.412,0.467]
nonEPZ below the threshold	0.372 [0.370,0.374]	0.408 [0.406,0.410]	0.220 [0.218,0.222]
EPZ at the threshold	0.458 [0.331,0.585]	0.136 [0.048,0.223]	0.407 [0.281,0.532]
nonEPZ at the threshold	0.539 [0.523,0.555]	0.132 [0.121,0.143]	0.329 [0.314,0.344]
EPZ above the threshold	0.454 [0.439,0.469]	0.022 [0.017,0.026]	0.524 [0.509,0.539]
nonEPZ above the threshold	0.558 [0.554,0.561]	0.051 [0.049,0.053]	0.391 [0.388,0.395]
95% confidence intervals in brackets.			

Figure 1: Generosity of TEWA orders and compensation index, 2002-03

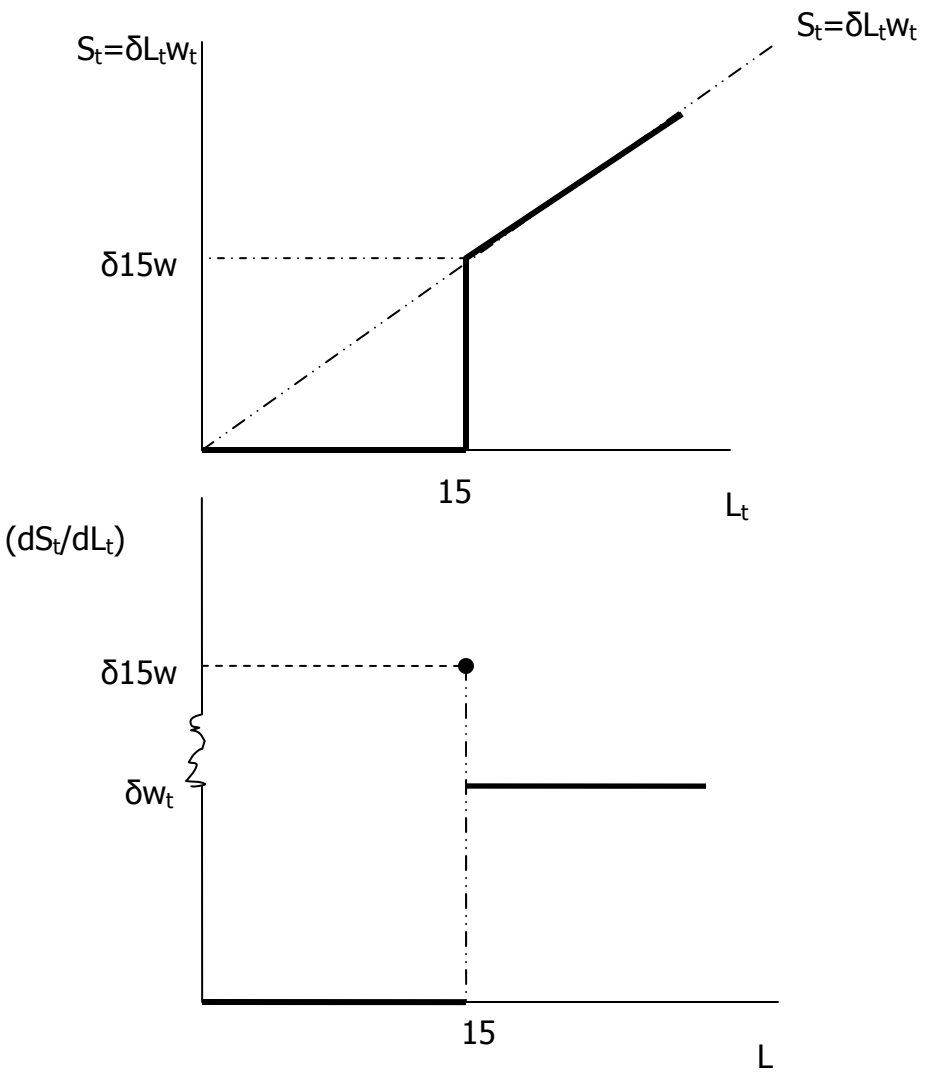


Source: Author's computations based on the information provided by the Commissioner.
Notes: The index of generosity is the multiple of the monthly salary per year of work service, above computed from the TEWA orders for firms; compensation index is the multiple of the monthly salary awarded to workers, above computed from compensation awarded to workers in 2002.



Source: Author's computation, for Sri Lanka; Holzmann, Iyer and Vodopivec (2003), for other countries.
Note: simulated generosity levels for Sri Lanka (inferred from a regression based on data for workers who received compensation in 2002), stipulated generosity levels as prescribed by compensation formulas in other countries.

Figure 3: Severance cost and firm size



S_t= Severance cost in period t.

Figure 4: Annual number of firms covered by TEWA, by number of employees, 1995-2003

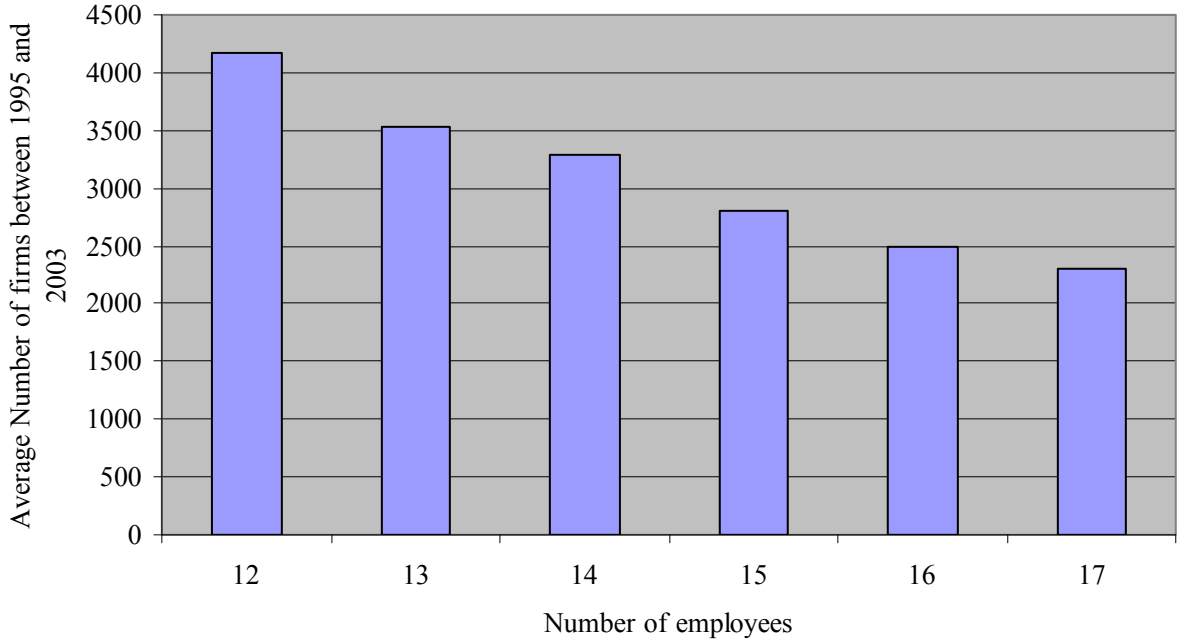
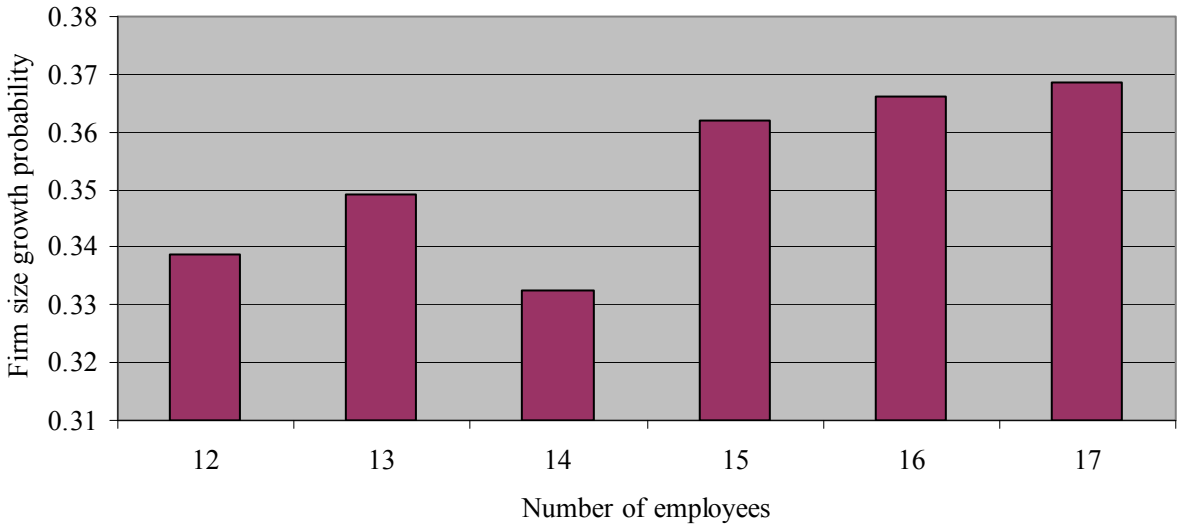


Figure 5: Share of firms covered by TEWA that increased employment during the year, by number of employees at the start of the year, 1995-2003



Appendix

Appendix 1: An example of real world retrenchment: Shell Gas Lanka

Shell Gas Lanka decided to close down one division of the company and filed an application for a retrenchment of 17 workers on April 18, 2001. The Commissioner General of Labor concluded the cross-examination by November 2001, and issued the order approving application on December 2, 2003 – two years and a half after its filing (in the meantime, the 17 workers remained employed and continued to be paid, although *de facto* they did not work). The order allowed the company to proceed with layoffs of all 17 workers, contingent on paying them:

- to workers with more than 10.5 years of service: 4.5 monthly wages times the sum of years of their service with the company plus the years of future service until normal retirement, with the ceiling of 90 monthly wages; and
- to workers with less than 10.5 years of service: 3.5 monthly wages times the sum of years of their service with the company plus the years of future service until normal retirement, with the ceiling of 70 monthly wages.

During the retrenchment, process, the company has frozen hiring except at the highest level. (Shell Gas was privatized in1995 under the clause of no retrenchment, and in the late 1990s reduced its staff via voluntary retirement programs, offering on average about 74 monthly wages.)

Source: Vodopivec (2004).

Table A1: Test for differences in growth rate between groups (Model 1).		
Hypothesis	Estimate	Chi-square
Test for difference in employment growth between nonEPZ firms with $(L_{t-1} \leq 13)$ and $(L_{t-1} = 14; (\beta_{k^-}) = 0$	$-$ **0.1127**	**222.01**
Test for difference in employment growth between nonEPZ firms with $(L_{t-1} \geq 15)$ and $(L_{t-1} = 14); (\beta_{k^+}) = 0$	**0.0538**	**53.73**
Test for difference in employment growth between nonEPZ firms with $(L_{t-1} \geq 15)$ and $(L_{t-1} \leq 13)$; $(\beta_{k^+} - \beta_{k^-}) = 0$	**0.1665**	**8455.52**
Test for difference in employment growth between EPZ firms with $(L_{t-1} \leq 13)$ and $(L_{t-1} = 14); (\beta_{k^-} + \gamma_{k^-}) = 0$	0.0303	0.25
Test for difference in employment growth between EPZ firms with $(L_{t-1} \geq 15)$ and $(L_{t-1} = 14); (\beta_{k^+} + \gamma_{k^+}) = 0$	0.1109	3.15
Test for difference in employment growth between EPZ firms with $(L_{t-1} \geq 15)$ and $(L_{t-1} \leq 13)$; $(\beta_{k^+} - \beta_{k^-}) + (\gamma_{k^+} - \gamma_{k^-}) = 0$	**0.0806**	**26.89**
Test for difference in employment growth below and above the threshold for EPZand nonEPZ firms) $\left(\begin{matrix}\{L_{t-1} \geq 15 in EPZ - L_{t-1} \leq 13 in EPZ\} - \\ \{L_{t-1} \geq 15 \, in \, nonEPZ - L_{t-1} \leq 13 \, in \, nonEPZ\}\end{matrix}\right); (\gamma_{k+} - \gamma_{k^-}) = 0$	$-$ **0.0859**	**53.91**

Note: Dependent variable: Indicator variable taking the value of 1 if employment increases and 0 otherwise. Logistic regression estimates give. Base case is 14 workers for a nonEPZ firm. Bold values are significant at 5%.

Table A2: The estimated impact of TEWA on employment growth at different employment levels.						
Multinomial logit estimation. All results are converted to marginal effects. Model 2						
Variables	Shrink		Stay the same		Grow	
No.ofworkers(k)	coefficient	std.errors	coefficient	std. errors	coefficient	std. errors
$\beta_{k=1}$	-.2975	.0075	**0.5076**	**.0100**	**-.2102**	**.0051**
$\beta_{k=2}$	-.2569	.0081	**0.4234**	**.0111**	**-.1665**	**.0057**
$\beta_{k=3}$	-.2146	.0086	**0.3446**	**.0119**	**-.1300**	**.0063**
$\beta_{k=4}$	-.1640	.0092	**0.2765**	**.0123**	**-.1125**	**.0066**
$\beta_{k=5}$	-.1344	.0095	**0.2209**	**.0125**	**-.0865**	**.0071**
$\beta_{k=6-7}$	-.1002	.0093	**0.1584**	**.0118**	**-.0581**	**.0074**
$\beta_{k=8-9}$	-.0590	.0096	**0.0876**	**.0114**	**-.0287**	**.0079**
$\beta_{k=10-11}$	-.0417	.0097	**0.0481**	**.0111**	-.0064	.0084
$\beta_{k=12}$	-.0161	.0113	0.0146	.0122	0.0015	.0098
$\beta_{k=13}$	-.0113	.0117	-.0044	.0123	0.0157	.0104
$\beta_{k=14}$	-	-	-	-	-	-
$\beta_{k=15}$	-.0076	.0124	-.0235	.0126	**0.0311**	**.0113**
$\beta_{k=16}$	-.0108	.0128	-.0202	.0131	**0.0310**	**.0116**
$\beta_{k=17}$	.0050	.0131	**-.0437**	**.0128**	**0.0387**	**.0120**
$\beta_{k=18-20}$	.0221	.0106	**-.0707**	**.0095**	**0.0485**	**.0098**
$\beta_{k=21-25}$	.0207	.0102	**-.0853**	**.0087**	**0.0646**	**.0097**
$\beta_{k=26-35}$	.0292	.0098	**-.1149**	**.0074**	**0.0857**	**.0095**
$\beta_{k=36-99}$	.0557	.0091	**-.1751**	**.0051**	**0.1194**	**.0090**
$\beta_{k=100-249}$	.1084	.0096	**-.2183**	**.0036**	**0.1099**	**.0095**
$\beta_{k=250-499}$	.1570	.0103	**-.2277**	**.0034**	**0.0707**	**.0101**
$\beta_{k>500}$	.1648	.0105	**-.2476**	**.0022**	**0.0828**	**.0105**
β_{EPZ}	-.0727	.0652	0.0061	.0715	0.0666	.0627
$k \leq 11$ in EPZ (γ_{11^-})	-.0792	.0653	-.0376	.0635	0.1168	.0671
$k = 12$ in EPZ (γ_{12})	-.0634	.0885	-.0275	.0885	0.0909	.0849
$k = 13$ in EPZ (γ_{13})	-.1260	.0873	0.0550	.1061	0.0710	.0868
$k = 15$ in EPZ (γ_{15})	.0202	.1040	-.0955	.0893	0.0753	.0940
$k = 16$ in EPZ (γ_{16})	-.1262	.0919	-.0430	.0973	0.1692	.0983
$k = 17$ in EPZ (γ_{17})	-.1004	.0993	0.0054	.1142	0.0950	.0974
$k \geq 18$ in EPZ (γ_{18^+})	.0034	.0677	-.0571	.0609	0.0537	.0610
Note: Dependent variable: Indicator variable taking the value of 3 if employment increases, 2 if employment is the same and 1 if employment reduces. Logistic regression estimates give. Base case is 14 workers for a nonEPZ firm. Bold values are significant at 5%.						

Estimate is Model 2 with shrinking below L_{t-1} as base outcome.

Variables regrouped to test for differences in employment growth rate below and above the threshold.

	Shrink		stay the same		Grow	
	$(y_{it}=1)$		$(y_{it}=2)$		$(y_{it}=3)$	
Variables	Marginal Effect	Std error	Marginal Effect	Std Error	Marginal Effect	Std error
$L_{t-1} \leq 13$ in EPZ $(\beta_{k^-}+\gamma_{k^-}+\beta_{EPZ})$	**−.24**	**.01**	**.20**	**.02**	**0.04**	**0.02**
$L_{t-1} \leq 13$ in nonEPZ (β_{k^-})	**−.14**	**.01**	**.24**	**.01**	**−.10**	**0.01**
$L_{t-1} \leq 14$ in EPZ (β_{EPZ})	−.07	.06	.01	.08	0.10	0.06
$L_{t-1} \leq 14$ in nonEPZ (β_{14})	–	–	–	–	–	–
$L_{t-1} \geq 15$ in EPZ $(\beta_{k^+}+\gamma_{k^+}+\beta_{EPZ})$	**−.01**	**.01**	**−.22**	**.01**	**0.23**	**0.01**
$L_{t-1} \geq 15$ in nonEPZ (β_{k^+})	.08	.01	**−.17**	**.01**	**0.09**	**0.01**

Test for differences in growth rate between groups ($y_{it}=3$)

Hypothesis	Estimate [1]
Test for difference in employment growth rate between nonEPZ firms with $(L_{t-1} \leq 13)$ versus $(L_{t-1}=14)$: $\beta_{k^-}=0$	**−0.01** (167.96)
Test for difference in employment growth rate between nonEPZ firms with $(L_{t-1} \geq 15)$ versus $(L_{t-1}=14)$: $\beta_{k^+}=0$	**0.09** (141.85)
Test for difference in employment growth rate between nonEPZ firms with $(L_{t-1} \geq 15)$ versus $(L_{t-1} \leq 13)$: $(\beta_{k^+}-\beta_{k^-})=0$	**0.19** (332.18)
Test for difference in employment growth rate between EPZ firms with $(L_{t-1} \leq 13)$ and $(L_{t-1}=14)$: $\beta_{k^-}+\gamma_{k^-}=0$	−.02 (3.27)
Test for differences in employment growth rate between firms with $(L_{t-1} \geq 15$ in EPZ) and $(L_{t-1}=14$ in EPZ) $\equiv \beta_{k^+}+\gamma_{k^+}=0$	0.17 (0.85)
Test for difference in employment growth rate between EPZ firms with $(L_{t-1} \geq 15)$ versus $(L_{t-1} \leq 13)$: $(\beta_{k^+}-\beta_{k^-})+(\gamma_{k+}-\gamma_{k^-})$	**0.19** (12.16)
Test for difference in employment growth rate below and above the threshold for EPZ and nonEPZ firms) $\equiv \begin{pmatrix} \{L_{t-1} \geq 15 in EPZ - L_{t-1} \leq 13 in EPZ\} \\ -\{L_{t-1} \geq 15 in nonEPZ - L_{t-1} \leq 13 in nonEPZ\} \end{pmatrix} \equiv (\gamma_{k+}-\gamma_{k^-})=0$	**−0.004** (32.75)

Note: Independent variables are dummy variables for firms that belong to stated groups only. Base case is 14 workers for a nonEPZ firm. Bold values are significant at 5%.

(1) Chi squared values reported in parentheses.