



School of Social Sciences
Economics Division
University of Southampton
Southampton SO17 1BJ
UK

Discussion Papers in Economics and Econometrics

THE EFFECTS OF EMPLOYMENT PROTECTION AND PRODUCT MARKET REGULATIONS ON THE ITALIAN LABOR MARKET

Adriana Kugler
and
Giovanni Pica

No. 0310

**This paper is available on our website
[http://www.socsci.soton.ac.uk/economics/Research/
Discussion_Papers](http://www.socsci.soton.ac.uk/economics/Research/Discussion_Papers)**

The Effects of Employment Protection and Product Market Regulations on the Italian Labor Market*

Adriana Kugler

University of Houston, Universitat Pompeu Fabra, CEPR and IZA

Giovanni Pica

University of Southampton

November 13, 2003

Abstract

Labor market regulations have often been blamed for high and persistent unemployment in Europe, but evidence on their impact remains mixed. More recently, attention has turned to the impact of product market regulations on employment growth. This paper analyzes how labor and product market regulations interact to affect turnover and unemployment. We present a matching model which illustrates how barriers to entry in the product market mitigate the impact of labor market deregulation. We, then, use the Italian Social Security employer-employee panel to study the interaction between barriers to entry and dismissal costs. We exploit the fact that costs for unjust dismissals in Italy increased for firms below 15 employees relative to bigger firms after 1990. We find that the increase in dismissal costs after 1990 decreased accessions and separations in small relative to big firms, especially for women. Moreover, consistent with our model, we find evidence that the reduction in dismissal costs had smaller effects on turnover for women in sectors faced with strict product market regulations.

Keywords: Barriers to Entry, Costs of Unjust Dismissals, European Unemployment.

JEL Classification: E24, J63, J65, L11, L43.

*We are grateful to Joshua Angrist, Giuseppe Bertola, Christian Haefke, Andrea Ichino, and Steve Pischke for useful suggestions. We thank Bruno Contini of the LABORatorio Riccardo Revelli for kindly providing us with the INPS data and Federico Cingano and Alfonso Rosolia for providing us with data on sector-level productivity and GDP growth.

1 Introduction

Labor market regulations have often been blamed for the poor performance of European labor markets. However, lack of sharp changes in labor market regulations has made it difficult to identify the impact of these regulations on employment. Evidence on the impact of labor market regulations remains mixed (see, e.g., Nickell and Layard, 1999). Moreover, even when it is possible to identify the impact of regulations, they appear to have moderate effects (e.g., Kugler, Jimeno, and Hernanz, 2003). For this reason, attention has turned to other causes for high and persistent unemployment in Europe.

Recently, attention has focused on the impact of restricted competition in the product market on employment.¹ On the one hand, product market regulations may reduce the number of firms and provide firms with market power, thus reducing employment levels due to scale effects. On the other hand, product market regulations may introduce barriers to entrepreneurship making it difficult to set up new firms and create new jobs. Bertrand and Kramarz (2002) use a unique panel for the French retail trade industry and find that stronger deterrence of entry by regional zoning boards slowed down employment growth in those regions. Boeri, Nicoletti and Scarpetta (2000), instead, use cross-sectional indicators of product market regulations generated by the OECD for 27 countries and find a negative correlation between their indicator of barriers to entrepreneurship and employment-to-population ratios. Also, Djankov et al. (2002) present new data on the regulation of entry of start-up firms in 85 countries and find that countries with heavier regulation of entry have larger underground economies.

In this paper, we present new evidence on the impact of employment protection legislation exploiting the differential change in severance pay for unfair dismissals in Italy in large and small firms after 1990, and then ask whether the effects of employment protection vary with the strictness of product market regulations. Krueger and Pischke (1997) have argued, for example, that besides labor market rigidities, restrictions on start up companies or product market regulations may depress employment by reducing the responsiveness of labor demand with respect to labor costs. We formalize a similar idea using a simple matching model with entry and dismissal costs to illustrate the interaction between regulations of entry and employment protection legislation, and, then, present evidence of the separate and joint effects of regulations in labor and product markets using social security data for Italy.

Italy is an interesting country to study because it is one of the more heavily regulated

¹See, for example, Bertrand and Kramarz (2002); Blanchard and Giavazzi (2003); Boeri, Scarpetta, Nicoletti (2000); Fonseca, Lopez-Garcia and Pissarides (2001); Gersbach and Schniewind (2001); Messina (2003); Nickell (1999).

OECD economies both in terms of barriers to entrepreneurship and in terms of employment protection. Djankov et al. (2002) report that an entrepreneur in Italy has to follow 16 different procedures, pay US\$3,946 in fees, and wait at least 62 business days to acquire the necessary permits to be able to start a business. Also, according to Nicoletti et al. (2000), Italy ranks third, after Turkey and Korea, in terms of the strictness of regulations that generate barriers to entrepreneurship, but they also find that the strictness of these regulations vary across sectors within Italy. Moreover, according to the same study, Italy ranks third in terms of the strictness of regulations on permanent contracts. More importantly for our analysis, Italy introduced a labor market reform after 1990 which increased employment protection for workers employed under permanent contracts in firms with less than 15 employees relative to those in firms with more than 15 employees. This reform, together with variation in the regulations of entry across sectors, allows us to identify the interaction between product and labor market regulations in Italy.

The theoretical section of the paper presents a simple matching model with entry and dismissals costs. Entry costs reflect barriers to entry generated by the costly administrative burdens documented by Nicoletti et al. (2000) and Djankov et al. (2002). Dismissal costs capture the strict employment protection regulation in the form of indemnities for unjust dismissals, advance notice requirements, and other procedural inconveniences. In the model, higher entry costs reduce job creation, because the higher are entry costs the more sensitive is job creation to the probability of filling vacancies. However, entry costs have no effect on job destruction because these costs are sunk. Moreover, while a reduction in dismissal costs increases job creation and job destruction, the increase in job creation as a result of lower dismissal costs is smaller the higher are entry costs. Consequently, an important implication of the model is that stricter regulation of entry reduces the effectiveness of labor market reforms in generating new jobs.

The empirical analysis uses an employer-employee panel from the Italian Social Security Institute (INPS) to examine how the 1990 Italian labor market reform affected worker flows in sectors subject to heavy regulations of entry and those subject to lighter regulations. Our results suggest the 1990 reform reduced accessions to permanent contracts, especially for women. Moreover, consistent with the predictions of the theory, the results suggest that the effect of the reform in terms of reduced accessions for women was smaller in sectors with heavy regulations of entry. The results also suggest the reform reduced separations from permanent contracts and that the reduction in separations was greatest in regulated sectors. An important implication of our findings is that for labor market deregulation to be effective in terms of generating new jobs, countries also have to reduce administrative burdens and

eliminate other regulations that create barriers to entrepreneurship.

The rest of the paper is organized as follows. Section II describes regulations in product and labor markets in Italy as well as recent reforms. Section III presents a theoretical framework to analyze the impact of entry and dismissal costs on turnover and employment. Section IV explains the identification strategy used to evaluate the impact of product and labor market regulations in Italy. Section V describes the Social Security data and presents estimates of the impact of increased strictness of employment protection in small firms in Italy after 1990, and its interaction with entry regulations, on turnover and employment.

2 Regulations in Italy

2.1 Employment Protection Regulations

Italy, together with the other Southern European countries, is considered one of the strictest countries in terms of employment protection legislation (EPL). For example, a study by Lazear (1990) for the period 1956-84 and a study by Bertola (1990) for the late 1980's rank Italy as the strictest country in terms of EPL. A study by the OECD's Employment Outlook for the late 1980's, ranks Portugal as the strictest country followed by Italy, Spain, and Greece. A similar study by the OECD's Employment Outlook for the late 1990's, which includes Turkey, North America, and Transition Economies as well, continues to rank Portugal as the strictest, followed by Turkey, Greece, Italy and Spain. The study by Nicoletti et al. (2000), which does not include some of the countries in the OECD's Employment Outlook study, also ranks Italy third, after Portugal and the Netherlands, in terms of the strictness of regulations on permanent contracts.

Dismissals were first regulated in Italy in 1966 through Law No. 604, which established that, in case of unfair dismissal, employers had to either hire back workers or pay severance, which depended on tenure and firm size. Severance pay for unfair dismissals ranged between 5 and 8 months for workers with less than two and a half years of tenure, between 5 and 12 months for those between two and a half and 20 years of tenure, and between 5 and 14 months for workers with more than 20 years of tenure in firms with more than 60 employees.² Firms with less than 60 employees had to pay half the severance paid by firms with more than 60 employees. In 1970, the *Statuto dei Lavoratori* (Law No. 300) established that all firms with more than 15 employees had to hire back workers and pay their foregone wages in case of unfair dismissals, but exempted firms with less than 15 employees.³ A number of recent

²By contrast, severance pay for fair dismissals is paid from workers' retained earnings, so they entail no cost to employers.

³Boeri and Jimeno (2003) present a theoretical explanation of why these exemptions may be in place to

studies show evidence of the binding effect of this law for firms at the 15 employee threshold. For example, the last annual report by the Italian Statistical Office, ISTAT, shows a larger fraction transiting to a smaller size category for firms around the 15 employee threshold than for firms at any other sizes. Similarly, Garibaldi, Pacelli and Borgarello (2003) find a higher probability of inaction and a higher probability of reducing firm size than of increasing it for firms at the 15 employee threshold.

Given the high costs of unfair dismissals for larger firms, in 1987 the Italian government liberalized the use of temporary contracts in an attempt to provide more flexibility to employers. Prior to 1987, temporary contracts could be used for specific projects, seasonal work, or for replacement of temporarily absent permanent workers. After 1987, temporary contracts could be used more widely subject to collective agreements specifying certain target groups. While the extended use of temporary contracts allowed for more flexibility in the labor market, these contracts could only be renewed up to two times and could only have a maximum length of 15 months. Consequently, even though temporary contracts were liberalized after this reform, the use of temporary contracts remained heavily regulated in Italy compared to other countries.⁴

Moreover, soon after the 1987 reform, Law No. 108 was introduced in 1990 further restricting dismissals for permanent contracts. In particular, this law introduced severance payments of between 2.5 and 6 months pay for unfair dismissals in firms with less than 15 employees. In contrast, firms with more than 15 employees still had to hire back workers and pay foregone wages in case of unfair dismissals. This means that the cost of unfair dismissals for firms with less than 15 employees increased relative to the cost for firms with more than 15 employees after 1990.⁵

In 1997, Italy moved again in the direction of trying to provide firms with a margin of flexibility by legalizing the use of temporary help agencies. However, as the 1987 reform, the legalization of temporary help agencies was limited in that it imposed restrictions on the maximum number of possible renewals of temporary help workers.⁶

begin with. They argue that exempting small firms reduces the disemployment effect of EPL, because small firms subject to EPL have to pay much higher efficiency wages to discourage shirking than large firms.

⁴Note that, according to the OECD's Employment Outlook (1999), Italy ranked first in terms of strictness of the regulation of fixed-term contracts during the 1980's and it continued to rank first during the 1990's.

⁵In 1991, the Italian government also introduced another reform aimed at providing fiscal incentives by reducing payroll taxes (i.e., social security contributions) for firms with more than 15 employees. As shown in Kugler, Jimeno, and Hernanz (2003) while an increase in dismissal costs should reduce both hiring and dismissals, a reduction in payroll taxes should increase hiring but have no effect on dismissals. Consequently, this reform should have increased hiring but should not have affected dismissals. In 1992, the government also eliminated a wage indexation mechanism (*Scala Mobile*) which had been adopted in 1945 and which applied to firms of all sizes.

⁶OECD measures of the strictness of regulations on temporary help agencies ranked Italy first in the

While the 1990 reform increased the costs of unfair dismissals for permanent contracts in firms with less than 15 employees relative to firms with more than 15 employees, the 1987 and 1997 reforms introduced flexibility at the margin by deregulating the use of temporary contracts and temporary layoffs. Since our data is for the period of 1986 to 1995, in this paper we exploit the temporal change in dismissal costs generated by the 1990 reform for permanent workers, which applied differently for small and large firms.⁷

2.2 Entry Regulations

Italy is not only one of the strictest countries in terms of regulation of the labor market, but also in terms of regulations in product markets. In their data set of regulations of entry of start-up firms, Djankov et al. (2002) find that Italy is one of the most restrictive countries in terms of the number of procedures required to set-up a business. An entrepreneur in Italy has to follow 16 different procedures to acquire the necessary permits to start a business, which is the same number required in Senegal, Ecuador, Romania and Vietnam, and well above the worldwide average number of 6.04 procedures. This study also finds, that without taking into account bribes, time and out-of-pocket costs involved in setting up a business in Italy rise to 45 percent of per capita GDP.

Nicoletti et al. (2000) construct broader measures of product market regulations which capture: (1) barriers to entrepreneurship (e.g., administrative burdens on start-ups and corporate firms, licensing and permit systems, existence of antitrust exceptions for public enterprises), as well as (2) state control over business enterprises (e.g., size of public enterprise sector, price controls in competitive industries).⁸ According to their measure capturing barriers to entrepreneurship, Italy ranks third, after Turkey and Korea, in terms of strictness among 27 OECD countries, followed by France and Belgium. Disaggregating this measure into what is due to administrative burdens to start-ups, regulatory opacity, and barriers to competition, Italy ranks first in terms of administrative burdens to start-ups. Italy also appears heavily regulated in terms of state involvement. According to Nicoletti et al.'s (2000) measure of state control, Italy ranks second after Poland. Separating this measure into a

late 1980's, but ranked Italy 6th in the late 1990's after Turkey, Greece, Spain, Portugal and Belgium (Employment Outlook, 1999).

⁷In our empirical analysis we also tried limiting the sample to the period from 1987 to 1996 to eliminate any possible effect of the liberalization of temporary contracts in 1987. In any case, though, we concentrate on permanent workers in our analysis.

⁸A number of studies have analyzed the impact of product market regulations on employment, the employment consequences of immigration, productivity, and investment using these indicators, including Boeri, Nicoletti and Scarpetta (2000); Angrist and Kugler (2003); Nicoletti and Scarpetta (2003); and Alesina, Ardagna, Nicoletti, and Schiantarelli (2003).

measure of public ownership and involvement in business operations (e.g., price controls), Italy ranks second after Poland in terms of public ownership and fourth in terms of state involvement after Spain, Greece, and Belgium.

While Italy is clearly heavily regulated compared to other countries, within Italy some industries are less heavily regulated than others because many regulations are industry-specific. For example, administrative burdens on start-ups are particularly heavy in Italy, as in France (see Bertrand and Kramarz, 2002), for retail distribution companies. Using the OECD international regulation database, Nicoletti (2001) constructs measures of industry-level regulation for seven sectors: retail distribution, road freight, mobile telephony, air passenger transport, fixed telephony, electricity, and railways.⁹ Using these measures, he ranks industries as very restrictive, restrictive, liberal, or very liberal, according to whether the summary indicator of regulation in the industry exceeds by more or less than one standard deviation the average value for the industry in the 28 OECD countries included in the sample.¹⁰ Using these indicators of strictness of regulation in the service sector, retail distribution, road freight, mobile telephony, electricity and railways are ranked as restrictive, while air passenger transport and fixed telephony are ranked as liberal.¹¹ We also focus in the textile sector as another sector with low entry restrictions in Italy, which has been dominated by small firms.

We use the fact that some industries within Italy are subject to strict regulation of entry while others are faced with lighter entry barriers to study the differential impact of changes in dismissal costs when product markets are more or less regulated. The next section presents a model to illustrate how employment protection and entry regulations, like those present in

⁹ See Boylaud (2000) for detailed study of the road freight and retail sectors; Boylaud and Nicoletti (2001) for a detailed study of the telecommunications sector; Gönenc and Nicoletti (2000) for a detailed study of the air passenger transportation sector; and Gönenc, Maher, and Nicoletti (2001) for a detailed study of each of these sectors.

¹⁰The reason for ranking the industry strictness by comparing the industry in a country to the industry's average in all countries in the sample is that some industries may be subject to market failures so that regulation may be justified. This means that it makes sense to compare Italy's electricity sector to the electricity sector in other countries rather than to Italy's retail distribution sector, which is unlikely to face the same market failures as the electricity sector.

¹¹ While some of these sectors have been affected by regulatory reform, the most important changes in the regulatory environment occurred after the period we study (see Goglio (2001) for a detailed description of these reforms). For example, *Telecom Italia* was privatized in 1997 and telecommunications services were fully liberalized also in 1997. In electricity, *ENEL* (the public legal monopoly until then) became a joint stock company in 1991. However, it was only until 1999 that the sector was fully liberalized by introducing functional unbundling of the industry and limiting the generation and import of *ENEL* to 50%. Similarly in railways, *Ferrovie dello Stato* (the integrated public monopolist until then), was transformed into a joint stock company in 1992. However, it was only until 1999 that the law requires legal separation between the network operators and the service company and that international operators are allowed to access this market.

Italy, interact in terms of their effects on turnover and employment.

3 Theoretical Effects of EPL and Entry Cost

A simple matching model illustrates the individual and joint effects of employment protection legislation and regulations on start-ups. The model is similar to Mortensen and Pissarides's (1994) but adds dismissal costs and fixed set-up costs for opening vacancies. Our theoretical model shows the standard effects of dismissal costs in terms of reducing job creation and job destruction, but in addition it illustrates how barriers to entry mitigate the effects of dismissal costs. This means that there are economic complementarities between labor and product market policies in our model, in the sense that the effectiveness of one policy depends on the implementation of the other policy.¹² Thus, an important implication of the model is that labor market deregulation will be less effective in the presence of heavier regulations of entry.

Firms have a discount factor r . There is a fixed set-up cost K of opening a vacancy and a cost c of holding the vacancy open. There is free entry, so that the value of a vacancy is equal to the fixed set-up cost in equilibrium. The number of matches in the economy is given by $m(u, v)$, which depends on the unemployment and vacancy rates u and v , since the labor force is normalized to one. The matching function is assumed to increase in both u and v and to be homogeneous of degree one. Accordingly, the arrival rate of applicants is $\frac{m(u, v)}{v} = m\left(\frac{1}{\theta}, 1\right) = q(\theta)$ with $q'(\theta) < 0$. As in Mortensen and Pissarides (1994), jobs are assumed to start at the highest possible level of productivity, ε_m , but jobs are subject to productivity shocks with instantaneous probability λ where the new match-specific productivity, ε' , is drawn from a distribution function $G(\cdot)$ on the support $[\varepsilon_0, \varepsilon_m]$. Jobs hit by shocks are either terminated or continued, and if they are terminated they have to pay a dismissal cost F , which is assumed to be pure waste. Every period, firms pay a wage $w(\varepsilon)$,

$$w(\varepsilon) = \phi\varepsilon + (1 - \phi)b$$

where b is the reservation wage of the worker and where the wage is a weighted sum of the productivity of the match and the reservation wage.¹³

¹²Orszag and Snower (1999) discuss economic and political complementarities between unemployment benefits and taxes, where political complementarities arise when the ability to gain political consent for one policy depends on the implementation of the other policies. Blanchard and Giavazzi (2003) instead discuss political complementarities between labor market regulations that determine the bargaining power of workers and entry regulations.

¹³This is the same as the wage in a model in which wage determination is characterized by Nash bargaining and workers have no bargaining power. By continuity, there is a positive bargaining power, under which our

The values of filled and vacant jobs are,

$$\begin{aligned} rJ(\varepsilon) &= \varepsilon - w(\varepsilon) + \lambda \int_{\varepsilon_0}^{\bar{\varepsilon}} [-F - J(\varepsilon)] dG(\varepsilon') + \\ &\quad \lambda \int_{\bar{\varepsilon}}^{\varepsilon_m} [J(\varepsilon') - J(\varepsilon)] dG(\varepsilon') \end{aligned} \quad (1)$$

$$rV = -c + q(\theta) [J(\varepsilon_m) - V] \quad (2)$$

where $\bar{\varepsilon}$ is the threshold match-specific productivity at which firms are indifferent between dismissing and retaining the worker. It is straightforward to show that $J(\varepsilon)$ is increasing in ε and there exists a threshold match-specific productivity $\bar{\varepsilon} \in [\varepsilon_0, \varepsilon_m]$ given by the condition $J(\bar{\varepsilon}) = -F$, such that workers are dismissed whenever $\varepsilon \leq \bar{\varepsilon}$ and they are retained whenever $\varepsilon > \bar{\varepsilon}$.

Imposing this condition on equation (2) and integrating by parts, the job destruction schedule is given by the following equation,

$$0 = rF + (1 - \phi)(\bar{\varepsilon} - b) + \lambda \frac{1 - \phi}{r + \lambda} \int_{\bar{\varepsilon}}^{\varepsilon_m} [1 - G(\varepsilon')] d\varepsilon' \quad (3)$$

Consequently, the job destruction schedule is flat and it decreases as dismissal costs, F , increase, but does not shift with changes in entry costs, K . The latter occurs because entry costs are sunk, so they do not affect dismissal decisions.

Free entry implies that the number of vacancies is determined by zero net profits, so that the value of a vacancy equals the entry cost, $V = K$. Substituting the free entry condition into the value of a vacancy in equation (2) yields,

$$J(\varepsilon_m) = \frac{rK + c}{q(\theta)} + K$$

where the first term captures the expected flow opportunity cost of opening a vacancy and the second term the cost to be paid up front upon opening. Combining this condition and the job destruction condition and using the fact that $J'(\varepsilon) = \frac{1-\phi}{r+\lambda}$, we get the job creation schedule:

$$\frac{1 - \phi}{r + \lambda} (\varepsilon_m - \bar{\varepsilon}) - \left(\frac{rK + c}{q(\theta)} + K + F \right) = 0 \quad (4)$$

The job creation schedule slopes downward. The higher is the threshold that induces dismissals, the lower is the value of a job and the smaller the incentives to open new vacancies. In addition, increases in both dismissal and entry costs reduce the incentives to

results below hold in a standard matching model with bargaining power. While our results hold for a low enough bargaining power of the workers, we keep this wage determination mechanism for simplicity.

open new vacancies, shifting down the job creation schedule (i.e. $\frac{d\bar{\varepsilon}}{dF} = -\frac{r+\lambda}{1-\phi} < 0$ and $\frac{d\bar{\varepsilon}}{dK} = -\frac{r+\lambda}{1-\phi} \left(1 + \frac{r}{q(\theta)}\right) < 0$).¹⁴ In addition, note that the entry cost K affects the slope of the job creation schedule. As K increases, the job creation schedule becomes steeper because firms are more careful about creating new jobs, so that a lower probability of filling the vacancy reduces job creation by more.

Given the job creation and job destruction schedules, the equilibrium values of the dismissal threshold and the labor market tightness parameter, $\bar{\varepsilon}^*$ and θ^* , are given by equations (3) and (4) (see figure 1). An increase in dismissal costs reduces the dismissal threshold and labor market tightness. The effects on the equilibrium value of $\bar{\varepsilon}^*$ are determined by the job destruction equation, which is independent of θ^* , so an increase in dismissal costs reduces the dismissals, i.e., $\frac{d\bar{\varepsilon}^*}{dF} = -\frac{(r+\lambda)}{(1-\phi)[r+\lambda G(\bar{\varepsilon}^*)]} < 0$. On the other hand, entry costs have no effect on dismissals. The effects on the equilibrium level of θ^* are determined by the job creation schedule, so both dismissal costs and entry costs reduce hiring, i.e.,

$$\begin{aligned}\frac{d\theta^*}{dK} &= \frac{r+q(\theta^*)}{rK+c} \frac{q'(\theta^*)}{q'(\theta^*)} < 0 \\ \frac{d\theta^*}{dF} &= \frac{\lambda G(\bar{\varepsilon}^*)}{[r+\lambda G(\bar{\varepsilon}^*)]} \frac{(q(\theta^*))^2}{q'(\theta^*)(rK+c)} < 0\end{aligned}$$

The negative effect of K on θ^* is clear. The entry cost reduces job creation while not affecting job destruction, hence the ratio of vacancies to unemployment decreases (see Figure 2). The negative effect of F on θ^* is due to the fact that an increase in F reduces job creation more than job destruction. The reason is that firing costs affect entry due to the lower profits realized at *any* realization of the shock, while they have an effect on destruction only in bad states of the world (see Figure 3).

In addition, the effect of an increase in dismissal costs on hiring will be smaller, the higher are entry costs, i.e., $\frac{d^2\theta^*}{dFdK} > 0$. This is because the higher are entry costs, the more sensitive is job creation to the probability of filling vacancies, so higher dismissal costs generate a smaller reduction in hiring or, viceversa, lower dismissal costs generate a smaller increase in hiring. Figure 4 shows the effects of an increase in firing costs at different levels of entry costs. The figure shows that higher entry costs shift the job creation down and also increases the slope of the job creation schedule. Consequently, an increase in dismissal costs has a smaller effect on labor market tightness the higher are entry costs.¹⁵

¹⁴Note that the reduction in job creation as a result of an increase in entry costs is greater than the reduction due to an increase in dismissal costs. This is because the entry cost generates both an up front cost and a flow cost $\frac{rK}{q(\theta)}$, while the firing cost only generates an up front cost.

¹⁵This is similar to the reduction in the labor demand elasticity generated by the constraint on entrepreneurship in Krueger and Pischke's (1997) model.

4 Identification Strategy

The goals of this paper are: first, to identify the impact of dismissal costs on permanent employment, and, second, to identify how the impact of dismissal costs varies with the strictness of entry regulations. To identify the impact of increases in dismissal costs, we compare firms with less than 15 employees to firms with more than 15 employees before and after the 1990 reform. To deal with the possibility that firm size may be affected by the reform itself, we use firm size during the pre-reform period which is highly correlated with current firm size, but not affected by the reform. In particular, we use the average firm size during the pre-reform period to assign firms to the smaller or bigger than 15 employees groups.¹⁶ Moreover, to identify how the impact of dismissal costs varies with the strictness of entry regulations, we compare firms with less than 15 employees relative to firms with more than 15 employees in sectors subject to heavier and lighter regulations of entry, before and after the 1990 reform.

The strategy to identify the impact of the change in dismissal costs is illustrated in Figures 5-6. Figures 5 and 6 show accession and separation probabilities in firms with less than 15 employees relative to firms with more than 15 employees for the period 1986 to 1995. Figure 5 shows a sharp decline in accession probabilities in small relative to big firms starting in 1990. Figure 6 also shows a decline in the separation probabilities starting in 1989, possibly in anticipation of the reforms. Figures 7 and 8 also show accession and separation probabilities for small firms relative to big firms, but separating firms into regulated and unregulated sectors according to the Nicoletti (2001) classification. Figure 7 shows that while accession probabilities decreased after 1990 in both regulated and unregulated sectors, the decline was greater in unregulated sectors as predicted by the theory. By contrast, Figure 8 shows that the decline in separation probabilities was greatest in the regulated sectors.¹⁷

To control for the possibility that reduced accessions and separations are the result of other shocks occurring during the post-reform period, we estimate the following linear probability model which controls for worker, year and firm effects, and for observable worker and firm characteristics:

$$E [m_{ijt} = 1 | X_{ijt}, D_j^S, Post_t] = \alpha_i + \tau_t + \psi_j + \beta' X_{ijt} + \delta (D_j^S \times Post_t) + u_{ijt} \quad (5)$$

where $m_{ijt} = 1$ if a match was created or destroyed, i.e., if there was either an accession or a

¹⁶The correlation between the average firm size during the pre- and post-reform periods is 0.95.

¹⁷The results below show that this is driven by the results for men, as the impact of the reform on women's separations was smaller in the regulated sector. Note that our theory does not make any predictions on the relative impact of increased dismissal costs on separations in regulated and unregulated sectors.

separation, for person i in firm j at time t , α_i is an individual effect, τ_t is a year effect; ψ_j is a firm effect; $Post_t$ is a dummy that takes the value of 1 after 1990 and zero otherwise; D_j^S is a dummy that takes the value of 1 if the worker is employed in a small firm, i.e., a firm with less than 15 employees during the pre-reform period, and 0 if the worker is employed in a big firm; and X_{ijt} includes worker characteristics such as age, occupation, and gender, and firm characteristics such as location and sectoral productivity. The interaction term between the small firm dummy and the post-reform dummy is included to capture the effects of interest.

While inclusion of time effects allows controlling for the possibility that the change in turnover after the post-reform period was due to macro shocks, it is possible that the cycle affects small and large firms differently. If this were the case, then we should have observed both reduced accessions and increased separations during the post-reform period due to the strong recession of 1992 and 1993. Instead, Figures 5 and 6 above show reduced accessions and separations. Nonetheless, we also estimate the following alternative specification allowing for size-specific cyclical effects:

$$E [m_{ijt} = 1 | X_{ijt}, D_j^S, Post_t, E_t] = \alpha_i + \tau_t + \psi_j + \beta' X_{ijt} + \phi E_t + \rho (D_j^S \times E_t) + \\ + \delta (D_j^S \times Post_t \times E_t) + u_{ijt}' \quad (6)$$

where E_t is an expansion variable which is either an expansion dummy taking the value of 0 during the recession years of 1992 and 1993 and one otherwise, or GDP growth. Here the impact of the reform is captured by the coefficient on the interaction of the small dummy, the post dummy and the expansion variable, which now measures the impact of the reforms during the post-reform expansion relative to the pre-reform expansion. The size-specific cyclical effect is captured by the coefficient on the interaction term between the small dummy and the expansion variable. Since we are also interested in how the effects of dismissal costs vary with the strictness of regulations of entry, we estimate the effects of interest both for the regulated and unregulated sectors.

5 Estimates of the Effects of EPL and Entry Cost

5.1 Data Description

The dataset is drawn from the Italian Social Security Administration (INPS) archives for the years 1986-1995. The original dataset collects social security forms of a 1/90 random sample employees every year, with employees born on the 10th of March, June, September, and December of every year being sampled. The original archives only include information on

private sector firms in the manufacturing and service sectors, so that it excludes all workers in the public sector and agriculture. We use a 10% random sample from this original dataset.

The dataset includes individual longitudinal records generated using social security numbers. However, since the INPS collects information on private sector employees for the purpose of computing retirement benefits, employees are only followed through their employment spells. The data, thus, stops following individuals who move into self-employment, the underground economy, unemployment, and retirement. The dataset also includes longitudinal records for firms employing the randomly selected workers in the sample using the firms' name, address, and social security and fiscal codes.¹⁸ The dataset is, thus, an employer-employee panel with information on workers and firm characteristics. In particular, the data includes information on employees' age, gender, occupation, dates of accession and separation with each firm, and type of contract, and information on firms' location, sector of employment, number of employees, and firms' dates of incorporation and termination. The advantage of this administrative data for the purpose of studying worker transitions is that, contrary to survey data which measures transitions by matching quarterly data and using tenure information to identify job changes, it identifies exact dates of accessions and separations according to when social security contributions began and ended.

Table 1 presents descriptive statistics by firm size, before and after the 1990 reform. The table shows lower accession rates for men and women after the reform in small and large firms. However, the table shows a larger drop in accession rates after the reform in small than in large firms. Similarly, separation rates are lower for men and women after the reform in small and large firms, but the drop in separation rates was much more pronounced in small firms. These simple comparisons of means illustrate the impact of increased dismissal costs on accessions and separations in small relative to big firms.

Tables 2 and 3 present descriptive statistics for men and women, respectively, by firm size in regulated and less regulated sectors, before and after the 1990 reform. The sample in this table includes only those in sectors which can be classified as more or less restrictive in terms of product market regulations. In particular, this sample includes workers and firms in the retail, road transportation, electricity, telecommunications, air transportation, and textile sectors. Following Nicoletti's (2001) ranking of industries, we classify retail, road transportation, electricity and telecommunications as regulated and air transportation and textiles as less regulated. As Table 1, these table shows that accession and separation rates fell after the reform in small relative to large firms. In addition, these tables show that

¹⁸While the dataset includes a random sample of workers, the probability that a firm is selected increases with size.

reduced accession rates after the reform were smaller in regulated sectors. This is consistent with the idea that higher entry costs mitigate the turnover effects of dismissal costs. The next section presents regression results which control for covariates.

5.1.1 Effect on Accessions

Table 4 reports marginal effects of a linear probability model for accessions estimated using equations (5) and (6). The dependent variable is a variable that takes the value of 1 if the person joined a firm in a given year and zero otherwise. The basic specification controls for age, occupation dummies, and firm and year effects. The effect of interest is captured by the interaction between the post-reform dummy and a dummy for firms under 15 employees during the pre-reform period. The reported standard errors allow for clustering by period-size group to control for common random effects within these cells.

Panels A and B of Table 4 show the results for men and women, respectively. The results show a large and statistically significant decline in permanent accessions in small relative to large firms after the 1990 reform was introduced. Column (1) shows that accession probabilities decreased by 0.0306 or 13.1% for men and by 0.0359 or 16.2% for women in small relative to big firms during the reform years. Including sector-specific trends and sector productivity in columns (2) and (3) reduces the effects on accession probabilities to between 0.0246 and 0.0251 for men and to between 0.0335 and 0.0339 for women.

Columns (4) and (5) of Table 4 report the results controlling for size-specific cyclical effects as in equation (6). The results for men in Panel A show a smaller effect of between 0.0232 and 0.0171 using the expansion dummy and GDP growth, respectively, to control for size-specific cyclical effects. By contrast, the results for women now show bigger effects of between 0.0468 and 0.0507 when the size-specific cyclical effect is controlled with the expansion dummy and GDP growth, respectively. Finally, since we are using panel data, we also include worker effects to account for the possibility that less-employable individuals may look for employment in smaller firms. The results with size-specific cyclical effects as well as individual fixed effects in Column (6) show a smaller but still significant effect for men of 0.0154 or 6.6% and a bigger effect for women of 0.0508 or 23%. The much larger reduction in hiring as a result of increased dismissal costs for women than for men is consistent with the view that dismissal costs have a much larger effect on outsiders than insiders.

Table 5 shows the marginal effects of models which include interactions with a regulated sector dummy, which allow to contrast how the effect differs between regulated and unregulated sectors. The third level interaction on the small dummy, the post-90 dummy, and the regulated dummy captures the differential effect of the increase in unfair dismissal costs

in the regulated relative to the unregulated sector. As in Table 4, the results show reduced accessions for men and women in small relative to big firms during the reform years. The results for men show no differential effects of the reform in regulated and unregulated sectors. By contrast, the results for women generally show a smaller reduction in accessions in regulated relative to unregulated sectors. The results for women are consistent with the idea that the effect of the reforms in terms of reduced hiring should be smaller in sectors faced with higher entry costs.

5.1.2 Effect on Separations

Table 6 reports marginal effects of a linear probability model for separations. The dependent variable is now a variable that takes the value of 1 if the person separated from the firm in a given year and zero otherwise.¹⁹ As before, Panel A reports the results for men and Panel B for women. The results show that separation probabilities decreased for both men and women. For example, the results from the basic specification show a decrease in separation probabilities of 0.0615 or 18.9% for men and of 0.0637 or 19.8% for women. Controlling for sector-specific trends and sector productivity the effects drop to 0.0607 and 0.0623 for men and women, respectively.

The results controlling for size-specific cyclical effects in Columns (4) and (5) of Table 6 show smaller effects of between 0.0551 and 0.0579 for men and larger effects of between 0.0861 and 0.0899 for women. Moreover, the results controlling for worker effects are smaller but continue to show significant reductions in separations in small relative to big firms during the reform period. The results with both size-specific cyclical effects and worker effects now show a reduction in separations of 0.0237 or 7.3% for men and of 0.034 or 10.6% for women in small relative to big firms after 1990.

Table 7 shows the marginal effects of models which include interactions with a regulated sector dummy. The effects of the reform become insignificant for men, but, as in Table 6, the results for women show reduced separations in small relative to big firms after the reform. Moreover, the results for men show bigger effects of the reform on separations in regulated sectors, while the results for women show bigger effects in the less regulated sectors.²⁰

¹⁹The controls in these specifications are as in the linear probability models for accessions.

²⁰Our theoretical analysis in Section 3 does not predict anything about the differential impact of dismissal costs in regulated or unregulated sectors.

5.1.3 Net Employment Effect

The effects of the reform on net employment can be determined using the following steady state conditions,

$$\begin{aligned}\lambda_S e_S &= \theta_S u \\ \lambda_L e_L &= \theta_L u\end{aligned}$$

where $\lambda_S = \lambda G(\bar{\varepsilon}_S^*)$, $\theta_S = \theta_S^* q(\theta_S^*)$, $\lambda_L = \lambda G(\bar{\varepsilon}_L^*)$, and $\theta_L = \theta_L^* q(\theta_L^*)$. The first steady-state condition requires the flow into unemployment out of small firms to be equal to the flow out of unemployment into small firms, and the second condition requires the flow into unemployment out of large firms to be equal to the flow out of unemployment into large firms. In addition, the following identity must hold:

$$u = 1 - e$$

where

$$e = [p_S \times e_S + (1 - p_S) \times e_L]$$

where p_S is the share of employment in small firms. Using the two steady-state conditions and the identity to solve for employment yields:

$$e = \left[\frac{p_S \lambda_L \theta_S + (1 - p_S) \lambda_S \theta_L}{\lambda_S \lambda_L + p_S \lambda_L \theta_S + (1 - p_S) \lambda_S \theta_L} \right]$$

The results above suggest accessions and separations decreased by 6.6% and 7.3% for men. Using these results together with average accessions and separation rates in small and large firms and the share of employment in small firms before the reform in the top panel of Table 1, suggests an increase in men's employment of less than a tenth of a percentage point due to the reform. In contrast, the results for women suggest greater decreases in accessions and separations of 23% and 10.6%, respectively. Combining these results with the average accession and separation rates in small and large firms and the share of employment in small firms for women before the reform in Panel B of Table 1, suggests a decline in women's employment of about 1% as a result of the reform. The results for men and women suggest no net employment effects due to increased dismissal costs for insiders but negative employment effects for workers likely to be outsiders. Moreover, the results above show greater effects of the reform in unregulated sectors, especially in terms of accessions, suggesting that most of the losses in employment after the increase in dismissal costs occurred in less regulated sectors.

6 Conclusion

Labor and product market regulations have often been blamed for the high unemployment in Europe. Yet, the empirical evidence on the impact of these regulations is mixed. In this paper, we present new evidence on the impact of dismissal costs on turnover and employment and ask how the employment consequences of dismissal costs vary with the strictness of entry regulations. We first present a model, which shows that while dismissal costs reduce both accessions and separations, the impact of dismissal costs on hiring is mitigated when entry costs are higher. This is because the higher are entry costs, the more careful are firms in creating new jobs. This result, thus, suggests that barriers to entry reduce the effectiveness of labor market deregulation. We use an employer-employee panel from the Italian Social Security to examine the impact of labor and product market regulations empirically. We exploit the fact that dismissal costs increased after 1990 in Italy for firms with less than 15 employees relative to larger firms. Our estimates suggest the 1990 reform reduced accessions by 6.6% and 23% for men and women, respectively. In addition, our estimates suggest a reduction in separations of 7.3% and 10.6% for men and women, respectively, as a result of the reform. These results are robust to the inclusion of sectoral productivity, size-specific cyclical effects, and firm and worker effects. Combining these results with the steady-state equations from the model suggests no disemployment effects of dismissal costs for men, who are more likely to be insiders, but a decline of about 1% in the employment of women, who are more likely to be outsiders. We then look at the impact of the 1990 reform on turnover in sectors subject to more and less restrictive entry regulations. While several authors have documented very costly administrative burdens in Italy, these authors also document the variability in entry regulation across sectors within Italy. We exploit this variability together with the changes in dismissal costs after 1990 for small relative to large firms to examine how labor and product market regulations interact. Our results suggest a smaller impact of the 1990 reform on accessions in regulated than in less regulated sectors, especially for women. An important implication of our theoretical and empirical findings is that for labor market deregulation to be effective in terms of generating new jobs, countries also have to eliminate administrative burdens that generate barriers to entrepreneurship.

References

- [1] Acemoglu, Daron and Joshua Angrist, (2001), Consequences of Employment Protection? The Case of the American with Disabilities Act, *Journal of Political Economy*, 109(5): 915-957.
- [2] Alesina, Alberto, Silvia Ardagna, Giuseppe Nicoletti and Fabio Schiantarelli, (2003), Regulation and Investment, NBER Working Paper No. 9560.
- [3] Angrist, Joshua and Adriana Kugler, (2003), Protective or Counter-Productive? Labor Market Institutions and the Effect of Immigration on EU Natives, *Economic Journal*
- [4] Autor, David, (2003), Outsourcing at Will: The Contribution of Unjust Dismissal Doctrine to the Growth of Employment Outsourcing, *Journal of Labor Economics*, 21(1): 1-42.
- [5] Autor, David, John J. Donohue III and Stewart J. Schwab, (2002), The Costs of Wrongful Discharge Laws, NBER Working Paper No. 9425.
- [6] Bertola, Giuseppe, (1990), Job Security, Employment, and Wages, *European Economic Review*, 54(4): 851-79.
- [7] Bertrand, Marianne and Francis Kramarz (2002), Does product market regulation hinder job creation? Commercial zoning and retailing employment in France, *Quarterly Journal of Economics*, Vol. 117(4), 1369-1414
- [8] Blanchard, Olivier J, Francesco Giavazzi (2003) Macroeconomic Effects of Regulation and Deregulation in Goods and Labor Markets, *Quarterly Journal of Economics*, Forthcoming
- [9] Blanchard, Olivier and Thomas Philippon (2003) The Decline of Rents and the Rise and Fall of European Unemployment, mimeo.
- [10] Boeri, Tito and Juan F. Jimeno (2003). The Effects of Employment Protection: Learning from Variable Enforcement, CEPR Discussion Paper No.3926.
- [11] Boeri, Tito, Stefano Scarpetta, Giuseppe Nicoletti (2000) Regulation And Labor Market Performance, *Centre for Economic Policy Research Discussion Paper DP2420*
- [12] Borgarello, Andrea, Pietro Garibaldi and Lia Pacelli (2002), Employment protection legislation and the size of firms: a close look to the Italian case, *mimeo*

- [13] Boylaud, Olivier, (2000), Regulatory Reform in Road Freight and Retail Distribution, OECD Economics Department Working Paper No. 255.
- [14] Boylaud, Olivier and Giuseppe Nicoletti, (2000), Regulation, Market Structure and Performance in Telecommunications, OECD Economics Department Working Paper No. 237.
- [15] Burda, Michael C. (1991) Labor and Product Markets in Czechoslovakia and the Ex-GDR: A Twin Study. *Centre for Economic Policy Research Discussion Paper* 548. p 41.
- [16] Contini, Bruno (2002), Osservatorio sulla mobilità del lavoro in Italia, Bologna, Il Mulino
- [17] Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes and Andrei Shleifer, (2002), The Regulation of Entry, *Quarterly Journal of Economics*, 117(1): 1-37.
- [18] Ebelt, Monique and Christian Haefke (2003), Product market deregulation and labor market outcomes, mimeo UPF
- [19] Fonseca, Raquel, Paloma Lopez-Garcia and Christopher Pissarides, (2001), Entrepreneurship, Start-Up Costs and Employment, *European Economic Review*, 45: 692/705.
- [20] Gali, Jordi, (2003), Discussion of The Decline of Rents and the Rise and Fall of European Unemployment, by O. Blanchard and T. Philippon, mimeo.
- [21] Gersbach, Hans and Achim Schniewind (2001) Product market reforms and unemployment in Europe, *IZA Discussion paper* n. 255
- [22] Goglio, Alessandro, (2001), Sectoral Regulatory Reforms in Italy: Framework and Implications, OECD Economics Department Working Paper No. 294.
- [23] Gönenc, Rauf and Giuseppe Nicoletti, (2000), Regulation, Market Structure and Performance in Air Passenger Transportation, OECD Economics Department Working Paper No. 254.
- [24] Gönenc, Rauf, Maria Maher and Giuseppe Nicoletti, (2000), The Implementation and the Effects of Regulatory Reform: Past Experience and Current Issues, OECD Economics Department Working Paper No. 251.

- [25] Hunt, Jennifer, (2000), Firing Costs, Employment Fluctuations, and Average Employment: An Examination of Germany, *Economica*, 67(266):177-202.
- [26] ISTAT, (2002), Annual Report. Rome: ISTAT Publications.
- [27] Krueger, Alan and Jörn-Stephen Pischke, (1998), Observations and Conjectures on the US Employment Miracle, in *Third Public German-American Academic Council Symposium*, Bonn.
- [28] Kugler, Adriana, Juan F. Jimeno and Virginia Hernanz, (2003), Employment Consequences of Restrictive Permanent Contracts: Evidence from Spanish Labor Market Reforms, CEPR Working Paper No. 3724.
- [29] Kugler, Adriana, (1999), The Impact of Firing Costs on Turnover and Unemployment: Evidence from the Colombian Labour Market Reform, *International Tax and Public Finance*, 6(3): 389-410.
- [30] Lazear, Edward (1990), Job Security Provisions and Employment, *Quarterly Journal of Economics*, 105(3): 699-726.
- [31] Messina, Julian, (2003), Sectoral Structure and Entry Regulations, IZA Discussion Paper No. 747.
- [32] Mortensen Dale T. and Christopher A. Pissarides (1994) Job creation and job destruction in the theory of unemployment, *Review of Economic Studies*, 61(3), July, pp. 397-415.
- [33] Nickell, Stephen (1999) Product markets and labor markets, *Labor Economics*, 6 pp 1-20
- [34] Nickell, Stephen and Richard Layard, (1999), Labor Market Institutions and Economic Performance, in David Card and Orley Ashenfelter, eds. *Handbook of Labor Economics*, Vol.3C, pp. 3029-2084.
- [35] Nicoletti, Giuseppe and Stefano Scarpetta, (2003), Regulation, Productivity and Growth: OECD Evidence, World Bank Working Paper No. 2944.
- [36] Nicoletti, Giuseppe, Stefano Scarpetta, Olivier Boylaud (2000) Summary indicators of Product Market Regulation with an extension to Employment Protection Legislation, *OECD Economics Department Working Papers* n. 226

- [37] Nicoletti, Giuseppe, (2001) Regulation in services: OECD patterns and economic implications, *OECD Economics Department Working Papers* n. 226
- [38] Nicoletti, Giuseppe, Andrea Bassanini, Ernst Ekkerhard, Jean Sébastien, Paulo Santago and Paul Swaim (2001) Product and Labor Markets Regulation in OECD Countries, *OECD Economics Department Working Papers* n. 312
- [39] OECD, (1999), *Employment Outlook*, Paris: OECD
- [40] Oyer, Paul and Scott Schaeffer, (2000), Layoffs and Litigation, *RAND Journal of Economics*, 31(2): 345-358.
- [41] Orszag, Michel and Dennis Snower. 1999. Anatomy of Policy Complementarities, IZA Discussion Paper No. 41.
- [42] Snower, Dennis , Assar Lindbeck (1993) How are Product Demand Changes Transmitted to the Labor Market? *Centre for Economic Policy Research Discussion Paper DP844*

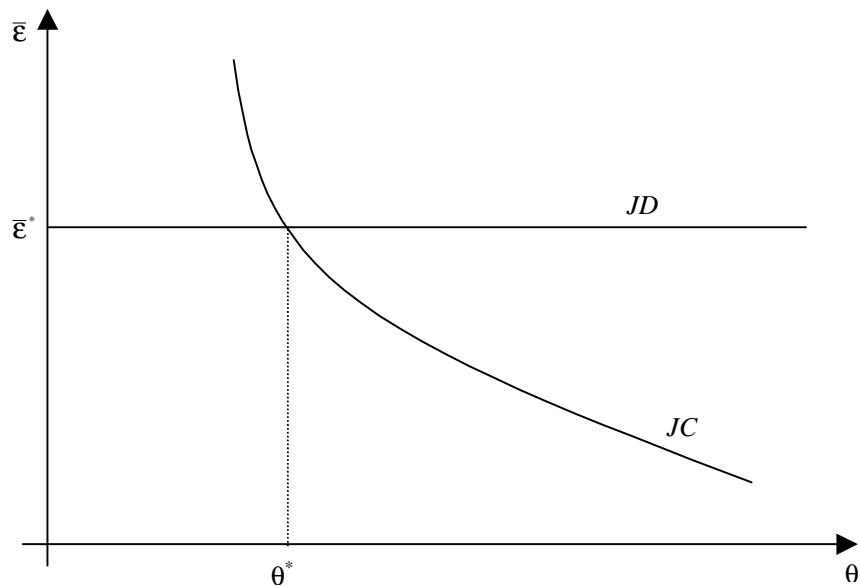


Figure 1: Equilibrium values of $\bar{\varepsilon}^*$ and θ^*

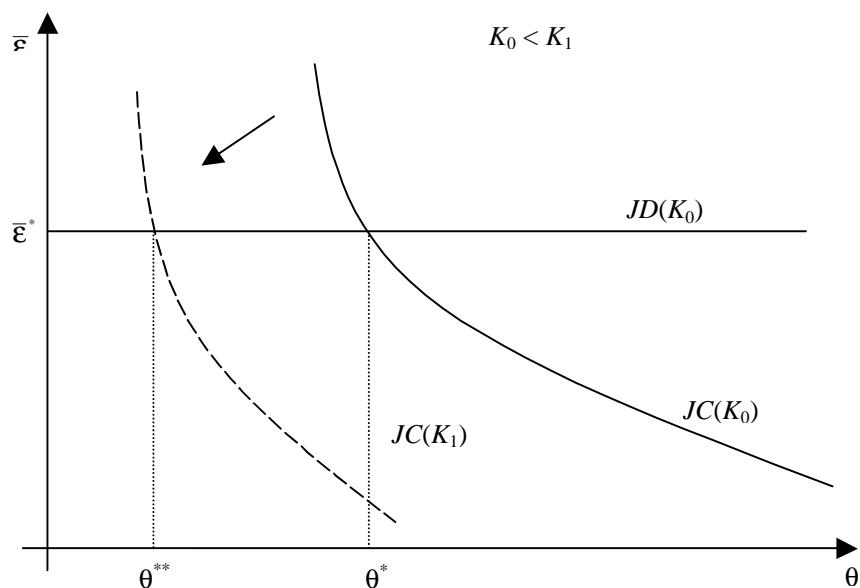


Figure 2: Effects of entry costs on JC

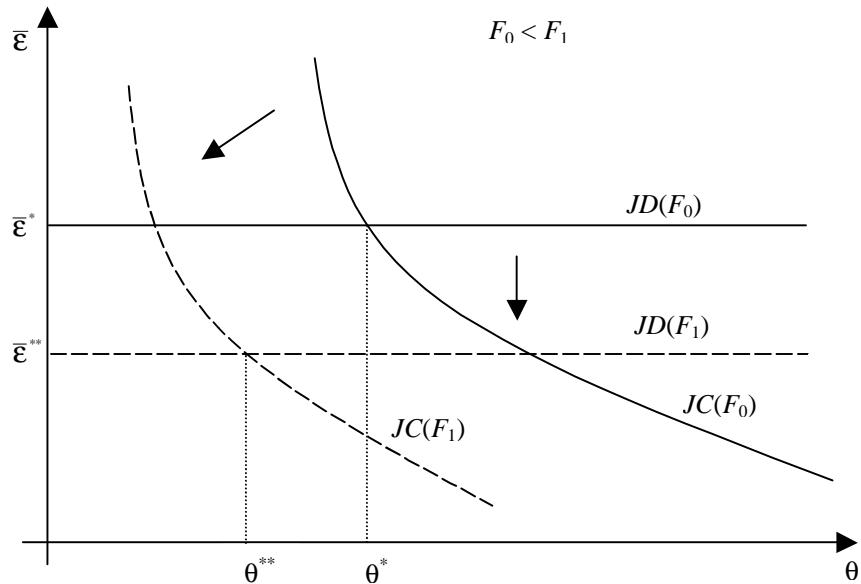


Figure 3: Effects of dismissal costs on JC and JD

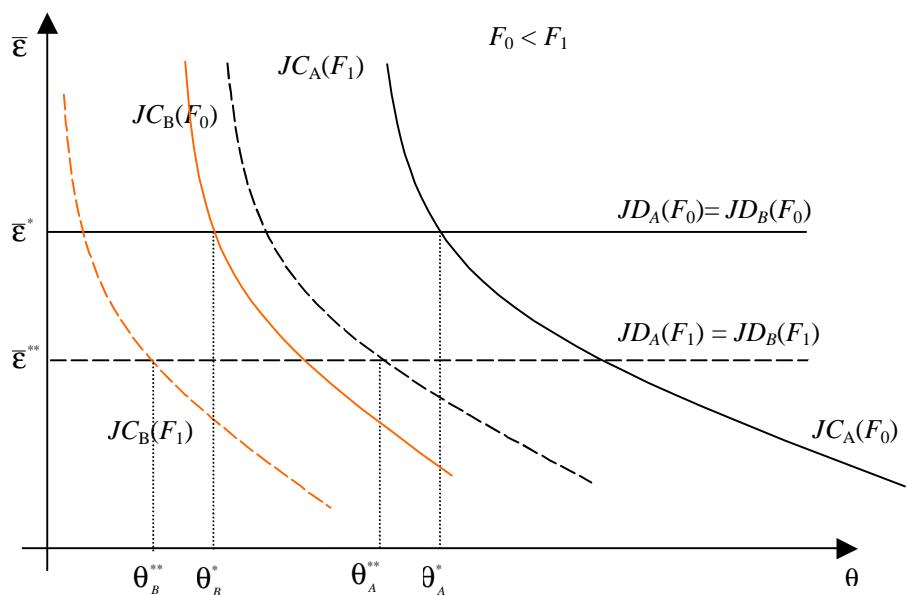


Figure 4: Effects of Dismissal Costs at Different Levels of Entry Costs

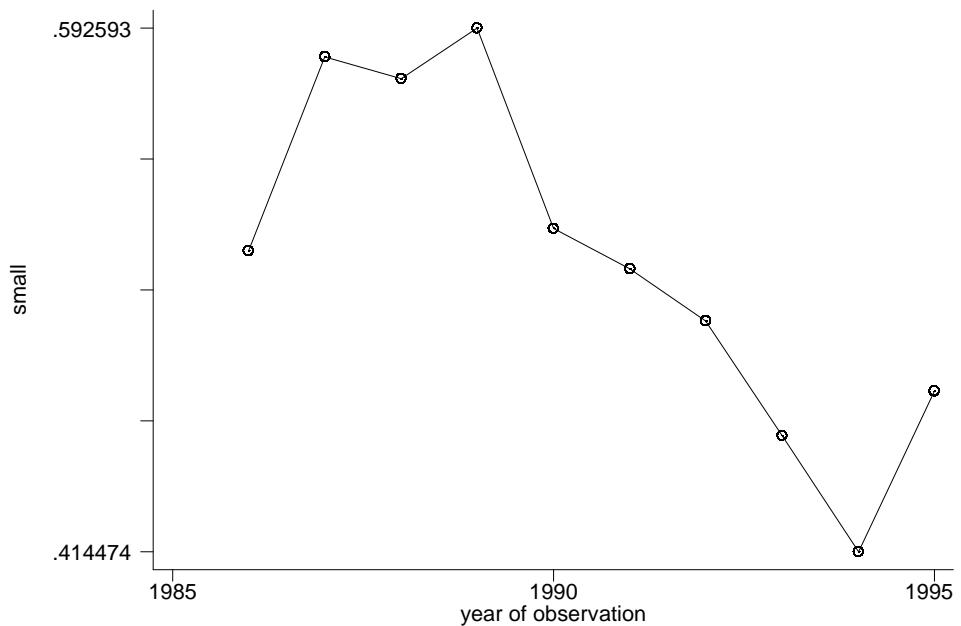


Figure 5: Probability of accessions in small firms

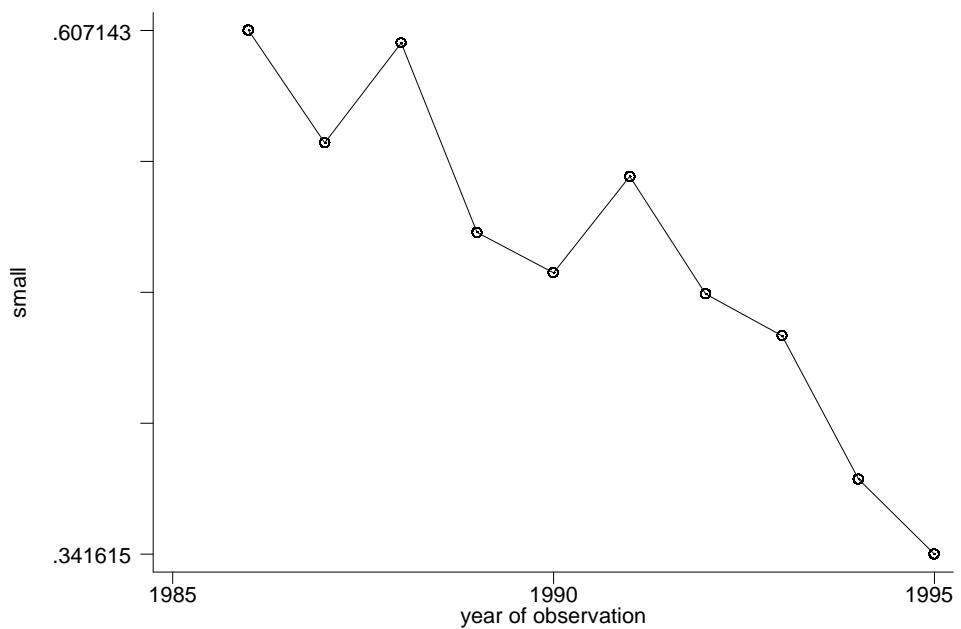


Figure 6: Probability of separations in small firms

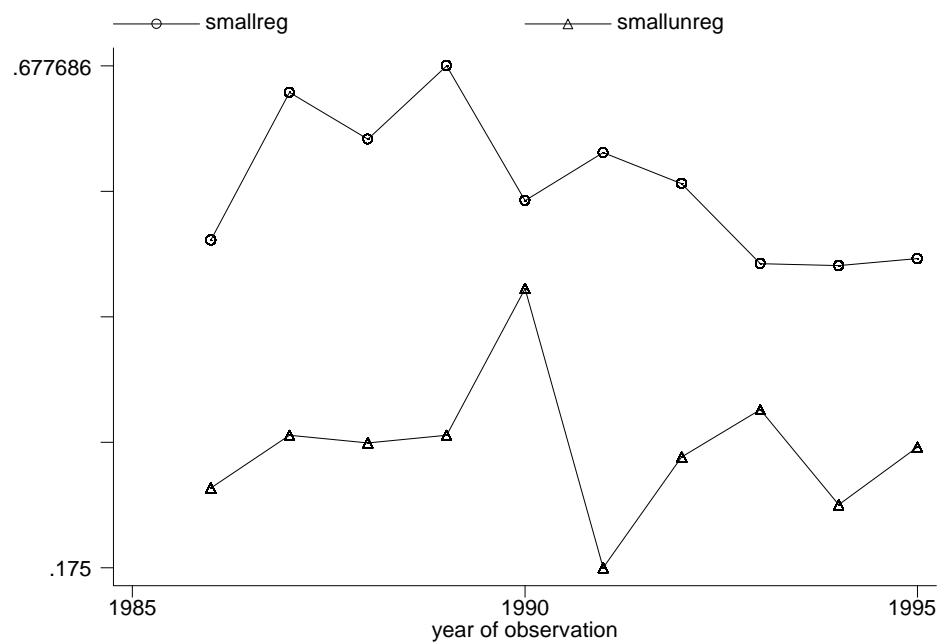


Figure 7: Probability of accessions in small firms by sector

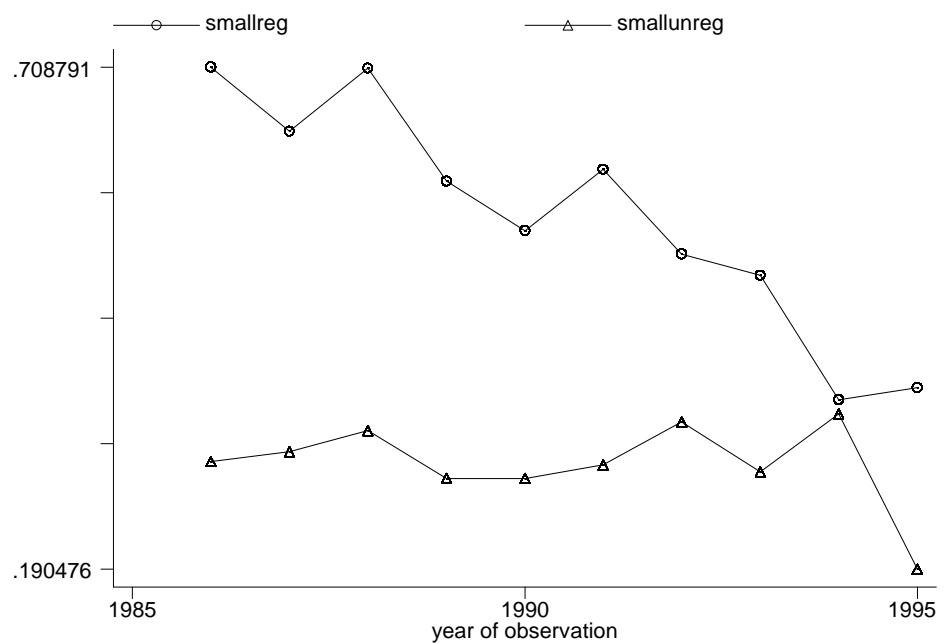


Figure 8: Probability of separations in small firms by sector

Table 1: descriptive statistics by firm size, before and after the reform (full sample)

Variables	Pre-reform	Post-reform	Pre-reform	Post-reform
	Small firms		Large firms	
A. MEN				
Age	35.79 (11.32)	36.99 (10.75)	39.70 (10.56)	40.73 (10.04)
% blue collars	.8052 .3961	.8085 .3935	.6268 .4837	.5959 .4907
Yearly average size of the firm	6.485 (3.9765)	6.897 (4.155)	6725.32 (22087.87)	7289.11 (22621.88)
Accession rate	.2337 (.4232)	.1877 (.3905)	.1251 .3308	.1115 (.3148)
Separation rate	.3247 (.4683)	.2555 (.4361)	.1740 (.3791)	.1648 (.3710)
N	12321	12640	27599	32729
B. WOMEN				
Age	32.18 (9.721)	34.05 (9.4)	35.38 (9.7)	37.10 (9.445)
% blue collars	.4170 (.4931)	.4254 (.4944)	.4754 (.4994)	.4427 (.4967)
Yearly average size of the firm	6.3218 (3.9831)	6.584 (4.1623)	2521.73 (12125.36)	3023.13 (13063.76)
Accession rate	.2212 (.4151)	.1692 (.3750)	.1318 (.3383)	.1192 (.3241)
Separation rate	.3218 (.4672)	.2415 (.4280)	.1924 (.3942)	.1780 (.3825)
N	7228	6796	11812	13748

Notes: only permanent workers are included. The pre-reform period goes from 1986 to 1990, the post-reform period from 1991 to 1995. Standard deviations in parenthesis.

**Table 2: descriptive statistics for men by firm size
Before and after the reform (regulation sample)**

Variables	Pre-reform	Post-reform	Pre-reform	Post-reform
	Small firms		Large firms	
A. REGULATED SECTORS				
Age	36.09 (11.31)	38.17 (10.60)	40.77 (10.11)	41.85 (9.857)
% blue collars	.7240 (.4471)	.7286 (.4448)	.6332 (.4820)	.5481 (.4977)
Yearly average size of the firm	5.658 (4.102)	6.0139 (4.275)	36243.54 (47379.08)	36483.39 (47024.12)
Accession rate	.1929 (.3947)	.1621 (.3687)	.0796 (.2707)	.0675933 (.251081)
Separation rate	.2652 (.4416)	.2157 (.4115)	.0970 (.2960)	.1142 (.3181)
N	1493	1437	2639	3669
B. UNREGULATED SECTORS				
Age	34.99 (9.766)	38.60 (10.51)	40.48 (11.23)	39.69 (10.32)
% blue collars	.7746 (.4193)	.7744 (.4193)	.7396 (.4391)	.7494 (.4336)
Yearly average size of the firm	8.704 (3.486)	9.049 (3.603)	953.3 (3194.91)	1413.34 (3902.25)
Accession rate	.1549 (.3631)	.1098 (.3135)	.0917 (.2888)	.0726 (.2596)
Separation rate	.2183 (.4146)	.1707 (.3774)	.1748 (.3800)	.1145 (.3186)
N	142	164	818	882

Notes: only permanent and males are included. The pre-reform period goes from 1986 to 1990, the post-reform period from 1991 to 1995. The regulation sample includes workers and firms in the retail, road transportation, electricity, telecommunications, air transportation and textile sectors. The retail, road transportation, electricity, and telecommunications are classified as regulated, while the air transportation and textile sectors are classified as unregulated. Standard deviations are in parenthesis.

**Table 3: Descriptive statistics for women by firm size
Before and after the reform (regulation sample)**

Variables	Pre-reform	Post-reform	Pre-reform	Post-reform
	Small firms		Large firms	
A. REGULATED SECTORS				
Age	32.10 (9.864)	34.52 (9.568)	36.64 (8.780)	38.34 (9.759)
% blue collars	.2490 (.4326)	.2668 (.4426)	.1485 (.3559)	.1571 (.3641)
Yearly average size of the firm	4.739 (3.520)	5.277 (3.8)	14675.81 (32121.72)	18831.17 (36654.68)
Accession rate	.1255 (.3315)	.1261 (.3321)	.1072 (.3096)	.0761 (.2653)
Separation rate	.2238 (.4170)	.1812 (.3854)	.1378 (.3450)	.1264 (.3325)
N	956	817	653	815
B. UNREGULATED SECTORS				
Age	32.16 (10.89)	35.18 (10.77)	34.72 (10.28)	36.66 (9.910)
% blue collars	.8698 (.3370)	.8358 (.3710)	.7977 (.4019)	.7669 (.4231)
Yearly average size of the firm	7.175 (3.610)	7.381 (3.850)	310.94 (1102.11)	784.57 (2694.88)
Accession rate	.1154 (.320)	.1026 (.3039)	.0691 (.2538)	.0949 (.2932)
Separation rate	.2456 (.4311)	.1935 (.3957)	.1508 (.3580)	.1474 (.3547)
N	338	341	796	875

Notes: only permanent and males are included. The pre-reform period goes from 1986 to 1990, the post-reform period from 1991 to 1995. The regulation sample includes workers and firms in the retail, road transportation, electricity, telecommunications, air transportation and textile sectors. The retail, road transportation, electricity, and telecommunications are classified as regulated, while the air transportation and textile sectors are classified as unregulated. Standard deviations are in parenthesis.

Table 4. Effects of the 1990 reform on accessions (full sample)

Regressors	(1)	(2)	(3)	(4)	(5)	(6)
A. Men (N = 85222)						
Post 1990	.01227 (.0125)	.0066 (.0079)	.0073 (.0081)	.0095 (.0090)	-.0016 (.0096)	.0004 (.0057)
Small firms	.0674** (.0027)	.0647** (.0025)	.0648** (.0026)	.0647** (.0026)	.0513* (.0131)	.0356** (.0095)
Post 1990 × Small firms	-.0306** (.0011)	-.0251** (.0030)	-.0246** (.0030)	-.0232** (.0031)	-.0171 (.0066)	-.0154* (.0075)
B. Women (N = 39548)						
Post 1990	.0110 (.0315)	-.0025 (.0118)	.0006 (.0106)	.0096 (.0113)	.0051 (.0077)	.0150* (.0088)
Small firms	.0710** (.0029)	.0703** (.0020)	.0697** (.0021)	.0698** (.0021)	.1002* (.0196)	.0609** (.0137)
Post 1990 × Small firms	-.0359** (.0012)	-.0339** (.0008)	-.0335** (.0008)	-.0468** (.0009)	-.0507* (.0102)	-.0508** (.0107)
Sector and Region fixed effects.	YES	YES	YES	YES	YES	YES
Trend	YES	NO	NO	NO	NO	NO
Productivity	NO	NO	YES	YES	YES	NO
Sector specific trends	NO	YES	YES	YES	YES	YES
Workers fixed effects	NO	NO	NO	NO	NO	YES
Recession dummy	NO	NO	NO	YES	NO	NO
GDP growth rate	NO	NO	NO	NO	YES	YES

Notes: Robust standard errors in parenthesis allow for clustering by period/size. All specifications control for firm, year and region effects, age, a gender dummy, a white-collar dummy, and total number of employees in the firm. Some specifications include sectoral productivity which is calculated as value-added deflated using a sector-level PPI over the number of workers using 1995 as the base year. Columns (4)-(6) control for size-specific cyclical effects. Column (4) interacts the small dummy with an expansion dummy, which takes the value of 0 for 1992-1993 and 1 otherwise, while columns (5) and (6) interact the small dummy with GDP growth. Column (6) controls for worker effects. * Denotes significance at the 1% level and ** denotes significance at the 5% level.

Table 5. Effects of the 1990 reform on accessions. (regulation sample)

Regressors	(1)	(2)	(3)	(4)	(5)	(6)
A. Men (N = 11232)						
Regulated sector	-.0207 (.0313)	-33.67 (38.29)	-33.84 (37.02)	-33.26 (38.10)	-34.85 (35.91)	2.655 (11.56)
Post 1990	.0016 (.0210)	.0077 (.0398)	.0082 (.0381)	.0110 (.0430)	.0137 (.0332)	.0264 (.0308)
Small firms	.0404** (.0030)	.0418** (.0030)	.0419** (.0030)	.0418** (.0030)	.0547** (.0134)	.0423 (.0723)
Post 1990 × Small firms	-.0064 (.0029)	-.0089* (.0039)	-.0089* (.0039)	-.0331** (.0040)	-.0162* (.0064)	-.0637 (.0494)
Post 1990 × regulated sector	.0178** (.0024)	.0125 (.0458)	.0176 (.0445)	.0175 (.0495)	.0102 (.0423)	.0181 (.0342)
Small firms × regulated sector	.0362** (.0093)	.0383* (.0118)	.0389* (.0117)	.0386* (.0118)	.0046 (.0173)	.0106 (.0781)
Post 1990 × Small firms × regulated sector	-.0120* (.0042)	-.0148 (.0114)	-.0161 (.0110)	.0143 (.0116)	.0031 (.0092)	.0259 (.0533)
B. Women (N = 5581)						
Regulated sector	-	-	-	-	-	-
Post 1990	.0472* (.0141)	.0366 (.0215)	.0372 (.0212)	.0562 (.0252)	.0409 (.0279)	.0342 (.0300)
Small firms	.0360** (.0012)	.0378** (.0017)	.0378** (.0017)	.0378** (.0017)	.0684 (.0345)	.0789 (.0563)
Post 1990 × Small firms	-.0349** (.0017)	-.0389** (.0014)	-.0388** (.0013)	-.0487** (.0011)	-.0557* (.0187)	-.0311 (.0384)
Post 1990 × regulated sector	-.0575** (.0017)	-.0355 (.0294)	-.0318 (.0292)	-.0594 (.0347)	-.0618 (.0390)	-.0449 (.0422)
Small firms × regulated sector	-.0424** (.0016)	-.0414** (.0030)	-.0412** (.0028)	-.0409** (.0026)	-.0719 (.0442)	-.0362 (.0733)
Post 1990 × Small firms × regulated sector	.0685** (.0025)	.0679** (.0059)	.0675** (.0054)	.0748** (.0057)	.0830** (.0218)	.0402 (.0501)
Sector and Region fixed effects.	YES	YES	YES	YES	YES	YES
Trend	YES	NO	NO	NO	NO	NO
Productivity	NO	NO	YES	YES	YES	NO
Sector specific trends	NO	YES	YES	YES	YES	YES
Workers fixed effects	NO	NO	NO	NO	NO	YES
Recession dummy	NO	NO	NO	YES	NO	NO
GDP growth rate	NO	NO	NO	NO	YES	YES

Notes: The regulation sample includes workers and firms in the retail, road transportation, electricity, telecommunications, air transportation and textile sectors. The retail, road transportation, electricity, and telecommunications are classified as regulated, while the air transportation and textile sectors are classified as unregulated. Robust standard errors in parenthesis allow for clustering by period/size. All specifications control for firm, year, and region effects; age; a gender dummy, a white-collar dummy; and total number of employees in the firm. Some specifications include sectoral productivity which is calculated as value-added deflated using a sector-level PPI over the number of workers using 1995 as the base year. Columns (4)-(6) control for size-specific cyclical effects. Column (4) interacts the small dummy with an expansion dummy, which takes the value of 0 for 1992-1993 and 1 otherwise, while columns (5) and (6) interact the small dummy with GDP growth. Column (6) controls for worker effects. * Denotes significance at the 1% level and ** denotes significance at the 5% level.

Table 6. The effect of the 1990 reform on separations (full sample)

Regressors	(1)	(2)	(3)	(4)	(5)	(6)
A. Men ($N = 85222$)						
Post 1990	-.0258 (.0150)	-.0262* (.0050)	-.0284** (.0047)	-.0254* (.0062)	-.0176 (.0093)	-.0505** (.0065)
Small firms	.1161** (.0044)	.1153** (.0044)	.1155** (.0041)	.1154** (.0041)	.1104** (.0095)	.0858** (.0108)
Post 1990 \times Small firms	-.0615** (.0015)	-.0607** (.0022)	-.0609** (.0018)	-.0551** (.0018)	-.0579** (.0044)	-.0237** (.0084)
B. Women ($N = 39548$)						
Post 1990	.0027 (.0416)	-.0113 (.0132)	-.0063 (.0010)	.0074 (.0104)	.0140 (.0102)	-.0222* (.0100)
Small firms	.1210** (.0028)	.1206 (.0025)	.1210** (.0027)	.1211** (.0026)	.1708** (.0234)	.1103** (.0157)
Post 1990 \times Small firms	-.0637** (.0012)	-.0623 (.0028)	-.0624** (.0030)	-.0861** (.0032)	-.0899** (.0136)	-.034** (.0123)
Sector and Region fixed effects.	YES	YES	YES	YES	YES	YES
Trend	YES	NO	NO	NO	NO	NO
Productivity	NO	NO	YES	YES	YES	NO
Sector specific trends	NO	YES	YES	YES	YES	YES
Workers fixed effects	NO	NO	NO	NO	NO	YES
Recession dummy	NO	NO	NO	YES	NO	NO
GDP growth rate	NO	NO	NO	NO	YES	YES

Notes: Robust standard errors in parenthesis allow for clustering by period/size. All specifications control for firm, year and region effects; age; a gender dummy; a white-collar dummy; and total number of employees in the firm. Some specifications include sectoral productivity which is calculated as value-added deflated using a sector-level PPI over the number of workers using 1995 as the base year. Columns (4)-(6) control for size-specific cyclical effects. Column (4) interacts the small dummy with an expansion dummy, which takes the value of 0 for 1992-1993 and 1 otherwise, while columns (5) and (6) interact the small dummy with GDP growth. Column (6) controls for worker effects. * Denotes significance at the 1% level and ** denotes significance at the 5% level.

Table 7. Effects of the 1990 reform on separations (regulation sample)

Regressors	(1)	(2)	(3)	(4)	(5)	(6)
A. Men (N = 11232)						
Regulated sector	-.0132 (.0363)	-.9932 (10.02)	-1.337 (8.213)	-.1253 (8.478)	1.71 (10.24)	-
Post 1990	-.1059** (.0203)	-.0855** (.0177)	-.0844** (.0149)	-.0821** (.0158)	-.0805** (.0115)	-.0822* (.0359)
Small firms	.0426** (.0088)	.0420** (.0090)	.0421** (.0089)	.0421** (.0089)	.0388 (.0446)	.0444 (.0843)
Post 1990 × Small firms	.0070 (.0052)	.0075 (.0057)	.0076 (.0057)	.0272** (.0052)	.0098 (.026)	-.0587 (.0575)
Post 1990 × regulated sector	.0795** (.0022)	.0516 (.0280)	.0618* (.0250)	.0672* (.0271)	.0765* (.0239)	.0485 (.0399)
Small firms × regulated sector	.0955** (.0118)	.0907** (.013)	.0920** (.0144)	.0913** (.0142)	.0898 (.0467)	.0631532 (.0910)
Post 1990 × Small firms × regulated sector	-.0777** (.0037)	-.0696** (.0086)	-.072** (.0101)	-.0833** (.0102)	-.0699* (.0284)	.0682 (.0621)
B. Women (N = 5581)						
Regulated sector	-	-	-	-	-	-
Post 1990	-.0077 (.0189)	-.0219 (.0203)	-.0217987 (.0205)	-.0218 (.0188)	-.0113 (.0329)	-.0642 (.0365)
Small firms	.0930** (.0027)	.0928** (.0027)	.0928** (.0027)	.0929** (.0027)	.0986* (.0393)	.1259 (.0685)
Post 1990 × Small firms	-.0499** (.0017)	-.0489** (.0008)	-.0489** (.0008)	-.076** (.0009)	-.0522* (.0211)	.0232 (.0467)
Post 1990 × regulated sector	-.0108 (.0013)	.0065 (.0285)	.0073 (.0262)	.0329 (.0234)	.0171 (.0463)	-.0005 (.0514)
Small firms × regulated sector	-.0293** (.0053)	-.0369** (.0038)	-.0368** (.0039)	-.0366** (.0032)	.0004 (.0658)	-.0049 (.0891)
Post 1990 × Small firms × regulated sector	.0184** (.0018)	.0299** (.0058)	.0298** (.0061)	.0151* (.0054)	.0098 (.0357)	.0213 (.0610)
Sector and Region fixed effects.	YES	YES	YES	YES	YES	YES
Trend	YES	NO	NO	NO	NO	NO
Productivity	NO	NO	YES	YES	YES	NO
Sector specific trends	NO	YES	YES	YES	YES	YES
Workers fixed effects	NO	NO	NO	NO	NO	YES
Recession dummy	NO	NO	NO	YES	NO	NO
GDP growth rate	NO	NO	NO	NO	YES	YES

Notes: The regulation sample includes workers and firms in the retail, road transportation, electricity, telecommunications, air transportation and textile sectors. The retail, road transportation, electricity, and telecommunications are classified as regulated, while the air transportation and textile sectors are classified as unregulated. Robust standard errors in parenthesis allow for clustering by period/size. All specifications control for firm, year and region effects; age, a gender dummy, a white-collar dummy and total number of employees in the firm. Some specifications include sectoral productivity which is calculated as value-added deflated using a sector-level PPI over the number of workers using 1995 as the base year. Columns (4)-(6) control for size-specific cyclical effects. Column (4) interacts the small dummy with an expansion dummy, which takes the value of 0 for 1992-1993 and 1 otherwise, while columns (5) and (6) interact the small dummy with GDP growth. Column (6) controls for worker effects. * Denotes significance at the 1% level and ** denotes significance at the 5% level.