

**CEP Discussion Paper No 1613**

**April 2019**

**A Tale of Comprehensive Labor Market Reforms:  
Evidence from the Italian Jobs Act**

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## **Abstract**

The Italian Jobs Act introduced a subsidy for new hirings as well as a new open ended labor contract based on graded security, with severance payments increasing with tenure, while phasing out the compulsory reinstatement of workers in the case of unfair dismissals applied until March 2015. Simple models of job creation and destruction predict that hiring subsidies and lower firing costs unambiguously increase hirings. Moreover, lower firing costs associated with graded security should also increase layoffs. These effects need not to be uniform across the size distribution of firms, especially when firms of different size are treated differently by the policy changes as in the case of the Jobs Act. On the one hand, the hiring subsidy was proportional to wages, but had a cap, hence was more generous for small firms - typically paying lower wages than large firms - making them particularly responsive along the job creation margin. On the other hand, the reduction in firing costs applied mainly to large firms concentrating on them the adjustment along the job destruction margin. To investigate empirically the effects of the Italian Jobs Act, we draw on a unique dataset covering the universe of private firms in Italy having at least once 10 to 20 employees in the two years prior to the reform of January 2015. We find evidence of a substantial increase in open ended hirings, and in the transformation of fixed-term into open ended contracts, in the aftermath of the Jobs Act. The effects of the Jobs Act on firings- conversely- are much smaller, and are concentrated on large firms, while small firms react more intensively- creating new open ended contracts - to the hiring subsidy.

Key words: Labor mobility, Jobs Act

JEL Codes: J10; J23

This paper was produced as part of the Centre's Labour Markets Programme. The Centre for Economic Performance is financed by the Economic and Social Research Council.

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Published by  
Centre for Economic Performance  
London School of Economics and Political Science  
Houghton Street  
London WC2A 2AE

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# 1 Introduction

The effects of a reduction of employment protection on labor market mobility have been thoroughly investigated by models of dynamic labor demand as well as by equilibrium models of the labor market.<sup>1</sup> Economic theory unambiguously predicts that a labor market with more flexibility for standard labor contracts should be associated with larger job and worker flows. In real life labor markets, however, structural reforms of employment protection legislation (EPL) are rare events (Boeri, 2011), and most reforms implemented in Europe over the last twenty years are *two-tier* reforms, which have been acting on the flexible fringe of the labor market, with more and more flexibility granted only to fixed-term contracts.<sup>2</sup> These reforms created a dual structure, particularly significant in Southern Europe, with a stock of open ended contracts largely unaffected by the reforms, coexisting with a growing part of the labor market experiencing greater flexibility at the margin. In addition to being relatively rare events, reforms of employment protection for regular contracts often introduce *marginal* adjustments to the legislation, and/or a long phasing-in period making it difficult to identify empirically the pure effect of the reform of EPL on labor mobility.

The Italian Jobs Act (JA) is a structural labor market reform aimed at reducing the dual structure in the labor market. As of March 2015, Italy introduced a new labor contract for *all new* open ended jobs based on graded security, with severance payments steadily increasing with tenure. This design of the contract had been advocated within policy-oriented academic circles (Boeri and Garibaldi, 2008; Cahuc et al. 2012; Bentolila and Jimeno, 2008) as well as by the research community (Blanchard and Tirole, 2008; Boeri, Garibaldi and Moen, 2017). The reform introduced a discrete change to the legislation as the traditional reinstatement clause applied to firms with more than 15 employees in the case of unfair dismissals was suppressed for all new hires on an open ended basis. The reform also reduced dramatically the discretion of judges in dismissal procedures: severance payments were made dependent on tenure based on well defined rules and the possibility of out-of-Court procedures was also introduced.<sup>3</sup> Overall, there is little doubt that the Italian JA represents a *complete* (rather than two-tier) and discrete (rather than marginal) reform, hence a rather unique experiment for testing the labor market effects of reforms of EPL.<sup>4</sup>

A few months before changing the rules for new open ended contracts, a sizeable hiring subsidy was introduced for any new job opened on a permanent basis. Disentangling the effects of the JA from those of the hiring subsidy is difficult. There are, however, some asymmetries in the enforcement of the hiring subsidy and of the JA by size of firms which turn out to be useful in separating the effects of the EPL reform from those of the new hiring subsidy. First, the hiring subsidy basically exempted employers from paying social security contributions on all new open ended hirings for three years up to a cap located below average wages. Thus, the subsidy was particularly generous for low-wage, mostly small, firms. Second, the new graded security contract implied a reduction of EPL only for firms above the 15 employees threshold, while leaving mostly unaffected firms below that threshold.

In this paper we use these asymmetries and the time-lag between the introduction of the hiring subsidy and the JA contract to make inferences about the effects of the two policy changes. Our approach is in line with the increasing literature identifying the effects of EPL exploiting within-country variable enforcement of the legislation<sup>5</sup> rather than cross-country variation in the strictness of employment protection<sup>6</sup> At the same time, the structural nature of the reform we investigate and the richness of our data allow us to analyse

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<sup>1</sup>Bentolila and Bertola (1990), Nickell (1986), Garibaldi (1998), Millard and Mortensen (1995) . See Boeri and vanOurs (2013) for a survey.

<sup>2</sup>There is large literature on dual labor markets. Boeri Garibaldi (2007) and Berton and Garibaldi (2012) model the Italian labor market. Cahuc et al. refer to France (2016)

<sup>3</sup>This reduced power of judges in the enforcement of EPL was so radical to be vetoed in 2018 by the Italian Constitutional Court.

<sup>4</sup>Early research on the Italian JA include Sestito and Viviano (2018) and Fana et al. (2015)

<sup>5</sup>See e.g. Riphahn (2004); Boeri and Jimeno (2005); Garibaldi et al. (2004); Ichino and Riphahn (2005); Behaghel, Crepon, and Sdillot (2008); Kugler and Pica (2008); Marinescu (2009); Martins (2009); Hijzen, Mondauto, and Scarpetta (2013); Cingano, Leonardi, Messina, and Pica (2016). The impact of changes in severance pay are studied in Garibaldi and Pacelli (2008), and Kugler (1995).

<sup>6</sup>Cross country studies aimed at capturing the long-term effects of EPL are also difficult to interpret, as employment protection legislation interacts with a number of other country-specific institutions (Blanchard and Wolfers, 2000).

the effects of the EPL reform on a number of relevant margins, including firms' growth, hirings and firings, and transformation of fixed-term into open ended contracts.

We draw on a unique dataset covering the universe of private firms having at least once 10 to 20 employees in the period 2013-2016. We concentrate on those hitting this corridor in the period 2013-14 predating the introduction of the JA. Firms are monitored at monthly frequencies by the Italian social security administration (INPS). These are high quality data as they are used to collect contributions from employers, define pension rights and eligibility to social programmes. We also have access to work-histories of the entire workforce employed by those firms. The total number of firms that hit the corridor between 2013 and 2016 corresponds to approximately 240,000 Italian firms, and approximately 6.2 million workers.

The structure of the paper is threefold.

At first we provide a simple theoretical framework enabling us to discuss the effects of the two key measures of the JA – the hiring subsidy and the graded security contract – on the hiring and firing margins at the job/firm level. We also evaluate potential differential effects along the size distribution of firms, and we discuss the implications of the JA in dual labor markets, notably on fixed-term contracts.

Next we describe the data and generate a set of descriptive statistics documenting the key phenomena associated to the Italian JA. We also construct transition matrices for firms between 10 and 20 employees, and obtain scalar measures of mobility across cells (Shorrock, 1978). We complete our analysis of firms' dynamics by disentangling upward and downward mobility. Finally we look at hiring and firing of open ended jobs at the firm level, as well as at the conversion of fixed-term contracts into open ended contracts.

We then present the estimation framework and illustrate the main econometric results. We begin by concentrating on the first difference, that is, before and after the JA, looking at the effects of the reform on hirings both in open ended and fixed-term contracts as well as on transformations from fixed-term into open ended contracts. Here we exploit the fact that the hiring subsidy was introduced in January 2015, while the new graded security contract in March 2015. Next, we use the two aforementioned asymmetries in the impact of the JA across the size distribution of firms to draw on cross-sectional variation in the enforcement of the JA. In particular, we compare outcomes in firms having more than 15 employees with those of firms below that threshold before the JA as only the former were subject to the discrete EPL reform. We also look at firms and jobs that benefitted from the hiring subsidy, and those that did not because of the restrictions imposed by the regulation to avoid opportunistic behavior. We also acknowledge that the intensity of the hiring subsidy treatment was higher in low wage firms, as the subsidy had a cap at 8060 Euros, reduced in 2016 to 3250 Euros. Overall, we find evidence of a substantial increase in open ended hiring and in the transformation of fixed-term into open ended contracts, in the aftermath of the Jobs Act. The effects of the Jobs Act on firings- conversely- are much smaller, and are concentrated on large firms, while small firms react more intensively- creating new open ended contracts- to the hiring subsidy.

The paper proceeds as follows. Section 2 describes the institutional setting, the Italian JA and provides a short summary of the relevant literature. Section 3 provides a simple stylized characterisation of the labor market in which the JA operates and evaluates theoretically the consequences of the hiring subsidy and of the graded security contract on job creation and destruction margins. Section 4 describes the data and reports descriptive statistics on firms' dynamics and worker flows. Section 5 describes our empirical strategy and reports the main results on hirings per firm, on conversions of fixed-term contracts as well as on firings. Section 7 concludes.

## 2 Institutional Setting and Literature Review

With the “Jobs Act” (JA) adopted in December 2014, the Italian Government obtained from the Parliament a broad mandate to introduce measures to rationalise employment protection, expand active labour market policies and make social protection more effective. The reform of employment protection was the most radical.<sup>7</sup>The previous open ended contract for firms with more than 15 employees involved the compulsory

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<sup>7</sup>The delegation law involved also a reform of the unemployment benefits that, however, became fully effective in 2017, beyond the period covered by this paper.

reinstatement of workers in the case of unfair dismissals. This reinstatement, although rarely enacted (about 3,000 cases in a typical year), was a strong deterrent to hiring in open ended contracts as it made the costs of dismissals very high (up to 36 months of pay) even for very short tenures. The reinstatement was a major deterrent because there is a risk of a long trial and eventually a reinstatement, with the employer having also to pay back the worker during the trial period. The new open ended contract introduced in March 2015 allowed for employment protection increasing with tenure, confining the possibility of reinstatement of workers to discriminatory dismissals, hence excluding this possibility for dismissals due to economic reasons (*motivo oggettivo*). The new contract was applied only to new open ended contracts while “grandfathering” existing rights. The new graded security contract replaced the reinstatement with a monetary compensation for economic unfair dismissals. This severance payment is flat at 4 monthly wages for the first two years, and then increasing with tenure up to a maximum of 24 monthly wages at a 12 years tenure (see Figure 1). The Jobs Act also introduced a new form of out-of-court procedure, according to which the employer can pay the worker an indemnity equal to 2 monthly wages in the first two years of tenure and then an additional monthly wage per year of service, with a maximum of 18 monthly wages after 18 years of service (displayed as “Out of Court Procedure” in the diagram). The acceptance of this transaction prevents any further dispute by the worker, that is, appealing to courts for a dismissal to be unfair or not. Both parties have a strong incentive to settle the dispute through this procedure, since the sum paid is not subject to social contributions or taxation. As mentioned above, the new dismissal rules applied to all new hires on a open ended basis, and did not involve workers continuing on permanent contracts in firms with more than 15 employees, who continued to be protected by the reinstatement clause. However, firms with less than 15 employees (where the reinstatement clause was not applied even before the JA) expanding above the threshold would move *all* workers (not only new hires) to the new graded security contract dismissal regulations, while before the JA they would have been subject to the reinstatement clause in this case. Thus, changes in employment protection for units below the 15 employees threshold were confined to their option to grow above that threshold. No change in dismissal regulations was envisaged for workers in firms with less than 15 employees remaining below that size threshold, as the open ended contract was already flexible with a maximum severance payment of 6 months. In the remainder we refer to the new contract as the *JA contract* or the *graded security contract*.

The 2015 Budget Law also introduced a sizeable hiring subsidy for new hires in open ended contracts. Basically employers were exempted from paying social security contributions up to a 8,060 Euros cap per year and worker lasting three years after the hire. In order to discourage opportunistic behavior of employers, the hiring subsidy excluded workers with an open ended contract in the previous six months (and with an open ended contract with the same firm in the 3 months before December 2014). The hiring subsidy applied uniformly to all firms and there was no firm size threshold associated to this policy. However, the cap on the subsidy made it more generous at relatively low wages, mostly in small, firms. Notice that the hiring subsidy was in place since January 2015 and had a three years duration for contracts signed within 2015, while the JA contract was enforced as of March 2015 and was supposed to apply gradually to all open ended contracts and for good.

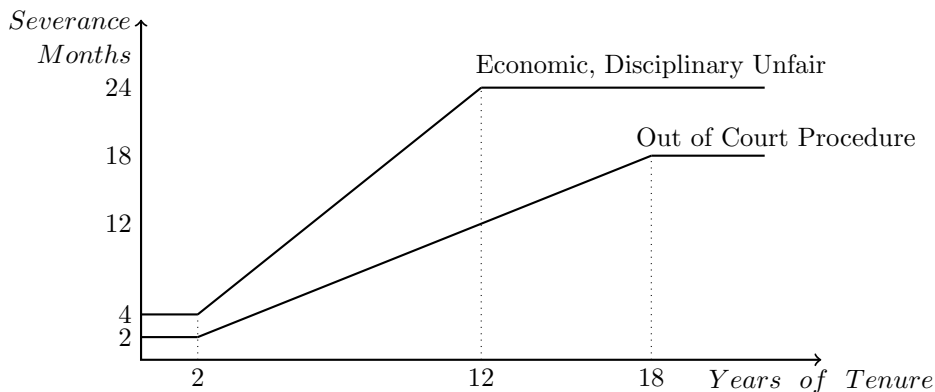
There is some literature offering preliminary evaluations of the JA contract, and a number of papers using the 15 employees threshold to identify the effects of employment protection in the Italian labor market. Sestito and Viviano (2018) use administrative data on worker flows from the so-called Comunicazioni Obbligatorie (Cob) in a specific Italian region (Veneto) and in the period from January 2013 to June 2015. They identify the effects of the hiring subsidy and the JA by using both the 15 employees threshold and the fact that some workers were not eligible to the hiring subsidy (e.g., those with an open ended contract in the previous six months or with an open ended contract with the same firm in the 3 months before Dec 2014). They find that gross hirings were positively affected by both, the hiring subsidy and the JA contract, but the two effects were quantitatively different: while about 40 % of gross hires in permanent contracts can be accounted for by the hiring subsidy, about 5% of these flows can be attributed to the effects of the introduction of the graded security contract. The joint effect of the two measures is negligible. Yet, Sestito and Viviano (2018) do not look at firing nor at transformations of fixed-term into open ended contracts, and their analysis focuses only on the first 3 months of the new contract. Leonardi and Nannicini (2016),

in an unpublished presentation drawing also on Cob data found that about one fourth of the effect of the two policies on gross hires could be attributed to the graded security contract. Finally, Fana, Guarrascio and Cirillo (2015), using aggregate data from Istat and Inps, found that the JA did not affect employment growth.

There are more and more empirical studies on employment protection drawing on within country variation in the enforcement of EPL, notably using the exemption of small units from the strictest EPL provisions to disentangle treatment and control groups. Garibaldi, Pacelli and Borgarello (2004), using stochastic transition matrices in firm size, looked at firm mobility around the threshold, finding that it falls as firms get closer to the 15 employees size. Schivardi and Torrini (2008) similarly found that the probability of firms' growth falls by 2 percentage points near that threshold. Boeri and Jimeno (2005) used the 15 employees threshold as a second difference in evaluating a reform of employment protection: they found that a tightening of employment protection in small firms reduced layoffs below the threshold relative to a control group of large firms.

Another strand of literature which is relevant for our purposes is on the economics of graded security. Boeri, Garibaldi and Moen (2017) develop a normative theory of severance pay, providing an optimal level of graded security at different tenure levels, depending on the efficiency of the judicial system. Boeri and Garibaldi (2008), Dolado et al. (2016) as well as Bentolila and Jimeno (2008) discuss the rationale for a *unifying contract* reducing contractual dualism between temporary and open ended contracts. This contract provides for severance increasing with tenure just like the new open-ended contract introduced by the Italian JA.

Figure 1: The Jobs Act Graded Security Contract



### 3 Theoretical Background: Hiring and Firing

The two policy measures of the JA can be described in the context of dynamic models of labor demand (Nickell, 1986, Bertola 1990) or matching models of job creation and destruction, along the Mortensen and Pissarides (1994) framework. In the paper and in the appendix we use the latter approach, and offer a theoretical framework to evaluate the two policies in the spirit of the matching model proposed by Garibaldi and Violante (2005). The model is fully in line with the traditional Mortensen and Pissarides matching model (2014), but rather than using the standard matching function for job creation, it makes explicit the role of hiring and firing at the firm level. The model turns out to be particularly suitable for describing the role of the two policies on hiring (job creation) and firing (job destruction) margins. For simplicity, the model takes the wage as given, an assumption that is somewhat reasonable in the context of small Italian firms where wages are set by centralized wage bargaining and there is no plant-level bargaining over and above these levels. The key details of the model are described in the appendix. Following Garibaldi and Violante

(2005), the distribution of idiosyncratic productivity is indicated with  $F(x)$ , the hiring margin is denoted by  $R_o$  while the firing margin by  $R_d$ . The two policy instruments are a severance payment (or a firing tax)  $S$  and a hiring subsidy  $H(\omega)$ <sup>8</sup>. The dependence of the hiring subsidy on the wage will be discussed below.

The key equations that describe the two margins read

$$\begin{cases} R_o - \omega &= -\frac{\lambda}{r+\lambda} \int_{R_d}^{\bar{x}} (1 - F(z)) dz + \lambda S - (r + \lambda)H(\omega); & \text{Hiring Margin} \\ R_d - \omega &= -\frac{\lambda}{r+\lambda} \int_{R_d}^{\bar{x}} (1 - F(z)) dz - rS; & \text{Firing Margin} \end{cases} \quad (1)$$

where  $\omega$  is the fixed wage,  $r$  is the pure interest rate, and  $\lambda$  is the arrival rate of job specific idiosyncratic shocks. Note that in the model the matching probability is indicated with  $\alpha$  and the two labor flows are

$$\begin{cases} Hir = \alpha[1 - F(R_o)] \\ Fir = \lambda F(R_d) \end{cases} \quad (2)$$

The basic equilibrium of the two margins is easily described in a space  $(R_d, R_o)$ , as illustrated in Figure 2. In the basic model, the firing margin  $R_d$  is independent of the hiring margin, and is described by a flat curve labelled  $Fir$ . The hiring margin is described by the upward sloping curve, labelled  $Hir$ . The equilibrium is at the intersection of the two curves as indicated by the locus  $E_1$  in Figure 2.

This model is useful to analyse the effects of the JA. Let us consider first the hiring subsidy. A basic hiring subsidy shifts the creation margin to the left, and implies larger hirings and job creation. This is described by the left panel in Figure 3. A hiring subsidy moves the equilibrium from  $E_1$  to  $E_2$  in the Figure. Yet, there is an additional feature of the hiring subsidy that is worth mentioning. As described in the previous Section, the hiring subsidy was proportional to gross wages, but had a cap. In particular, it could not exceed 8,060 Euros exempting employers from paying social security contributions for gross wages up to approximately 24,000 Euros. For wages above that level, there was no full exemption of employers from social security contributions. Put it another way, the hiring subsidy was proportional to wages only for relatively low-wage firms while it was flat for high wage firms, offering a lower percentage reduction of labor costs than in small firms. We can formally describe this feature by assuming that the hiring subsidy is declining with wages, i.e., that  $H(\omega)$  with  $H' < 0$ , so that firms with higher wages have a lower subsidy.

The presence of a firm size firm wage effect is an empirical stylized fact (Oi, 1999) confirmed also by Italian firm-level data. This means that the hiring subsidy gave to small firms a larger reduction in unit labor costs than to large firms. Suppose then to have two groups of firms. On the one hand, there are small firms paying relatively low wages. On the other hand, there are large firms paying high wages. The prediction of the model is that small firms should respond more on the hiring margin (in other words, should create jobs at lower productivity levels) than large firms, and move to an equilibrium like  $E_3$  in Figure 3 to the left of  $E_2$ , the new equilibrium for large firms.

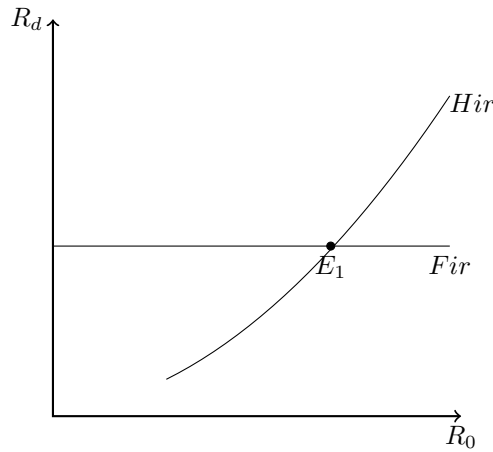
Let us now consider the effects of the introduction of graded security. In the context of the model, this policy can be described as a reduction in  $S$ . The firing curve shifts up implying more fires at given hirings, that is, firms initiate firing at a higher productivity threshold than without the reform. The hiring curve also shifts to the left as the value of a job for a firm is increased by lower firing costs. Thus, we should expect a shift up of both the firing and hiring curves, as depicted in the right-hand side panel of Figure 3 bringing us to a new equilibrium like  $E_4$ . Yet, the introduction of graded security, as discussed in the previous Section, involved only firms above the 15 employee threshold, i.e. relatively large firms.

The overall predictions for the effects of the JA contract and the hiring subsidy on open ended contracts are therefore as follows. Small firms should experience an increase in hirings without any effect on firing. Large firms, instead should experience both, an increase in hiring and firing. Whether the increase in hiring

<sup>8</sup>In the context of fixed wages, there is no substantial difference between a firing tax and a severance payment, and the latter - a transfer from the firm to the worker- better describes the mechanism we want to highlight

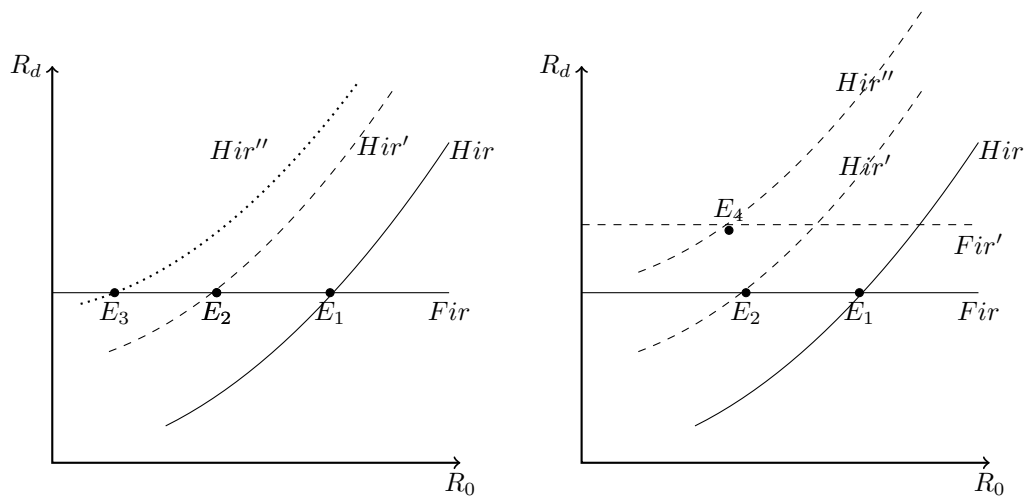
is larger in small or large firms is an empirical matter: it depends on whether the reduction in firing costs can be offset the relative disadvantages of large vis-a-vis small firms put in place by the design of the hiring subsidy. On the firing side, instead, there is no ambiguity: the increase in firing should be concentrated on large firms.

Figure 2: Basic Equilibrium with Hiring and Firing Margins



*Note:*  $R_o$  is the hiring margin and  $R_d$  is the firing margin in the model with fixed wages. The two curves correspond to equations 2 in the text.  $E_1$  is the initial equilibrium.

Figure 3: Equilibrium with Hiring Subsidy in Large and Small Firms



*Left Panel:* The low hiring subsidy for high wage firms shifts upward  $Hir$  lowering  $R_o$  to  $E_2$ , hence increasing hirings.

*Left Panel:* The high hiring subsidy for firms with low wages shifts further upward  $Hir$  lowering  $R_o$  to  $E_3$  hence increasing hirings.

*Right Panel:* The low firing cost (coupled with the low hiring subsidy) shifts upwards the firing curve ( $Fir$ ) and the new equilibrium ( $E_4$ ) has a higher  $R_d$  involving higher firings.



The model above considers only open ended contracts. We know that substantial hiring in Italy takes place via fixed-term contracts. In the case of contracts of limited duration there are two effects at work. On the one hand, a reduction in EPL and the hiring subsidy limited to open ended contracts should induce a substitution of fixed-term with open ended hirings. On the other hand, fixed-term contracts are often used like extended probationary periods predating their conversion into open ended contracts. Under these conditions, an increase in the value of an open ended job for the employer increases also the option value of hiring on a fixed-term basis, having then the option to transform the job into an open ended contract when the match quality is tested. A priori it is not possible to establish which one of the two effects will dominate. There is instead no ambiguity about transformations of fixed-term into open ended contracts which are bound to increase as both, the substitution and the option value effects, operate in the same direction, by increasing the conversions of fixed-term into open-ended contracts. As to differences in the size of firms, the option value effect can be considered to be lower in small firms due to their lower firing costs and better monitoring of individual workers. If the substitution effect plays a more important role in small units, we should expect to observe a stronger reduction (or a smaller increase) in fixed-term hirings in small relative to large firms.

## 4 Data and descriptive statistics

The extraction from the social security records is based on the employment level of firms. The original dataset was built by extracting from the archives all private firms that between January 2013 and December 2016 had hit the band 10-20 employees at least once. This corresponds to approximately 240.000 firms, employing roughly 6.2 million workers over the 3 years time span covered by our data. Administrative data have the advantage of providing good high frequency data. Hence we decided to operate with monthly observations. The total number of records and observations over these 48 months is approximately 250 million. As the size of firms is endogenous to the JA, the paper works with a subsample of firms having hit the 10-20 employee band in the period January 2013 December 2014, that is, the sub-period *predating* the introduction of the JA. We also removed from the sample all firms experiencing the net hiring of more than 100 workers (or a tenfold increase in their initial size) within any given month. This very large growth was indeed attributed to mergers or acquisitions rather than to a genuine growth of firms. In descriptive analyses and regressions we focus only on continuing firms, displaying positive employment levels throughout the entire period covered by our data. When we look at firings, the behaviour of entrants and exiting firms is also considered. In the continuing sample there are approximately 44000 firms employing an average of 12.2 employees, thus having approximately 536000 jobs. Including firms that enter and exit there are in the sample approximately 60000 firms.

For each firm, beyond the basic details (province, city, sector, age, 4-digits sector, etc.) we observe at monthly frequencies the total number of full-time and part time employees, the number of fixed-term and open ended contracts. Note that Inps calculates also the “firm labor force” (*forza aziendale*), a full time equivalent concept that we use to identify the 15 employees threshold. This variable is rounded at integer values. In the legislation there is a specific definition that labor Courts should apply for measuring firm size around the threshold. Specifically, to obtain the relevant firm size in applying EPL, the judges count i) full time average open ended contracts in the last 6 months, ii) part time open ended full time equivalent in the last 6 months, and iii) average fixed-term employees hired in the last 24 months weighted by their effective job duration. The actual value is rounded at integer values. This suggests that in practice the threshold is not readily observed. The concept of “*forza aziendale*” compiled by Inps is a reasonable proxy of the threshold defined by the law, thus we use it in our analysis. However, the legal definition is more subtle, and it is not even obvious that employers in firms around the threshold know at each point in time whether they are above or below the threshold.

## 4.1 Threshold Passing

We are first of all interested in assessing firms' dynamics before and after the JA. We begin by investigating threshold passage. Before March 2015 firms passing the 15 employees threshold were subject to the reinstatement clause in case of unfair dismissals. Conversely, as of March 2015 firms that pass the 15 employees threshold are no longer subject to the reinstatement in case of unfair dismissals for their *entire workforce*, regardless of the tenure of their workers. We are interested in finding out whether this change led to more firms passing the 15 employees threshold, as one would expect. We consider only continuing firms, hence we do not cover firms entry and exit.

Formally, let us define with  $L_{it}$  firm size at time  $t$ , where  $t$  refers to (year/month). Threshold pass is defined as

$$Threshold\_Pass = \begin{cases} 1 & \text{if } L_{i,t} \geq 16 \text{ and } L_{i,t-j} < 16 \text{ with } j = 1, 3, 12 \\ 0 & \text{otherwise,} \end{cases}$$

or simply as moving beyond the 15 employees in a given interval. The legislation changed on March 7 2015, and the threshold passage can be defined on a monthly, quarterly as well as yearly basis. Figure 4 reports the simple counts of firms passing the threshold for each month, whereas the definition used in the Figure refers to the 12 month passage. In Figure 4 the vertical lines denote the three important dates in the JA. The first line refers to end December 2014, where the sizeable marginal hiring subsidies were introduced. The second vertical line refers to March 2015 when graded security was introduced. The last line refers to the end of December 2015, when the magnitude of the marginal hiring subsidy was reduced by 50 percent for new hires following that date.<sup>9</sup>

We find that threshold passage increased substantially with the JA contract. The increase in passage probably began already with the marginal hiring subsidy, but we clearly observe an acceleration after March 2015. We also observe a marked reduction in 2016, after the scaling down of the hiring subsidy, but still at the end of 2016 the number of firms passing the threshold was twice as large than in 2014.

## 4.2 Mobility

Beyond the increase in threshold size passing, we are interested in understanding whether there was a change in firm mobility with the introduction of the graded security contract. We evaluate firm mobility by generating transition matrices across firm-size cells<sup>10</sup>, and then computing mobility indexes. The focus is, once more, on continuing firms. Formally, in this section we take as state  $s_t$  the firm size at time  $t$ . We consider  $s_t \in \{\leq 11, 12, \dots, 19, \geq 20\}$  as a set recording firm size in 10 different cells, where  $s_{it}$  is size for firm  $i$  at time  $t$  measured with the firm labor force indicator compiled by INPS. The lower (10) and upper (20) size classes also include firms with less than 10 and more than 20 employees respectively. The matrix  $M_t$  records simply the probability of changing size  $s_{it}$  to size  $s_{i,t+12}$

$$s_{t+12} = M_t s_t$$

The literature on stochastic processes provides various scalar mobility indexes summarizing the information reported in the transition matrices. Figure 5 reports the value of one of these measures, the Shorrock index, between 2015 and 2016.<sup>11</sup> Formally, the trace measure reads

$$\text{Trace Measure} =: 1 - \frac{m - Tr(M)}{m - 1} \quad (3)$$

<sup>9</sup>The same three vertical lines are reported in most Figures throughout the paper.

<sup>10</sup>The transition matrices are in the web appendix.

<sup>11</sup> Shorrock (1978) introduced also the Determinant measure  $\frac{det(M)}{m-1}$ , where  $det(M)$  is the determinant of the stochastic matrix. Sommers and Conslik (1979) introduced the Eigenvalue measure: one minus the modulus of the second largest eigenvalue of  $M$ . In addition, the mean crossing measure is the sum over  $i$  and  $j$  (from 1 to  $m$ ) of  $M$

where  $Tr(M)$  is the trace of  $M$  and  $m$  is the number of states. Figure 5 points to a marked increase in overall mobility, notably after the introduction of the JA contract. On average, mobility increases by more than 5 % (from 0.72 in the period before the introduction of the JA contract to 0.76 in the period March 2015 through December 2016).

It is also interesting to analyse whether this increase in the mobility of firms is associated more to expansions or to contractions of firms, once more fully exploiting the high frequency of our data. Figure 6 displays monthly dummies of linear probability regressions in which the dependent variable is a dummy assigning value 1 to firms increasing their workforce from one month to the next and zero otherwise (upward mobility) or 1 to firms shrinking size and 0 otherwise (downward mobility). The right-hand-side includes firm fixed effects and monthly time dummies. In the upward mobility regressions all monthly dummies in the year after the introduction of the JA are strictly positive, but then they become not significantly different from zero when the hiring subsidy is scaled down. The story is slightly different for the downward mobility regression: here the effect is initially smaller (and in some months coefficients are not significantly different from zero), but it persists and increases also in 2016. In both cases it is visible a reduction in mobility in November and December 2014, which may be attributed to anticipation effects, and a huge spike in December 2015 when the subsidy was scaled down. Most of the action seems to come from the hiring subsidy rather than the graded security contract at least when we look at upward mobility, which actually declines after March 2015.

Overall, the increase in firms' dynamics observed after the introduction of the JA is not only associated to expansions of firms, notably above the 15 employees threshold, but also to an increase in firms' contractions. Similar results can be obtained by counting jobs (rather than firms) created and destroyed in expanding and declining units, applying the definitions of the job turnover literature (Davis and Haltiwanger, 1999). Since 2015 there has been an increase in both job creation and job destruction rates, defined as the sum of firm-level headcount employment growth and decline in continuing firms normalized by total employment in the base year. Notice that all the measures commented so far concern net employment variations at the firm level, hence do not capture the reallocation of workers occurring at given employment levels within each firm. In the next section we look at workers flows, and we focus on hirings and firings on both open ended and fixed-term contracts as well as transformations from fixed-term to open ended jobs.

### 4.3 Hirings and Firings

Figure 7 displays total hirings in open ended contracts (top panel) and the total number of firms displaying positive hirings in open ended contracts (bottom panel). In both cases there is a visible increase (of the order of almost 30 %) in hirings, notably at the beginning of 2015 with respect to the same months in 2014 and 2013, a huge spike in December 2015 (corresponding to almost a 500 % increase with respect to December 2013 and 2014). In 2016 hires decline broadly to the levels predating the JA. These spikes as well as yearly variations replicate aggregate dynamics of new open ended hires registered by the Inps Osservatorio del Precariato<sup>12</sup>. The lower diagrams of the two panels look at the behaviour of small and large firms. *Large* firms are those that were within the band 16-19 between June and December 2014, while *small* firms are those that in the same 6 months were in the band 9-12. The diagrams suggest that small firms (line with small triangles) were more responsive to the hiring subsidy than large firms (dotted line).

The hiring subsidy seems therefore to have led to a strong increase in open ended hirings in 2015 just after the introduction of the JA, and to an anticipation to December 2015 of the subsidized hires planned for 2016 in order to benefit from the full exemption from employers social security contributions planned for 2015 only. This interpretation is consistent with the fact that we do not observe a similar pattern in the case of hirings in fixed-term contracts (Figure 8), not covered by the hiring subsidy. In the case of the transformations of fixed-term into open ended contracts we notice the same spikes observed in the case of open ended contracts, in correspondence to the introduction and then the scaling down of the hiring subsidy (Figure 9). In this case the initial spike (January 2015) is more pronounced than the spike observed in December 2015, a fact that cannot be explained by changes in the population at risk: the end of the year spike appear to be relatively

<sup>12</sup>See <https://www.inps.it/NuovoportaleINPS>

small even when we normalize transformations by the stock of fixed term contracts at the beginning of the month, as done in the bottom panel of Figure 9.

The time pattern in the case of firings, notably firings from open ended contracts in continuing firms (Figure 10) is different. Here we observe a moderate increase after March 2015, when the graded security contract was introduced, spanning well beyond the end of the large hiring subsidy. Indeed no spike is observed in December 2015. The role of the graded security contract when the focus is on firings is consistent with the fact that the changes occurred after March 2015 are not visible when we focus on small firms (dotted line in the bottom panel of Figure 10). Consistently with the theoretical predictions in Section 3, small firms seem to be affected by the JA only as far as the hiring margin is concerned.

## 5 Estimation framework

The above suggests that both the hiring subsidy and the graded security contract have affected firms dynamics as well as workers' flows. In order to properly evaluate the effects of the JA reform we need i) to define more precisely the outcomes of interest, and ii) run multivariate regressions taking into account also of firm-specific and time-varying variables affecting hiring and layoff policies of firms.

### 5.1 Key definitions and estimating equations

Before detailing our estimation framework, we need to formalize our definitions. Let  $Y_{i,t}$  be the outcome of interest (hirings, separations, contract transformations, etc.) of firm  $i$  at month  $t$  and  $I_{i,jt} = 1$  be an indicator function if firm  $i$  has taken a certain action (hiring, layoff, transformation of fixed-term into open ended contract, etc.) for individual  $j$  at month  $t$ . Out of  $J$  individuals, we have at the firm level:

$$Y_{it} = \sum_{j=1}^J I_{i,jt} \quad \text{if} \quad (I_{i,jt} = 1)$$

In some specifications we normalize these measures by the initial workforce of the firm so that

$$y_{it} = \frac{Y_{it}}{N_o}$$

The normalization is done at the initial level of the workforce since total employment is endogenous to the JA. The outcome  $y_{it}$  is therefore defined on a per-worker basis relative to the employment levels in January 2013 for continuing firms, and to the first month in which they have positive employment in the extended sample.

Another key variable at the job (rather than firm) level is whether or not the new job has been subject to the hiring subsidy. We let the variable  $\Lambda_{i,jt}$  be an indicator function that takes the value 1 if firm  $i$  hires individual  $j$  on an open ended contract basis benefitting from the hiring subsidy and 0 otherwise. We also want to take into account of whether the subsidy is the one present in 2015 and involving potentially a full exemption from social security contributions or it is the less generous partial de-contribution of 2016. Thus, defining by  $H(i, t)$  total subsidized hires in firm  $i$  at time  $t$ , we add a time-varying parameter capturing the birth rate of the jobs,  $\rho_t$ :

$$H_{it} = \sum_{j=1}^J \rho_t \Lambda_{i,jt} \quad \text{if} \quad (\Lambda_{i,jt} = 1),$$

where  $\rho_t = 1$  if hires took place in 2015, and  $\rho_t = 0.5$  if the hires took place in 2016. Before 2015,  $\rho_t = 0$ . Finally, we define dummy variables capturing the key dates of the JA, i.e.:  $Jan, 15_t$  taking value 1 if the job was initiated in 2015 benefitting from the largest hiring subsidy,  $Mar, 15_t$  if the job was initiated after the date of introduction of the graded security contract (March 2015), and  $Jan, 16_t$  if the job was initiated in 2016 benefitting from the lower hiring subsidy.

We run different specifications for each outcome equation. We begin with a simple fixed effect regression with monthly dummies

$$Y_{it} = \alpha_i + \delta_t + \epsilon_{it} \quad (4)$$

where  $\alpha_i$  is firm fixed effect and  $\epsilon_{it}$  is the error term. The inspection of  $\delta_t$  complements the above descriptive analysis taking into account of time-invariant firm-specific characteristics. Next, we include in this setting the reform dummies, that is:

$$Y_{it} = \alpha_i + \beta_1 Jan, 15_t + \beta_2 March, 15_t + \beta_3 Jan, 16_t + \gamma H_{it} + \epsilon_{it}, \quad (5)$$

where  $Jan, 15_t$  takes a value 1 since January 2015 at the introduction of the large hiring subsidy of the JA, and zero otherwise.  $March, 15_t$  marks the introduction of graded security in March 2015 and  $Jan, 16_t$  the halving of the hiring subsidy and the reduction of its duration. A third set of regressions involves also firm-specific time trends:

$$Y_{it} = \alpha_i + \rho_i t + \beta_1 Jan, 15_t + \beta_2 March, 15_t + \beta_3 Jan, 16_t + \gamma H_{it} + \epsilon_{it}, \quad (6)$$

where  $\rho_i$  is the coefficient on the firm-specific time trend. A fourth set of regressions draws also on the asymmetries between small and large firms characterized by our model and implied by the JA. Hence, it includes in the regressors not only time effects and group-specific time trends, but also their interactions with a dummy capturing small firms.

$$Y_{it} = \alpha_i + \beta_2 t S_i + \delta_t + \gamma_2 S_i \times Jan, 15_t + \eta H_{it} + \epsilon_{it} \quad (7)$$

where  $S_i$  is a dummy variable for small firms, and  $S_i \times Jan, 15_t$  is the main interaction variable of interest. The coefficient  $\gamma_2$  captures the interaction between the JA and small firms as of January 2015. An alternative specification is estimated with firm-specific time trends in lieu of the group-specific time trend

$$Y_{it} = \alpha_i + \beta_i t + \delta_t + \gamma_2 S_i \times Jan, 15_t + \eta H_{it} + \epsilon_{it} \quad (8)$$

where  $\beta_i$  is the coefficient of the time trend of firm  $i$ , while  $\gamma_2$  is the group-specific effect of the JA on small firms. Finally we run equations including placebo dummies covering periods before the JA, i.e.:

$$Y_{it} = \alpha_i + \delta_t + \beta_2 t S_i + \sum_{t=1}^T \gamma_t S_i \times \delta_t + \eta H_{it} + \epsilon_{it} \quad (9)$$

where the estimates  $\gamma_t$  up to December 2014 can be interpreted as placebo. The regressions are run with the extended sample.

## 6 Regression Results

Figure 11 displays the  $\delta_t$  coefficients (and 95 % confidence bands) for the monthly dummies of the pure firm fixed effects regression of firm-level open ended hirings. The message is quite clear both when we consider total hires (top panel) and hires relative to firm-level employment in December 2014 (bottom panel): a strong increase of new hires occurs in the aftermath of the introduction of the hiring subsidy, and as an anticipation in December 2015 of the additional hires planned in 2016 (which replicate then the dynamics of 2013 and 2014).

Figure 12 suggests that the JA has not significantly altered the seasonal pattern of hirings in fixed-term contracts. The negative substitution and positive option value effects would seem to have been mutually offsetting in affecting fixed-term hirings. In the case of transformations (Figure 13) the two effects operate in the same direction and the  $\delta_t$  coefficients are strongly positive in the aftermath of the JA throughout 2015. Figure 14 finally looks at total firings. Here we see a spike at the end of 2014 as if employers had anticipated layoffs in order to make room for subsidized hirings in 2015. Here the increase is visible after the

introduction of the graded security contract in March 2015, and goes well beyond the first year of the JA. As discussed in Section 3, we should expect a strong asymmetry between small and large firms when we look at the firing margin, rather than at the hiring margin, as small firms are not affected by the reduction of firing costs. Figure 15 is consistent with this prediction: the 2015 and 2016 increase in firings are concentrated in large firms (top panel) while  $\delta_t$  coefficients for small firms are never significantly different from zero.

Table 1 displays other specifications for the open ended hirings equations. The coefficient of the dummy marking the introduction in January 2015 of the hiring subsidy is highly significant and positive, except when we control for subsidized hirings (second and fourth columns) or we confine our analysis to firms not benefitting from the hiring subsidy (fifth and sixth columns). In the latter cases coefficients are either negative and/or not statistically significant. The number of subsidized hirings unsurprisingly positively affects hires per firm, while the dummy capturing the introduction of the graded security contract is always significant and negative. A possible interpretation of this result is that the anticipations of open ended hires induced by the 2015 hiring subsidy dominate the other policies<sup>13</sup>. Indeed also the coefficient for the 2016 less generous hiring subsidy is negative. This interpretation is consistent with the observation of a positive coefficients for the monthly dummies following the introduction of the graded security contract in richer specifications of the open ended hiring equation when control is made also for the asymmetry in the response of small and large firms (Table 2). Small firms appear once more to be more responsive than large firms on the hiring margin, while they are not responsive to the JA on the firing margin.

## 7 Final Remarks

This paper uses a unique dataset drawn from the Italian social security records to study the effects of the Italian Jobs Act. The latter involves two main policies: a marginal subsidy for hiring on a open ended basis as well as a new labor contract based on graded security, in the spirit of the idea of Boeri and Garibaldi (2008) and Boeri et al. (2017). Whereas the marginal hiring subsidy applied to all firms, the new contract reduced costs of dismissals only for firms above the 15 employees threshold. Due to a cap in the hiring subsidy the latter was in general more generous to small and low-wage firms than for large and relatively high-wage firms.

According to the predictions of a simple model of hiring and firing with fixed wages, we show that the hiring subsidy and the graded security contract should have operated along both margins, increasing either hirings and firings. In order to identify separately the effects of the two policies, one can rely on the different timing of the two measures (the hiring subsidy begun in January 2015, the graded security contract in March 2015) as well as on the asymmetry between small and large firms. We show that the former should react to the JA only on the hiring margin while the latter on both hiring and firing.

We find an increase in mobility in the aftermath of the introduction of the JA, measured either as the number of firms passing the 15 employees threshold or as mobility measures for transition matrices. We also observe a significant increase in open ended hiring as well as an increase in the transformation of fixed-term contracts into open ended contracts. Fixed-term hiring is largely unaffected by the JA, which may be attributed to the presence of two mutually offsetting effects: a negative substitution effect inducing employers to replace fixed-term hiring with open ended contracts, and a positive option value effect inducing a larger use of fixed-term contracts as extended probationary periods for open ended hirings. The two effects are operating in the same direction in the case of the transformations of fixed-term into open ended contracts that indeed increase substantially in the aftermath of the JA.

The 2015 hiring subsidy dominates the graded security contract in its impact on hirings. The effect of the graded security contract is visible over and beyond the hiring subsidy when we look at the firing margin. In the latter case small firms are unresponsive to the reforms, whose impact is concentrated on large firms. Small firms are instead reacting more than large firms to the hiring subsidy, which is more generous for

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<sup>13</sup>Cirillo et al.(2015) argue that the softening of EPL lowers the bargaining power of workers at all levels leading to a decrease in open ended hiring in both large and small firms, offsetting the increase in open ended hiring generated by lower EPL in large units.

them.

Further work may wish to look at individual incentives to switch jobs when reforms reducing employment protection are introduced at the margin. Another interesting dimension for further research relates to the transformation of fixed-term into open ended contracts within the same firm, unfolding the option value of hiring with fixed term contracts.

## Appendix:

### A Basic Model of Hiring and Firing at the Job Level

The theoretical framework used to analyse the effect of the JA policies is the matching model of hiring and firing proposed by Garibaldi and Violante (2015). The model is fully in line with the traditional Mortensen and Pissarides matching model (2014), but rather than working with the traditional matching function for job creation, it highlights explicitly the role of hiring and firing margins. In the model the matching function is described by a simple searching probability  $\alpha$  and market tightness does not play any role. Firms buy the rights to post a vacancy at an endogenous flow cost  $q$ , and post vacancies driving the value of a vacancy to zero. Following Garibaldi and Violante (2005), the distribution of idiosyncratic productivity is indicated with  $F(x)$ , the hiring margin is indicated with  $R_o$  while the firing margin is indicated with  $R_d$ . The model is mainly partial equilibrium and we solve it for a given wage  $\omega$ . The two policy instruments are a severance payment (or a firing tax)  $S$  and a hiring subsidy  $H(\omega)$ .

The value of a vacancy reads

$$rV = -q + \alpha \frac{u}{v} \left\{ \int_{R_o}^{\bar{x}} [J(z) + H(\omega)] dF(z) - [1 - F(R_o)]V \right\} \quad (10)$$

Since the value of vacancy is driven down to zero by firm competition  $V = 0$ , the price of vacancy licence reads

$$q = \frac{\alpha u}{v} \int_{R_o}^{\bar{x}} [J(z) + H(\omega)] dF(z) \quad (11)$$

The value of a filled job is indicated with  $J$  and its value reads

$$(r + \lambda)J(x) = x - \omega + \int_{R_d}^{\bar{x}} J(z) dF(z) - \lambda F(R_d)S \quad (12)$$

The two key hiring and firing margins at the job level are determined by the following key equations

$$\begin{cases} J(R_o) & = & -H(\omega) & \text{Hiring Margin} \\ J(R_d) & = & -S & \text{Firing Margin} \end{cases} \quad (13)$$

The hiring subsidy implies that the marginal hire is such that  $J(R_o) + H(\omega) = 0$ . Finally, new jobs are created above the hiring margin while jobs below the firing margin are destroyed. Total hiring flows are

$$\begin{cases} \text{Hirings} = \alpha[1 - F(R_o)] \\ \text{Firings} = \lambda F(R_d) \end{cases} \quad (14)$$

To obtain the hiring and firing condition one needs to integrate by part the expected value of the job in equation (12), and using the fact that  $J' = \frac{1}{r + \lambda}$ . Further, using the fact that the firing margin  $J(R_d) = -S(\omega)$ , the value of a job reads

$$J(x) = \frac{x - R_d}{r + \lambda} + S \quad (15)$$

while its expected value is

$$\int_{R_d}^{\bar{x}} J(x) dF(z) = \frac{1}{r + \lambda} \int_{R_d}^{\bar{x}} (1 - F(z)) dz \quad (16)$$



The results of the two expressions can then be used to obtain the key firing condition  $R_d$ . The creation is then similarly derived in using the fact that  $J(R_o) = -H(\omega)$

$$\left\{ \begin{array}{l} R_o - \omega = -\frac{\lambda}{r+\lambda} \int_{R_d}^{\bar{x}} (1 - F(z)) dz + \lambda S - (r + \lambda)H; \quad \text{Hiring Margin} \\ R_d - \omega = -\frac{\lambda}{r+\lambda} \int_{R_d}^{\bar{x}} (1 - F(z)) dz - rS; \quad \text{Firing Margin.} \end{array} \right. \quad (17)$$

To show that the hiring curve is upward sloping one needs to differentiate  $R_o$  with respect to  $R_i$  and show that it is strictly positive, so that  $\frac{\partial R_o}{\partial R_d} = \frac{\lambda}{r+\lambda}(1 - F(R_d)) > 0$ . The firing margin is clearly independent of the hiring margin.

The predictions of the two policies at the firm level can be obtained by simple comparative statics. The effect of the hiring subsidy on the hiring margin is obtained by differentiating the top equation in (17) with respect to  $H$  so as to obtain  $\frac{\partial R_o}{\partial H(\omega)} = -(r + \lambda) < 0$ . In other words, the hiring curve shifts to the left with higher hiring subsidy as in the left panel of Figure 3 in the text. Since total hires are given by  $Hirings = \alpha[1 - F(R_o)]$ , total hires obviously increase in response to a larger subsidy. The effect of the firing  $S$  on the two margin can be studied in similar fashion. Looking at the firing margin, the differentiation of  $R_d$  with respect to  $S$  yields- after simple algebra  $|\frac{\partial R_d}{\partial S}|_{R_o=\bar{R}_o} = -\frac{r+\lambda}{r+\lambda F(R_d)} < 0$ , so that lower firing costs increase firings. In other words, the firing curve shifts up with lower firing costs as in the right panel of Figure 3 in the text. The effect on the  $S$  of the hiring curve is  $|\frac{\partial R_o}{\partial S}|_{R_d=\bar{R}_d} = -\lambda < 0$  so that the hiring curve shifts up as in the right panel of Figure 3 in the main text.

## References

- [1] Behaghel, L, Crepon, B., and B. Sedillot (2008) “The perverse effects of partial employment protection reform: The case of French older workers” *Journal of Public Economics*, vol. 92, issue 3-4, 696-721
- [2] Bentolila, S., and Bertola, G. (1990). “Firing Costs and Labor Demand: How Bad is Euroclerosis?”, *Review of Economics and Statistics*, 57, 381-402.
- [3] Bentolila, S. (1997). “Las decisiones judiciales sobre despidos en Espana: una perspectiva economica”, *Cuadernos de Informacion Economica*, 128-129.
- [4] Bentolila, S., and J. F. Jimeno (2008), “Two-tier Employment Protection Reforms: The Spanish Experience?”, CESifo DICE Report 4/2008, 49-56.
- [5] Bentolila, S., Cahuc, P., Dolado, J. J., and Le Barbanchon, T. (2012). “Two-tier labour markets in the Great Recession: France versus Spain”. *The Economic Journal*, 122(562):155-187
- [6] Bertola, G. (1990). “Job security, employment and wages” G Bertola *European Economic Review*, 34 (4), 851-879
- [7] Berton, F. and Garibaldi, P. (2012) “Workers and firms sorting into temporary jobs” *The Economic Journal* 122 (562), 125-154
- [8] Blanchard, O.J., and J. Wolfers (200) “The Role of Shocks and Institutions in the Rise of European Unemployment: the Aggregate Evidence”, *The Economic Journal*, Volume 110, Issue 462 March 2000 Pages 1-33
- [9] Blanchard O.J. and Tirole J. 2008. “The Joint Design of Unemployment Insurance and Employment Protection: A First Pass”. *Journal of the European Economic Association*, MIT Press, vol. 6(1), pages 45-77, 03.
- [10] Boeri, T (2011), “Institutional reform and dualism”, *Handbook of Labor Economics 4b* ed. D. Card and O. Ashenfelter. Elsevier.
- [11] Boeri, T. (1999). “Enforcement of employment security regulations, on-the-job search and unemployment duration”, *European Economic Review*, 43, 65-89.
- [12] Boeri, T. and Garibaldi, P. (2008) “Un Nuovo Contratto Per Tutti”. *Chiare Lettere* Milano.
- [13] Boeri, T. and Garibaldi, P. (2007) “Two-Tier Reforms of Employment Protection: a Honeymoon Effect?” *The Economic Journal* 117 (521), 357-385
- [14] Boeri, T. and Garibaldi, P. and E.R. Moen (2017) “Inside Severance Pay” *Journal of Public Economics* 145, 211-225
- [15] Boeri, T. and J. vanOurs, (2013) *The Economics of Imperfect Labor Market* Princeton University Press
- [16] Boeri, T. and Jimeno, J. (2005). “The effects of employment protection: Learning from variable enforcement”, *European Economic Review*, 49 (8), 2057-77.
- [17] Botero, S, Djankov, S., La Porta, R., Lopez-de-Silanes, F. and Shleifer, A. (2004). “The Regulation of Labor”, *Quarterly Journal of Economics* 119, 1339-1382.
- [18] Cahuc, P. (2012). “For a unified contract”. *European Labour Law Journal*, 3(3):190-205.
- [19] Cahuc, P, Charlot, O., and Malherbet, F. (2016) *International Economic Review* Explaining, “The Spread of Temporary Jobs and Its Impact on Labor Turnover”, Volume 57, Issue 2, pages 533-572, May 2016

- [20] Cingano, F, Leonardi, M, Messina, J, and Pica, G (2016) “The effects of employment protection legislation and financial market imperfections on investment: evidence from a firm-level panel of EU countries”, *Economic Policy* 25 (61), 117-163
- [21] Cirillo, V. and Guarascio, D (2015) “Jobs and Competitiveness in a Polarised Europe”, *Intereconomics*, May 2015, Volume 50, Issue 3, 156160
- [22] Davis, S. and Haltiwanger, J. (1999) “Gross job flows” *Handbook of Labor Economics*, 1999, vol. 3, Chapter 41, Part B, 2711-2805, Elsevier.
- [23] Dolado, J., Lalle, E. and Siassi, N. (2016) “From Dual to Unified Employment Protection: Transition and Steady State” *IZA Discussion Paper* No. 9953
- [24] Fana, M, Guarascio, D., and V. Cirillo (2015) “Labour market reforms in Italy: evaluating the effects of the Jobs Act”, *ISI growth Working Paper* 5/2015
- [25] Fraisse, H, Kramarz, F. and Prost, C. (2009). “Labor Court Inputs, Judicial Cases Outcomes and Labor Flows: Identifying Real EPL”. *Working Paper Banque de France*, n.404.
- [26] Garibaldi, P. (1998). “Job flow dynamics and firing restrictions”. *European Economic Review* 42, No. 2: 245-75.
- [27] Garibaldi, P., L., Pacelli and Borgarello, A. (2004) “Employment Protection Legislation and the Size of Firms”, *Giornale degli Economisti e Annali di Economia*. Num. 4, 33-68
- [28] Garibaldi, P. and Violante G.L. (2005), “The Employment Effects of Severance Payments with Wage Rigidities”. *The Economic Journal*, 115: 799832
- [29] Garibaldi, P, and L. Pacelli (2008) “Do Larger Severance Payments Increase Individual Job Duration?”, *Labour Economics* 15 (2), 215-245.
- [30] Haltiwanger, J., Scarpetta, S. and H. Schweiger (2008) “Assessing Job Flows Across Industries: The role of Industry, Firm Size and Regulations” *NBER Working Paper 13920* <http://www.nber.org/papers/w13920> Cambridge, MA 02138
- [31] Kugler, A. (1995) “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
- [32] Kugler, A. and Pica, G. (2008) “Effects of employment protection on worker and job flows: Evidence from the 1990 Italian reform” *Labour Economics* 15 (1), 78-95
- [33] Mortensen, D. and C.A. Pissarides (1994) “Job Creation and Job Destruction in the Theory of Unemployment”, *The Review of Economic Studies* Vol. 61, No. 3 (Jul.), pp. 397-415
- [34] Hijzen, A., Mondauto, L. and Scarpetta, S. (2013) “The Perverse Effects of Job-Security Provisions on Job Security in Italy: Results from a Regression Discontinuity Design” *IZA Discussion Paper* 7594
- [35] Ichino, A and Riphan, R. (2005) “The Effect of Employment Protection on Worker Effort: Absenteeism during and after probation”, *Journal of the European Economic Association*, Volume 3, Issue 1 Pages 120-143
- [36] Leonardi, M. and T. Nannicini (2016) “The Effects of the Jobs Act”, Unpublished Presentation at INPS.
- [37] Marinescu, I. (2009) “Job Security Legislation and Job Duration: Evidence from the United Kingdom”, *Journal of Labor Economics* Volume 27, Number 3, 465-486.
- [38] Martins, P. (2009), “Dismissals for Cause: The Difference That Just Eight Paragraphs Can Make?”, *Journal of Labor Economics*, Vol. 27, No. 2, pp. 257-279.

- [39] Millard, S. and D. Mortensen (1995) "The unemployment and welfare effects of labour market policy: a comparison of the USA and the UK" *Unemployment Policy: How Should Governments Respond to Unemployment*, 545-72, Guillermo de la Dehesa, Dennis J. Snower eds, Cambridge University Press
- [40] Nickell, S.J., (1986), "Dynamic Models of Labor Demand", in *Handbook of Labor Economics*, Volume 1, Orley Ashenfelter and Richard Layard eds. Chapter 9, 473-522, North Holland.
- [41] Oi, W.Y and Idson, T.L. (1999) "Firm size and wages" *Handbook of Labor Economics*, Volume 3, Orley Ashenfelter and David Card eds. Chapter 33, 2165-2214, North Holland.
- [42] Riphahn R.T. (2004) "Employment protection and effort among German employees" *Economics Letters* 85 (3), 353-357.
- [43] Schivardi, F., and Torrini, R., (2008), "Identifying the Effects of Firing Restrictions through Size-Contingent Differences in Regulation", *Labour Economics*, Vol. 15, pp. 482-511.
- [44] Sestito, P. and Viviano, E. (2018) "Firing costs and firm hiring: evidence from an Italian reform" *Economic Policy*, Volume 33, Issue 93, 1 January, Pages 101-130,
- [45] Sommers, P. and Conlisk J. (1979) "Eigenvalue immobility measures for Markov chains " *The Journal of Mathematical Sociology* Volume 6, 1979 - Issue 2. Pages 253-276.
- [46] Shorrocks, A.F. (1978) "The Measurement of Mobility" *Econometrica*, Vol. 46, No. 5 (Sep., 1978), pp. 1013-1024.

Table 1: Regressions of Difference Across Time: Open Ended Hires  
 Dependent Variable: Total Open Ended Hires

ESTIMATED COEFFICIENTS	Firm Fixed Effect		Firm Specific Trend		Firms with No Incentive	
	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
$\beta_1$ (January 2015 onward)	0.0536*** (0.0030)	-0.0441*** (0.0040)	0.0712*** (0.0065)	-0.0482*** (0.0073)	-0.0050 (0.0026)	0.0030 (0.0064)
$\beta_2$ (March 2015 onward)	-0.0194*** (0.0032)	-0.0214*** (0.0032)	-0.0171*** (0.0065)	-0.0197*** (0.0040)	-0.0153*** (0.0025)	-0.017*** (0.0035)
$\beta_3$ (January 2016 onward)	-0.0279*** (0.0031)	0.0106*** (0.0033)	-0.0165 (0.0123)	0.0304*** (0.0124)	0.030*** (0.027)	.0215* (0.0125)
$\gamma$ (Subsidized hires)	.	0.0134*** (0.0003)	.	0.0163*** (0.0004)	.	.
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm Specific Trend	No	No	Yes	Yes	No	Yes
Observations	2,900,159	2,900,159	2,900,159	2,900,159	1,248,091	1,248,091
R-squared	0,0042		0.149	0.156	0.0017	0.1846
Number of id	62467	62467	62467	62467	26601	26601

Standard errors in parentheses

\*\*\* p<0.001, \*\* p<0.01, \* p<0.1

In all regressions the dependent variable is the total hires per firm

Models in Column (1) and (2) is  $Y_{it} = \alpha_i + \beta_1 Jan, 15_t + \beta_2 March, 15_t + \beta_3 Jan, 16_t + \gamma H_{it}$

Models in Columns (3) and (4) is  $Y_{it} = \alpha_i + \rho_i t + \beta_1 Jan, 15_t + \beta_2 March, 15_t + \beta_3 Jan, 16_t + \gamma H_{it} + \epsilon_{it}$

Model in Columns (5) and (6) refer to firms that did not use the hiring subsidy.

Column (5) is fixed effect and Column (6) is firm specific trend.

$\alpha_i$  is firm fixed effect;  $t$  is a time trend,  $\rho_i$  is the firm specific trend;

$\beta_1$ ,  $\beta_2$  and  $\beta_3$  are the coefficients of the policy dummies from January 2015,

from March 2015 onward, and from January 2016 onward respectively

Table 2: Regressions of Difference Across Firm Groups and Time: Open Ended Hires  
 Dependent Variable: Total Open Ended Hires

VARIABLES	Trend for Small Firms		Firm Specific Trend		Small Firms $\times$ Month	
	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Small-Firms Jobs Act	.0344464*** (.0028329)	-.0130826*** (.0026939)	.0433878 *** (.0031347)	-.0139161*** (.002825)	-	-
Hiring Subsidy	.0137707*** (.0004035)	-	.0167661*** (.0005062)	-	.0137959 *** (.0004042)	-
Trend small firms	-.0003637 **** (.000095)	.0000959** (.0000959)	.	.	.	.
11-2014 $\times$ Small Firms	-	-	-	-	0.122 ** (.0043795)	.0121232** (.0043772)
12-2014 $\times$ Small Firms	-	-	-	-	.0121133** (.0063394)	.0120765 ** (.0046059)
1-2015 $\times$ Small Firms	-	-	-	-	.0368*** (.0063394)	-.0047236 (.0062609)
2-2015 $\times$ Small Firms	-	-	-	-	.037265 *** (.0053958)	-.004543 (.0053147)
3-2015 $\times$ Small Firms	-	-	-	-	.0424015*** (.0054287)	.0002447 (.0053792)
4-2014 $\times$ Small Firms	-	-	-	-	.0287611*** (0062915)	-.013705 ** (.0062887)
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Trend for Small Firms	Yes	Yes	No	No	No	No
Firm Specific Trend	No	No	Yes	Yes	No	No
Observations	2,900,159	2,900,159	2,959,359	2,959,359	2,900,159	2,900,159
R-squared	0.0219	0.0042	.1535	0.1468	0.346	0.0216
Number of id	62,467	62,467	62,467	62,467	62,467	62,467

Standard errors in parentheses

\*\*\* p<0.001, \*\* p<0.01, \* p<0.1

In all regressions the dependent variable is the total hires per firm

Models in Column (1) and (2) is  $Y_{it} = \alpha_i + \beta_2 t S_i + \delta_t + \gamma_2 S_i \times JAN, 15_t + \eta H_{it} + \epsilon_{it}$

Models in Columns (3) and (4) is  $Y_{it} = \alpha_i + \beta_i t + \delta_t + \gamma_2 S_i \times JAN, 15_t + \eta H_{it} + \epsilon_{it}$

Model in Columns (5) and (6) is  $Y_{it} = \alpha_i + \delta_t + \beta_2 t S_i + \sum_{t=1}^T \gamma_t S_i \times \delta_t + \eta H_{it} + \epsilon_{it}$

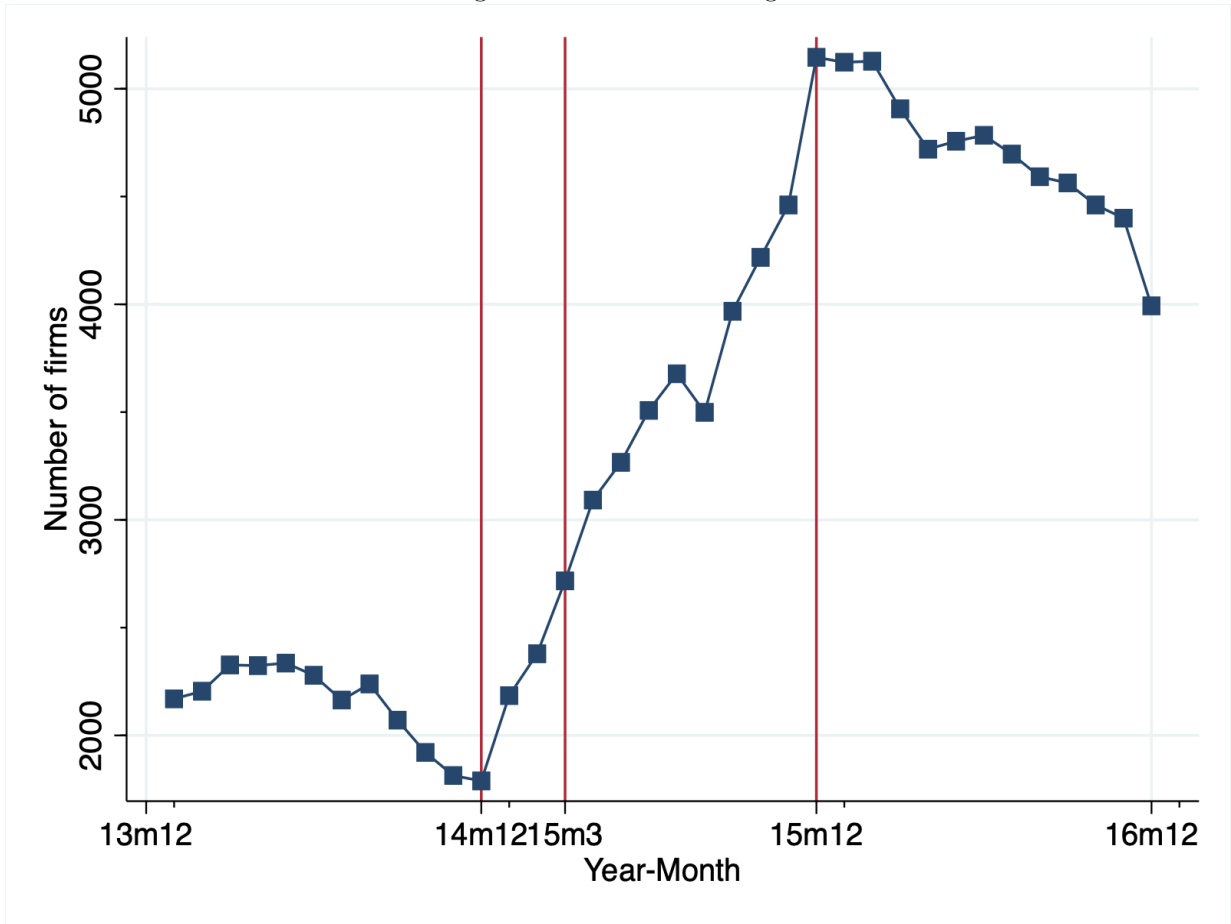
$\alpha_i$  is firm fixed effect;  $t$  is a time trend;  $\beta_i$  is the firm specific trend,  $S_i$  is dummy for small firms (9-12 size)

$JAN, 15_t$  is a dummy taking value 1 after January 2015

$H_{it}$  is the total number of subsidized hiring in firm  $i$

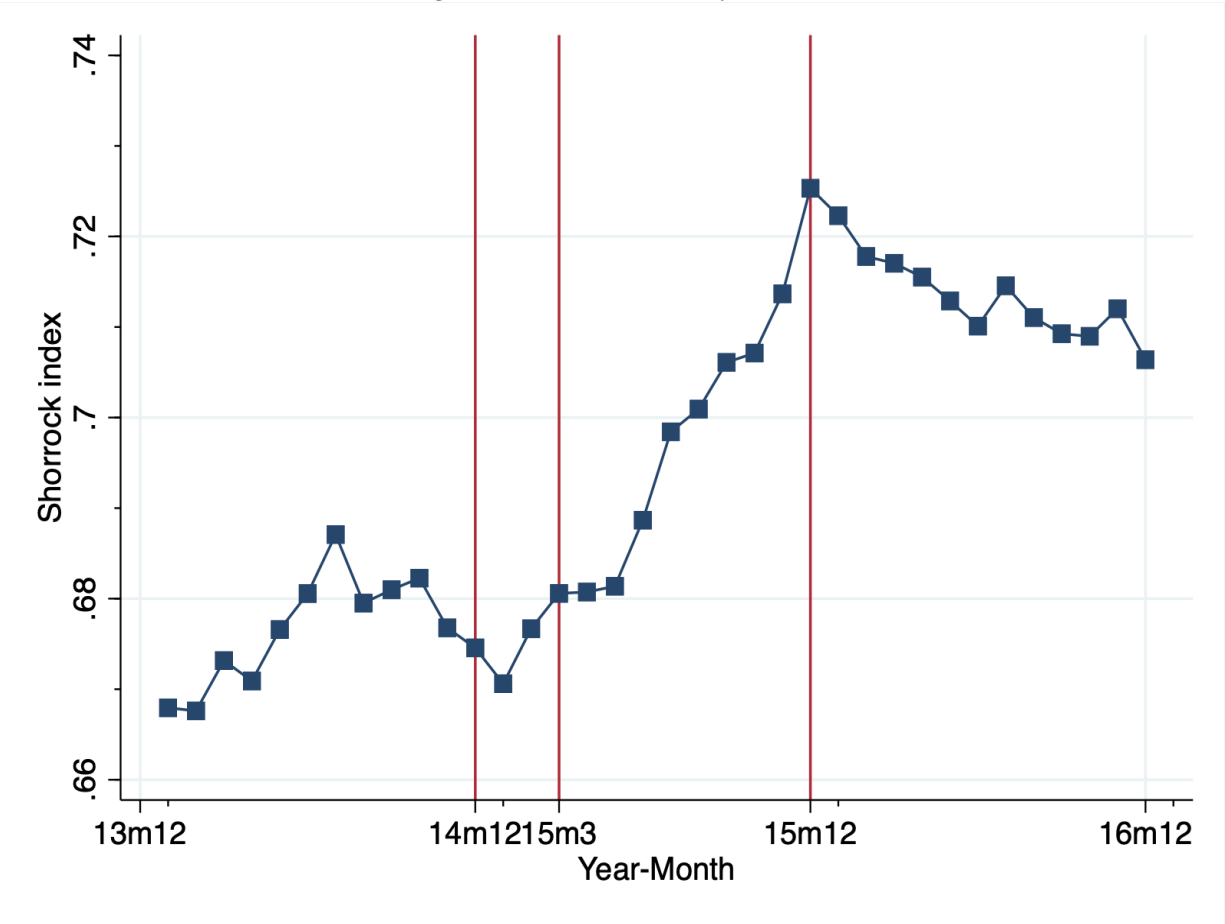
The omitted monthly dummy is September 2014

Figure 4: Threshold Passing



*Note:* Threshold Passing refers to the number of firms that in month  $t$  employ a total workforce above 15 employees and in month  $t - 12$  had less than 15 employees. The employees are obtained with the full time equivalent estimate provided by Inps.

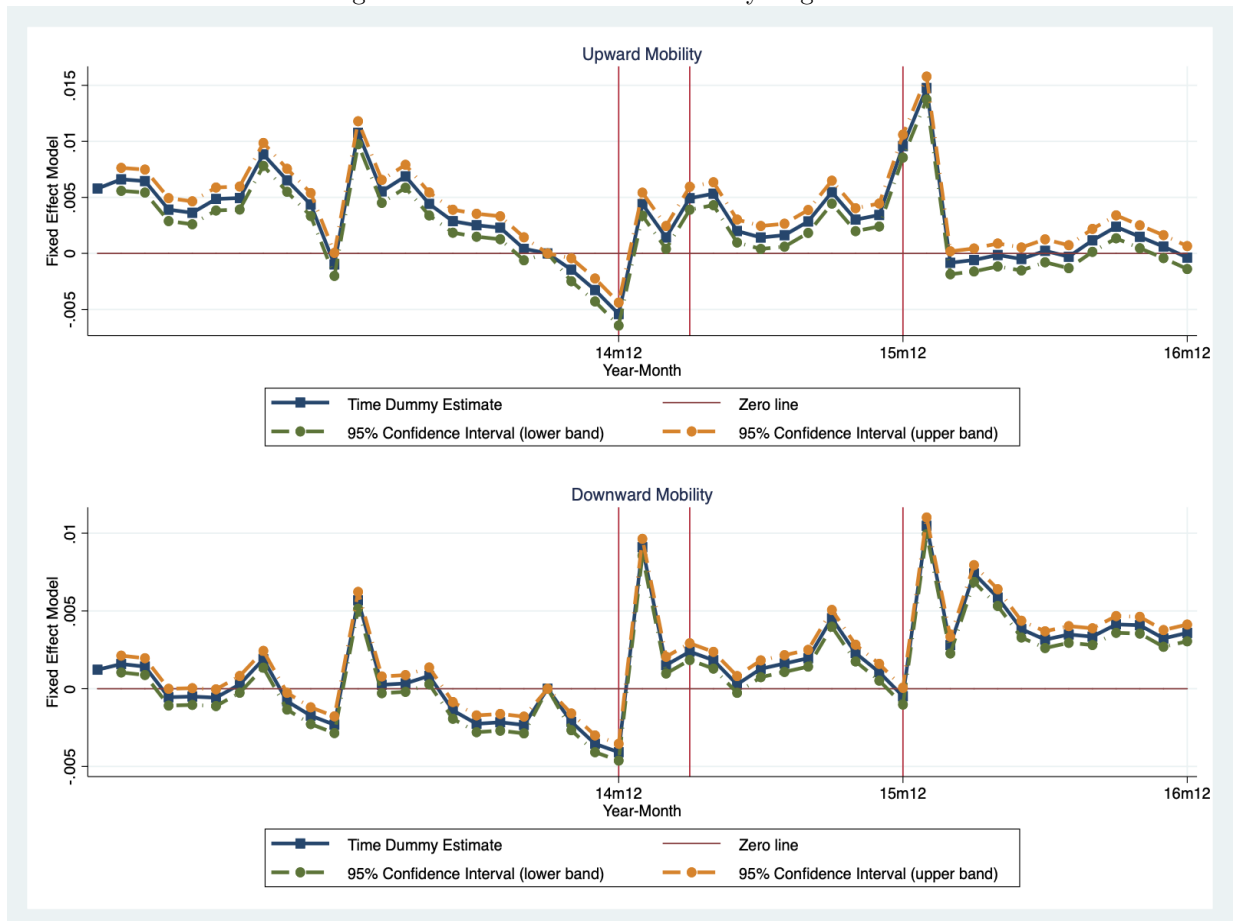
Figure 5: Shorrock Mobility Index



Note: Monthly Shorrock mobility indexes computed over yearly transition matrices. Shorrock index is bound between 0 and 1 where 0 corresponds to no mobility and 1 to no immobility

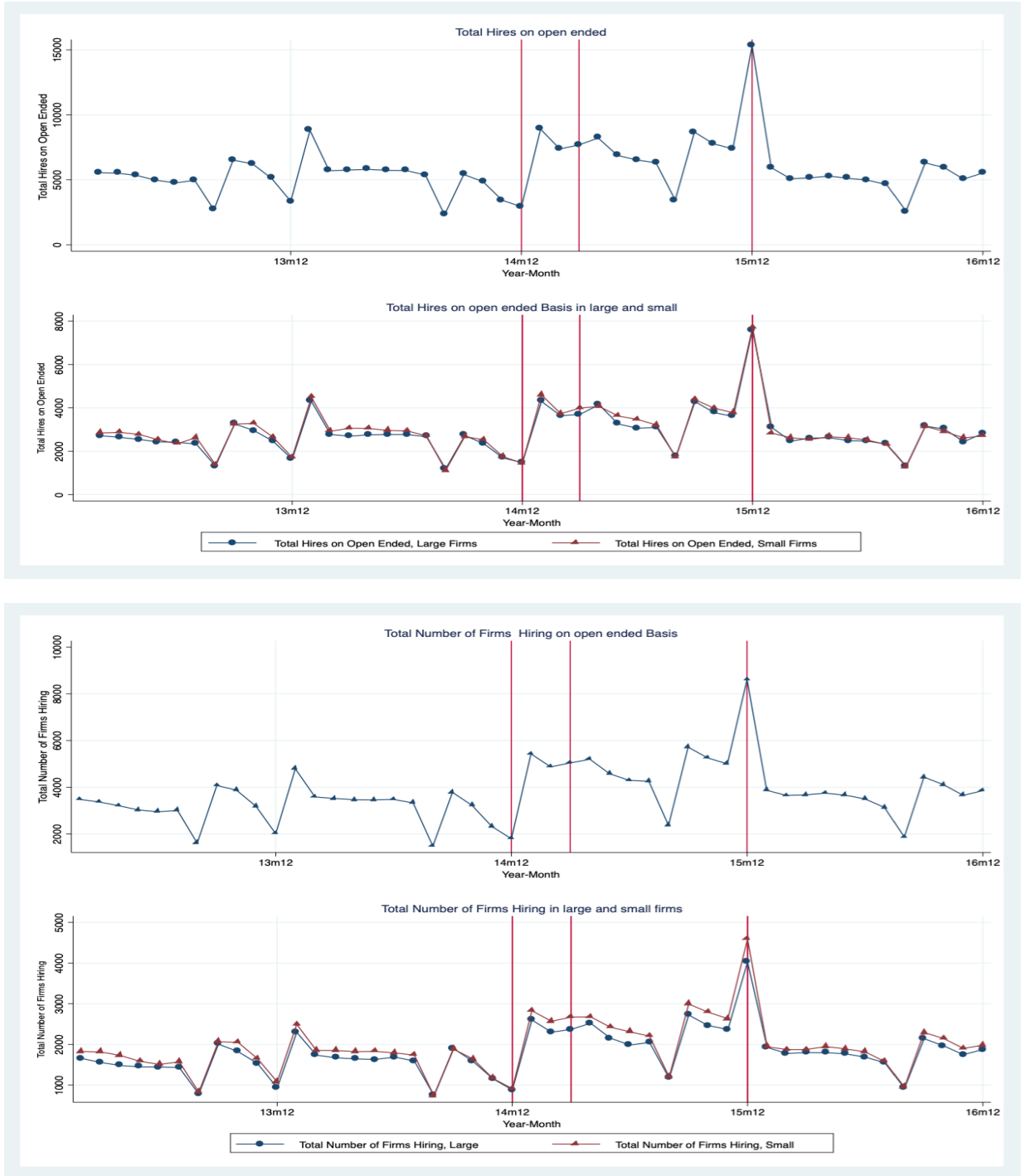


Figure 6: Time Dummies in Mobility Regressions



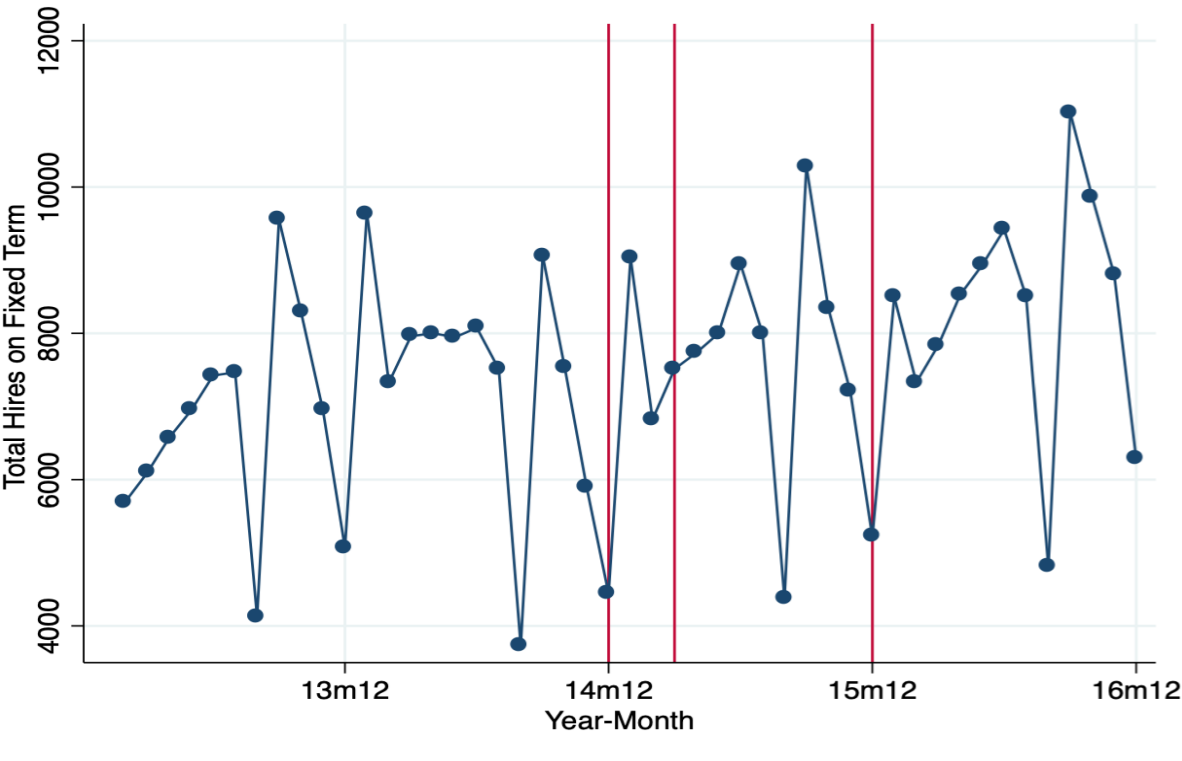
*Note* The estimated equation is the linear probability model  $Y_{it} = \alpha_i + \delta_t + \epsilon_{it}$ , where  $Y_{it} = 1$  if the firms experiences mobility upward (downward) and zero otherwise. The omitted time dummy is September 2014, and the estimation drops also the dummy January 2013 to identify the fixed effect. The Figure displays the  $\delta_t$  coefficients together with the 95% confidence intervals.

Figure 7: Total Hires: Open Ended



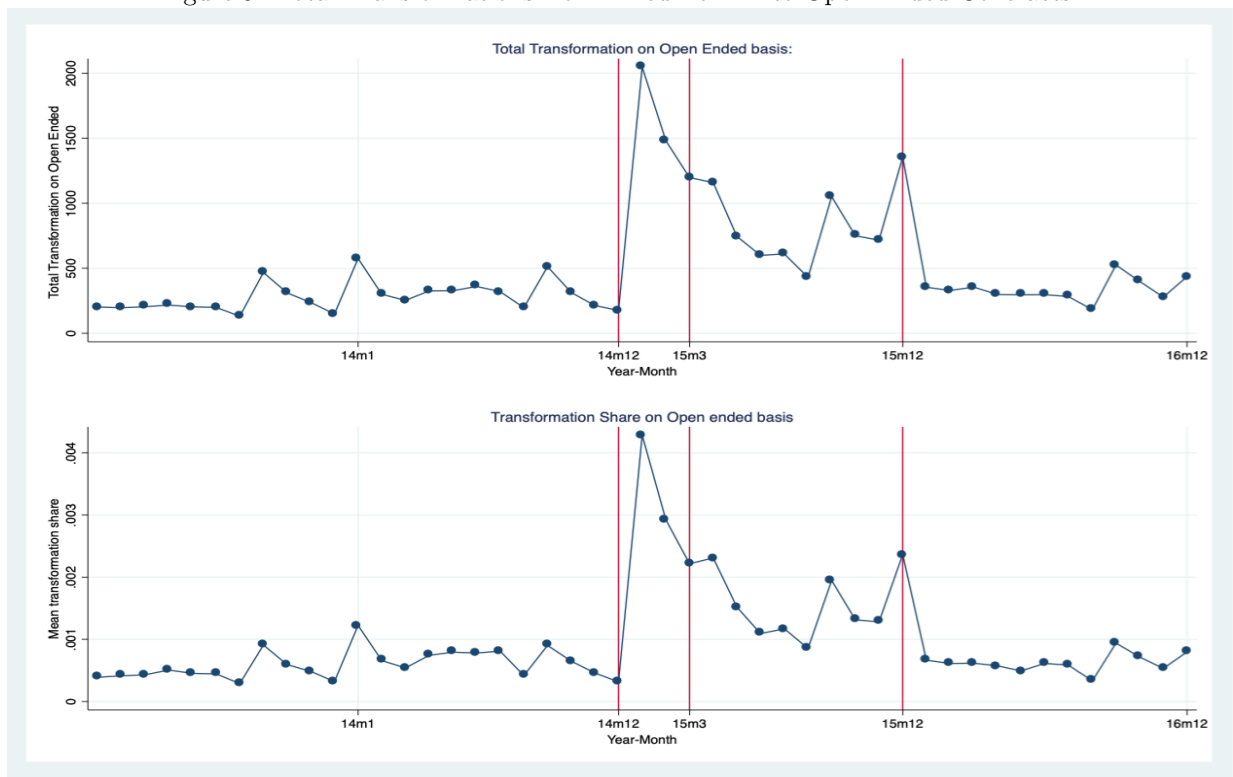
*Note:* The top panel counts Hires while the bottom Panel counts the number of firms that have open ended Hires. The lower figure in each panel measures differently for large and small firms. Small firms employ between 9 and 12 employees in the second semester of 2014. Large firms employ between 16 and 19 employees in the second semester of 2014. Firm size is measured through the full time equivalent definition provided by Inps

Figure 8: Total Hires Under Fixed-Term Contracts



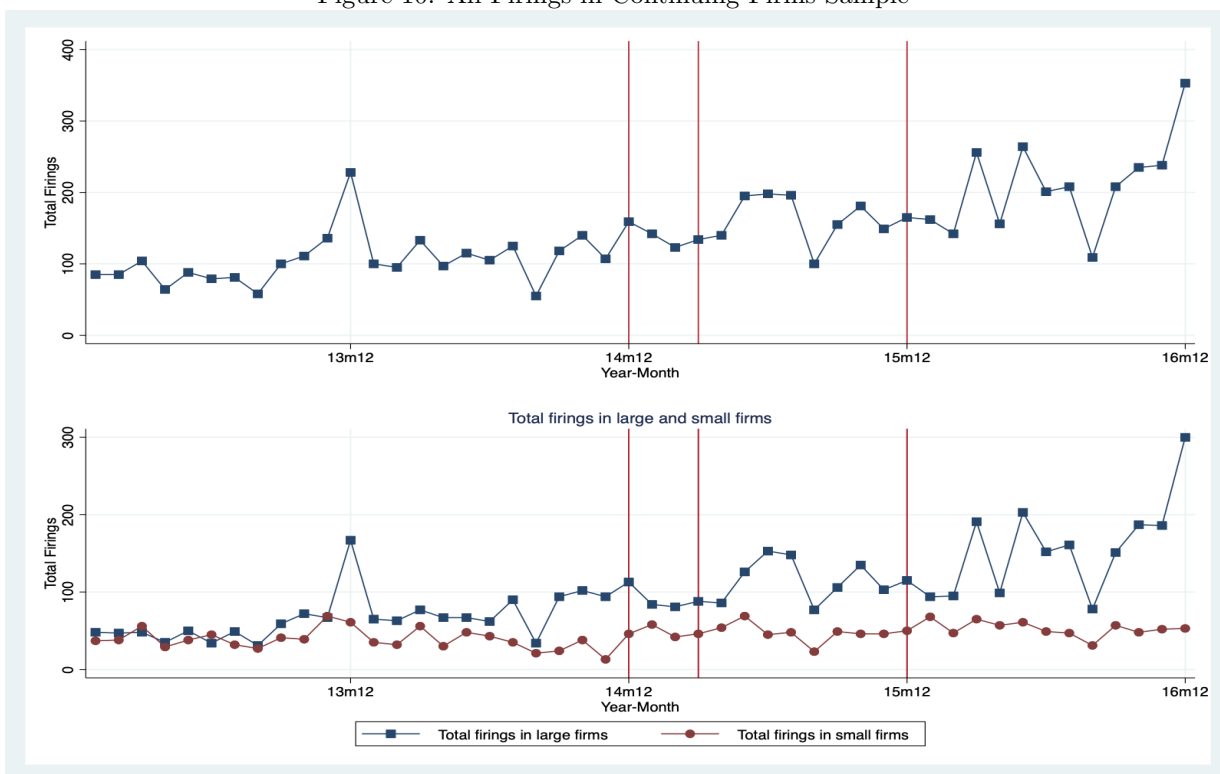
Note: Total number of new hires under a fixed-term contract basis.

Figure 9: Total Transformations from Fixed-Term into Open Ended Contracts



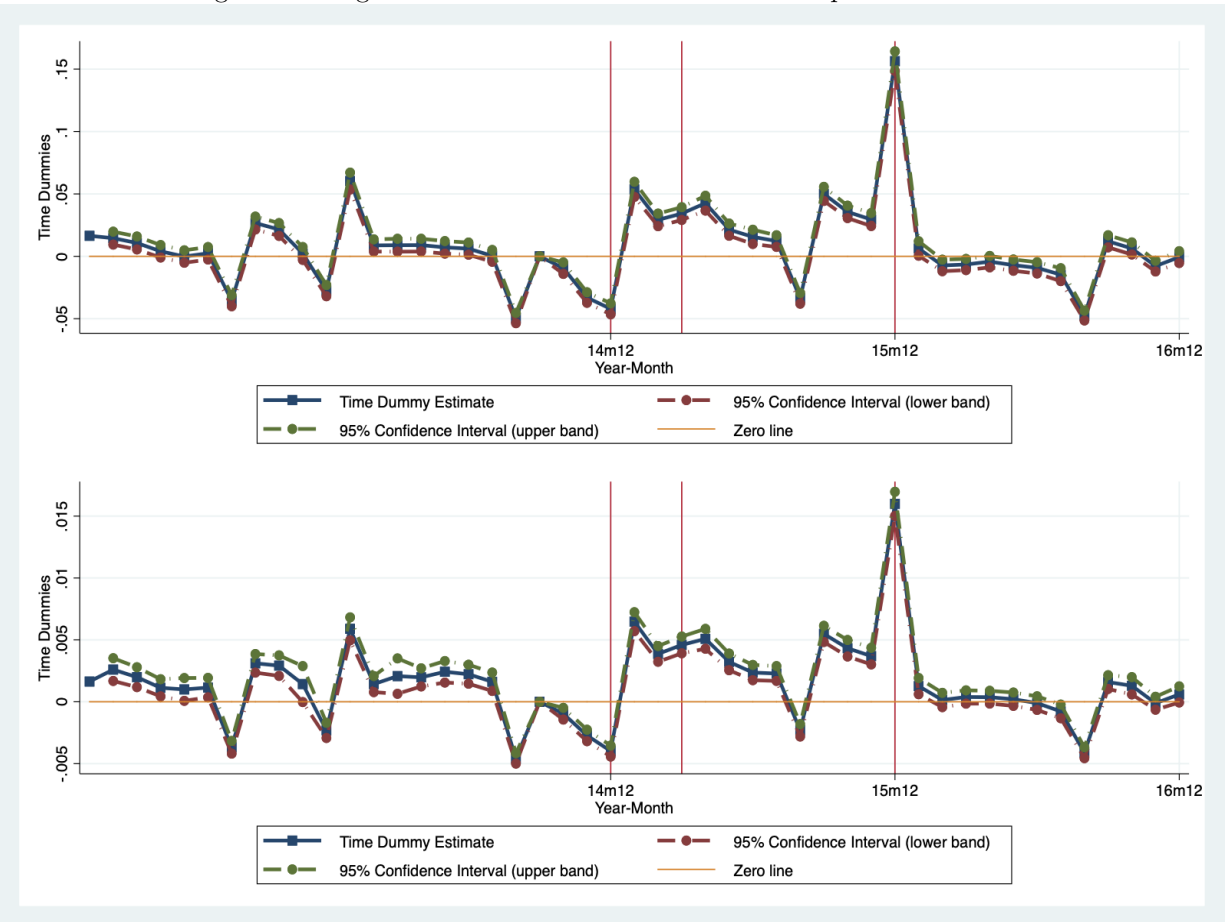
Note Transformations of Fixed-Term Contracts into Open Ended Hires. Top panel: Total Transformations Bottom Panel: Mean Transformation per Worker

Figure 10: All Firings in Continuing Firms Sample



Note Top panel: Total Individual Firings in the continuing firm sample. Bottom panel: Total Firings from Open Ended Contracts in small firms (9 to 12 employees in the second semester 2014) and large firms (above 15 employees in the second semester of 2014). Firm size is measured through the full time equivalent definition provided by Inps.

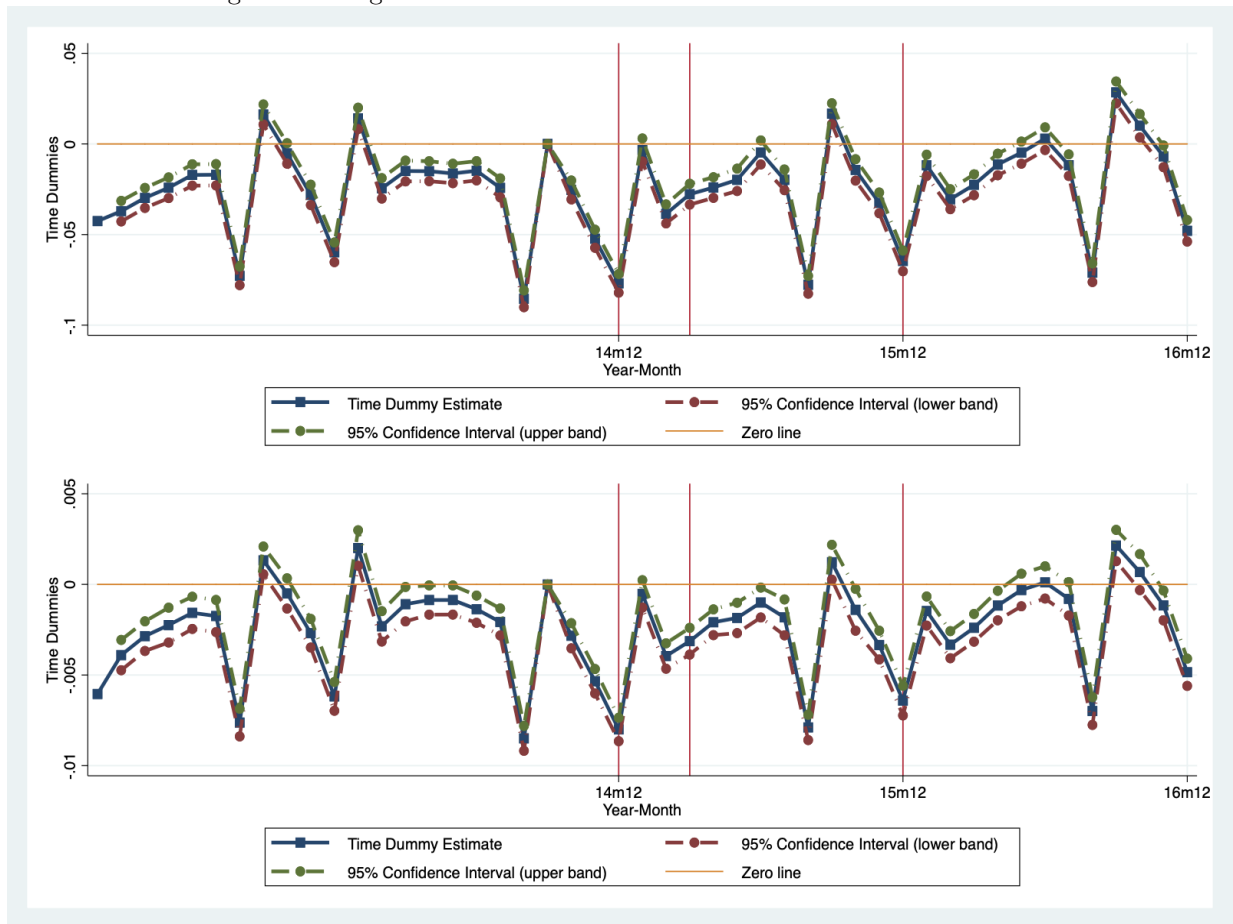
Figure 11: Single Difference: Time Dummies in New Open Ended Hires



*Note* The estimated equation is  $Y_{it} = \alpha_i + \delta_t + \epsilon_{it}$ . The Figure displays the  $\delta_t$  coefficients together with the 95% confidence intervals. The omitted monthly dummy is September 2014, and the estimation drops also the dummy January 2013 to identify the fixed effect

Top panel: The dependent variable is new open ended hires at the firm level. In the bottom panel the dependent variable is new open ended hires relative to the employment level of the firm in January 2013.

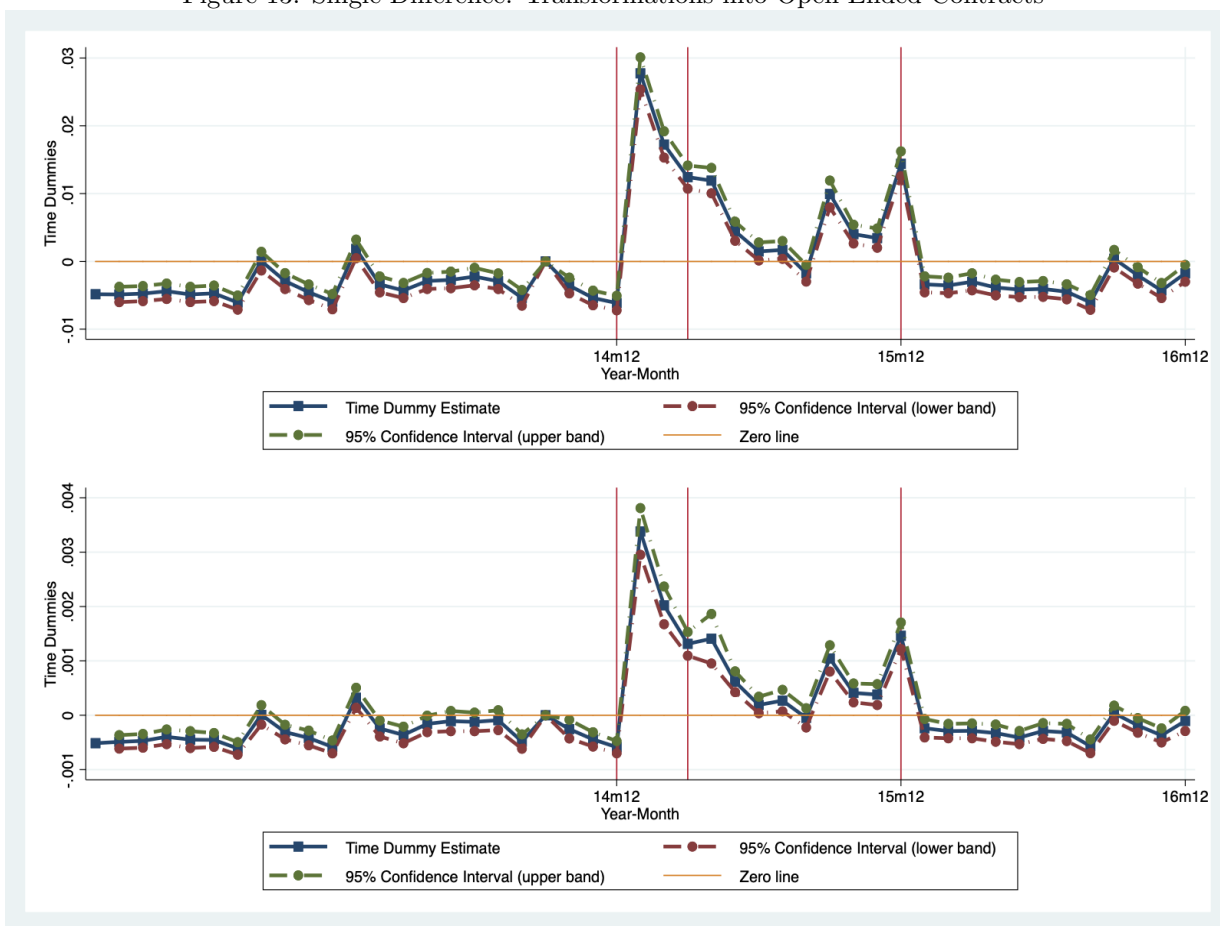
Figure 12: Single Difference: Time Dummies in New Fixed Term Hires



*Note* The estimated equation is  $Y_{it} = \alpha_i + \delta_t + \epsilon_{it}$ . The Figure displays the  $\delta_t$  coefficients together with the 95% confidence intervals. The omitted monthly dummy is September 2014, and the estimation drops also the dummy January 2013 to identify the fixed effect

Top panel: The dependent variable is new hires on a fixed term basis at the firm level. In the bottom panel the dependent variable is new fixed-term hire relative to employment in January 2013.

Figure 13: Single Difference: Transformations into Open Ended Contracts

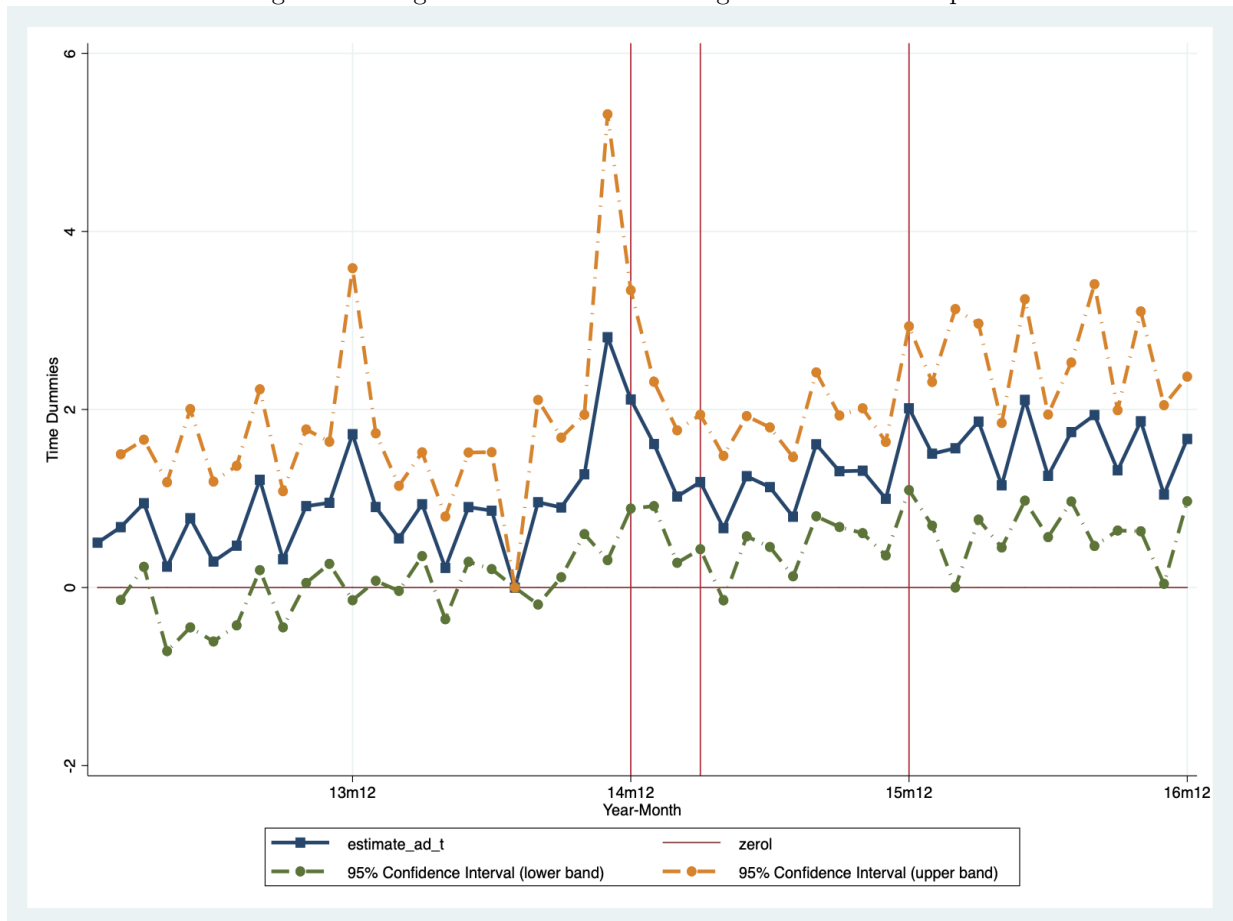


Note The estimated equation is  $Y_{it} = \alpha_i + \delta_t + \epsilon_{it}$ . The Figure displays the  $\delta_t$  coefficients together with the 95% confidence intervals. The omitted monthly dummy is September 2013, and the estimation drops also the dummy January 2013 to identify the fixed effect

Top panel: The dependent variable is new transformations into open ended contracts at the firm level. In the bottom panel the dependent variable is new transformation into open ended relative to employment in January 2013.

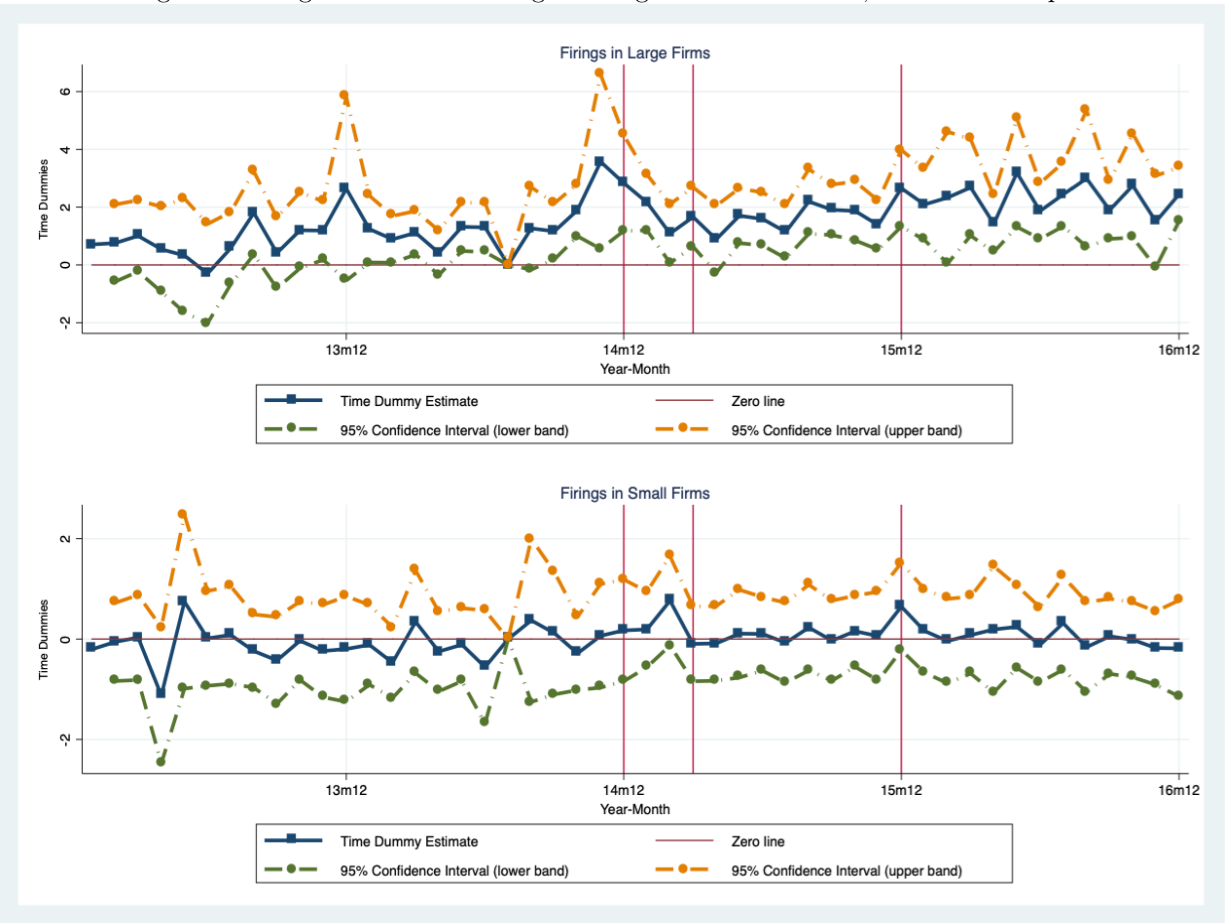


Figure 14: Single Difference: Total Firings in Extended Sample



*Note* The estimated equation is  $Y_{it} = \alpha_i + \delta_t + \epsilon_{it}$ . The Figure displays the  $\delta_t$  coefficients together with the 95% confidence intervals. The omitted monthly dummy is September 2014, and the estimation drops also the dummy January 2013 to identify the fixed effect. The dependent variable is total firings. The sample includes also firm exit.

Figure 15: Single Difference: Firings in Large and Small Firms, Extended Sample



Note The estimated equation is  $Y_{it} = \alpha_i + \delta_t + \epsilon_{it}$ . The Figure displays the  $\delta_t$  coefficients together with the 95% confidence intervals. The omitted time dummy is September 2014, and the estimation drops also the dummy January 2013 to identify the fixed effect

Top Panel: Total Individual Firings in large firms (above 15 employees in the second semester of 2014). Bottom panel: Total Firings from open ended contracts in small firms (9 to 12 employees in the second semester of 2014). Firm size is measured through the full time equivalent definition provided by Inps.

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