

# Employment protection legislation and hiring incentives: a tale of two reforms<sup>1</sup>

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## Abstract

A very recent and debated Italian labor market reform introduced a (temporary) generous subsidy for firms hiring workers with an open-ended contract and reduced (open-endedly) the protection for workers from firing in large firms. By using administrative micro data on the universe of job flows occurred in Piedmont, one of the largest Italian regions, we aim at assessing the impact of a reduction in labor cost and employment protection legislation on turnover by exploiting quasi-experimental conditions implied by two labor market reforms within a difference-in-differences framework.

Preliminary results show that both reforms, namely a rebate in social security contributions and a reduction of firing costs for new open-ended contracts, had a positive and significant effect on hiring rates with an open-ended contract, where the driving force seem to be the hiring incentive. In fact, the reduction in social security costs raised both open-ended hiring and conversions from fixed-term to open-ended contracts independently from the reduction of firing costs, which in turn seem to play a marginal role in boosting employment. On the contrary, after the reduction in employment protection, duration of new contracts has reduced and firing rate increased.

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# 1. Introduction

Deregulation has been a hallmark of labor market policies in advanced economies during the last three decades [Berton et al. 2012]. Advised in the early nineties as a way out of Eurosclerosis [Imf 1999; Oecd 1994], until the recent financial crisis deregulation mostly took the form of less binding regulations on temporary employment [Barbieri et al. 2016; Boeri 2010; Cappellari et al. 2012]. This gave rise to a growing problem of *dualization* between a group of more protected workers with open-ended contracts, and another more exposed to the economy's swings. The employment loss that followed the financial and the sovereign debt crises on the one hand added the challenge of growing unemployment to that of segmentation, while on the other created the political capital to proceed to further and more radical reforms [Hastings and Hayes 2016]. Not by chance, the two most indebted countries in the EU – namely Italy and Spain – have in 2012 proceeded to unprecedented deregulation of open-ended contracts [Meardi 2014; Perez and Rhodes 2014; Picot and Tassinari 2017], also under implicit pressure from international institutions [Sacchi 2015, 2018]. A less binding employment protection legislation (EPL) on open-ended contracts is indeed expected to ease the transitions to this kind of contract by means of a more frequent worker turnover, and hence to reduce labor market segmentation and to benefit those workers – women, non-nationals, the youth – that are more likely to hold a temporary job [Bertola 1999; Lazear 1990]. However, EPL reductions *per se* do not necessarily imply higher employment levels [Bentolila and Bertola 1990; Bertola 1990; Cazes 2013; Noelke 2016; Oecd 2004], if not through indirect effects occurring through more efficient retention [Bassanini and Ernst 2002; Bierhanzl 2005] and workers' allocation on existing jobs [Berton et al. 2017; Hopenayhn and Rogerson 1993; Rogerson 1987]. For this reason, in Italy – our case study – EPL reforms have been recently accompanied by dedicated employment incentives, whose expected effect – in spite of mixed available empirical evidence [Cahuc et al 2014; Ciani and De Blasio 2014; Cipollone and Guelfi 2003; Martini and Trivellato 2011; Neumark 2013; Neumark and Grijalva 2013] – is exactly that of raising labor demand.

Four more reasons explain why Italy is a particularly apt case to study the consequences of EPL reforms and hiring incentives. First, Italy is among the OECD countries with the highest degree of compliance to the deregulating policies suggested during the early nineties [Brandt et al. 2005] and during the 2000s [OECD 2013]. Second, segmentation and persistence in temporary contracts proved to be particularly harsh [Berton et al. 2011]. Third, during the last recession Italy experienced a wide employment loss that hit the youth and the marginal workers in particular. Fourth, the way Italy regulated hiring incentives and EPL, through firing costs reductions, enables the application of a fairly simple impact evaluation strategy that allows to assess the causal effect of EPL reductions and of hiring incentives on the probability to get an open-ended contract, and to differentiate this effect by former career status (unemployed vs. temporary worker).

In this article, we aim to assess the impacts of the introduction of the mentioned generous hiring incentives (HI) and of the reduction of firing costs (FC) on the probability of getting an open-ended contract. The impact of the two reforms can be identified separately exploiting the quasi-experimental discontinuities implied by the changes in the legislation adopting a difference-in-difference set up. Namely, the HI was

available to all firms that since January 2015, offered an open ended contract to persons who didn't have any open ended contract in the previous six months. In turn, the FC was applicable since March 2015 to all firms employing at least 15 employees.

A recent paper from Sestito and Viviano [2018] has analyzed the same reforms on Veneto, an Italian Region from North of Italy using our same source of administrative data, i.e. the so-called Comunicazioni Obbligatorie. Our first objective is to replicate their analysis on Piedmont, tackling the same research question with the same methodology (difference-in-difference) and on the same type of data. Then, we propose several ways to innovate their strategy. First, our estimates are produced separately by gender and age, allowing a deeper insight about potential heterogeneity in the effect of the policy. Second, we can take advantage of a longer longitudinal perspective, up to early 2017, while Sestito and Viviano [2018] could investigate only the immediate short-term effect of the reform, i.e. up to six months from the inception of the HI. Moreover, we also introduce a duration analysis in order to model the probability of getting an open-ended contract taking into account that the probability of being still eligible for the policy evolves with time. Finally, we extend the analysis of the impact of the policies to terminations of open-ended contracts.

The paper proceeds as follows: next section details the institutional background and the features of the two mentioned reforms. Then, in section three, we describe the data and the sampling strategy we use for the analysis, and presents some descriptive evidence. Section four deals with the difference-in-differences analysis of the impact of the two reforms on both the short- and long-term probability of getting an open-ended job and of having one's own temporary contract converted in an open-ended one. Section five moves to duration analysis, and hence also to the issue of job termination. In section six, we draw some tentative concluding remarks.

## 2. Institutional background

Starting from a situation of no limitations to individual layoffs, employment protection legislation in Italy was introduced during the sixties with Laws 604/1966 and 300/1970, the latter being better known as the “workers’ statute”. Indeed, under the civil code of 1865, open-ended contracts were explicitly forbidden. Recognizing an existing *de-facto* situation in which many employers aimed at integrating their laborers open-endedly within the production process, the fascist civil code enforced in 1942 introduced the possibility to stipulate open-ended employment contracts; nonetheless, it also granted the complete freedom to dismiss workers without any justification. Law 604/1966 represented a turning point with respect to this principle, inasmuch as it introduced the idea that individual layoffs must be justified in order to prevent abuses from the employers. In particular, an employer is legitimated to dismiss a worker if a *just cause* exists – damage of equipment, fight or violence towards other colleagues – or in case of a *justified reason*, that can be either *subjective* – major breaches of contract obligations – or *objective*, when the organization of the production process would make impossible the continuation of the employment relationship. In case the dismissed employee deems illegitimate

the layoff, she has to bring the case to a labor court. Under Law 604/1966, the labor judge has the authority to ascertain whether the dismissal was legitimated by a just cause or a justified reason. In case it was not, the employer is obliged to choose between starting a new employment relationship with the dismissed worker, or to compensate her with a sum ranging from 2.5 to 14 monthly salaries, depending on firm size and worker's seniority. In no case a severance pay is present. Law 300/1970, with its well-known article no. 18, introduced a more generous compensation system for illegitimate dismissals in firms employing more than fifteen workers in the same production unit or municipality.<sup>2</sup> According to its provisions, an illegitimate layoff is deprived of any legal effect, leads to reinstating the dismissed worker to her former position, and to the compensation of all foregone salaries and social security contributions since the layoff date. As for Law 604/1966 – which keeps applicable to small firms – no severance pay is present for legitimate dismissals, while layoffs that are deemed discriminatory are null.<sup>3</sup>

Based on the above-described provisions included in Law 300/1970, Italy has usually been presented as an exemplary case of rigid labor markets. This view was far from being unchallenged [Contini and Revelli 1992; Contini and Trivellato 2005; Del Conte et al. 2004], but what is relevant to our purposes is that since the early nineties the institutional setting defined by Laws 604/1966 and 300/1970 started to be considered questionable. Nonetheless, after a decade of partial labor market reforms that led to an almost complete liberalization of the use of temporary contracts [Davidsson 2011], it was only the economic crisis in 2008 that created the necessary political capital and institutional context to proceed to a revision of Law 300/1970. Following a process that Sacchi [2015] has defined *conditionality by other means*, the European Union required Italy to proceed to structural labor market reforms – in particular to revise the employment protection system concerning workers in medium and large firms – in order to receive financial support in the aftermath of the sovereign debt crisis. The fourth Berlusconi government made two attempts to fulfill this request through the introduction of contractual derogations to the labor law, but in both cases it proved unsuccessful. In 2010 it tried to circumvent article no. 18 by allowing employers to stipulate open-ended contracts with a provision to move the settlement of labor disputes (including those about dismissals) from labor courts – which decide according to the law – to arbitration boards, which instead decide according to equity principles. The government eventually withdrew this provision, after the President of the Republic deemed that it might be unconstitutional. In August 2011 a new attempt was made with Law 148/2011. Its article no. 8 provided that plant- and local-level collective agreements had the possibility to derogate to labor law, thereby including the norms concerning individual layoffs. This kind of collective agreements had to be signed by the most representative unions at the national or local level, a condition that could give rise to a massive number of lawsuits from national union representative questioning the representativeness of local signers. For this reason, the labor market provisions of Law 148/2011 was considered not sufficient by the European Commission, the European Central Bank and the International Monetary Fund, that withdrew their support to the Berlusconi government and made pressure

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<sup>2</sup> The threshold falls to five workers in the farming sector. In any case, having more than sixty employees all over Italy suffices to apply article 18 of Law 300/1970.

<sup>3</sup> For more details about the Italian institutional framework until the Monti government, see Berton et al. [2012].

for the reinstatement of a new “technical” government. Berlusconi resigned in November 2011, when the former European Commissioner Mario Monti became the new Prime Minister, with Elsa Fornero as Labor Minister.

Law 92/2012 eventually succeeded in revising article no. 18 of Law 300/1970. In cases of layoffs motivated under a disciplinary reason that a labor court rules illegitimate, reinstatement is possible only if the judge deems that the supposed *just cause* or *justified subjective reason* simply did not exist, or that the relevant collective agreement decided to punish in a different way. Moreover, the dismissed worker is entitled of a compensation ranging from five to twelve monthly salaries, on top of all foregone social security contributions. Instead, in the other cases in which a disciplinary layoff is judged illegitimate, the dismissed workers are only entitled to a monetary compensation ranging from twelve to twenty-four monthly salaries. For layoffs motivated by an economic reason, instead, reinstatement is possible only if no *justified objective reason* actually existed; in those cases, laid-off workers are also entitled of a monetary compensation ranging from five to twelve monthly salaries. In all the remaining situations of unlawful economic dismissals, workers are only entitled to a monetary compensation ranging from twelve to twenty-four monthly salaries. No severance pay – to be understood as firing cost to be paid to the dismissed worker in case of a lawful dismissal – has been introduced.

Although it markedly reduced firing costs for firms employing more than fifteen workers [Berton et al. 2017], Law 92/12 was still deemed to leave too much discretionary power to labor courts, hence failing to solve one of the (supposed) major limitations of the Italian labor law, namely its high degree of uncertainty. Coupled with widespread delays in civil trials, it used to result into high expected costs of labor disputes for both workers and employers [Sestito and Viviano 2016, 2018].

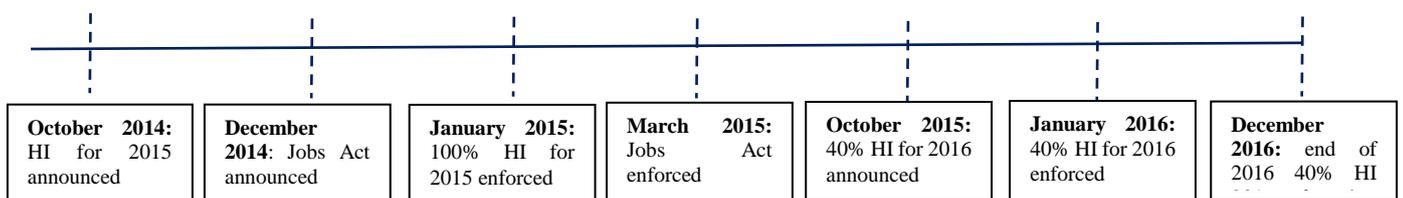
## **2.1 The policy reform under scrutiny**

The Decree 183/2014 – a part of a wider labor market reform better known as “Jobs Act”, implemented under the Renzi government – intended to remove this residual degree of uncertainty in labor and especially in firing costs and accordingly the new hires by firms with more than fifteen employees dating from March 7<sup>th</sup> 2015 would be subject to more flexible firing rules. More precisely, Decree 183/14 established, as a general rule, that unfair individual layoffs are subject to a monetary compensation only, amounting to two months of pay for every year of seniority, up to a maximum of 24 monthly salaries. Reinstatement is now limited to discriminatory dismissals and a few cases of disciplinary layoffs. The temporal (before and after March 7<sup>th</sup> 2015) and sectional (below or above the 15-employee threshold) discontinuities are exactly what we take advantage of to apply a difference-in-differences identification strategy.

On top of this – and possibly showing some awareness that EPL reductions hardly lead to direct employment effects – the Financial Stability Law for 2015 introduced a large hiring incentive (HI) benefitting all new open-ended contracts dating from January 1<sup>st</sup> 2015, under the conditions that i) the benefitted workers did not hold any open-ended contracts in the six months before the incentivized hire, and ii) they were not apprentices (for whom another incentive scheme was already in place). The HI was a 3-year 100% exemption from social security contributions up to a threshold, corresponding to full rebate of contributions for around 80% of firms

[Sestito and Viviano 2018], and was initially planned to be applicable to all open-ended hires started in 2015. The Financial Stability Law for 2016 then reduced the subsidy to a 40% rebate of social security contributions for two years for all new open-ended contracts activated during the year 2016. In the case of the HI, the different temporal (before and after January 1<sup>st</sup> 2015 and 2016) and sectional (workers with or without an open-ended contract in the former six months or coming or not from an apprenticeship) discontinuities are what allow us to identify its impact – separately from the EPL reduction. **Figure 1** helps visualizing the timeline of the policies under scrutiny.

**Figure 1** Timeline of the policies under scrutiny



*Source: adaptation from Sestito and Viviano [2018]*

### 3. Data and Sample Description

The analysis is carried out using an administrative archive called Comunicazioni Obbligatorie (CO) collected in Piedmont region. The CO is an administrative register of the entire population of daily labor market flows, managed locally by the Italian regions, under the coordination of the Ministry of Labor. The database includes the population of job contracts that have been opened, terminated or transformed by companies that were active in Piedmont region between January 2008 and June 2017. The CO is a linked employee-employer database, hence for each job spell we can observe information relative to both the workers and the firm in which they are employed. A part from workers' demographics (age, gender, nationality, education, domicile), we also can observe contract type, occupation, sector of activity, and reason for contract termination. The contract type tells whether the workers is employed under open-ended or fixed-term bases, where the latter category includes: (i) standard direct-hire fixed-term dependent contracts, (ii) agency workers, (iii) apprentices (iv) consultants (so-called *parasubordinati*) (v) interns (so-called *tirocinanti*) (vi) on-call jobs and (vii) domestic work [Veneto Lavoro 2016]. We complement these information with firm size derived from an administrative database called ASIA (Archivio Statistico delle Imprese Attive), produced by the Italian National Institute of Statistics (Istat). ASIA contains all enterprises carrying on economic activities in the fields of industry, commerce and services and that are active for at least six months in a calendar year and defines firm size as the average number of workers holding a job positions in the year, including management but excluding consultants and agency workers [Istat 2015, p. 38].

Even though CO includes all flows since January 2008, our period of analysis is composed of monthly individual outcome events occurring from January 2013; this is to focus on a period including only the two reforms we are focusing on, as detailed in the previous section.<sup>4</sup> Our available data terminates in June 2017. We exclude from the analysis employees in the public and agricultural sector and domestic job contracts holders (to whom the reforms do not apply). Then, we further select only persons whose age was in the range 15-70 years old when the hiring incentive was enforced, i.e. in January 2015. Finally, we exclude all person-months observations after death or retirement. To keep the database manageable, we draw a 1:10 random sample based on three birth dates per month; the final sample is composed of 106,907 individuals and 5,196,219 person-months.

**Table I** describes the data by gender, contract and age: the sample is composed of men (55.31%) and women (44.69%). The most common contract type is the open-ended one, followed by the standard fixed-term contract. As emerges comparing CO and national labor market composition [Istat 2018], the proportion of women, young and non-standard contract types is higher in our sample than in the general population. This because CO data, mapping labor market flows instead of stocks, records more than proportionally those workers with shorter job spells and more fragmented careers, as they are more likely to generate a flow which is covered by the CO data.

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<sup>4</sup> In 2012, as detailed in Section 2, another major labor market reform was indeed introduced.

**Table 1** Sample Description

		% sample	% population
Sex composition:	Women	44.69	36.58
	Men	55.31	63.42
Contract Type:	Permanent	54.63	86.18
	Fixed term	7.15	
	Apprentices	3.45	
	Agency	2.09	
	On call	1.71	
	Consultants	2.14	
	Intern	2.14	
	Firm Size:	<8	24.88
	8-12	7.15	
	13-16	4.12	
	17-21	3.12	
	22+	60.74	
Non-employment:		28.07	
Age composition:	15-24	10.83	6.32
	25-34	27.66	19.99
	35-49	39.88	44.49
	50-64	21.64	29.20
N. Persons	106,907		
N. Person months	5,196,219		

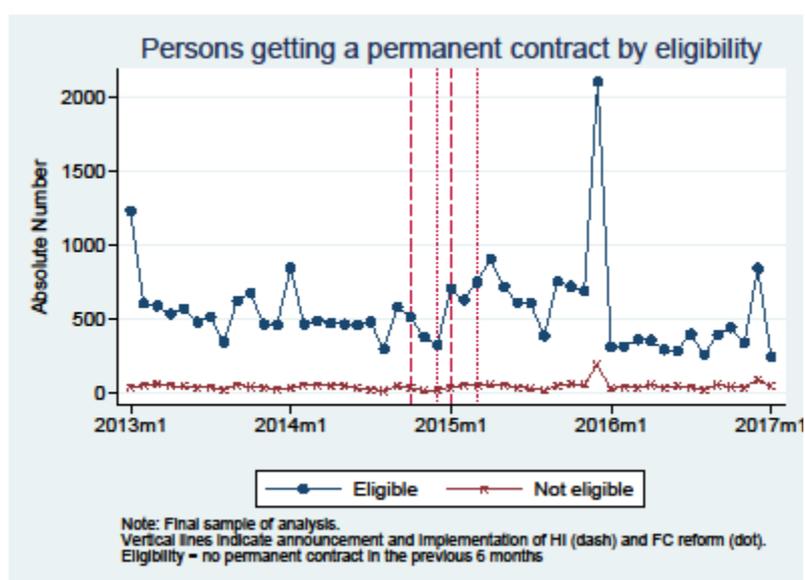
Source: Authors' elaboration based on final sample of analysis (CO data) and on active labour force statistics [Istat 2018]

In this paper, we investigate mainly two outcomes: the individual probability to find an open-ended job because of hiring and the individual probability to get the fixed-term contract converted into an open-ended one. The reference population for the first outcome is composed of individuals who are at risk of getting an open-ended job, i.e. those who are without a job and those who are employed with a temporary contract. Persons were eligible for the HI after January 2015 if in the previous six months they did not have an open-ended contract.

**Figure 2** shows the evolution of number of individuals getting an open-ended contract since January 2013 up to January 2017 by individual eligibility status. Vertical lines indicate the time of announcement and of the implementation of the HI and of the FC reforms. Notice that the pool of eligible for the HI is more than ten times larger than that of not eligible, showing that the target of the HI included the vast majority of individuals without an open-ended contract. The number of new open-ended contracts increased in correspondence of the implementation of the HI and increased again sharply in December 2015 and December 2016, suggesting an anticipation effect with respect the reduction of the HI for new contracts starting from January 2016 and its almost complete elimination in January 2017.<sup>5</sup>

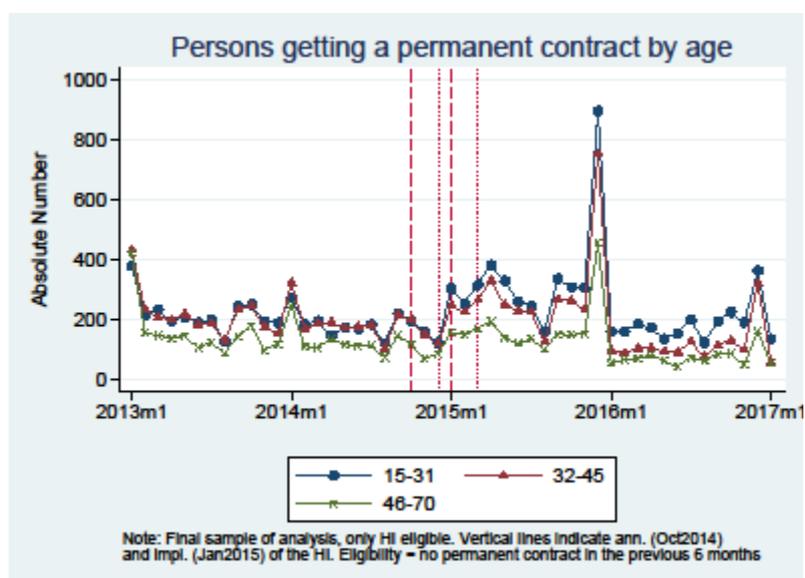
<sup>5</sup> From January 2017 onward, the HI remained available only for limited categories of new contracts, i.e. those regarding youth below 35 years old and Southern regions' residents.

**Figure 2** Evolution of the number of persons getting an open-ended contract



**Errore. L'origine riferimento non è stata trovata.** reports the evolution of flows into open-ended contracts by age (15-32, 33-45 and 46-70 years, corresponding to sample tertiles). The figure confirms that the number of new open-ended contracts increased for all the age groups during the 2015, with the sharpest increase detectable in December 2015 at all ages and in particular among the younger.

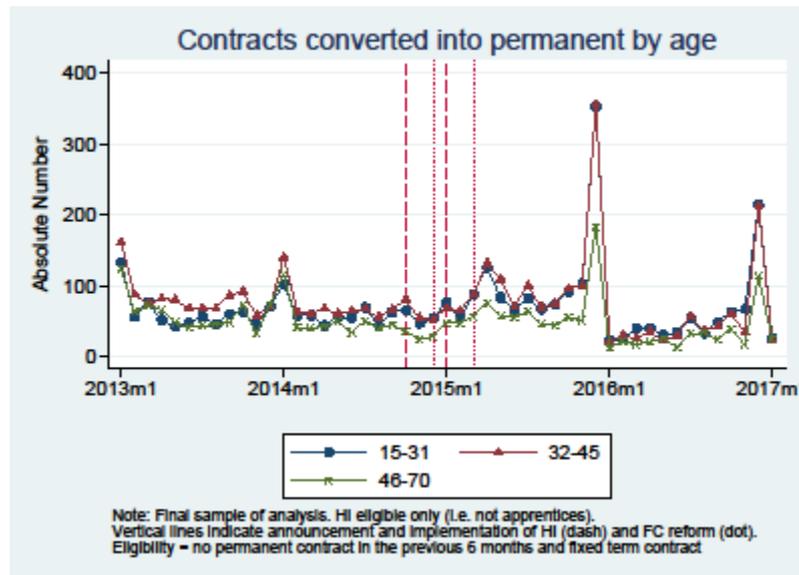
**Figure 3** Evolution of the number of conversions of temporary contracts into open-ended contracts



The reference population for the second outcome is composed of individuals at risk of conversion, i.e. only those who are already employed in a firm with standard fixed-term or apprentice contracts. A contract conversion into open-ended is eligible for the HI only if the conversion involves a worker who did not hold an open-ended contract in the previous six months and who is currently employed with a fixed-term contract. In fact, since conversion from apprentices were already eligible for a different monetary incentive, the 2015

reform excluded these conversions from the target of the policy. As **Figure 4** shows, the pattern of conversion is very similar to that plotted in **Figure 3**. The number of conversions increased with the introduction of the HI, and the highest increase is detectable among young workers with picks in correspondence of December 2015 and 2016.

**Figure 4** Evolution of the number of persons with a temporary-based contract converted into an open ended



#### 4. Short- and long-term effect of the reform

The graphical evidences presented so far show that among HI eligibles the inflow into open-ended contract increased after January 2015, with important picks in correspondence of the months after which the HI would have been reduced. In order to identify the causal effect of the HI and FC reforms, we adopt a difference-in-differences (DID) estimation strategy that allows to control for composition, seasonality and individual unobservable effects. We estimate the short-term effects (up to June 2015) of the introduction of the HI and of the reduction in FC, replicating Viviano and Sestito [2018] on Piedmont data. In order to estimate the long-term effect of the HI we take advantage of the full longitudinal dimension of our data and we estimate the effect of the two policies on the probability to get an open-ended contract or of a conversion up to December 2016.

As anticipated in the previous sections, the discipline of the HI changed in January 2016. In fact, while during the first year of implementation of the reform (2015), firms were entitled to a reduction of 100% of social security contributions for three years (up to a ceiling), in January-December 2016 the rebate was decreased to 40%, and for a maximum of two years.

For both the short- and long-term analysis, first, we look at the probability of getting an open-ended contract and we identify the effect of HI by comparing the change in monthly flow into open-ended jobs in the pool of

eligible versus non-eligible workers, before and after the HI reform.<sup>6</sup> Second, we focus at contract conversions from fixed-term to open-ended contract by firm size and we estimate the separate effects of FC and HI, by comparing the conversion rate of eligible versus non-eligible workers in firms of different size classes. A third common exercise is a subgroups analysis of the effects, which allows us to understand possible heterogeneities in the response to the policy between gender and age groups.

#### 4.1 Probability of getting an open-ended contract

The identification of the effect of the HI reform on the probability of getting an open-ended position may be obtained by comparing open-ended hires and conversions of eligible ( $No_{P_{6m}}$ ) and non-eligible individuals before and after the HI reform by estimating the following equation:

$$(1) \quad Y_{im} = \alpha + \beta I(Post2015m1 * No_{P_{6m}})_{im} + No_{P_{6m}im} + Employed_{m-1} + \gamma_m + \gamma_i + \varepsilon_{it}$$

where  $i$  denotes individual and  $m$  months. The included controls are:  $\gamma_m$  month dummies (interaction of calendar year and calendar month),  $\gamma_i$  individual dummies,  $No_{P_{6m}}$  a dummy for the condition of individual monthly eligibility and a dummy for lagged employment status.  $Y_{im}$  is the binary outcome equals to zero in all the months the individual is at risk of getting an open-ended contract, i.e. when he is employed temporarily or non-employed, and takes value one in the month  $m$  of the transition to an open-ended contract. The key variable is the interaction  $I(Post2015m1 * No_{P_{6m}})_{im}$  that takes value one if the individual is eligible for the HI in a month  $m$  after the HI reform was implemented. The DID estimator  $\beta$  measures the average difference in monthly probability of getting an open-ended contract between eligible and non-eligible after the reform (January-June 2015) minus the same difference before the reform (January 2013-December 2014). Hence, the coefficient (multiplied by 100) indicates by how many percentage points an eligible person is more or less likely to get an open-ended contract in January-June 2015 with respect to a person who in the same months was not eligible for the HI, at the net of any pre-reform difference between the two groups, possible effects of seasonality and individuals unobservable characteristics, since we control for time and individual fixed effects.

Results from the estimation of Equation 1 are reported in **Table 2**. The probability of getting an open-ended contract is estimated separately for men and women and for different populations “at risk”, i.e. the unemployed and those already employed but without an open-ended contract.<sup>7</sup>

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<sup>6</sup> There is indeed no obvious way to assess the impact of the reduction of firing costs on the likelihood of getting an open-ended job, as firm size is not observed for unemployed workers.

<sup>7</sup> The full estimation outputs are reported in the Appendix.

**Table 2** Short-term effect of HI on the probability to find an open-ended job by sex and employment status (Individual DID estimates up to June 2015)

	Women			Men		
	All	Unemployed	Employed	All	Unemployed	Employed
	b/ci95	b/ci95	b/ci95	b/ci95	b/ci95	b/ci95
Effect of HI	0.052*** [0.044,0.059]	0.034*** [0.025,0.043]	0.053*** [0.035,0.071]	0.045*** [0.039,0.050]	0.033*** [0.027,0.040]	0.041*** [0.027,0.056]
Adj.R2	0.11	0.13	0.13	0.11	0.12	0.13
#obs	640,653	357,431	283,222	810,740	473,426	337,314

Note The table displays the coefficient  $\beta$  estimated from Equation (1). Other included controls are fixed effects for: time (year\*month); individuals; eligibility (no permanent contract in the previous 6 months) and employment status at t-1. Robust SE clustered at individual level. Significance \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

The results confirm a strong positive effect of the HI in the immediate aftermath of the reform on the probability of finding an open-ended contract. Both sexes display similar coefficients and patterns; the probability of finding an open-ended position increased for both men and women by more than four percentage points. Moreover, the effect of the incentive on the flow from temporary employment into open-ended employment is higher than that from non-employment into open-ended employment among both men and women.

**Table 3** shows the DID coefficient of equation (1) estimated separately by age and employment status. The main message is the following: the positive effect found among unemployed is driven by older age groups, while youngsters drive the results for temporary workers.

**Table 3** Short-term effect of HI on the monthly probability to find an open-ended job by age and employment status in the previous month (Individual DID estimates up to June 2015)

	Unemployed			Temporary		
	Young (15-32)	Mid (33-45)	Old (46-70)	Young (15-32)	Mid (33-45)	Old (46-70)
	b/ci95	b/ci95	b/ci95	b/ci95	b/ci95	b/ci95
$\beta$ (Effect of HI)	0.024*** [0.013,0.035]	0.040*** [0.031,0.050]	0.034*** [0.026,0.042]	0.053*** [0.031,0.074]	0.052*** [0.035,0.069]	0.030*** [0.008,0.051]
Adj.R2	0.09	0.11	0.17	0.11	0.13	0.15
#obs	360,168	247,059	223,630	305,154	172,626	142,756

Note: The table displays the coefficient  $\beta$  estimated from Equation (1). Other included controls are fixed effects for: time (year\*month); individuals; eligibility (no open-ended contract in the previous 6 months). Robust SE clustered at individual level. Significance \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

In **Table 4** we can observe how the estimated effect of the HI reform on the individual monthly probability to find an open-ended job varied in the long run. The probability remains positive and significant for all the categories, however among the unemployed it is possible to observe a drastic reduction with respect the effect of Table 2, suggesting an important and possible offset of the HI role in boosting employment among those without a job. Differently, the effect of the HI remains very positive and of similar magnitude even up to December 2016 among those employed with a temporary job. This overall trend is confirmed also when focusing on different age groups (**Table 5**).

**Table 4** Long-term effect of HI on the probability to find a permanent job by sex and employment status (Individual DID estimates up to December 2016)

	Women			Men		
	All b/ci95	Unemployed b/ci95	Employed b/ci95	All b/ci95	Unemployed b/ci95	Employed b/ci95
$\beta$ (Effect of HI)	0.026*** [0.023,0.029]	0.011*** [0.009,0.014]	0.050*** [0.040,0.060]	0.026*** [0.024,0.029]	0.011*** [0.008,0.013]	0.051*** [0.044,0.059]
Adj.R2	0.08	0.11	0.10	0.08	0.10	0.10
#obs	1,018,573	610,777	407,796	1,291,755	805,301	486,454

Note: The table displays the coefficient  $\beta$  estimated from Equation (1). Other included controls are fixed effects for: time (year\*month); individuals; eligibility (no permanent contract in the previous 6 months) and employment status at  $t-1$ . Robust SE clustered at individual level. Significance \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 5** Long-term effect of HI on the probability to find a permanent job by sex and employment status (Individual DID estimates up to December 2016)

	Unemployed			Employed		
	Young (15-32) b/ci95	Mid (33-45) b/ci95	Old (46-70) b/ci95	Young (15-32) b/ci95	Mid (33-45) b/ci95	Old (46-70) b/ci95
$\beta$ (Effect of HI)	0.009*** [0.005,0.013]	0.012*** [0.009,0.016]	0.010*** [0.008,0.013]	0.046*** [0.036,0.056]	0.067*** [0.057,0.077]	0.040*** [0.028,0.052]
Adj.R2	0.08	0.1	0.15	0.08	0.11	0.12
#obs	569,468	427,442	419,168	446,254	244,726	203,270

Note: The table displays the coefficient  $\beta$  estimated from Equation (1). Other included controls are fixed effects for: time (year\*month); individuals; eligibility (no permanent contract in the previous 6 months) and employment status at  $t-1$ . Robust SE clustered at individual level. Significance \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 4.2 Probability of contract conversions from fixed-term to open-ended contracts

We now restrict the attention only to individuals who are employed with a standard fixed-term or apprenticeship contract, with the aim to estimate the effect of the two reforms on the probability of getting a temporary contract converted into an open-ended one. In order to estimate the effect of both HI and FC reforms we specify equation (2), where the eligible are only fixed-term contracts with no open-ended jobs in the previous six months, while non-eligible are the apprentices and those fixed-term workers with an open-ended job in the previous six months. In fact, as already mentioned, conversions of standard fixed-term were eligible for HI whereas apprentices' conversions were not, since they were already eligible for an ordinary subsidy, which was unchanged by the reform. Moreover, we include in equation (2) the enforcement of the reform of FC in March 2015, by looking at how the probability of conversion varies between firms of different sizes. Hence, we estimate the probability of conversions by estimating the following equation:

$$(2) \quad Y_{im} = \alpha + \beta I(Post2015m1 * No_{P_{6m}} \& Fixed)_{im} + No_{P_{6m}} \& Fixed_{im} + \delta I(Post2015m3 * large)_{im} + \theta I(Post2015m1 * No_{P_{6m}} \& Fixed) * (Post2015m3 * large)_{im} + \gamma_m + \gamma_i + \gamma_g + \varepsilon_{it}$$

where  $\gamma_m$  are month\*year dummies,  $\gamma_i$  individual dummies,  $\gamma_g$  firms size groups dummies (three categories). The coefficient  $\beta$  identifies the effect of the HI, comparing before and after January 2015 the workers employed

with a fixed-term contract eligible for the HI to the non-eligible. The coefficient  $\delta$  captures the effect of the FC, comparing the behavior of large (17 employees or more) versus small (13 employees or less) firms before and after the introduction of the FC in March 2015.<sup>8</sup> Interactions between the two policies are identified by the coefficient  $\theta$ .

Results from Equation 2 are reported in **Table 6** distinguishing between women and men, short- and long-term of the effect of the policies. Equation 2 is fully specified in column 4, while columns 1-3 present different specifications of Equation 2 where the two policies are included alone or in combination. The first column reports the effect of HI only, which is always positive and highly significant. The second column reports the effect of FC only, which is positive and significant only in the long run, but remarkably smaller than the effect of HI, partly consistently with Viviano and Sestito [2018]. The effect of FC vanishes for all but men in the long run when we estimate the effect of both policies (column 3), whereas HI remains almost unaffected. In column 4, the interaction between the two policies is positive and significant only among men, suggesting that the reduction of FC in large firms acted by strengthening the effect of the HI. Differently from what we observed for the HI, which benefitted both men and women in the same way, it emerges a strong gender pattern when we focus on the effect of FC alone or in combination with the HI.

**Table 6** Short- (up to June 2015) and long- (up to December 2016) term Effect of both HI and FC on the probability of conversion from fixed-term to open-ended job contract (Individual Diff-in-diff estimates)

Short run	Women				Men			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	HI	FC	Both	Interacted	HI	FC	Both	Interacted
	b	b	b	b	b	b	b	b
$\beta$ (Effect of HI)	0.022***		0.022***	0.020***	0.024***		0.024***	0.022***
$\delta$ (Effect of FC)		0.001	0	-0.001		0.001	-0.001	-0.002**
$\theta$ (Effect of HI*FC)				0.004				0.006**
Adj.R2	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05
#obs	331581	331581	331581	331581	415370	415370	415370	415370
<b>Long run</b>								
$\beta$ (Effect of HI)	0.022***		0.022***	0.021***	0.025***		0.025***	0.022***
$\delta$ (Effect of FC)		0.002**	0.000	0.000		0.003***	0.002***	0.001*
$\theta$ (Effect of HI*FC)				0.000				0.006***
Adj.R2	0.04	0.04	0.04	0.04	0.05	0.04	0.05	0.05
#obs	522,122	522,122	522,122	522,122	653,683	653,683	653,683	653,683

*Note: The table displays the coefficient  $\beta$  estimated from Equation (2). Other included controls are fixed effects for: time (year\*month); individuals; HI eligibility (no open-ended contract in the previous 6 months); FC eligibility (large firms vs mid and small). Robust SE clustered at individual level. Significance \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .*

<sup>8</sup> We keep firms around the 15 employees' threshold separate, in order to control for possible measurement errors in firm size as recorded in the ASIA archive.

Then, in order to deepen our understanding of the effects of the two policies on the probability of transformations of temporary contracts into open-ended ones, we estimate the model in column 4 by different age groups.

Results of **Table 7** suggest the existence of two major patterns. First, the positive and independent effects of *both* the two policies is actually driven only by male younger workers, while among older ones the interaction term of the policy is never significantly different from zero. For example, among eligible young men employed in large firms, in the long run the probability of conversion increased per effect of the HI by 2.1 percentage points and by additional 1.1 percentage points due to the FC. Second, by looking at changes over time, we observe a small increase in the impact of the FC policies on the probability of conversions among young and mid-age male workers. This is likely because the mid period includes the peaks in December 2015 and 2016 evident in **Figure 3**.

**Table 7** Short- (up to June 2015) and Long- (up to December 2016) term Effect of both HI and FC on the probability of conversion from fixed-term to open-ended job contract (Individual Diff-in-diff estimates)

Short run	Women			Men		
	Young (15-32)	Mid (33-45)	Old (46-70)	Young (15-32)	Mid (33-45)	Old (46-70)
	b	b	b	b	b	b
$\beta$ (Effect of HI)	0.022***	0.023***	0.014***	0.022***	0.021***	0.023***
$\delta$ (Effect of FC)	-0.001	-0.001	-0.003	-0.003**	-0.002	-0.001
$\theta$ (Effect of HI*FC)	0.003	0.005	0.005	0.008*	0.006	0.003
Adj.R2	0.02	0.06	0.08	0.02	0.07	0.07
#obs	149,754	116,981	64,846	185,546	136,222	93,602
<b>Long run</b>						
$\beta$ (Effect of HI)	0.022***	0.026***	0.016***	0.021***	0.023***	0.022***
$\delta$ (Effect of FC)	-0.000	0.001	-0.001	0.001	0.001	0.001
$\theta$ (Effect of HI*FC)	0.002	-0.001	-0.002	0.011***	0.008**	-0.001
Adj.R2	0.02	0.06	0.07	0.02	0.07	0.07
#obs	239,406	182,790	99,926	294,633	213,023	146,027

Note: The table displays the coefficient  $\beta$ ,  $\delta$ ,  $\theta$  estimated from Equation (2). Other included controls are fixed effects for: time (year\*month); individuals; HI eligibility (no open-ended contract in the previous 6 months); FC eligibility (large firms vs mid and small). Robust SE clustered at individual level. Significance \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## 5. Analysis of firing and duration

In this section, we investigate further effects of the reforms, as predicted by the theory discussed in **Section 2**. One important aspect that might be influenced by the reduction in FC is the length of the “open-ended contracts” which despite their name, might have reduced substantially their duration as result of lower firing costs faced by firms, as suggested by the theory [Bentolila and Bertola 1990; Bertola 1990]. On the other hand, a higher worker turnover could increase the quality of the match and hence increase tenure. Furthermore, the lower labor cost because of the HI might have induced firms to invest less in searching and screening strategy resulting in a potential lower match quality and in more freedom to adapt to boost and decrease in their business activities by reducing the stock of labor. It is hence a matter of empirical investigation.

In order to understand whether the two policies influenced the duration of the new open-ended contracts we employ a discrete time proportional hazard model and we estimate the survival profile of all new open-ended contracts activated between November 2013 and December 2016 (maximum possible duration is 44 months). In this exercise, we go deeper into the definition of treatment and we distinguish between five possible contractual arrangements as defined by the combinations of the two policies features (see **Table 8**). In practice, by looking at the interaction between contract’s date of activation and the individual monthly eligibility status, we are able to distinguish different treatment levels mimicking the main phases of the two reforms, namely introduction of the HI in January 2015, introduction of the new open-ended contract in March 2015 and reduction of the HI generosity in January 2016. The benchmark is represented by Type-1 contracts, i.e. those

subject to the pre-reform rules. Type-1 contracts are completely unaffected by the two reforms because activated before the two reforms' start date, or even though they were activated in between January 2015-March 2015, individuals were not eligible for the HI. Type-2 contracts regard individuals eligible for the HI and hired during the first two months of the HI reform, and as such granted 100% of subsidy but unaffected by the FC reform because activated before its implementation. Contracts Type-3, Type-4 and Type-5 are all activated after March 2015, hence they are fully influenced by the FC, however they benefit differently from the HI, as Type-3 enjoys full (100%) HI, whereas for Type-4 the HI is reduced to 40% and completely absent for Type-5. Combinations between the two reforms and the consequent contract type typology are described in **Table 8**.

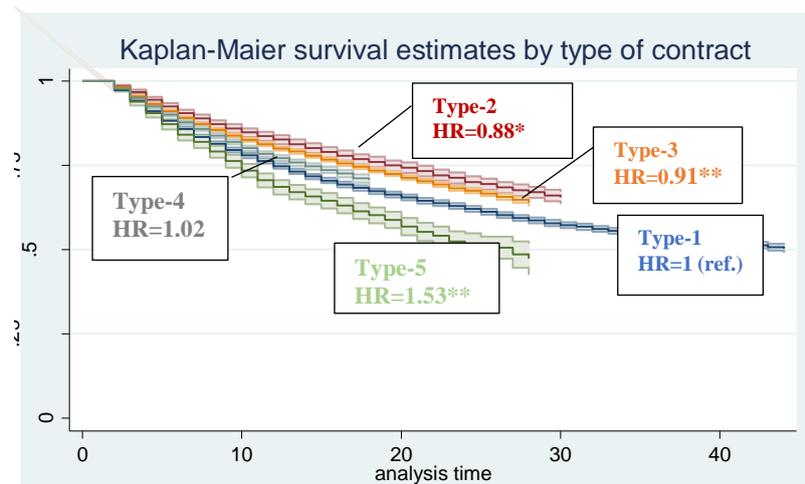
**Table 8** Cluster of open-ended contract arrangements defined by different reforms interaction

<i>Type of contract</i>	<i>Amount of HI influence</i>	<i>Amount of FC influence</i>	<i>Conditions defining contract type</i>
<i>Type-1 (pre-reform)</i>	<i>0</i>	<i>0</i>	<i>&lt; January 2015 or &lt;March 2015 + not HI eligible</i>
<i>Type-2</i>	<i>100%</i>	<i>0</i>	<i>&gt;= January 2015 and &lt;March 2015 + HI eligible</i>
<i>Type-3</i>	<i>100%</i>	<i>100%</i>	<i>&gt;= January 2015 and &lt;January 2016 + HI eligible</i>
<i>Type-4</i>	<i>40%</i>	<i>100%</i>	<i>&gt;= January 2016 and &lt;January 2017 + HI eligible</i>
<i>Type-5</i>	<i>0</i>	<i>100%</i>	<i>&gt;=March 2015 + not HI eligible</i>

The survival estimates as well as the hazard rate (HR) for each of these five contractual types are displayed in **Figure 5**; the model also includes several controls to net out potential differential evolution in the socio-economic composition of the groups, namely: gender; age class (3 categories); education (3 categories; reference: missing education); Italian native dummy; place of work (3 categories, reference: Torino, the Regional County Seat); sector of activity dummies (11 categories) and occupation dummies (8 categories).

**Figure 5** suggests the existence of two main patterns in contract duration. On the one hand, the lower the cost of labor, the higher is the duration of open-ended contracts, as implied by the comparison of the survival functions of Type-1 (old firing rules without the HI), with Type-2, Type-3 and Type-4 (all covered to some extent by the HI): contracts Types that benefit from the HI on average last longer. On the other hand, the lower the EPL, the lower the duration, as emerged by the comparison of Type-1 and Type-3, both without subsidy, but with low or high firing cost: consistently with the expectations, a reduction in firing cost significantly decreases the duration. Open-ended contracts not covered by the HI with reduced EPL present 53% higher risk of been terminated than pre-reform open-ended contracts

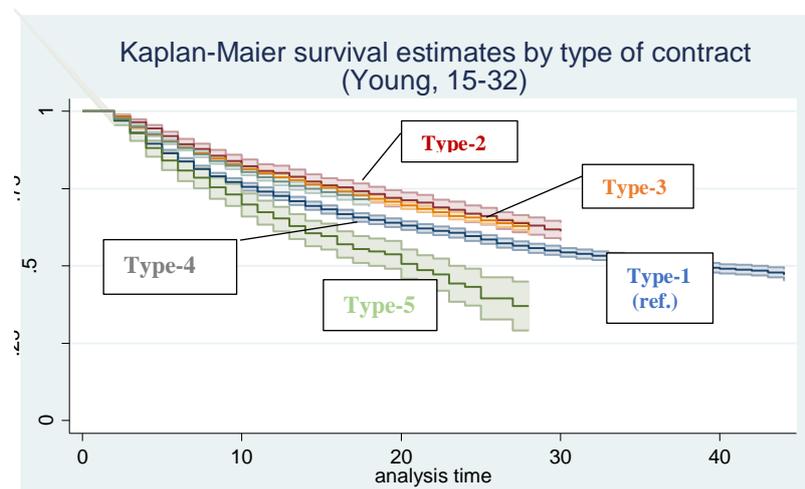
**Figure 5** KM Survival estimate of new open-ended contract duration by contract type (Youth, 15-32 years old)



Note Flow sample of new open-ended contracts activated during November 2013-December 2016.  
Contract types described in Table 8

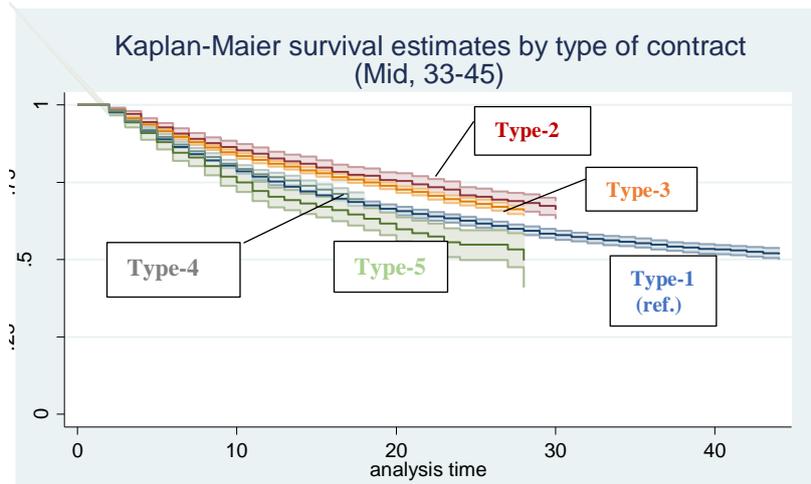
The next Figures (6-8) present the same survival estimation of **Figure 5** divided by age groups. It is possible to notice that the gradient between contract types is almost the same in all the age groups, with cheaper and more secure contracts lasting longer. However, interestingly, at younger age the difference in duration among contracts type are more remarkable, as suggested by more distance between the curves. In particular, youth hired under contract Type-5, i.e. the most expensive and less secure contract, present a very steep and low survival curve, suggesting that they are those experiencing the shortest duration with most of contracts lasting less than 20 months.

**Figure 6** KM Survival estimate of new open-ended contract duration by contract type (Youth, 15-32 years old)



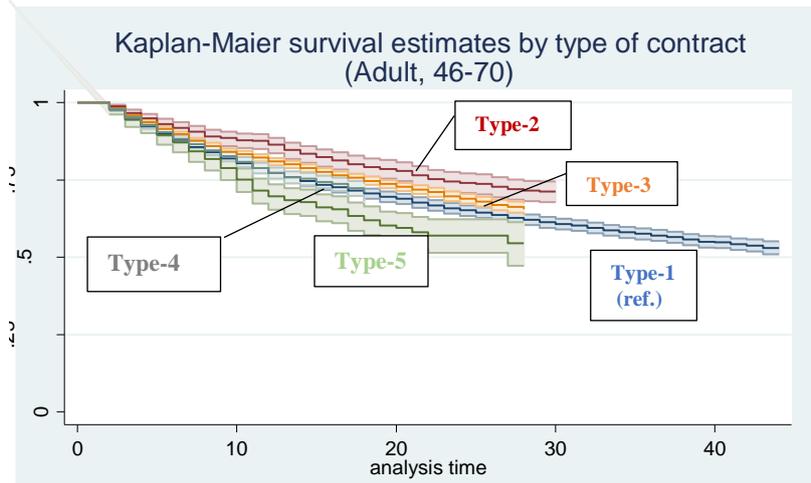
Note Flow sample of new open-ended contracts activated during November 2013-December 2016.  
Contract types described in **Table 8**. Age measured at January 2015

**Figure 7** KM Survival estimate of new open-ended contract duration by contract type (Mid age, 33-45 years old)



*Note* Flow sample of new open-ended contracts activated during November 2013-December 2016. Contract types described in **Table 8**. Age measured at January 2015

**Figure 8** KM Survival estimate of new open-ended contract duration by contract type (Adult, 46-70 years old)



*Note* Flow sample of new open-ended contracts activated during November 2013-December 2016. Contract types described in **Table 8**. Age measured at January 2015

The decrease in duration observed for the new types of open-ended contracts seems to be driven by a parallel increase in the firing rates induced by the lower firing costs faced by firms. In fact, while around 39% of terminations were ascribed as firings among Type-1 and Type-2 contracts (both under the old EPL rules), the figure rises to 42% with Type-3 and exceeds 50% with Type-4 and Type-5, namely those new open-ended contracts with reduced EPL and low or none HI (**Table 9**).

**Table 9** Proportion of job terminations due to firing among types of open-ended contracts

<i>Type of contract</i>	<i>Amount of HI influence</i>	<i>Amount of FC influence</i>	<i>% Firings</i>
<i>Type-1 (pre-reform)</i>	<i>0</i>	<i>0</i>	38.84
<i>Type-2</i>	<i>100%</i>	<i>0</i>	39.29
<i>Type-3</i>	<i>100%</i>	<i>100%</i>	41.87
<i>Type-4</i>	<i>40%</i>	<i>100%</i>	51.63
<i>Type-5</i>	<i>0</i>	<i>100%</i>	51.69

*Note Flow sample of new open-ended contracts activated during November 2013-December 2016.  
Contract types described in Table 8*

## 6. Conclusion

In 2015, Italian government launched an important a structural reform of labor market, called Jobs Act, which reduced EPL for all new open-contracts starting from March 2015 activated in firms with more than fifteen employees. The reform intended to reduce the strong dualism characterizing Italian labor market, with highly protected open-ended contracts and very flexible temporary jobs, more typically held by younger cohorts of workers. With the aim of promoting a wider and pervasive use of open-ended contracts, the Jobs Act reduced the level of uncertainty of firing costs and introduced a temporary but very generous hiring incentive aimed at facilitate the adoption of these new contracts.

The two reforms were introduced in January and March 2015, and applied to different categories of workers and firms, allowing a standard policy evaluation exercise with a difference-in-differences framework. We complement the analysis on the impact of the two reform on hires and conversions with a duration analysis of new open-ended contracts.

Preliminary results indicate that the two reforms were indeed able to foster adoption of new open-ended contracts, as both the probability of hiring and conversion increased among men and women, different age groups and whatever the baseline employment status was. However, evidence from the duration analysis suggests that these positive effects have at best been mitigated by the increased turnover, as average duration fell below the pre-reform trends and layoffs increased substantially rising overall turnover.

We plan to extend the analysis by computing the net effect of these flows, by looking at the overall employment creation generated comparing, in a standard DID framework, the behavior of firms eligible to hire adopting the new open-ended contract with reduced firing costs with the non-eligible firms, i.e. large (17 employees or more) versus small (13 employees or less) firms.

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