

INCREASING RETIREMENT AGE, WORKPLACE TRAINING AND LABOR MARKET OUTCOMES

EVIDENCE FROM ITALIAN FIRMS

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ABSTRACT

INCREASING RETIREMENT AGE, WORKPLACE TRAINING AND LABOR MARKET OUTCOMES

This paper analyses how an unexpected increase in retirement age affects workplace training and other labor market outcomes. At this aim we use data derived from the Rilevazione su Imprese e Lavoro (RIL), a survey conducted in 2015 and 2010 on a representative sample of Italian firms. Applying different regression models we then show that firms which, because of the Law n. 214/2011 (the so-called "Fornero pension reform"), were forced to give up previously planned hirings, increased training activities at workplace if the related costs were funded through external resources. Moreover, the reduction of planned hirings due to the reform affects workforce composition, while no effect is detected on firm competitiveness.

KEYWORDS: Ageing, Workplace Training, Pension reforms, Italy

JEL: J24, J26

AUMENTO DELL'ETÀ PENSIONABILE, FORMAZIONE PROFESSIONALE E DINAMICHE DEL MERCATO DEL LAVORO

Questo lavoro analizza la relazione tra un aumento (inatteso) dell'età pensionabile, la formazione professionale ed altre variabili del mercato del lavoro. L'analisi utilizza i dati della Rilevazione Imprese e Lavoro (RIL) condotta nel 2015 e nel 2010 su un campione rappresentativo di imprese italiane. Applicando diversi modelli di regressione viene messo in luce come le imprese che, a seguito della Legge n. 214/2011 (c.d. "Riforma Previdenziale Fornero") sono state costrette a rinunciare ad assunzioni precedentemente programmate, hanno incrementato l'attività di formazione sul luogo di lavoro finanziata con risorse esterne. Inoltre, la riduzione delle assunzioni programmate dovuta alla riforma sembra incidere sulla composizione della forza lavoro senza che si rilevi alcun effetto sulla competitività delle imprese.

PAROLE CHIAVE: Invecchiamento, Formazione sul posto di lavoro, Riforma delle pensioni, Italia

JEL: J24, J26

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INTRODUCTION

Population ageing is one of the key challenges facing the world economy. In 2010, for the first time in the European Union, the share of individuals aged 55-64 surpassed the share of those aged 15 to 24 (Eurofound 2012). In a few decades, the old-age dependency ratio—understood as the ratio of the number of people aged 65 or more to the number of those in the working-age population—is expected to threaten the sustainability of the public finance of most advanced economies (Disney 2007). In order to alleviate this pressure on public finance, active ageing policies aimed at boosting older workers' employment are increasingly implemented all across advanced economies. In particular, a generalized – although heterogeneous in terms of magnitude and timing – delay of minimum retirement age has been widely introduced (OECD 2015). That is, aged workers' employment and employability have been partly pursued by pushing age requirements to get a pension upwards. The existing empirical literature generally supports this strategy (Manoli and Weber 2016; Mastrobuoni 2009; Staubli and Zweimüller 2013), although unintended substitution effects on alternative welfare schemes should be considered (Ardito 2017).

When combined with a strict employment protection legislation (EPL) and rigid compensation schemes, tightening retirement rules may nonetheless have detrimental effects upon generational turnover and skill formation at the company level. The intuition is that if, at old age, wages grow faster than productivity – e.g. due to the existence of deferred compensation schemes – senior workers become progressively unprofitable to the firm. Within such context, strict EPL may induce firms to keep at work (aged) workers that would have let retire otherwise. The literature on the relationship between age and productivity provides mixed results. Older workers may suffer from skill obsolescence (De Grip and van Loo 2002; Rosen 1975) and from declining cognitive abilities (Verhaegen and Salthouse 1997). The implications on productivity seem to be negative (Anderson 2002; Crepon 2002; Haltiwanger 1999; Hægeland and Klette 1999; Ilmakunnas et al. 1999) although Warr (1994) suggests instead that age is a poor predictor of work performance. What is important to our analysis, however, is that a general evidence that wages grow faster than productivity exists (Crepon 2002; Dostie, 2011; Dygalo and Abowd 2005; Ilmakunnas and Maliranta 2005)¹.

If employers cannot react to changing retirement rules through lower wages or by firing older workers, the adjustment has to occur on other margins (Brandolini et al. 2016). Boeri et al. (2016) study the reaction of Italian firms to Italy's 2012 pension reform in terms of generational turnover finding that "a lock-in of five workers for one year reduces youth hiring of approximately one full-time equivalent worker". Training has emerged as another adjustment channel (Mahyew and Rijkers 2004) to update and strengthen aged workers' competences, thus reducing the gap between individual productivity and remuneration. A large evidence, indeed, shows that skilled aged workers have a significantly higher probability of remaining in the labor market than their unskilled peers, and to retire later (Bassanini et

¹ Neither view remains however unchallenged: see Hellerstein (1999).



al. 2007; Battistin et al. 2012; OECD 2015). However, employers may have low incentives to invest in older workers' skill formation, as the payback period would be anyway rather short (Skirbekk 2004).

The main aim of our paper is exactly to study how ageing affects firms' training policies. Although not new to empirical analysis, the evidence on this issue is rather scant. Montizaan et al. (2010) exploit a natural experiment situation using data on the Dutch public sector; their results show that a retirement age postponement has a positive but small impact on the training participation of senior public-sector employees. Focusing on a sample of Italian males aged between 45 to 56, Battistin et al. (2012) show in turn that one-year increase in minimum (early) retirement age increases training participation by 12%. The analysis performed by Brunello and Comi (2013) moves along analogous lines suggesting that training intensity is significantly spurred for workers affected by pension reforms as compared to cohorts escaping their effects.

Our empirical analysis develops a comparable identification strategy – i.e. a pension reform tightening age requirements to retire – but improves on the existing literature by exploiting firm level data derived from the Rilevazione su Imprese e Lavoro (RIL), a survey conducted in 2010 and 2015, with an extremely rich set of information on training decisions, dedicated questions on the pension reform used for identification, and representative at the national level. In particular, contrary to the literature briefly surveyed above, we focus on training supplied by firms rather than on training demanded by workers. Moreover, our analysis spans over a number of training measures, including total and per-employee cost as well as the share of trained workers over total employment. Eventually, it allows identifying who ultimately pays for training, by distinguishing the source by which training was funded.

Applying different regression models (pooled OLS, fixed effect, difference in difference with propensity score matching) we show that ageing brings a positive effect on the share of workers undergoing workplace training. However, this does not imply that employers react to ageing by providing older workers with more training. Indeed, the total cost of training is not affected by the reform, and the source of financing shifts from internal resources to the so-called Interprofessional Funds, i.e. to sources co-funded and managed by employers' and workers' representatives². Moreover, the reduction of planned hirings due to the reform affects workforce composition while no effect is detected for firm competitiveness. In particular, estimates point out that, following the pension reform, the employment rate of women decreased, the probability of opening a vacancy increased, whereas the impact on temporary contract depends crucially on firms' heterogeneity.

The paper proceeds as follows. Section 2 describes the institutional background and explains why our case study – i.e. Italy – represents an ideal test-bed to our purposes. Section 3 introduces the data, discusses the sample selection issues and presents some descriptive statistics. In section 4 we present the econometric results for workplace training and other labor market outcomes. Section 5 concludes.

² The Inteprofessional Funds for continuous training have been introduced by the article 118 of the law n. 388/2000 and the subsequent article 48 of the law n. 289/2002. These will progressively absorb the resources derived from compulsory contribution, which amounts to 0,30% of the payroll costs, paid up-to now by the firms to the INPS, and devoted to the financing of workers' training. The constitution of the Funds comes from an agreement between the social parties, while a supervision function is assigned to the Ministry of Labour and Social Policies. The financial mechanism, so long as it is based on compulsory contribution, requests the will of the single firm to join one of the constituted Funds (see Croce 2010).

1 INSTITUTIONAL BACKGROUND

In order to identify the effect of ageing on workplace training, we take advantage of a pension reform recently introduced in Italy as part of the austerity measures that followed from the sovereign debt crisis, i.e. the so-called "Fornero reform". The Fornero reform was introduced in December 2011 with Decree n. 201/2011, confirmed under Law n. 214/2011 two weeks later, and eventually enforced starting from January 2012. It followed a long series of pension reforms that started in the early nineties and progressively tightened the age requirements to retire, while at the same time reducing the amount of benefits (Ardito 2017). Its main changes with respect to former rules – as established under Law n. 247/2007 and marginally reviewed by Laws n. 122/2010 and n. 148/2011 – have been:

- (i) the introduction of stricter requirements and of monetary penalties for seniority retirement. Under Law n. 247/2007, seniority retirement was possible if the sum of age and years of contribution reached a minimum threshold (called "quota"), that was set to grow to 97 for dependent workers by 2013. The Fornero reform substituted the quota system with a scheme of early retirement in which the access to seniority pensions is possible if a minimum of 42 years and 1 month of pension contributions have been paid³. Moreover, pensions are subject to a 1% (2%) cut if the retiree is younger than 62 (60) years old.
- (ii) the introduction of stricter requirements to get an old-age pension. Under Law n. 247/2007 the requirements for old-age retirement were 65 years old for men, depending instead on sector for women. With the Fornero reform the age requirement became 66 for everybody, set to grow at 67 by 2022.

Italy and the Fornero reform represent then an ideal test-bed to assess the impact of ageing upon workplace training policies for a number of reasons. First, Italy has among the oldest population among advanced economies, well above the OECD and the EU average (figure 1). Second, although in Italy a legal minimum wage does not exist, the combination of minimum pays set by collective agreements at the sectoral level and extending also to non-unionized workers, with little margins to derogate at the firm level, result in an extremely limited individual wage drift (Devicienti et al. 2007). Third, in Italy a clear system of seniority wage schemes does exist (Brugiavini and Peracchi 2010). Fourth, employment protection legislation for senior workers is typically high for historical reasons, as they mostly entered the labor market and completed their careers – what often involved working in a medium or large firm, where protection is higher – before the deregulation season started (this fact, for instance, has protected senior workers more than younger ones from the employment losses implied by the economic crisis: Eurofound 2012). Fifth, the Fornero reform could by no mean be anticipated by the firms, as it was introduced only 20 days after the Monti government installed, and enforced another 25 days later, with no discussion with the social partners and under tight international pressure for budget

³ The threshold was set at 41 years and 1 month for women.



recovery (Eurofound 2012; Sacchi 2015). Sixth, Italy displays one among the highest labor discrimination rates, and the main source of discrimination is exactly age (Rymkevitch and Villosio 2008). Finally, Quaranta and Ricci (2017) prove that the reform under scrutiny actually represented a binding employment constraint. In particular, they find that the introduction of the so-called 'Fornero reform' prompted - between 2012 and 2015 - 2.2% of Italian firms to abstain from previously planned hirings. Furthermore, following this reform, the employment rate of young people aged less than 35 decreased, as did the women's employment rate and the percentage of fixed-term contracts, whereas the share of workers involved in vocational training activities increased.

2 DATA

The empirical analysis is carried out on the longitudinal sub-sample derived from the Rilevazione su Imprese e Lavoro (RIL), a survey conducted by the National Institute for the Analysis of Public Policies (INAPP) in 2010 and 2015 on a representative sample of partnership and limited liability firms operating in extra-agricultural private sector⁴. This survey collects a rich set of information about firms' productive characteristics and performance, employment composition, personnel organization, industrial relations and other workplace characteristics. The detailed information on training represents a specific strength of the RIL dataset. Unlike most of the alternative sources – which typically provide only yes/no pieces of information – RIL reports the exact number of workers that take part into training programs, the amount of monetary resources invested, and the source of financing, including the use of public subsidies. Combined with data with workforce characteristics, RIL allows us to build refined training intensity measures. With respect to the specific analysis proposed here, moreover, a dedicated question makes the use of RIL of pivotal importance. In the 2015 wave, firms were asked whether, as consequence of the unexpected retirement age postponement that followed from the Fornero reform, they were forced to step back from previously programmed recruitment plans. Thanks to this question, we are able to discriminate between firms whose recruitment plans were affected by the reform, and those that were not: this will be our treatment variable. As main outcome variables we distinguish instead among five different measures of training at the firm level: the share of employees undergoing training, (logarithm of) total training costs, (logarithm of) per-employee training costs and two dichotomous variables taking the value of one when firms make use of internal funds and/or of Interprofessional Funds to finance training activities.

Moreover, to better understand the impact of the pension reform on the short-time evolution of the Italian labor market, we extend the analysis on the implication of renouncing to previously planned hiring on the employment structure, on the probability to post a vacancy to fill a job, and on firms' competitiveness, measured as the (log of total) sales per employee.

⁴ For more details on sample design, methodological issues and procedures for requesting data related to the Rilevazione su Imprese Lavoro (RIL), see: <http://www.inapp.org/it/ril>

In order to focus our attention upon firms with at least a modicum of potential for recruitment and training policies, we restrict the sample to companies with more than 9 employees. In other words, we assume that in micro firms there is little room for combining training policies with generational recruitment plans. After dropping the outliers – defined as firms belonging to the first or the last centile of one of the dependent variables’ distributions – we remain with a panel of about 3,000 firms observed for two consecutive wave of the survey.

2.1 Descriptive statistics

Table 1 presents the summary statistics for a set of training variables and other labor market outcomes. Note that all training measures report a positive trend over the period under study. In particular, we observe that the average incidence of firms undergoing some workplace training activities grows from less than 43% to more than 57%. This mirrors into a growing share of trained workers – from 21.9% to 35.3% - as well as into a larger per-firm expenditure (from roughly € 4,180 to more than € 7,365). Evidence on per-trainee expenditure – the trend of which is also positive – suggests that total expenditure grew more than the number of trainees. Such costs have been funded both through internal resources, and with Interprofessional Funds.

As for the other labor market outcomes, the average incidence of firms with an open vacancy (i.e expecting to fill a job) is constant over time at around 12%, the average share of female workers is slightly increasing, passing from 33.6% in 2010 to 34.5% in 2015, while the share of workers with fixed-term contracts decreases from 12.2% to 9% between 2010 and 2015. Finally the average of productivity, measured as (the log of) total sales per employee shows a rather flat pattern during the period.

Table 1 Descriptive statistics for training and other outcome variables

	2010		2015		2010-2015	
	Mean	Std dev	Mean	Std dev	Mean	Std dev
Workplace training						
Training investment (0/1)*	44.8	0.50	60.5	0.49	51.2	0.50
Use of internal funds (0/1)*	31.3	0.46	39.5	0.49	34.7	0.48
Use of Interprofessional Funds (0/1)*	4.3	0.20	10.4	0.31	6.8	0.25
N. of trained workers	10.6	84.96	32.3	1383.1	19.5	887.3
Share of trained workers*	23.4	0.35	37.5	0.40	29.2	0.38
Per employee training cost (euro)	104.2	486.4	141.2	628.70	119.1	548.4
Total training cost (euro)	4176.0	28599.2	7417.9	52481.7	5480.6	39992.5
Other outcome variables						
Open vacancies (yes/no)*	12.1	0.33	12.1	0.33	12.1	0.33
Share of female *	33.8	0.26	34.5	0.26	34.1	0.26
Share of temporary workers*	12.4	0.18	9.4	0.16	11.2	0.17
Log of sales per employee	11.65	1.24	11.8	1.23	11.733	1.24
N of Obs		3,719		2,838		6,557

Note: * percentage points. Sampling weights applied
Source: RIL data 2010-2015



3 Econometric analysis

The descriptive statistics summarized above represent the basis of a more thorough investigation of the role of pension reform on workplace training and other labor market outcomes. The econometric analysis is performed on the following linear relationship:

$$TRAIN_{it} = \alpha_0 + \alpha_1 Pens_{it} + \alpha_2 M_{it} + \alpha_3 F_{it} + \alpha_4 L_{it} + \tau_t + \varepsilon_{it} \quad (1) \quad t=[2010, 2015]$$

where *TRAIN* stands for one of the six training variables described above: i) the incidence of training investment; ii) the use of internal funds; iii) the use of Interprofessional Funds; iv) the share of trained workers; v) the (log of) total training costs; vi) the (log of) training cost per employee. Our key explanatory variable *Pens* is a dummy taking the value of one if the firm had to change its recruitment plans because of the Fornero reform (our treatment variable). The vector $M_{i,t}$ denotes controls for management and corporate governance characteristics, $F_{i,t}$ includes a set of controls for firms' productive characteristics (size, sector of activity, geographical location, sales per employee, innovations, exports), whereas $L_{i,t}$ formalizes workforce composition in terms of gender, education, occupational categories (for more details see table A.1 in the Appendix). Furthermore, τ is a dummy taking the value of one in 2015 and aimed at controlling for the presence of common trends, while ε is the error term – assumed to have zero conditional mean and finite variance – capturing the idiosyncratic component of the dependent variable.

To test our hypothesis, the standard pooled OLS regressions are performed to estimate equation (1), as the richness of information included in the RIL database leaves in principle little room for unobserved heterogeneity. However, the OLS strategy is not suitable to control for potential time-invariant firm-specific unobserved heterogeneities. Hence, we take advantage of the panel structure of the RIL data and circumvent the omitted variable biases performing fixed effect estimates (FE). In this regard, it must be noticed that our data contains only two years, and thus the variability within firms of many explanatory variables is limited (Wooldridge 2012).

Following a stepwise estimation procedure, we also take into account endogeneity issues. Indeed, while it is reasonable to argue that the approval of pension reform in 2011 was an exogenous and unanticipated shock, one cannot assume that firms that give up to their previously planned hirings are statistically identical to those that did not change them over the period 2012-2015 (see Croce, Ricci and Tesauro 2018). For example, a positive estimated coefficient for the variable $Pens_{i,t}$ might reflect some specific feature of long-term competitiveness associated to the firm's size or high quality human resource management rather than a short-term causal impact of the pension reform.

We address this matter by using a combination of difference-in-differences (Diff-in-Diff) and Propensity Score Matching (PSM) methodologies (see Rosenbaum and Rubin 1983). More specifically, we exploit (i) the existence of data for the pre-and post-policy change periods and (ii) the availability of a rich set of covariates that control for observable characteristics of the firms included in the longitudinal

component of our sample. In technical jargon, we assign to our treatment group those firms that changed their hiring plans because of the introduction of the Law n. 214/2011. As for the non-experimental control groups, we consider i) all firms that did not change hiring plans examined before and after the reform of 2011; ii) those firms that would have change them examined in the period before 2011.

The non-random assignment of the policy change may raise questions about the selection into the treatment status. Thus, as far as to the extent they are imputable to observable characteristics, we adopt a propensity score method. Based on this argument, we then combine Diff-in-Diff and propensity score strategies in order to address differences between the two groups due to time invariant non-observable factors (Heckman et al. 1997, 1998). In other words, we estimate a difference in difference specification in which treated and control firms have been paired using a propensity score matching procedure, where the score has been estimated using the controls introduced in equation (1) as predictors. This strategy acts as a robustness check to cope with the potential selection bias in the treatment.

3.1 Main Results

Table 2 reproduces the estimation results derived from Berton et al. (2017c). Here the different training measures are displayed in the rows, and the three estimation strategies in the columns.

Note that estimates unambiguously show that the exogenous ageing shift implied by the reform under scrutiny resulted in an increase of the share of trained workers (line one): our most conservative estimates suggest an effect of around five percentage points. Rather consistently, we also find that the total (per-company) as well as the average (per-trainee) cost of training increased, by almost 50% and by 22-25% respectively, but these estimates do not survive the fixed-effects approach (lines four and five). Combined with the result that the Fornero reform displaced youth employment (Boeri 2017), we can conclude that at least part of the effects we have detected are related to old-age workers. In other words, firms reacted to ageing by investing more in old-age workers' training. While this is consistent with the idea that firms use training to enhance the productivity of unprofitable workers in a context of high employment protection and of downward wage rigidity, it appears more at odds with the fact the payback period for such a huge investment – 50% in terms of overall spending growth – would be very short (a few years at most)⁵. Results in lines two and three of table 2 help us to solve the puzzle. All of our estimates suggest that training has been enhanced by using Interprofessional Funds, what left unaffected firms' own funds. Put it differently, firms have increased workplace training, but its funding has been at least partially externalized. On top of being consistent with the idea that firms are not willing to invest money when the payback period is too short, this is also coherent with the results we have obtained from a companion piece of research, in which we go deeper into the role that unions play in training and skill formation (Berton 2017a). Interviews to key informants, indeed, indicate that

⁵ The reader should not be surprised by such a huge percentage growth of training costs, provided that the starting values are rather small: € 98.5 in terms of per-trainee costs, and € 4,500 in terms of overall (firm-level) expenditure.



unions play in general a rather passive role in designing workplace training policies, unless it becomes an issue of (re)training old-age workers at risk of being laid off.

Table 2 Estimation results from Berton et al. (2017c). Full sample

	Pooled OLS	Fixed Effects	DiD with PSM
Share of trained workers	.050** (.023) 6596 - .121	.083** (.031) 6596 - .091	.051*** (.018) 6596
Use of internal funds (y/n)	-.018 (.03) 6589 - .041	-.062 (.043) 6589 - .016	-.024 (.023) 6589
Use of Interprofessional Funds (y/n)	.052** (.025) 6585 - .190	.068** (.034) 6585 - .059	.065*** (.018) 6585
Per-employee training costs (log of)	.249* (.144) 6143 - .175	-.060 (.217) 6143 - .072	.215* (.130) 6143
Total training costs (log of)	.469** (.237) 6128 - .282	-.068 (.357) 6128 - .087	.429** (.234) 6128

Note: robust (bootstrapped) standard errors in second lines; number of observations and adjusted R-squared in third lines; *** = 1% significant; ** = 5% significant; * = 10% significant. Control variables: managerial characteristics (employers' education, age, family ownership), workforce composition (gender, age, education, professions, fixed term contracts), gross workers turnover, vacancy, performance related pay, firms' characteristics (age, physical capital per capita, sector of activity, size, macro-region, foreign markets, product innovation, process innovation).

Source: Berton et al. (2017c)

The estimates reported in table 2 show different patterns across sector and firm size. More specifically, Berton et al. (2017c) makes it clear that the positive effect of ageing – as identified by the pension reform under scrutiny – upon the share of trained workers, the total cost of training and per-employee training expenditure, appears driven by small firms in the service sector, with no leakage on the use of Interprofessional Funds. As neither internal funds look affected by the increased training activity – and the related costs – we must presume that small companies from the service sector rely upon alternative external funds, e.g. other regional or European programs.

On the contrary, the use of Interprofessional Funds emerges from larger firms and the manufacturing sectors, again two strongly related features, as manufacturing firms are larger on average. Rather surprisingly, however, no effect seems to suggest that these companies are reacting to an exogenous positive shock to their workers' age by increasing training activity. This is consistent with the hypothesis that large firms from the manufacturing sector have reacted to the increased retirement age by shifting their training programs from young and mature-age workers to older employees, and by taking advantage – to do this – of the availability of Interprofessional Funds, which have probably substituted other external sources of financing.

This interpretation is consistent with the well-established fact that large firms in the manufacturing sector are more unionized – and are therefore likely to benefit from a privileged access to Interprofessional Funds – and with evidence from Berton et al. (2017a) suggesting that unions' involvement into training programs within the manufacturing sector – and with blue-collar workers in

particular – becomes pivotal only in cases of (a risk of) firm closure, and when (re)training emerges as an employment protection device, a feature largely related to ageing workforce.

3.2 Further results

In the previous section we have shown that postponing retirement age may induce firms to invest in its workforce by providing training activities, with potential benefits for firms' competitiveness. At the same time, giving up to previously planned hirings due to the reform may have an adverse effect on firms' competitiveness because of the worsening of the wage-productivity balance.

To investigate this issues more in depth, we perform an explorative regression analysis by focusing on a set of labor market outcomes: i) the probability of posting a vacancy to fill a job; ii) the employment share of women; iii) the employment share of fixed-term workers and iv) the (log of) total sales per employee.

Table 3 reports the pooled OLS estimates. Note that the change of hiring plans is associated to an increase of 5.5% of the probability of posting a vacancy to fill a job. Further, we find that it is negatively correlated to the employment share of women (-2.5%) and to the share of temporary workers (-1.5%), suggesting that the pension reform has affected the composition of employment beyond the well-known effect on younger cohorts and training activities. In this case, the size of firms exerts an opposite influence on the share of temporary workers, when they play no significant role in shaping the female share of the employment.

The evidence on changes in employment composition, however, does not pair with a significant evolution of the firms' performance following the introduction of new retirement rules: table 4 indicates that the Fornero reform did not reduce significantly the sales per employee, at least in the short run.

On the whole, pooled OLS results suggest that increasing the retirement age has induced Italian firms to substitute temporary with permanent contractual arrangements and female with male workers, to postpone hirings throughout an higher propensity to open vacancies while it exerted no impact on firm competitiveness (see also Quaranta and Ricci 2018).

Actually, the pooled OLS estimates may be misleading in the case that controlling for a large set of explanatory variables is not enough to circumvent potential omitted variables biases related to time invariant firm-specific unobserved heterogeneity.

**Table 3 Pooled OLS estimates**

	Vacancy	Female	Temporary	Ln (sales pc)
Pension reform (Law n. 214/2011)	0.055** [0.026]	-0.025** [0.012]	-0.015** [0.007]	-0.033 [0.072]
Year 2015	0.001 [0.009]	-0.007* [0.004]	0.005 [0.004]	0.015 [0.029]
Ln (n. of employees)	0.057*** [0.006]	0.004 [0.003]	0.009*** [0.002]	-0.002 [0.017]
Ln (sales per employee)	0.001 [0.004]	-0.018*** [0.003]	-0.009*** [0.002]	
Other controls	yes	yes	yes	yes
Constant	-0.083 [0.065]	0.514*** [0.041]	0.299*** [0.030]	10.165*** [0.187]
N. of Obs	6556	6557	6557	6557
R2	0.133	0.477	0.168	0.162

Other controls include: managerial characteristics (employers' education, age, family ownership ecc), workforce composition (age, education, professions, fixed term contracts ecc), performance related pay, firms' characteristics (age, physical capital per capita, sector of activity, size, macro-region, share of foreign markets, product innovation, process innovation), membership to employers' association.

Note: Robust (bootstrapped) standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Source: RIL data 2010-2015

To address this issue, Fixed Effect (FE) estimates are displayed in table 4. Here we observe that the pension reform continues to be positively related to the probability of posting a vacancy (+9,5%) and negatively correlated with the employment rate of women (-1,1%). Analogously, FE estimates confirm that increasing legal retirement age produces no significant effect on firm performance in the short time. These results suggest that OLS results do not suffer from omitted variable biases, except for temporary contracts. In such a case table 4 reports that renouncing to hire is associated to an increase of the share of fixed-term contracts (+1,8%), i.e the propensity to use temporary contracts is not bounded once firms' unobserved characteristics are controlled for.

Table 4 Fixed effect (FE) estimates

	Vacancy	Female	Temporary	Ln (sales pc)
Pension reform (Law n. 214/2011)	0.095** [0.038]	-0.011** [0.005]	0.018** [0.008]	0.018 [0.094]
Year 2015	-0.02 [0.012]	-0.003 [0.002]	-0.006 [0.004]	0.028 [0.041]
Ln (n. of employees)	0.053* [0.031]	-0.008 [0.008]	0.092*** [0.014]	-0.146 [0.153]
Ln (sales per employee)	0.014* [0.008]	0.001 [0.001]	-0.002 [0.002]	
Other controls	yes	yes	yes	yes
constant	-0.386* [0.214]	0.454*** [0.057]	-0.117* [0.067]	11.456*** [0.837]
N. of Obs	6556	6557	6557	6557
R2	0.028	0.041	0.139	0.019

Control controls include: managerial characteristics (employers' education, age, family ownership ecc), workforce composition (age, education, professions, fixed term contracts ecc), performance related pay, firms' characteristics (age, physical capital per capita, sector of activity, size, macro-region, share of foreign markets, product innovation, process innovation), membership to employers' association.

Note: Robust (bootstrapped) standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Source: RIL data 2010-2015

CONCLUSION

In this paper, we exploit a pension reform recently introduced in Italy to assess the impact of ageing on workplace training policies. We find that an exogenous ageing shift of a few years results in a higher share of trained employees and in larger monetary investments in training. While this is consistent with the idea that training is a viable solution to increase productivity of unprofitable workers in a context of high employment protection and of downward wage rigidity, our results may appear more puzzling once one considers that the payback period for such training investments would be rather short. The puzzle is solved by observing that training investments are not funded out of companies' internal funds, but are financed (at least partially) by Interprofessional Funds.



APPENDIX A

Table A 1 Variables definition

Variables labels	Variables description
Pens	Dummy variable that equals to 1 if firms gives up to hiring plans over the period 2013-2014 because of the mandatory increase in the retirement age established by the Law n. 214/2011, 0 otherwise
Education	<p>Management and corporate governance</p> Three dummy variables for employers/managers with i) tertiary education; ii) upper secondary or primary education iii) lower secondary or no education; 0 otherwise
Age	Three dummy variables for employers/managers aged i) less than 40 years; ii) between 39 and 55 years; iii) more than 54 years; 0 otherwise
Family firm	Dummy variable that equals to 1 if the ownership of the firm is held by a family, 0 otherwise
Educational composition	<p>Workforce composition</p> Share of employees with: i) tertiary education; ii) upper secondary education; iii) lower Secondary and Primary education (on the firms' total number of employees)
% aged<40	Share of employees less than 40 years old (on the firms' total number of employees)
Training measures	Five variables: i) incidence of training investment; ii) private funds; iii) Interprofessional Funds; iv) share of trained workers (on the firms' total number of employees); v) (log of) total training costs vi) log of training costs per employee
% temporary contratcs	Share of temporary employees (on the firms total number of employees)
% females	Share of female workers (on the firms' total number of employees)
Professional composition	Share of executives, share of white collars and share of blue collars (on the firms' total number of employees)
Employers association	Dummy variable that equals to 1 if firms is member of an employer association, 0 otherwise
Ln (sales)	<p>Firms characteristics</p> (Log of) total sales per employee
Innovation	Dummy variable that equals to 1 if the firm has invested in product or process Innovation three years before the survey, 0 otherwise
Foreign markets	Dummy variable that equals to 1 if the firm sells its products or services on foreign markets, 0 otherwise
Firm size	Log of n of employees
Macro-region	N. 4 dummy variables for: North West, North East, Centre, South
Sector of activity	Dummies variables for: Electricity, gas water distribution (public utilities), food, textile, tobacco etc; chemistry, metallurgy etc; mechanics and other manufacturing goods; construction; retail and wholesale, tourism, hotels and restaurants etc; transportation; insurance and financial intermediation, information and communication; other business services; healthcare, educational and social services, others

Source: RIL-Inapp data 2010-2015

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