THE UNINTENDED EFFECTS OF INCREASING FIXED-TERM EMPLOYMENT ON HEALTH

Donatella Lanari, Giorgio d'Agostino, Luca Pieroni

1. Introduction

Over the last decades, numerous European countries have introduced other forms of employment, leading to a significant increase in the number of temporary workers, in order to promote a greater flexibility of the labour market, employment and productivity growth (Geronikolaou *et al.*, 2016; Parello, 2011). With regard to Western Europe, there has been a considerable increase of fixed term labour contracts from the '80s, whereas in the middle of the '90s temporary works increased quickly even in Southern Europe[1]. The subsequent decrease in permanent jobs in favour of temporary works better responded to the changes and fluctuations of the labour market and reflected the higher competition between companies since they had to adapt quickly to the varying supply and demand conditions of the labour market. The liberalised use of temporary forms of employment created a new category of temporary workers in the middle between unemployed and permanent employed, with lower rights and social protection, and consequently less costly. Some authors evidenced that the regulations of temporary work in Europe aimed also to reduce the high unemployment rate especially among the young workers (Barbieri *et al.*, 2009), although it may translate into a feeling of economic uncertainty for individuals (Schmitt, 2012).

Since 1997, Italy undertook steps towards flexibility with reforms which liberalized the use of flexible or temporary employment leaving unchanged the discipline and employment protection for standard regular workers. Starting with the Treu Package (Law 196/1997), which introduced apprenticeship, part-time employment and temporary contracts, at the turn of the new century, two labour market reforms increased job flexibility by introducing new atypical and temporary contracts and by relaxing the restrictions on their use. Based on an EU directive, the Italian Law 368/2001 relieved employers of being obliged to define the specific reasons for using fixed-term contracts and eliminated mandatory limits to their

[1] The highest percentages have been recorded in Spain, staying above 30% since 1990 (Dolado *et al.*, 2002).

renewal. This reform generally revised employment protection legislation at the margin, mostly providing more flexible types of contracts for new hirings (atypical contracts), without modifying rules for workers who already had permanent (open-end) contracts. The new institutional changes in the fixed-term contracts became effective from 2005 onwards, when a large part of manufacture sectors renewed the collective agreement. The labour market reform greatly contributed to the spread of temporary employment in Italy, registering the steepest increase of temporary contracts among young people with respect to other European countries. In Italy, youth temporary employment for workers between 15 and 24 age years raised from 26.5% in 2000 to 36.9 in 2005, joining 46.8% in 2010 (Cappellari *et al.,* 2012). The empirical evidence suggests that precarious employment is an important determinant of adverse health outcomes since temporary workers are more likely to suffer from income instability and lower wages, stressful working conditions, hazards at the workplace (Becker and Engel, 2018). The decentralisation of the bargaining process over wages and working hours and the lack of regulation and protection that support the standard employment relationship reduced the rights and power of precarious workers, all factors resulting in a difficult psychological environment in the workplace (Robone *et al.,* 2011). In particular, job insecurity is associated with lower self-perceived health, and even lower physical health, as well as higher probability to have depressive symptoms (Rugules *et al.,* 2008; Waenerlund et al. 2011).

Our paper aims to address the effects of the increasing role of fixed-term employment on workers' health status in Italy. We use self-rated health (SRH) as a health outcome indicator, although its appropriateness has been often put to question, because the evaluation could be downward biased for pessimistic individuals or could change across cultures (Prinja *et al*., 2012). These potential limitations impose to be careful in case of cross-population comparisons. However, other studies have established that self-rated health is closely linked to objective health conditions (Egidi and Spizzichino, 2006), physical and emotional well-being, and it is a valid predictor of mortality (Idler and Benyamini, 1997). Overall, it allows for a global, complete and reliable evaluation of the general individual health status and well-being: respondents, when assessing their condition, are able to account simultaneously for the different dimensions of health.

Data were drawn from the IT-SILC dataset, which includes the question on SRH, over the period 2004-2009. Based on simple correlations, some studies have investigated the association between employment status (unemployment, atypical contracts, part-time contracts) and health effects in Italy (Minelli *et al.*, 2014; Pirani and Salvini, 2015) or Europe (Ronchetti and Terriau, 2019). Our approach is different from previous studies since our aim is to identify changes in SRH from an exogenous variation determined by the application after 2005 of the new rules concerning the fixed-term contracts in Italy and estimate the causal effect of their

extension of applicability in the labour market. We show that the new labour market regime explains the increase of a negative perceived health of about 17-19%, irrespective of the control group or the functional form used. Our results are robust when we extend the analysis performing an ordered *logit* model.

2. Econometric model

Consider a dataset composed by a series of independent cross-sections, such that observations on N individuals are available in each period. We denote each subject i ($i = 1,\dots,n$) that we follow for one year and observe the pooled data for t ($t = 1,\dots,T$) time points. Y is the outcome of interest. We indicate as S our dichotomous treatment variable, recording 1 when the individual is involved in the labour market regime with a fixed-term contract and zero otherwise, and X is a column vector of covariates. The vector X includes the confounders, namely they may simultaneously affect both S and Y. We specify a model for the relationship between the potential outcome $Y^{(s)}$ and the treatment indicators S_+. As a benchmark, a linear probability model is shown in the equation below:

$$E\left(Y^{(s)}\right) = \beta_0 + \beta_1 S_+ + X'\beta_2 \quad (1)$$

where S_+ is a scalar summarising the treatment post reform (i.e., workers with a new legislation of fixed-term contracts). While β_0 estimates the potential outcome mean (i.e., the expected self-rated health without the reform of fixed-term contracts), in order to estimate the parameters of interest β_1, and interpret the estimate as a change due causally to the reform of employment on perceived health, we include the identification assumption that the new fixed-term contracts was conditional upon renewal of collective agreement. Following D'Agostino *et al.* (2018), we consider that the sectors of Textiles, Wood Products, Chemicals, Construction, Transportation, Retail Trade, Food Products and Telecommunication renewed collective agreements, mostly in 2005 and 2006. Other important sectors of the economy such as Metal Manufacturing and Banking renewed the collective agreements in that period but decided to postpone the implementation of the 'new' fixed-term contract to a successive agreement[2].

Thus, we identify the effects on perceived health based on the timing of their introduction which has not involved homogeneously all the employees. Our empirical strategy compares what happened in terms of self-perceived health in a

[2] Later, Law 247/2007 introduced changes in maximum duration (i.e., three years) for fixed-term contracts stipulated with each employer. However, the new reform of fixed-term contracts was only applicable from September 1, 2009.

treatment group of workers with fixed-term contracts with respect to a potential control group. A fundamental challenge to this approach is to determine counter-factual outcomes. When perceived health in the group of workers with fixed-term contracts is observed, after the opportunity for firms to increase the use of temporary job, the impact of the law should be assessed in relation to the potential outcomes in the absence of labour flexibility inflows.

The counter-factual outcome is approximated by observed perceived health in: i) workers of sectors that did not apply early (2005 or 2006) the new rules on the fixed-term contracts; workers with permanent contracts, who are not affected by the Italian labour market reform. In the first case, the control group accounts for the application differences among sectors of the fixed-term contracts, which should not differs with respect to individual characteristics of workers (CG_1). In the second case, the control group (CG_2), also includes a large sample of workers with permanent contract, which irrespective of the sectoral application of the fixed-term contracts, represents a benchmark for self-rated health. In particular, in this case, to reduce the detrimental effects of confounders in estimating the causal effect of the introduction of the new fixed-term contracts on perceived health, we use an inverse probability weight (IPW) method estimated by a standard logistic regression.

3. Data

The dataset IT-SILC used in this paper is drawn from the cross-sectional survey of the European Statistics on Income and Living Conditions (EU-SILC) in the period 2004-2009. This survey is designed to be representative of each European country which analyses the living conditions of private households and includes variables for our interest of labour conditions, socio-demographic characteristics and perceived health. The choice of using the cross-sectional survey, instead of the longitudinal counterpart, depends from a greater disaggregation of several variables at the sectoral level, which is required for a correct identification of the causal estimation of the increasing fixed-term employment on health. Although this sectoral disaggregation is publicly unavailable, we obtained from Italian Institute of Statistics (IIS) an *ad hoc* data processing by ADELE service[3]. In particular, the dataset was extended by including the *three digit* European statistical classification of economic activities (NACE), which allows us to identify the sub-sectors that applied the new job legislation.

[3] The analyses have been carried out by the authors at the ISTAT's Laboratorio per l'Analisi dei Dati Elementari (ADELE).

Our baseline analysis is carried out on the birth cohorts of employees aged 15-64. As a partial limitation to the use of the dataset, workers employed by the public sector were excluded from this analysis. In addition, we excluded self-employed workers because many laws were passed during the analysed period specifically for them, complicating identification of the labour market reforms in which we were interested. We removed from the dataset workers on leasing contracts, because detailed information on them was not available and seasonal workers due to missing data. The number of observations we obtain for the baseline estimation is about 5,000 when the *CG1* sample is accounted for and about 47,000 when we use the sample *CG2*.

SRH is used as an outcome of the labour market reform impact which allowed of using fixed-term job contracts more easily. The question "how is your health in general" administered to individuals in the dataset distinguishes five modalities (very good, good, fair, bad, very bad). In the empirical analysis, we maintain the ordered framework along with a dichotomous variable which code individual answers with 0 for a "positive" health perception (good, very good), and 1 for "poorer" health perception (fair, bad, very bad).

Figure 1- *Cohort and age patterns of poor health.*

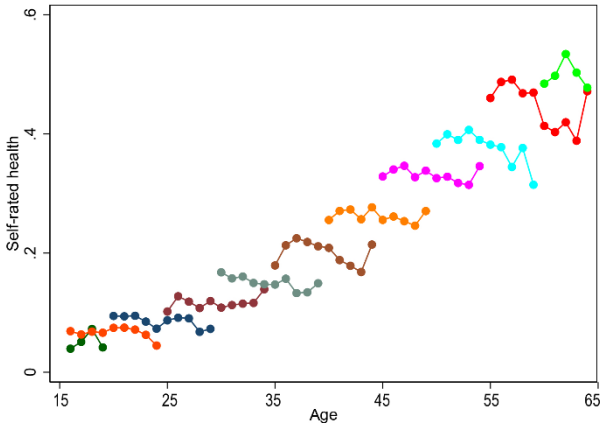


Figure 1 shows an upward trend in the poor health pattern by age and cohorts, meaning that health problems increase by age. Table 1 compares the health status between workers with fixed-term contracts in the new labour market regime (Treatment Group, *TG*) and control groups (*CG1* and *CG2*). Workers with a new fixed-term contract report worse health (2-3 percentage points) than their counterparts.

From the same source IT-SILC, we collected several control variables. The first block of control variables include the mostly common used individual characteristics

such as gender, marital status, age and cohort classes, household size and the highest degree of education, where the latter variable is categorised as no education, primary, pre-secondary, secondary and tertiary education. We also distinguish between Italian and immigrant workers, for whom we consider the region of origin (EU and extra-EU countries). The second block of controls consider the residence home areas of the worker according to the degree of urbanisation (if he or her lives in small, medium or large cities) and their perception of crime or violence in his residential home area. The last block characterise the firm by controlling for the size of the firm, the number of worked hours of the individual and by the fact that the worker attended at an official training course in the past. Descriptive statistics are listed in the Lanari *et al.* (2022).

Table 1*- Descriptive statistics of self-rated health for workers.*

Outcome	Modalities	CG1	CG2	TG
	Good/very Good	0.808	0.792	0.778
	Poor	0.192	0.208	0.222
Self-rated health				
	Very good	0.194	0.179	0.173
	Good	0.614	0.613	0.605
	Discrete	0.170	0.195	0.197
	Bad/Very Bad	0.023	0.013	0.025

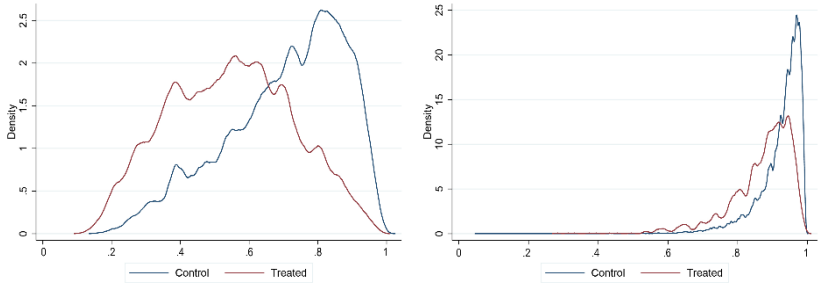
Notes: The sample size is composed by 5,328 observations when we include workers with a fixed-term contract who were not affected by the reform (CG1) and by 47,835 observations when we also consider workers with a permanent contract (CG2). TG. Treatment Group.

4. Results

In this section, we present the estimates of the effect of the introduction of the new fixed term contracts on health of workers. We offer estimations using the SRH indicator in the dichotomous scale to compare those who had a positive perception of health to those who reported poor health. Then, we display results using the SRH indicator in the ordered scale.

Before presenting the main results of the analysis, Figure 2 shows the balanced graph of the propensity scores used (inversely) as weights for SRH. We do not present the balanced graph of the ordered perceived health variable for each health state, since they are really close to the highlighted graphs. The patterns suggest that the treated and control samples are well balanced and that the mass of propensity scores at 1 and 0 is small. This confirms that the used control variables are useful to remove the selection bias in our sample.

Figure 2 - *Balanced graphs of the self-rated health.*



A. Self-rated health (CG1) *B. Self-rated health (CG2)*

Table 2 reports the main estimation results. The first two columns compare estimates from the weighted linear probability model (LPM) by the inverse of the propensity scores of the covariates using CG1 as control group. The potential outcome parameter β_0 measures the percentage of workers who perceived a poor health status and were not affected by the new labour market regime ("Potential outcome means"). On the other hand, the introduction of the new fixed-term contracts increases of 3.2 percentage points the probability to move to a poor health status (β_1, "average treatment effect"), corresponding to a variation of about 16.3% (0.032/0.196)[4]. The magnitude is larger using the CG2 control group.

Table 2 - *Estimates of the reform of fixed term contract on (poor) self-rated health.*

	Linear probability model (LPM)				*Logit* model			
Parameters	CG1		CG2		CG1		CG2	
β_1	0.032	***	0.043	***	0.032	***	0.037	***
	(0.009)		(0.011)		(0.012)		(0.012)	
β_0	0.196	***	0.216	***	0.195	***	0.216	***
	(0.006)		(0.001)		(0.006)		(0.001)	
Observations	*5,328*		*47,835*		*5,302*		*47,661*	

*Notes: Robust standard errors are reported in brackets; ***p<0.01, **p<0.05, *p<0.1. CG1 includes workers who were not affected by the reform; CG2 also considers workers with a permanent contract.*

The inclusion of open-ended contracts in this control group highlights a significant impact on workers involved in the new fixed-term contracts, who experienced a worsening in health, estimated around 20% (i.e., 0.043/0.216). These results are close to the *logit* propensity score estimates in columns 3 and 4, which list the estimated parameters of equation (1) in terms of marginal effects, irrespective of the

[4] The effect of the fixed-term contract reform is estimated in percentage as: $(1*100)/0$.

control group used. Table 3 lists the parameter estimates of the ordered *logit* model. Since we had few observations of workers in "very bad" health status, we have included them in that of "bad" health. Using *CG1* control group, the estimated $\beta'_1 s$ parameters suggest that the effect to extend the fixed-term contracts by the Italian Law 368/2001 reform is not uniform across these modalities. The application of these new rules increased "fair" health perception of workers involved in the fixed term contracts by 2.9 percentage points, whereas decreased workers with "good" health perception by 2.7 percentage points. Estimates using CG2 show similar results. Thus, the ordered estimation suggests that the effects in health perception of workers involved in the new rules of fixed-term contracts depend largely on changes in the worker responses to be in good of fair health status.

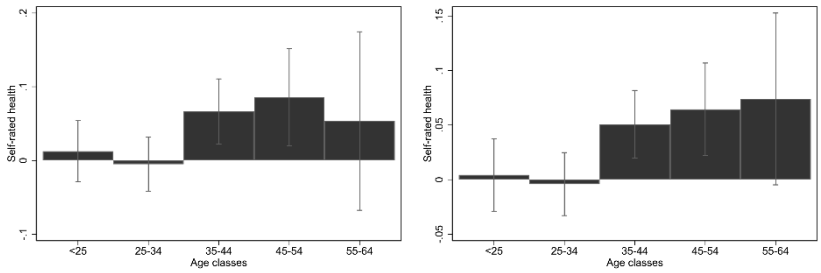
Table 3 - *Estimation results: the reform of fixed term contract on (poor) self-rated health.*

Control Group	Self-rated health	Very good		Good		Fair		Bad	
CG1	β_1	-0.004		-0.027	*	0.029	**	0.003	
		(0.012)		(0.016)		(0.011)		(0.005)	
	β_0	0.184	***	0.618	***	0.172	***	0.024	***
		(0.006)		(0.008)		(0.006)		(0.000)	
	Observations	*5,328*		*5,328*		*5,328*		*5,328*	
CG2	β_1	-0.007		-0.034	***	0.037	***	0.004	
		(0.011)		(0.015)		(0.011)		(0.004)	
	β_0	0.169	***	0.614	***	0.193	***	0.022	***
		(0.001)		(0.002)		(0.001)		(0.000)	
	Observations	*47,835*		*47,835*		*47,835*		*47,835*	

*Notes: Robust standard errors are reported in brackets; ***p<0.01, **p<0.05, *p<0.1. CG1 includes workers who were not affected by the reform; CG2 also considers workers with a permanent contract.*

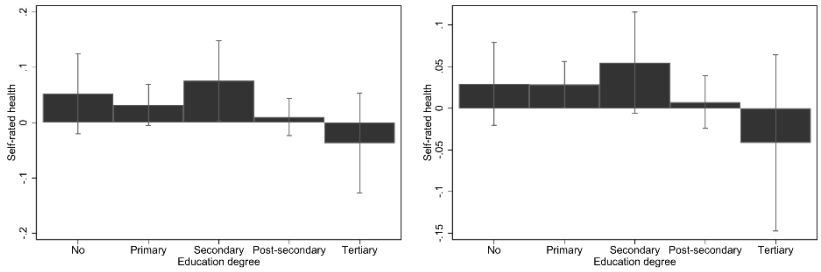
To complete the analysis, Figures 3 shows the marginal effects on the binary variable SRH, when we consider a heterogeneous effect linked to age, education and region of residence. The choice of the heterogeneous groups is quite in line with the existing literature of health behaviours and is still consistent with the heterogeneous effects of the Biagi reform found by D'Agostino *et al*. (2018). We find that the introduction of the new fixed term contract had a significant impact on workers in the age class 35-55, with primary or secondary education degrees (significant level, 10%) and either on workers living in south or north regions.

Figure 3 - *Marginal effects, Self-rated health.*



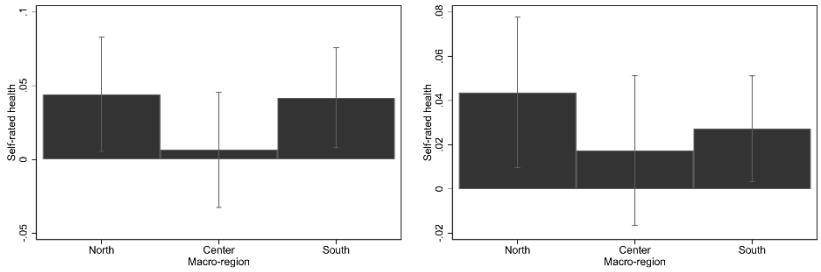
A. Age (CG1)

B. Age (CG2)



C. Education degree (CG1)

D. Education degree (CG2)



E. Macro-region (CG1)

F. Macro-region (CG2)

5. Conclusions

The present study exploited data of an extended classification of economic activities by ISTAT to estimate the effect of the increasing flexibility of fixed-term contracts on self-rated health of workers in the first decade of this century. Comparison of the SRH profiles of various working contract types pointed out where the differences lie: workers with a new fixed-term contract performed worse on the

SRH compared with the workers with the same type of working contract applied before the new Italian reform on fixed-term contract. Our study also examined the effect of the Italian labour market reform on health compared to almost all labour market contracts, as a control group. Clearly, the evaluation of the causal effect of the changes in relieving employers of being obliged to define the specific reasons for using fixed-term contracts and in eliminating mandatory limits to their renewal is complex because linked to many confounding factors, such as gender, educational level, and social status, while the reasons for accepting this new contracts range from economic needs, experience for next contracts and reduction of periods out of work. The availability of data on several risk factors at the baseline allowed us to perform multivariate adjustment for potential confounding factors, including chronic conditions. Our findings support the contention that fixed-term contracts generally deteriorated perceived health.

Which plausible explanation could be underlying the relationship between fixed-term contracts and perceived health? The literature discussed in Introduction suggests as a potential mechanism on explaining negative impact, the increase of job instability and wage volatility (i.e., economic uncertainty). Having not unlimited employment generates fears and anxiety that might have negative consequences for individuals' quality of life and subjective well-being, although some advantages of temporary contracts has been stressed in literature, as the increase job chances for active workers who would otherwise be cut out of the labour market or job satisfaction for highly skilled workers (Guest *et al.*, 2006). However, the magnitude of these recognized channels depends on how the new labour market regimes are linked with the country institutional setting. For example, in the Nordic countries the welfare system assists largely workers losing job or women in pregnancy time, favouring a speed return to employment also through an efficient system of employment offices. In this case, job instability from fixed-term contracts is not expected to increase (or makes less significant) economic uncertainty. On the other hand, countries with a weak institutional setting associated to the extensive use of fixed-term contracts for employed workers (or women searching job after maternity), generated less and penalized opportunities in job, with a reduction of contract duration and a likely greater persistence in temporary contracts. D'Agostino *et al.* (2018) confirmed that the new regimes of contracts in Italy generated the persistence of temporary employment, which allows us to maintain confidence with the underlying explanation of fixed term contract-health nexus in this study.

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SUMMARY

This paper estimates the effect of the increasing role of fixed-term employment on workers' health status in Italy. We use data from IT-SILC dataset, which includes workers' responses in self-rated health over the period 2004-2009. We identify changes in self-rated health from the application after 2005 of the new rules concerning the fixed-term contracts and estimate the causal effect of their extension of applicability in the labour market. We show that the new fixed term regime explains the increase in poor health of workers, irrespective of the control group or the econometric model used.

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