

**Higher educated, lower paid:
The fixed-term wage penalty within highly educated workers in Italy**

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Abstract

This paper explores the temporary-permanent wage gap experienced by Italian graduate workers. In order to evaluate the wage gap along the entire wage distribution, and to account for heterogeneous effects of temporary employment, we apply the Recentered Influence Function (RIF) regression approach. The results suggest that the monthly net wage earned by Italian highly educated workers having a temporary contract is lower than that of their “permanent” counterparts even after controlling for a plethora of individual and job characteristics. More than 50% of the wage gap is due to unobserved characteristics. A discrimination effect due to the job contract emerges along the entire distribution, mainly at the top and at the bottom of the distribution. Field of study more than location of University contributes to explain this discrimination effect.

Keywords: Graduates, RIF-regression, Temporary employment, Wage differentials.

Jel Classification: J20, J31, J40

1. Introduction

Over the past decades many studies have focused on the wage differentials attempting to verify whether temporary workers get paid more or less than permanent ones (Davia and Hernanz 2002; Booth, Dolado and Frank 2002). In this literature, however, the worker's education degree has been analysed only focusing on wage differentials between education groups. Despite the large increases in higher education participation, the economic literature highlighted a growth in such wage differentials in particular during the 80s (Card and Lemieux 2001; Elias and Purcell 2004; McIntosh 2006). Nevertheless, focusing on average differences between groups can miss some of the overall change in inequality. Indeed, wages can also vary within education categories, and, as it has been argued by Katz (1999), much of the overall increase in wage inequality has been due to an increase in this residual inequality within education groups (Lindley and McIntosh 2015). As recently highlighted by Card et al. (2018), the place where one works strongly influences earnings meaning that workers with same education can be paid differently according to the place where they work. Concurrently, within-firm wage inequality plays an increasing role in explaining wage inequalities leading to wage differentials for workers having same educational background and working in the same firm.

Given that, in this paper we examine within-group wage differentials (among recently graduated workers) emphasizing the role of heterogeneities along the distribution of wages (high paid jobs and low paid jobs) and focusing on differentials due to the specific job contract they have.

In many European countries, the interest in employment conditions and earnings' profile experienced by graduates has always been high, especially during economic crisis (Rostan and Stan 2017, Aina, Casalone, and Raitano 2019). Given the relatively low private returns from investing in tertiary education and difficulties experienced by Italian graduates to enter the labour market, Italy is a particularly interesting country to investigate (European Commission 2015). The implementation of the Bologna Process improved occupational outcomes of Italian graduates, however graduates' work conditions strongly differ from those experienced in other European countries. Among the possible reasons, relying on different theories and approaches, there are some weaknesses of the Italian production structure: a large population of micro and small firms, low-tech specialization, few investments in technologies and innovation. All these factors contribute to explain why Italian economy does not show high employment rates of graduates and promote few high-quality jobs for qualified workers (Reyneri 2005).

Looking at the type of contract, several authors have analysed the nature of fixed-term contracts focusing on the possibility to represent for young workers either "stepping stones" towards more stable work arrangements or, "dead ends" with poor pay and prospects (Berton, Richiardi, and Sacchi 2012). The insider-outsider model can explain the high incidence of flexible jobs among recent graduates (Bentolila and Dolado 1994; Lindbeck and Snower 2002). The insider workers (permanent) dominate the labour unions and will make sure that their terms of employment are guaranteed as much as possible relative to the outsiders. The latter are the groups of people with a weak link to the labour market, including new entrants such as recent graduates.

According to the theory of compensating differentials, workers with same education or skills should receive different wages if their working conditions are different (Rosen 1974). This theory involves a positive wage differential for temporary workers like a risk premium in return for wider

flexibility accorded to employers or like a premium for the high probability of being dismissed. However, empirical studies suggest the existence of a negative differential for temporary worker (Dias da Silva and Turrini 2015; Lass and Wooden 2019).

Based on these arguments, we investigate whether a wage differential arises within tertiary educated workers testing the hypothesis of the existence of glass ceiling or sticky floors phenomena, i.e. more pronounced wage differential at the top or at the bottom of the wage distribution. The Recentered Influence Function (RIF) estimates, performed using the 2015 survey “*Inserimento Professionale dei Laureati*”, shows that temporary graduate workers suffer a wage penalty and that the wage gap tends to decrease as we move from the bottom toward the top of the wage distribution suggesting a sticky floor effect. The Oaxaca-Blinder (1973) decomposition put in evidence that most of the total wage difference is due to the *discrimination effect* represented by the type of contract. Furthermore, the analysis sheds lights on important heterogeneities in terms of field of study and location of the University.

The paper contributes to the literature in two main aspects. First, it analyses wage differentials within the group of graduated workers (within-group inequality). Second, looking at the whole wage distribution, it accounts for the heterogeneity effects of temporary contract among graduates’ workers meaning that the temporary-permanent wage differential might vary among high paid and low paid workers. For example, we might hypothesize that at the bottom of the wage distribution, temporary contracts are used as “dead ends” more than “stepping stones”. Concurrently, among high paid workers, temporary contracts are more likely to be transformed into permanent positions. If this is true, we should expect a stronger wage penalty at the bottom of the wage distribution. In conclusion, several mechanisms can be in action and potentially explain why the same contract can have heterogenous effects on wage paid to workers. This is what we test in the next pages.

The remainder of the paper is organized as follows: Section 2 briefly discusses the literature both on wage differentials and on employment status of graduates; Section 3 presents data, some descriptive statistics, and the procedure used in the analysis. Section 4 shows the main results and Section 5 concludes.

2. The background literature

The higher level of flexibility in the labour market hits not only unskilled or low-skill workers, but also the graduate ones. Several studies have found that a substantial proportion of graduates faces difficulties in entering the labour market and finding a job that matches their educational level (Barone and Ortiz 2011; Verhaest and Van der Velden 2013). Therefore, individuals who recently graduated may be willing to accept a fixed-term contract if this allows them to obtain more stable jobs, jobs that best match their skills, or in case of high unemployment rates (Reyneri 2005; Treu 1992).

Try (2004) finds evidence that graduates consider some flexible jobs as a good investment opportunity to enter labour market. However, flexible work might also be associated to ‘bad jobs’ (Doeringer and Piore 1971; Rebitzer and Taylor 1991). Indeed, graduate workers covered by short-term work arrangements might risk to move from one flexible job to another, with periods of unemployment or inactivity. Therefore, a temporary job might become a trap if workers find themselves cycling between temporary positions and unemployment for many years (Berton, Richiardi, and Sacchi 2012). Gagliarducci (2005) demonstrates that, for Italian graduates, the longer

the time spent in fixed-term jobs, the lower the probability of eventually obtaining a permanent job. On the contrary, a study carried out by Berton, Devicienti, and Pacelli (2007) on Italian social security data, highlights that a high percentage of young graduates who started to work with fixed-term employment arrangements are able to find a permanent job five years later, while only a low percentage is still in non-regular employment.

Looking at wages, empirical evidence show that temporary and permanent workers receive different compensations. Most empirical studies do not detect a wage premium for employees working under fixed-term work arrangements contradicting what compensating wage differentials theories state. Conversely, a wage penalty for temporary workers has been detected in most of empirical exercises (Stancanelli 2002; Picchio 2006; Brown and Session 2005; Picchio 2008; Kahn 2012; Dias da Silva and Turrini 2015). With respect to Italy, the existence of a wage gap between permanent and temporary workers has been clearly highlighted by Picchio (2006) and Rossetti and Tanda (2007).

Most of these studies estimate wage differentials between types of workers in terms of the average wage of the two categories of workers. However, the temporary wage penalty might vary within the same type of workers (e.g. the graduates). If it is greater in the lower tiers of the wage distribution, a sticky floor effect is at work. Reversely, a glass ceiling effect means that the wage gap widens in the upper tail of the wage distribution. On this ground, Mertens, Gash, and McGinnity (2007) evaluate the wage gap across the wage distribution of temporary and permanent workers through a quantile approach finding that the wage gap decreases as higher quantiles are considered, and that having a fixed-term contract penalizes low-skilled workers more than high-skilled ones. Bosio (2009), applying the same methodology, explores how the wage gap differs across the wage distribution for Italian data. He finds a wider wage gap at the bottom of the distribution (of approximately 30%), which slowly decreases at the top of the wage distribution. Relating to workers with a high level of education, Gaeta, Lavadera, and Pastore (2018) study the wage gap due to over-education among Italian PhD holders adopting an unconditional quantile approach. They show that this gap is highly heterogeneous along the wage distribution, confirming a glass ceiling hypothesis, and that the over-education wage gap varies both according to the field of specialization of PhD holders and to the sector of employment.

Regarding to the field of study, Checchi et al. (2004) analyse the employment outcomes of 1997 and 1999 graduates from two public universities three years after graduation and they find that graduates in Medicine, Pharmacy, and Science had a significantly higher average salary than graduates in Humanities and Law. Similarly, Ballarino (2006) shows that Medical, Technical-scientific, and Economic degrees give an advantage with respect to degrees in the Social Sciences, Education, and Humanities in terms of economic returns. Croce and Ghignoni (2019), comparing STEM and NON -STEM graduate workers, argue that the former bear a lower wage gap than the latter and that they are mainly permanent workers. Overall, previous empirical studies show a superior performance of “quantitative” subjects compared with ‘non-quantitative’ or ‘soft’ ones and an increase in the diffusion of temporary work among all graduates (Ballarino and Bratti 2009).

3. Methodology

3.1 Data and descriptive statistics

Data used in the analysis are drawn from a survey, “*Inserimento Professionale dei Laureati*” (IPL hereafter), carried out by the Italian National Institute of Statistics (Istat) in 2015 on individuals who successfully graduated at university in 2011. The main aim of the survey is to detect the employment status of interviewed four years after graduation.

IPL dataset is particularly relevant as it delivers broad information on the transition from school to work. Data include information on individual characteristics, family background, educational career, job features. Moreover, it provides information about the contract type (temporary or permanent) and the monthly net wage paid for the main job (defined in terms of hours worked per day).

The sample covers 41,458 graduates – that are currently working both as employees (28,345) and self-employed or as para-subordinate workers (13,113). Due to the specific features of the para-subordinate work, we focus on the sub sample of employees.

Contract type is the main variable of interest, the latter takes value of 1 if the worker has a temporary contract and it is equal to 0 if she has a permanent contract. The dependent variable is the (ln) monthly net wage.¹ The explanatory set of variables includes: individual characteristics - gender, class of age, level of educational degree (Phd, master or three-year degree), field of study, graduation mark, duration of studies, location of the University, residence before enrolling at a university, employment status during the years of university; job tenure and job tenure squared; job characteristics - type of contract (part-time and full-time), macro-area of work (whether the individual works in the South of Italy or not), occupation and industry; and socio-demographic background - marital status, occupational status of father and mother (whether she/he is employed or retired) and their educational level.

Table 1 shows the main descriptive statistics for the variables used in the analysis. Two main groups compose the sample: permanent employees with tertiary education (59%) and short-term employees with tertiary education (41%). Table 1 highlights the existence of a wage gap between the two typologies of workers – those having a permanent contract and those covered by short-term work arrangements. The adjusted net monthly wage of permanent workers (adjusted for full-time equivalent) is about 1.682 euros; conversely, temporary workers earn a monthly net wage of about 1.420 euros. Focusing on workers’ characteristics, on average graduates with a temporary contract are younger – the majority of them are in the first two age classes (<26 and 27-28 years old) suggesting that the temporary contract might be a port-of-entry into the labour market. Conversely, almost 40% of permanent employees are between 29 and 33 years old and almost 28% is more than 34 years old; overall 69% of employees with permanent contract is more than 29 years old suggesting a positive correlation between employee’s age and permanent contract.

Focusing on the main characteristics of the university career, major differences do not emerge in terms of career performance (graduation mark/years of study) and field of study. The duration of the university is similar between the two groups of workers – almost 4 years – as well as the graduation mark. Graduates in Letters, Philosophy, Languages, Psychology, Pedagogy and Physical education

¹ The monthly net wage, expressed in euro at current prices (2014), is converted into full time equivalent (FTE) (see Venturini and Villosio 2008).

compose more than 30% of the sample, while less than 20% are graduated in Sciences. Finally, about 20% of permanent and 30% of temporary workers receive a degree in Medicine. The share of graduates receiving a degree from a University located in Northern Italy is equal to almost 50% - both for temporary and permanent employees – while the remaining 50% is equally divided between graduated in Universities located in Central and Southern Italy. Finally, focusing on job characteristics it emerges that 26% of temporary and 23% of permanent workers are public employees. In terms of professions, many graduates' workers in the sample are concentrated in the following categories: technicians and associate professions, intellectuals, scientists and clerks. The share of temporary and permanent workers is uniformly distributed across professional categories. Among high qualified and managerial professions, the share of temporary employees is higher (4%) than workers with permanent contracts (1%).

Table 1. Descriptive statistics for permanent and temporary workers

Variables	Definition	Mean and SD			
		Permanent		Temporary	
Monthly net wage	Monthly net wage full time equivalent	1,682.22	541.3	1,421.8	538.83
Employees with permanent contract	1= Permanent employee; 0= otherwise	0.59	-	-	-
Employees with temporary contract	1=Temporary employee; 0= otherwise	-	-	0.41	-
Individual characteristics					
Married	1=unmarried; 0= otherwise	0.26	0.43	0.11	0.31
Woman	1=female; 0= male	0.53	0.49	0.65	0.47
North Italy	1=area of residence before enrolment in University (North: Piemonte, Lombardia, Liguria, Valle d'Aosta, Emilia Romagna, Trentino Alto Adige, Veneto, Friuli Venezia Giulia); 0= otherwise;	0.46	0.49	0.47	0.49
Central Italy	1=area of residence before enrolment in University (Centre: Lazio, Marche, Toscana, Umbria); 0= otherwise;	0.19	0.39	0.20	0.40
Southern Italy	1=area of residence before enrolment in University (South: Abruzzo, Campania, Molise, Puglia, Calabria, Sicilia, Sardegna, Basilicata); 0= otherwise;	0.32	0.46	0.31	0.46
Abroad	1=area of residence before enrolment in University (Foreign country); 0= otherwise;	0.01	0.09	0.01	0.10
<26 years old	Share of graduates with less than 26 years old	0.08	0.27	0.17	0.37
27 – 28 years old	Share of graduates with age between 27 and 28	0.22	0.41	0.35	0.47
29 – 33 years old	Share of graduates with age between 29 and 33	0.42	0.49	0.38	0.48
>34 years old	Share of graduates with age >34	0.28	0.45	0.09	0.29
Field and features of the					

course of study

Engineering, Architecture	Share of graduate workers in that specific field of study	0.12	0.33	0.08	0.27
Agriculture	“ “	0.20	0.39	0.18	0.39
Mathematics, Physics, Chemistry, Biology	“ “	0.08	0.26	0.10	0.29
Economics, Statistics and Law	“ “	0.39	0.48	0.33	0.46
Letters, philosophy, languages, psychology	“ “	0.21	0.40	0.31	0.46
Medicine	“ “	4.28	3.13	4.11	2.14
Duration of studies	Average years of study	0.49	0.49	0.51	0.49
Macro region of the University (Norther Italy)	Location of University where she/he studied	0.24	0.43	0.24	0.43
Macro region of the University (Central Italy)	“ “	0.26	0.43	0.24	0.43
Macro region of the University (Southern Italy)	“ “	102.3	8.04	102.37	7.83
Graduation mark	Graduation mark	0.004	0.06	0.01	0.11
PhD	1=Having a PhD; 0=otherwise	0.49	0.50	0.36	0.48
Master Degree (Laurea Specialistica).	1=Having a Master degree; 0=otherwise	0.76	0.42	0.75	0.43
Intra-regional migration for study purposes	1=He/she moved to study in another region	0.20	0.40	0.19	0.39
Student worker	1=He/she worked while studying				

Family background

Father employed	1=Father employed or retired; 0=otherwise	0.95	0.21	0.96	0.19
Mother employed	1=Mother employed or retired; 0=otherwise	0.93	0.24	0.94	0.22
Father's educational level	1= University graduated ; 0 =otherwise	0.15	0.35	0.17	0.37
Mother's educational level (University graduate)	1= University graduated ; 0 =otherwise	0.13	0.33	0.14	0.35

Job characteristics

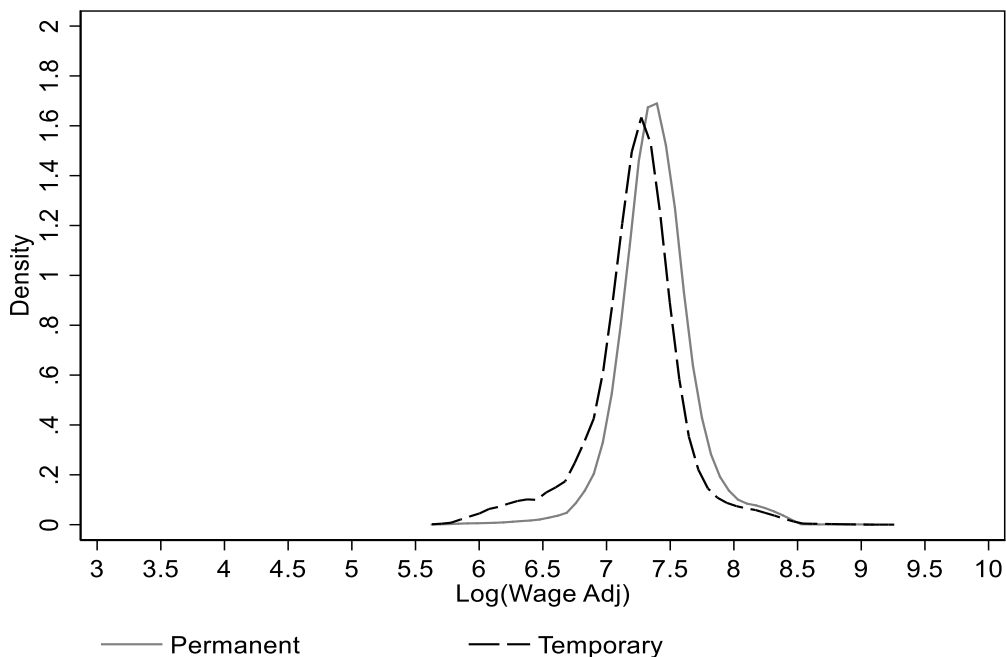
Part-time	1=part time worker; 0=full-time worker	0.13	0.33	0.22	0.41
Public employee	1=Working in the public sector; 0=otherwise	0.23	0.42	0.26	0.44
Working in agriculture	1=Working in the agriculture; 0=otherwise	0.01	0.11	0.02	0.15
Working in manufacturing	1=Working in the manufacturing; 0=otherwise	0.25	0.43	0.22	0.41
Working in services	1=Working in the services; 0=otherwise	0.73	0.44	0.74	0.43
Job tenure	Years worked in the same place of work	5.3	3.04	3.31	3.12
Working in the South of Italy	1=work in South or Islands; 0=otherwise	0.22	0.41	0.17	0.38
Legislators, entrepreneurs and high management	1= ISCO 1; 0=Other profession	0.01	0.07	0.04	0.19
Intellectual and highly specialized professions	1= ISCO 2; 0= “ “	0.32	0.46	0.34	0.47
Technicians and associate professionals	1= ISCO 3; 0= “ “	0.38	0.48	0.34	0.47
Clerks	1=ISCO 4; 0= “ “	0.13	0.34	0.16	0.37

Service and sales workers	1=ISCO 5; 0= “ “	0.07	0.25	0.09	0.28
Craftsmen, skilled workers and farmers	1=ISCO 6; 0= “ “	0.001	0.03	0.002	0.05
Plant and machine operators and assemblers	1=ISCO 7; 0= “ “	0.001	0.003	0.0008	0.02
Elementary occupations	1=ISCO 8; 0= “ “	0.002	0.05	0.002	0.05
Armed forces	1=ISCO 9; 0= “ “	0.03	0.17	0.0005	0.02
Number of observations			17,296	11,049	

Source: Authors calculations based on Istat 2015.

Figure 1 shows the kernel distribution of the (ln) adjusted wage and highlights the existence of a wage gap between the two groups of workers along the entire distribution supporting previous empirical evidence. This gap seems to be higher at the bottom of the wage distribution (left-hand side of the curve), while graphically almost disappears among high-paid workers (right-hand side of the curve). However, the descriptive analysis needs to be further detailed accounting for individual, job, field of study characteristics in order to evaluate if after controlling for these factors, the wage gap still persists.

Figure 1. Distribution of monthly wage for temporary and permanent workers



Source: Authors calculations based on data Istat 2015.

Table 2 underlines the mean wage and the standard deviation of wage between three groups of workers, those at the bottom of the wage distribution (10th percentile), at the middle (50th percentile) and at the 90th percentile, corresponding to the top paid occupations. The wage differential is decreasing along the wage distribution and it is reverted among the highest paid jobs, where temporary workers on average earn more than permanent workers. However, the dispersion in earnings among high paid workers is more than double compared to low paid jobs.

Table 2. Mean wage at different percentiles of the wage distribution

	Percentiles of the wage distribution					
	10th		50th		90th	
	Mean	Sd	Mean	Sd	Mean	Sd
Permanent workers	634.38	140.63	1425.66	20.99	2737.23	681.95
Temporary workers	621.08	140.56	1425.75	21.51	2872.64	780.12

Source: Authors calculations based on Istat 2015.

3.2 Procedure

The wage gap between temporary and permanent workers is generally investigated at the conditional mean applying conventional estimation strategies, such as the ordinary least squares (OLS), of the Mincer-type wage equation. However, the OLS approach allows observing the conditional effect of the contract only on at the average wage and it does not permit the inspection of the heterogeneity of effects along the wage distribution. The wage gap at the conditional mean may, indeed, hide significant differences at the bottom or at the top of the wage distribution.

In order to evaluate the role of contract along the wage distribution of graduated workers, and to examine whether and how the wage penalty of temporary workers changes by wage quantile, we use the Recentered Influence Function (RIF) regression known also as Unconditional Quantile regression (UQR) (Firpo, Fortin, and Lemieux 2009; Bosio 2014). The model is based on the statistical concept of influence function (IF), a tool used to obtain the relation between a data point and the statistics of interest, such as quantile. Through the IF, and regressing each observation's recentered influence on the explanatory variables, we can estimate how these variables jointly shape the unconditional statistics of interest. Thus, the RIF captures a change in the statistic of interest (e.g., the 10th percentile of the wage distribution) in response to a change of an explanatory variable(s) as the type of contract.

One of the main advantages of RIF regression is the possibility to estimate quantile-specific effects, and not only the mean differences. The method proposed by Firpo, Fortin, and Lemieux (2009) consists of running a simple regression where the outcome variable is replaced with a transformation of it, which is the RIF. To investigate the varying contract wage penalty along the distribution, we estimate the following model:

$$RIF(Y_i; Q_\tau) = \alpha_\tau + \sum_j^J \beta_{j\tau} C_{ji} + \sum_{k=1}^n \gamma_{k\tau} X_{ki} + \varepsilon_i \quad (1)$$

where Y_i is the outcome variable that is the (log) of net monthly wage, i denotes the graduated worker, Q_τ is τ th-quantile, C_{ji} identifies the dummy for the type of contract j of worker i , equals to 1 if it is temporary and 0 otherwise, X_{ki} is the vector of n control variables, and ε is the error term. The coefficients of interest are $\beta_{j\tau}$. In a second step, we identify the effect of unobserved characteristics on the wage gap between temporary and permanent graduate workers applying to the RIF-regression the Oaxaca-Blinder decomposition method (Firpo, Fortin, and Lemieux 2018). This method allows decomposing the differences in mean wages between permanent and temporary workers at τ th-quantile into two components: the endowments, or composition, effect, and the coefficient, or wage structure, effect. Advantages of the decomposition are its relatively simple

implementation, the intuitive approach, and the chance to get information on specific drivers of wage discrimination (individual, labour market and job characteristics).

4. Results and discussion

In the Italian labour market, highly educated workers with a temporary contract suffer a wage penalty compared to those employed under permanent contracts. Such wage penalty is consistent with previous findings on the Italian context (see Picchio, 2006; Rossetti and Tanda, 2007; Bosio 2009; Comi and Grasseni 2012). According to our estimates – see Table 3 below – the wage gap is about 10%. Similarly, Picchio (2006) detected a wage penalty for Italian temporary workers of about 12-13%, Castagnetti and Rosti (2010) using data on labour market transitions of university graduates showed a pay gap of about 13%. Lower wages for temporary workers may be linked to low incentives to invest in firm-specific human capital by firms, and to a low usage of efficiency wages. If the latter prevail, we should expect low initial wages during probation periods and higher wages after contract renewal (Lodovici and Semenza 2012). However, estimates in Table 3 show that highly educated workers are paid less when they are employed under a fixed-term contract, no matter if they work in low-paid or high-paid jobs.

Table 3: OLS and Unconditional Quantile Regression of log monthly wage

	(1)	(2)	(3)	(4)
	OLS	UQR 10	UQR 50	UQR 90
Temporary	-0.108*** (0.008)	-0.119*** (0.018)	-0.081*** (0.008)	-0.115*** (0.013)
Engineering, Architecture, Agriculture	-0.0132 (0.014)	-0.095*** (0.027)	0.0223 (0.014)	0.055** (0.025)
Mathematics, Physics, Chemicals, Chemistry, Biology	-0.022* (0.013)	-0.061** (0.025)	0.021 (0.014)	-0.047** (0.02)
Economics, Statistics and Law	-0.0236* (0.012)	-0.110*** (0.026)	0.003 (0.013)	0.0510*** (0.019)
Letters, philosophy, languages, psychology	-0.126*** (0.015)	-0.202*** (0.038)	-0.088*** (0.015)	-0.047** (0.021)
Macro region of the University (Central Italy)	-0.043** (0.019)	-0.063* (0.035)	-0.009 (0.015)	-0.076*** (0.029)
Macro region of the University (Southern Italy)	-0.053*** (0.018)	-0.009 (0.033)	-0.040** (0.017)	-0.108*** (0.032)
Work in South or Islands	-0.157*** (0.016)	-0.221*** (0.039)	-0.120*** (0.015)	-0.069*** (0.021)
Individual Characteristics	YES	YES	YES	YES
Job Characteristics	YES	YES	YES	YES
Sectoral Dummies	YES	YES	YES	YES
ISCO Dummies	YES	YES	YES	YES
Constant	7.517*** (0.084)	7.243*** (0.139)	7.360*** (0.114)	8.090*** (0.217)
R-sqr	0.25	0.126	0.195	0.121
Number of observations	15,719	15,719	15,719	15,719

Note: Bootstrapped standard errors in parentheses; 500 replications.

Although wage gap persists along the entire wage distribution, it slightly changes depicting a U-shape pattern. The wage penalty associated to temporary jobs is larger at the bottom of wage profile— in line with Bosio (2014) for Italy. However, it does not disappear at the top of the distribution. The increasing heterogeneity of the Italian production structure contributes to disentangle this result. High-productive and high-paying firms coexist with low-paying and low-productive firms (Bugamelli et al. 2018; Cirillo and Ricci 2019). The place where one works strongly affects earnings, meaning that workers with same education can be paid differently according to the place where they work (Card et al. 2018). Estimates in Table 3 show that both for high-paid and low-paid workers, temporary contracts are used to compress wages and this result leads to reject the sticky floors hypothesis which supports the idea that wage gap for temporary employees depends on their position in the wage distribution.

Academic careers play certainly a role. Among low-paid workers, those graduated in socio-humanistic disciplines and technical fields (engineering, architecture and agriculture) experience major wage penalties with respect to those graduated in Medicine—in line with Ballarino (2006), Croce e Ghignoni (2019). The place where one studies also matters contributing to explain wage differences among workers. Those graduated in Universities located in Southern Italy and working in high-paid jobs receive 10% less than those graduated in Universities located in Northern Italy. Regional disparities contribute to explain wage differences (AlmaLaurea 2014).

Going further in the analysis, Table 4 shows the detailed decomposition of the wage gap at specific percentiles (10th, 50th and 90th) allowing to disentangle, on one side, the part of the wage gap due to observable characteristics – first part of the table – and the unexplained part – second part of the table. A discrimination effect related to the type of contract is suffered by Italian graduates. More than half of the wage gap is due to unexplained characteristics, while less than 50% can be explained by individual, occupational and socio-economic features of workers. In line with Bosio (2009) and Comi and Grasseni (2012), this gap is higher among low-paid jobs than high-paid jobs. Such discrimination may be linked to wage policies pursued by Italian firms and aimed to set different wages for temporary and permanent workers – although they have very similar occupational profiles (Pianta and Vaona 2007).

The analysis shed lights on different uses of temporary contracts. At the bottom of the wage distribution, temporary contracts may be used as “dead ends” more than “stepping stones”. Among high paid jobs, temporary contracts are more likely to be transformed into permanent positions and they are likely to be used as screening device before converting temporary positions into permanent ones. In both cases temporary employment is associated to lower earnings and discrimination. However, at the bottom of the wage distribution, the wage gap is higher.

Table 4 also shows that the wage gap gets worse for women (explained factor). The endowment effect of individual characteristics related to the field of study increases the explained part of the wage penalty for those graduated in humanistic disciplines both among low-paid and middle paid jobs. Conversely, having a degree in economics, statistics and law issues pushes downward the wage penalty for high paid jobs.

In the second part of Table 4, we focus on the unexplained components of the decomposition, that is unobserved features that might play a role in explaining the permanent-temporary wage gap. We observe that the discriminatory effect of the contract decreases for women if they work in high paid jobs. Gender does not explain the existence of a temporary-permanent wage gap among high paid jobs – at the 90th percentile. According to Addabbo and Favaro (2011) graduated females have better individual characteristics than highly educated men that in part compensate the difference in

returns, in particular at the extremes of the distribution. Among low-paid workers, specific fields of studies such as economics, statistics, and law, but also engineering, mathematics, physics, tend to increase the discriminatory effect of the contract. Moreover, working in Southern Italy pushes up the unexplained component of the wage gap among low-paid workers. Conversely, having studied in a University located in Southern Italy compresses wage gap between permanent and temporary workers in high paid jobs.

Table 4: RIF Detailed Decomposition at different quantile

	10 th Percentile	50 th Percentile	90 th Percentile
Overall			
Wage Gap (Unadjusted)	0.359*** (0.018)	0.130*** (0.006)	0.173*** (0.011)
Total Explained	0.108*** (0.013)	0.065*** (0.005)	0.055*** (0.008)
Total Unexplained	0.251*** (0.023)	0.065*** (0.007)	0.117*** (0.013)
Explained			
Female	0.006*** (0.002)	0.006*** (0.001)	0.009*** (0.002)
Field of study (Engineering, Architecture, Agriculture)	-0.001 (0.002)	0.001 (0.001)	0.005** (0.002)
Field of study (Mathematics, Physics, Chemicals Chemistry, Biology)	0.001 (0.001)	0 (0)	-0.001 (0.001)
Field of study (Economics, Statistics and Law)	0.001 (0.001)	0 (0)	-0.003*** (0.001)
Field of study (Letters, philosophy, languages, psychology)	0.016*** (0.004)	0.010*** (0.002)	0.004 (0.002)
Macro region of the University (Central Italy)	0.001 (0.001)	0.002** (0.001)	0.003* (0.002)
Macro region of the University (Southern Italy)	-0.001 (0.001)	-0.001** (0.001)	-0.004*** (0.002)
Work in South or Islands	-0.005*** (0.002)	-0.003*** (0.001)	0 (0.001)
Unexplained			
Female	0.021 (0.02)	-0.004 (0.007)	-0.027* (0.014)
Field of study (Engineering, Architecture, Agriculture)	0.037*** (0.013)	0.004 (0.005)	0.018* (0.009)
Field of study (Mathematics, Physics, Chemicals, Chemistry, Biology)	0.019*** (0.005)	0.003 (0.002)	0 (0.004)
Field of study (Economics, Statistics and Law)	0.058*** (0.02)	0.01 (0.008)	0.054*** (0.013)
Field of study (Letters, philosophy, languages, psychology)	0.029 (0.018)	-0.004 (0.006)	0.012 (0.009)
Macro region of the University (Central Italy)	0.022 (0.022)	-0.010* (0.006)	-0.02 (0.012)
Macro region of the University (Southern Italy)	-0.003 (0.015)	-0.004 (0.005)	-0.020* (0.011)

Work in South or Islands	0.019*	-0.005	0.001
	(0.011)	(0.003)	(0.006)
Number of observations	15,759	15,759	15,759

Note: Standard errors in parentheses. *** p<0.001, ** p<0.05, * p<0.1

5. Conclusions

A high level of education has usually played an important role in protecting individuals against unemployment and increases the probability to find a “good job”. However, over the past decades the increasing flexibilization of European labour markets, and specifically of the Italian one, has eroded the protection effect of higher education against precarious work and unemployment. During the 2008 economic crisis, most European countries have experienced a waste of graduate human resources. A growing share of young graduates are increasingly employed in temporary and low-qualified positions. The Southern European countries showed the worst labour market performances. Italy is among them.

This paper contributes to the debate on highly educated workers and labour market conditions by exploring the wage gap experienced by recently graduated workers. We analyse wage differentials within the group of graduated workers (within-group inequality) and we look at the whole wage distribution accounting for the heterogeneity effects of temporary contract among graduates. An increasing wage dispersion has characterized Italian labour market meaning that the temporary-permanent wage differential might vary among high paid and low paid workers. Several mechanisms can be in action, and potentially explain why the same contract can have heterogeneous effects on wage paid to workers. Labour studies suggest that temporary contracts may be used to screen new workers, to recover demand fluctuation or to systematically pay workers lower to sustain competitiveness. Different reasons behind the usage of temporary contracts might explain why some contracts are transformed into permanent ones while others remain short-term. Whatever the reasons behind an intense usage of temporary jobs by Italian firms, our analysis highlights that temporary graduate workers are paid less, and this is due to a sort of discrimination effect. No observable characteristics can explain the wage differential. A pure discrimination effect emerges.

Several policy implications might be drawn. First, temporary workers are paid less than permanent ones no matter the type of jobs they perform. Therefore, the prolonged labour market difficulties of highly educated workers have relevant negative effects on the Italian socio-economic growth potential: highly educated workers might be more willing to migrate to find abroad better labour conditions. Second, the academic careers of highly educated workers matter: for workers graduated in Economics, Statistics and Law, discrimination increases at the bottom and at the top of distribution. Therefore, for these type of graduates entering in the labour market should be better monitored to reduce the discrimination represented by the type of contract. Finally, regional disparities affect labour market outcomes. Our analysis indicates that steps should be taken to ensure that the discrimination caused by the type of contract does not exacerbate problems already exist in Southern Italy for graduates in the labor market.

The analysis shows heterogeneities in wage discrimination along the distribution. Nevertheless, the method used has several limitations. For instance, we are not able to isolate contributions in earnings dispersion due to the place of work nor we are able to control for unobservable features of workers not varying over time and leading to an upward bias of our estimates. Therefore, a future

line of research could be to implement the same approach to an employer-employee database that helps to overcome these drawbacks.

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