

Better late than never? The effect of age at graduation into the labour market over the life cycle.

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Abstract

This paper analyses the importance of the timing of graduation in determining earnings. By using a rich longitudinal dataset (AD-SILC) with details on the work career of Italian graduates (i.e. age at entry in the labour market, effective labour market experience in weeks, and annual and weekly earnings) amongst the period 1975-2009; we find that graduates who complete college at a later age receive a significant earnings gap of about 2.5% per each year of delay. This result is persistent over the entire work career, as they do not catch up with those who acquire their degree earlier in life.

Keywords: university-to-work transition, time-to-degree, wage differentials, Italy.

JEL: I12, J24, J31.

1. Introduction

Overall researches agree that people who invest in education, especially in tertiary education, have more job opportunities, and thereby a reduced probability of being unemployed, and they earn more during their entire working life than those who have attained less years of education.

However, looking at the recent statistics provided by the OECD (2010) it emerged that the age profile of university graduates has increased over time. Figure 1 shows that the portion of graduates above 30 years old is not negligible, especially in the North European countries where the share of graduates over 30 accounts for a quarter or more of the total graduation rate. This trend has drawn the attention of researchers, who attempt to provide evidence of the effect of a graduation not at the usual age on the economic returns. Contrary to the policy of lifelong learning encouraged by the European Commission and promoting in numerous countries, this tendency has several drawbacks. Unless late enrollees can improve their job opportunities and their wage profiles, especially if their current labour market state is poor, they reduce the time in employment over their life course, which can negatively affect their earnings profiles and so partly vanishing the benefits associated to human capital accumulation. Overall, the main concern of completing a university degree late in life is of not being able to attain the wages of individuals who take the more traditional route of school and then work.

Nevertheless, the propensity of delaying entry into the labour market because of getting a university degree not within the minimum period or at the usual age, which is only a recent phenomenon over the OECD countries, has always been a distinctive trait of the Italian tertiary education system. Italian universities, both private and public, have no official limit to the number of years a student can be enrolled in a degree programme since progression is not conditional on past performance; students can re-sit exams several times during an academic year if they fail but also if they are unhappy with the mark obtained. Consequently, students enrolled on standard four-year degree courses, obtain their degree after an average of 7.5 years, with only one in eight students completing within the legal duration (ISTAT, 2000).

The number of students enrolled beyond the legal duration has increased over time, which highlights the waste of public and private resources along with a postponement of labour market entry. Contrary to what seem to suggest figure 1, the narrow portion of graduates above 30 years in Italy (about 16%) is not to be interpreted as an efficient behaviour of Italian students compared to those of the Nordic countries. This percentage is misleading as it does not include only students who choose to not enrol in tertiary education immediately after high school, but also those who undertake a standard path. Then, it should be necessary to discriminate age at graduation by year of

matriculation or by previous job experiences to provide an unbiased picture of the years taken to graduate. In Italy the average age at matriculation is 20 years, while it is 22 in Germany, 24 in Finland, 25 in Sweden and New Zealand and 26 in Island (Eurostat, 2012), so the fact of completing the degree before 30 is not efficient as Italian undergraduates tend to not complete their studies within the legal duration. Although the transition to university particularly occurs after high school completion, the fraction of students enrolled beyond the minimum period is on average about 40% of the total population of students and it has increased over the period 1969-2011, hence Italian university students get the degree well beyond the expected age (see figure 2). As a result, this feature can have consequences for graduates once in the labour market, for instance in terms of probability of finding a job, of starting wage, and they might not be able to catching up over their entire work career.

As stated in the literature, human capital influences directly both the profile and the dynamics of the total work career of each individual as well as his/her income profile. At large, more educated people face low probability of being unemployed and at the same time have more chances of facing better labour market conditions from the start. Thus, a person decides to invest in education because of the greater expected monetary and non-monetary returns. Not surprisingly, higher earnings prospects are the most obvious benefit and the consensus estimate is that the return to education is quite substantial. Recent analyses, mainly using US data, suggest that an additional year of schooling typically raises an individual's earnings power (Trostel et al., 2002). In particular, it has been estimated that four years of college education in the US raise earnings by about 65% (a return of about 13% compounded) (Card and Krueger, 1992). In order to explain emerging earnings differences amongst workers, several aspects have been exploited. For instance, a large body of studies have analysed the link between the labour market outcomes and family background, as it has been proved that children's outcomes are highly correlated with parents' characteristics, especially with their level of education (Card, 1999). Then, since Tinto (1973), it has been shown a positive association between college proximity and college going, especially individuals with financial constraints and/or with lower returns' expectations in the labour market benefit from universities availability in the area of residence (Lauer, 2002).

Additional sources of heterogeneity in terms of returns to education that have been studied are school quality and ability, the latter measured by IQ or aptitude test and final grade (Welch, 1973; Checchi, 1999). Also the earnings differentials between more and less educated workers (Buchinsky, 2001), females and males (Blau and Kahn, 2000; 2006; Dolton and Makepeace, 1986) and ethnicity (Blau and Beller, 1992; Altonji and Blank, 1999) have been investigated. Other

research, instead, look at the differences in earnings across fields of study (Berger, 1988; Daymon and Andrisani, 1984; Paglin and Ruffolo, 1990; Blundell et al., 2000; Loury, 1997; Buonanno and Pozzoli, 2009). Finally, there are several contributions on the “sheepskin effect”, i.e. the existence of wage premiums related to credentials rather than the years of schooling attained. In these papers, the diverse income performance obtained in the labour market by individuals is explained looking the type of diploma/degree achieved instead of focusing on the years spent in formal education (Brunello et al., 2001; Belman and Heywood, 1991).

While the issue of returns to education largely explored all the links mentioned above, much less is known about whether and how individuals’ earnings are related to study completion not within the expected age. For instance, Monks (1997) finds a negative correlation between age at graduation and entry-level wage, and Brodaty et al. (2008) show that, during the early work career, each additional year spent obtaining a degree entails a reduction in earnings of about 9%. Aina and Casalone (2011) find a persisting wage penalty for Italian graduates who enter into the labour market with more than two years of delay. Aina and Pastore (2012) assess that delayed graduation increases the chances of overeducation and entails a direct wage penalty, which is equal to about 7% of the median wage. Holmlund et al. (2008) analyse the effect of gap years between high school and university enrolment on subsequent wages, using administrative Swedish data. They find that university postponement has a significant and negative effect on earnings, which is not vanishing over the work career. While Hallsten (2012), still for Sweden, find that late enrolment in university can improve the probability of finding a job (about 12%) but it has only a negligible effect on earnings, and the effects are more pronounced for women rather than men.

Considering the poor number of studies on this topic, we aim at providing evidence about the effect of delayed graduation on both the starting wage level and earnings profile over the working life in Italy. Indeed, this paper analyses the labour market returns of Italian graduates over their entire work career focusing on a specific trait of their academic experience, which is the completion not at the expected age. By using a rich longitudinal dataset (AD-SILC) with details on the work career of Italian graduates amongst the period 1975-2009, we investigate the effect that age at graduation as well as age at starting a job after graduation can have in the wage profile of each individual. Basically, we account for the effect of a graduation not at the expected age on the earnings profile and especially, by using longitudinal data, we aim to assess if in case of starting wage gap, “mature” graduates are able to catching up such penalty.

Therefore, we add to the previous studies on the economic returns of tertiary education investment by focusing on the effect of university completion not within the minimum period (i.e. not at the

expected age) and assessing whether this behavior can have persistent effects on the work career of an individual, not only in the short run. Thanks to the dataset we can exploit the entire career of each graduate once in the labour market. AD-SILC is the first panel dataset available for Italy that follows individuals for dozen of years and collects detailed information on individual working status and earnings, characteristics (e.g. education and information on family background) and on firms features (e.g. sector and firm size). The remaining of the paper is organized as follows. Section 2 and 3 describe the data and the empirical strategy, respectively. Section 4 discusses the empirical results. Section 5 concludes, summarizing our main findings.

2. Data

The empirical results are based on a new panel on individual working histories, called AD-SILC, recently built merging longitudinal information provided by administrative archives with a sample dataset. In particular, AD-SILC has been developed merging the IT-SILC 2005 sample (i.e. the Italian version of EU-SILC 2005) with the administrative records on individual working histories since their entry in the labour market up to 2009 collected by the Italian National Social Security Institute (INPS).

AD-SILC is the first panel dataset available for Italy that follows individuals for dozen of years since their entry on the labour market and collects detailed information on individual working statuses, characteristics (e.g. education and information on family background) and on firms features (e.g. sector and firm size). Administrative archives manage detailed information on the universe of individuals (and firms) since the beginning of their work career up to the most recent years and these archives refer to each type of worker (i.e. private and public employees, self-employed).

For each working episode (or period receiving welfare and unemployment benefits), in each year, archives record the number of weeks, the gross earnings (including employees' contributions), the starting and final date of the episode and the characteristics of the firms. Therefore, these archives offer a comprehensive picture of the working episodes of the Italian labour force. By definition, administrative archives are not plagued by attrition (if someone disappears from the archives it means that he/she has stopped to work). However, being not relevant to administrative purposes, these archives do not record information needed for analyzing determinants of individual working statuses and earnings, e.g. educational attainments, family composition, family background. On the contrary, the IT-SILC 2005 wave collects detailed information about several time invariant individual characteristics, including a specific section on family background (e.g. on parental

characteristics when the interviewed was 14, father and mother birth date, education, occupation, family composition). Due to their complementary characteristics, IT-SILC and INPS archives information have then been merged in a new panel dataset. Hence, starting from a cross section of about 47,000 individuals interviewed in IT-SILC 2005, the AD-SILC panel contains around 1,150,000 observations with the individual working histories from labour market entry up to 2009. The advantage of this dataset is given by the entire work career of each individual, which allows observing the earnings profile over time and studying differences in wages due to specific characteristics.

As known, analysis of earnings trends across cohorts requires the use of long panel dataset. However, the lack of such type of data for the Italian context prevent studies on the evolution of the earnings distribution. In Italy, the income distribution has been mainly studied using microdata provided by the Survey on Household Income and Wealth (SHIW), which has been carried out every two years by the Bank of Italy since the '70s and contains a very small panel component (Brandolini et al. 2001). The time span covered by similar surveys at the EU level is instead limited. At present, the ECHP covers the period 1994-2001 and the EU-SILC refers to the period 2004-2011. Furthermore, previous studies on earnings based on the INPS data – e.g. Rosolia and Torrini (2007) – did not include among covariates individual education (as said, not recorded in administrative archives), which is, instead, a crucial determinant of earnings.

Using AD-SILC we are able to reconstruct for each individual the time of labour market entry, the effective labour market experience (in weeks) and annual and weekly earnings, and other important covariates. By using all these information, we are able to select from the dataset the sample of graduates and to analyse whether the time at graduation and at entry in the labour market can affect their wage profile. Being data on earnings reliable since 1975, we selected tertiary graduates entered in the labour market after graduation since 1975 and we followed these individuals up until 2009 (we also include in the sample those graduates graduated since 1975 but entered in the labour market before 1975). As to reduce the influence of outliers we dropped those who graduated at 35 years old or over or entered in the labour market after 36.

Our final sample is composed by 1,512 graduates, which 90% have at least five annual records, 75% at least 8 records, 50% at least 13 records and finally 25% at least 22 records. The total number of observations amounts to 13,233.

Our dependent variables are annual and weekly gross earnings from private employment, because self-employed and public employees earnings are less reliable in AD-SILC (we dropped from the sample the bottom 1% of earnings data for each year). Anyway, periods spent working as self-employed or public employee are taken into account as to compute effective individual experience. Furthermore, note that around 30% of our sample had working experiences before graduation. We

can then measure effective total experience (in weeks) spent on the labour market, hence including also periods worked before the graduation.

However, our dataset does not record the field of study of workers, neither the year of enrolment at tertiary programmes. Furthermore, it only records the year when the highest degree was attained, not the precise date, hence not allowing us to exactly measure the duration of job search after the graduation. Therefore, we measure the delay in graduation using two different proxies, namely the year the highest education level has been achieved – using IT-SILC data - and both the age at graduation along with the age when the individual entered in the labour market after graduation – using INPS (whose value is, then, equal or higher than the graduation age). The latter proxy is our preferred specification to reach our goals; but we will present some computations also considering only age at graduation.

AD-SILC allows to study the link between earnings (in logs) and delay in graduation controlling for several time varying and invariant covariates; which are age, gender, parental background (coded through the highest parents' educational attainment), region of work, cohort of entry in the labour market (both the first entry and the entry as a tertiary graduate), effective experience, tenure in a specific firm and (since 1987) firm's size and sector (coded through 3 digits NACE)¹.

Table 1 summarise the main characteristics of our sample. The sample is composed by 54.6% of males and individuals are almost equally distributed among the three birth cohorts considered, i.e. 1950-1959, 1960-1960 and 1970-1979. Most of observations are working in the North of Italy (59.8%) which is not surprising as it reflects the Italian labour market conditions. About 50% of the parents has at most a lower secondary degree, while only 16% has a university education level.

Table 2 reports the graduation age and the age of entry in the labour market after the graduation, distinguished according to individuals time invariant characteristics.

3. Empirical strategy

To analyze the association between the delay in completing tertiary education and individual annual gross earnings (or weekly wages) along the career path, we estimate two groups of equation. First, we run a standard OLS Mincerian regression (also augmented including further controls and fixed effects regarding year, region of work and year of first entry in the labour market, i.e. a cohort fixed effect) on the subsample of tertiary graduates including as main variable of interest the age at the entry in the labour market or, alternatively, the graduation age.

$$\log(w_{it}) = \beta \text{Entry_age}_i + \gamma X_{it} + \varepsilon_{it}$$

¹ Information on fixed-term contracts has only been available since 1998.

Of course, OLS estimates can be plagued by omitted variables bias. We then move to individual fixed effects panel estimates. Being impossible to estimated through a FE model the influence of a time invariant characteristics (as the entry age) we focus on the interaction between the age of entry in the labour market as graduate and the working experience, as to analyze whether an eventual earnings gap for those delaying their entry vanishes along the career path.

$$\log(w_{it}) = \beta \text{Entry_age}_i * \text{Exp}_{it} + \gamma X_{it} + \varepsilon_{it}$$

where Exp_{it} is the labour market experience (seniority) and X_{it} are additional characteristics that can be controlled for in regressions.

Using both pooled OLS and fixed effect models we study: i) the relationship between the delay in education and the starting wage (also controlling for information about possible periods spent working before attaining a tertiary degree); ii) the evolution of the wage gaps along the career path among tertiary graduates distinguished according to the delay in getting the degree; iii) the association between the delay in education and the unemployment risks along the career, i.e. considering as dependent variable the cumulated number of working weeks since the entry in the labour market. Wage equations will be run considering as dependent variable both annual gross earnings and weekly wages. Furthermore, we will also assess whether the relationship between delayed entry and earnings profiles change according to gender and parental background.

4. Empirical results

4.1 OLS estimates

- OLS estimates of the relationship between delay and annual gross (log) earnings (Table 3) clearly show the existence of a negative association between the delayed entry and annual earnings. The later the individual enters in the labour market (or attains a tertiary degree), the lower is, on average, the annual earning.
- The size of the effect is large – in baseline models M1 and M2 one year of delay in graduation age reduces annual earnings on average by 1.5% and one year of delay in labour market entry after the graduation reduces annual earnings on average by 2.5%. The size increases when a restricted sample based only on 10 years subsequent the entry in the labour market of graduates are considered, which is more in line with the results of Aina and Casalone (2011) where they investigate the effect of delayed graduation on wages after 5 years of graduation and the wage penalty estimated is about of 9%.

- For both proxies of delay considered (age at graduation and both age at graduation with age at entry the labour market after graduation) and all estimated models, the estimated coefficients are always statistically significant.
- The results regarding annual earnings are confirmed when considering weekly gross wages as the dependent variable (Table 4).
- We then run the baseline model M2 (considering entry age as the variable of interest) estimating the interaction between the delay and workers' gender and parental background (coded with a dummy whose value 1 the one if the worker has at least a parent with at least an upper secondary degree, 0 otherwise; Table 5).
- The “delay gap” is higher for females, but it is maybe due to higher unemployment risks, because it is not significant when it is measured looking at weekly wages rather than at annual earnings.
- Consistent with the existence of family networks and connections on the Italian labour market, graduates who has a good parental background experience a lower “delay gap” than the children of less educated parents.

4.2 FE estimates

- Considering age at entry in the labour market as our preferred proxy of delay, the interaction term between the delay and the effective individual experience in a panel FE model clearly show that the delay gap in annual earnings increases along the career (Table 6). Indeed the estimated interaction coefficient between the entry age and the experience is negative and significant in all estimated models.
- This result seem to suggest that individuals who postpone entry in the labour market face a persistent wage gap over time. Thus, late entrants do not catch up in terms of earnings.
- These results are confirmed when gross weekly wages are considered (Table 7).

4.3 FE estimates path by gender and parental background

To be added

4.4 Effects on unemployment risks

To be added

5. Conclusions

To be written

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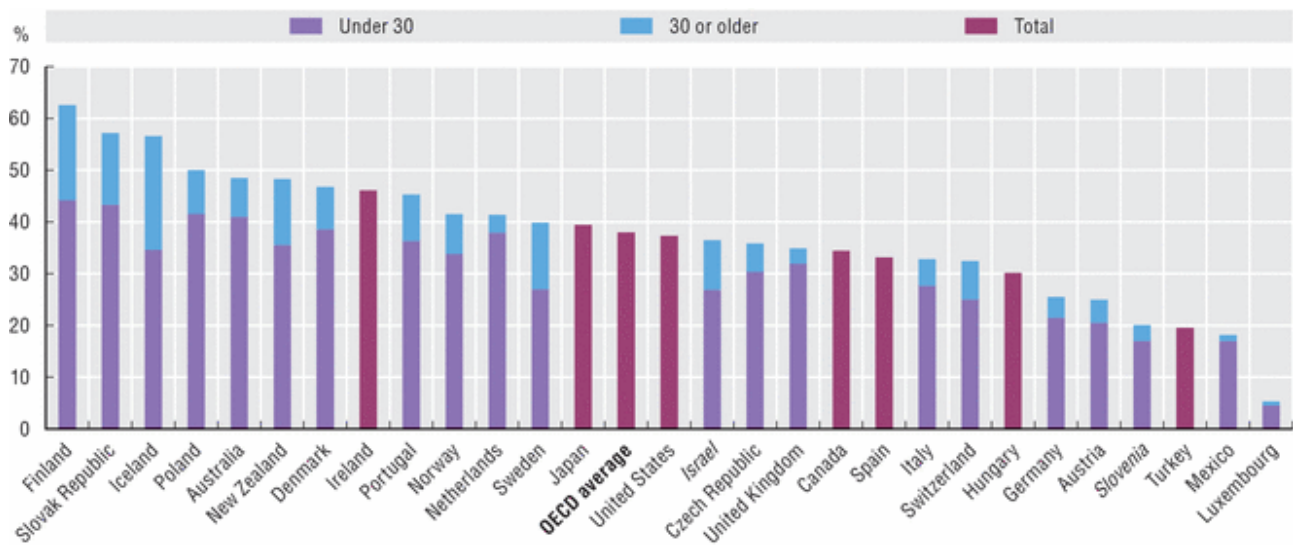
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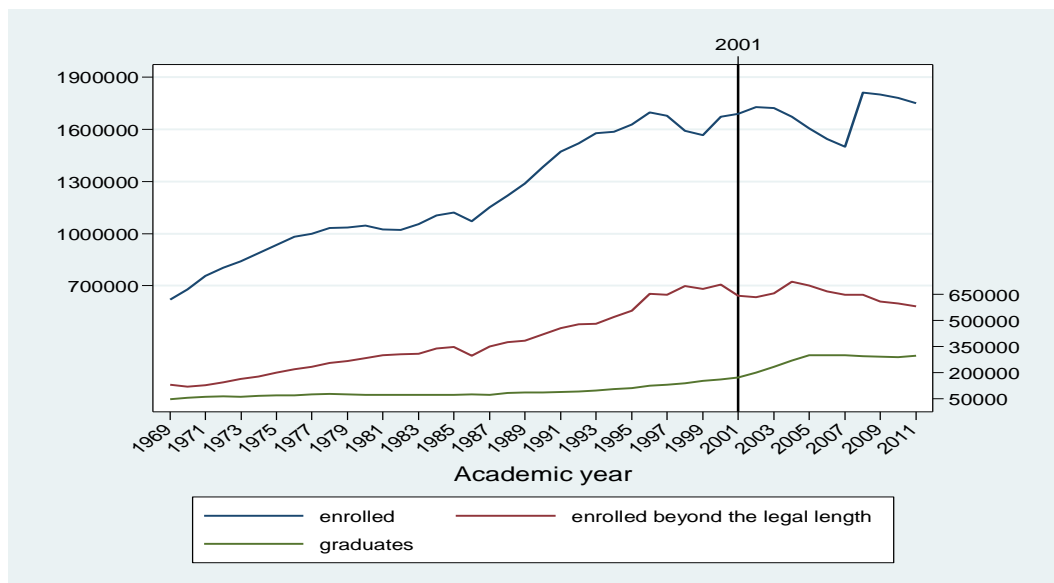
Tables and Figures

Figure 1 – University graduation rates by age



Source: OECD. Table A3.1. See Annex 3 for notes (www.oecd.org/edu/eag2010).

Figure 2- Trends in number of Italian students enrolled, enrolled beyond the legal length, and graduated: 1969-2009



Source: Own elaboration of Istat and MIUR data (1969-2009). Vertical line shows when “3+2” reform has been introduced.

Table 1: Sample characteristics

		Absolute values	%
<i>Gender</i>	Male	7,226	54.6
	Female	6,007	45.4
<i>Birth date</i>	1950-1959	4,459	33.7
	1960-1969	4,628	35.0
	1970-1979	4,146	31.3
<i>Working area</i>	North	7,908	59.8
	Center	3,008	22.7
	South	2,317	17.5
<i>Highest parental educational attainment</i>	Less than primary degree	286	2.2
	Primary	2,994	22.8
	Lower secondary	3,151	24.0
	Upper secondary	4,598	35.0
	Tertiary	2,109	16.1
<i>Number of observations</i>		13,233	100.0

Source: own elaboration on AD-SILC data

Table 2: Mean age at graduation and at entry in the labour market as tertiary graduate (by time invariant characteristics)¹

		Age at graduation	Age at entry in the labour market
<i>Gender</i>	Male	26.6	28.2
	Female	25.8	27.6
<i>Birth date</i>	1950-1959	25.7	27.4
	1960-1969	26.6	28.3
	1970-1979	26.2	27.8
<i>Highest parental educational attainment</i>	Less than primary degree	25.7	27.3
	Primary	26.4	28.2
	Lower secondary	26.1	27.6
	Upper secondary	26.2	27.9
	Tertiary	25.9	27.8
<i>Total</i>		26.2	27.9

¹ Mean values are computed referring to single individuals, not to total observations.

Source: own elaboration on AD-SILC data

Table 3: OLS estimates of the relationship between delay and annual gross (log) earnings

	M1	M2	M3	M4	M5	M6
Age at graduation	-0.0150 0.0000		-0.0138 0.0000		-0.0373 0.0000	
Age at entry in the labour market as tertiary graduate		-0.0250 0.0000		-0.0215 0.0000		-0.0634 0.0000
<i>Control variables</i>						
Age	✓	✓	✓	✓	✓	✓
Gender	✓	✓	✓	✓	✓	✓
Labour market experience	✓	✓	✓	✓	✓	✓
Tenure			✓	✓		
Firm's size			✓	✓		
Region of work f.e.	✓	✓	✓	✓	✓	✓
Year f.e.	✓	✓	✓	✓	✓	✓
Entry cohort f.e.	✓	✓	✓	✓	✓	✓
Firm's sector f.e.			✓	✓		
Restricted to 10 years after entry					✓	✓
Number of observations	13,085	13,085	11,224	11,224	9,677	9,677

Source: own elaboration on AD-SILC data

Table 4: OLS estimates of the relationship between delay and annual weekly (log) wages

	M1	M2	M3	M4	M5	M6
Age at graduation	-0.0178 0.0000		-0.0167 0.0000		-0.0212 0.0000	
Age at entry in the labour market as tertiary graduate		-0.0210 0.0000		-0.0182 0.0000		-0.0308 0.0000
<i>Control variables</i>						
Age	✓	✓	✓	✓	✓	✓
Gender	✓	✓	✓	✓	✓	✓
Labour market experience	✓	✓	✓	✓	✓	✓
Tenure			✓	✓		
Firm's size			✓	✓		
Region of work f.e.	✓	✓	✓	✓	✓	✓
Year f.e.	✓	✓	✓	✓	✓	✓
Entry cohort f.e.	✓	✓	✓	✓	✓	✓
Firm's sector f.e.			✓	✓		
Restricted to 10 years after entry					✓	✓
Number of observations	12,988	12,988	11,148	11,148	9,603	9,603

Source: own elaboration on AD-SILC data

Table 5: OLS estimates of the relationship between age at entry, gender and parental background

	Log annual earnings		Log weekly wages	
	M2	M2	M2	M2
	gender	background	gender	background
Age at entry as graduate	-0.0202 <i>0.0000</i>	-0.0246 <i>0.0000</i>	-0.0201 <i>0.0000</i>	-0.0209 <i>0.0000</i>
Age at entry * female	-0.0104 <i>0.0519</i>		-0.0021 <i>0.5185</i>	
Age at entry * good background		0.0063 <i>0.0000</i>		0.0042 <i>0.0000</i>
<i>Control variables</i>				
Age	✓	✓	✓	✓
Gender	✓	✓	✓	✓
Labour market experience	✓	✓	✓	✓
Parental background		✓		✓
Region of work f.e.	✓	✓	✓	✓
Year f.e.	✓	✓	✓	✓
Entry cohort f.e.	✓	✓	✓	✓
Number of observations	13,085	12,990	12,988	12,894

Source: own elaboration on AD-SILC data

Table 6: Individual fixed effects estimates of the interaction between age at entry, labour market experience and annual gross (log) earnings

	M1 - Baseline	M2 – Restricted to those who have never worked before graduation	M3 – Restricted to the first 10 years after the entry as graduate	M4 - Baseline Full
Age at entry * experience	-0.000021 <i>0.0120</i>	-0.000023 <i>0.0234</i>	-0.000063 <i>0.0008</i>	-0.000018 <i>0.0588</i>
<i>Control variables</i>				
Age	✓	✓	✓	✓
Experience	✓	✓	✓	✓
Tenure				✓
Firm's size				✓
Region of work	✓	✓	✓	✓
Year f.e.	✓	✓	✓	✓
Firm's sector f.e.				✓
Obs.	13,085	10,615	9,677	11,224

Source: own elaboration on AD-SILC data

Table 7: Individual fixed effects estimates of the interaction between age at entry, labour market experience and weekly gross (log) wages

	M1 - Baseline	M2 – Restricted to those who have never worked before graduation	M3 – Restricted to the first 10 years after the entry as graduate	M4 - Baseline Full
Age at entry * experience	-0.000012 0.0038	-0.000014 0.0039	-0.000008 0.1689	-0.000009 0.0884
<i>Control variables</i>				
Age	✓	✓	✓	✓
Experience	✓	✓	✓	✓
Tenure				✓
Firm's size				✓
Region of work	✓	✓	✓	✓
Year f.e.	✓	✓	✓	✓
Firm's sector f.e.				✓
Obs.	12,988	10,547	9,603	11,148

Source: own elaboration on AD-SILC data