

THE UNEQUAL OPPORTUNITY FOR SKILLS ACQUISITION DURING THE GREAT RECESSION IN EUROPE

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This paper is the first to investigate the extent to which the high levels of joblessness resulting from the Great Recession across Europe have translated into higher school attendance among youth. Using repeated cross-sectional and longitudinal data from the EU-SILC for 28 countries, we establish a robust counter-cyclical relationship between rising unemployment rates and school enrolment. The same is true of transitions back to education. Our analysis by subgroups reveals a worrying trend, with youths from the most disadvantaged backgrounds (measured by low household income) less likely to enrol in tertiary studies when unemployment rises.

JEL Codes: I23, I24, J64, E32

Keywords: EU-SILC, Great Recession, school enrolment, unemployment, unequal opportunity, youth

1. INTRODUCTION

The Great Recession has hit young people particularly hard across Europe (Bell and Blanchflower, 2011). According to the microdata from the Labour Force Survey, the unemployment rate for those between 15 and 29 years of age reached 18.8 percent in the European Union (28 countries) in 2013, while the corresponding figure for those between 30 and 64 was 9.4 percent. In countries such as Spain or Greece, nearly every second young person who was looking for a job that year could not find one, resulting in a youth unemployment rate in those countries of 43.2 percent and 48.7 percent, respectively. Undoubtedly, such levels of joblessness and

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overall employment insecurity have important consequences for young people's lives in multiple domains: the chances of leaving home (Becker *et al.*, 2010; Matsudaira, 2016), decisions on marriage (De la Rica, 2005), fertility and family formation (Del Bono *et al.*, 2012, 2015; Ayllón, 2019), income mobility (Cantó and Ruiz, 2015) and so on.

A poor economy can also affect young people's decisions on investment in education. It is reasonable to expect that when young people observe that there are fewer jobs available (and perhaps more precarious working conditions), pursuing further education can be regarded as a good alternative to joblessness or bad career prospects. The opportunity cost of education is lower when the unemployment rate is high, and so remaining in education or returning to school could be more likely during an economic downturn than in a growing economy (Becker, 1975; Heylen and Pozzi, 2007). Uncertainty about the future can also drive school retention and transitions back to education (Kodde, 1986; Canton, 2002).

On the other hand, it is also true that when the economy enters recession and governments are forced to implement austerity measures, educational budgets can suffer major cuts, jeopardizing young people's chances of remaining in or returning to education—because of increased tuition fees, a reduced number of scholarships or more expensive student loans (Kane, 1994; Dellas and Sakellaris, 2003).¹ By the same token, in those contexts where non-compulsory education is not fully subsidized, a decline in individual and family income during recession years may also prevent young people from remaining in, or returning to, education because of an increased 'inability to pay' (Christian, 2007; Méndez and Sepúlveda, 2012; Sakellaris and Spilimbergo, 2000). A lower availability of part-time jobs to fit in with study may also make enrolment more difficult during recession (Dellas and Sakellaris, 2003).

The main objective of this paper is to assess the extent to which the high levels of joblessness resulting from the Great Recession across Europe have translated into a higher probability among young people of educational enrolment, of getting back into education or of remaining at school. Does the reduced opportunity cost of study override the increased difficulties in educational enrolment brought about by austerity measures and declining income? If so, our results should find a positive association between increasing unemployment rates and the probability that young people are enrolled. But if the (in)ability-to-pay effect is dominant, then there will be a negative association between unemployment and school enrolment.

Empirical evidence on the effect of crises on schooling decisions is scant (particularly in the case of Europe) and ambiguous (mostly based on single-country case studies). The majority of papers find a counter-cyclical relationship: when the economy enters a period of recession (and the unemployment rate rises), school attendance and enrolment increase (see, among others, Alessandrini *et al.*, 2015; Long, 2015; Méndez and Sepúlveda, 2012; Heylen and Pozzi, 2007; Dellas and

¹Multiple examples of cutbacks in education are found across Europe in the context of the Great Recession. According to the European University Association, public spending on higher education decreased more than 40% in Greece between 2008 and 2014; between 20% and 40% in Ireland, Lithuania and the United Kingdom; and between 10% and 20% in the Czech Republic, Spain, Iceland and Italy (see Public Funding Observatory, 2016). As for tuition fees, possibly, the most extreme case during the period can be found in the United Kingdom, where fees tripled in 2012.

Sakellaris, 2003; Dellas and Koubi, 2003; Mattila, 1982; and references therein). Fewer studies find a pro-cyclical relationship (King and Sweetman, 2002; Rucci, 2003; Edwards, 1976); and yet another group of papers finds no association at all (Kane, 1994; Polzin, 1984). So it is unclear at this point what to expect in the context of the Great Recession in Europe.

This paper contributes to the literature in several important ways. First, to the best of our knowledge, this is essentially the first paper to study the impact of the Great Recession on educational enrolment in a total of 28 European countries (and 113 regions)—the only exception being a brief analysis by Vandenberghe (2010) (commented later). Second, this is the first analysis whose findings are based not solely on repeated cross-sectional data or longitudinal data, but on both. This way, we not only study the association between bad economic conditions and total enrolment, but we also try to understand which group (those remaining or those transiting back into education) drives the overall trend. This allows us to draw new conclusions on the extent to which the effect of cyclical fluctuations on human capital decisions is persistent or transitory in the context of Europe. Finally, our in-depth analysis by individual and household characteristics allows us to reveal the great heterogeneity by subgroup that lies behind the overall trend.

Our results are based on the European Union-Statistics on Income and Living Conditions (EU-SILC) for the period between 2004 and 2014. We have matched the EU-SILC with data from Eurostat for the total and the youth unemployment rates (at both country and regional levels). Given that the Great Recession impacted very differently on the European countries and regions, we can exploit the large variability in unemployment rates across time and territory to identify a change in the decision by European youth to enrol in, return to or remain in education. All our results are the outcome of logit regressions with fixed effects and clustered standard errors.

Our main findings are consistent with the body of literature that documents counter-cyclical schooling decisions. In particular, we find that a 1 percentage point increase in the regional unemployment rate is associated with an increase of between 0.23 and 0.37 percentage points in the probability of being enrolled in education. In the case of transitions back to education, the same estimates are between 0.15 and 0.16 percentage points; in the case of remaining at school, the figure ranges from 0.21 to 0.25 percentage points. Our results are robust to the use of the unemployment rate measured at the country level, to the use of the youth unemployment rate, in different geographical areas, for different age groups, to different standard error adjustments and to different specifications. The analysis by demographic subgroups indicates that young males and people under 24 are more likely to be enrolled in response to labour market conditions. Moreover, those without a college degree and those who were previously employed are also more likely to return to education when the unemployment rate rises. More importantly, we find that household income was a very strong determinant of schooling decisions during the period: those in the lowest part of the income distribution were not as likely to enrol in education as their richer counterparts. Indeed, when we break the results down by level of education, we even find a negative association between rising unemployment rates and enrolment at the university level among those in the poorest income quartile.

Our results have both positive and negative implications. On the positive side, the Great Recession meant that young Europeans acquired more education; in the future, this can translate (among other things) into higher economic growth and productivity, lower (wage) inequality (Gregorio and Lee, 2002) and better career prospects (Valero and Van Reenen, 2016). Also, with the decision to enrol in, return to or remain in education, young people can avoid unemployment scarring (Arulampalam *et al.*, 2000, 2001) or a poor labour market entry (Genda *et al.*, 2010) and the future consequences of these. On the negative side, our results show that the Great Recession rendered more unequal the possibility of enrolling in education, as students from more disadvantaged economic backgrounds are less likely to enrol in university studies in response to rising unemployment rates. Moreover, in contexts where over-education is a problem, and graduates perform tasks that are below their qualifications, acquiring more education may not pay off, and the accumulation of human capital may not produce the expected returns. Indeed, McGuinness *et al.* (2015) show that over-education is more important in some of the peripheral countries hardest hit by the Great Recession in Europe, where, moreover, youth over-education tends to be more important than adult over-education. Also, the accumulation of *general* human capital may not be appreciated by firms that are willing to employ individuals with more *specific* human capital. If this is the case, these young graduates can be regarded as less productive and may suffer the consequences in the long run.

After this introduction, the paper continues as follows. Section 2 reviews the literature on the influence of the business cycle on human capital investment decisions. Section 3 presents the data sets used, defines our dependent variables and details our controls. Section 4 introduces the econometric technique used throughout the paper. Section 5 shows our main results and gives an account of a series of robustness checks. And finally, Section 6 summarizes our findings and discusses some policy recommendations stemming from our results.

2. LITERATURE REVIEW

The literature on the influence of the business cycle on schooling decisions is not particularly extensive, especially in the case of Europe (Vandenberghe 2010). Most of the theoretical papers about the cyclical nature of schooling find a positive relationship between economic growth and human capital accumulation (Becker 1975; DeJong and Ingram, 2001; Dellas and Sakellaris, 2003). However, the empirical literature is much more diverse and ambiguous, and mostly based on country case studies.

The great majority of analyses (devoted to the United States) establish a counter-cyclical relationship: school attendance and enrolment decline as the economy grows, while the number of students increases when the unemployment rate rises. The study by Long (2015), the closest to our work, assesses the impact of the Great Recession on college enrolment in the United States and concludes that the attendance level increased during the recession, particularly in those states most affected by the economic downturn (measured by state unemployment rates and an indicator for change in home values, as many families rely on home equity

to finance college). However, she highlights that the trend is driven by part-time enrolment (full-time enrolment actually declines) and such change favoured particularly minority students, while whites reduced their enrolment in those states most affected by the crisis. Long (2015) also shows that the number of less-than-one-year certificates increased and suggests that this may be related to an increased likelihood of upper-level students being more likely to stay to finish their degrees after the recession. Barr and Turner (2014) identify a similar counter-cyclical trend (also in the United States), but they attribute it to an increase in the availability of financial aid and the extensions to unemployment insurance benefits introduced during the Great Recession.

Furthermore, Alessandrini et al. (2015)—also using data for the United States for the period 1986–2012—find that a 1 percent increase in GDP above its trend increases the probability of young people enrolling in post-secondary education by 1.37 percentage points. Moreover, in an analysis by subgroups, the authors show that low-skilled individuals (proxied by parental education) are more responsive to macroeconomic conditions. In turn, Méndez and Sepúlveda (2012) study not only schooling episodes but also training, using quarterly data from the National Longitudinal Survey of Youth (NLSY79) for a period of 19 years. They determine that aggregate schooling and time devoted to schooling in the United States are clearly counter-cyclical, while training is pro-cyclical (mainly because firm-financed training is so; only self-financed training is found to be counter-cyclical). They conclude that skills acquisition investment also depends on the educational level and the employment status of the individual, with an increased probability of enrolment higher for the unskilled.

Continuing on evidence from the United States, Dellas and Sakellaris (2003) find once more a counter-cyclical relationship: a 1 percentage point increase in the unemployment rate is associated with a 2 percent increase in college enrolment among 18–22-year-old high-school graduates for the period between 1968 and 1988. Importantly, the authors indicate that ‘youths that substitute away from college education in a boom year are less likely to go to college later on when economic activity falls. The increase in college enrolment during a subsequent recession seems to come from increased participation of new cohorts of high school graduates’ (Dellas and Sakellaris, 2003, p. 164). This way, they establish a persistent effect of cyclical fluctuations in enrolment decisions. In a similar fashion, Dellas and Koubi (2003) study the schooling behaviour of different age groups and identify a general counter-cyclical trend that is stronger for teenagers and those in the 25–29 age group. They also show that the expected real interest rate is negatively associated with enrolment, but there is no evidence of a link with other credit market variables.

There are other studies with similar evidence for the United States. DeJong and Ingram (2001) estimate a business cycle model in which a representative individual allocates time across skills acquisition, leisure and labour. Using data from 1948 to 1995 to estimate the parameters of the model, they find that skills acquisition is counter-cyclical, having a correlation with total output of -0.36 . Betts and McFarland (1995), using information from the 1960s up to the mid-1980s, ascertain that a 1 percentage point increase in the unemployment rate of recent college graduates is associated with an increase of 0.5 percent in full-time

college attendance. When the unemployment rate of all adults is considered, the same effect increases to 4 percent. Mattila (1982) shows that school enrolment between 1956 and 1979 increased during recessions among young males (but not older ones)—a result that he interprets as evidence of a ‘discouragement effect’. And Card and Lemieux (2001) also establish a counter-cyclical relationship in the United States to explain enrolment trends in the 1970s, though the effect is weak and depends on age.

As for evidence outside the United States, we can highlight the work of Heylen and Pozzi (2007), who establish a positive relationship between economic crises (measured by large increases in the inflation rate) and schooling (measured by a change in the average number of years of schooling for the population aged 15 between t and $t-5$) in a macro-data panel of 86 countries for the period between 1970 and 2000.² They determine that a crisis translates on average into 0.3 extra years of schooling, and that crises do not need to be extreme to translate into more human capital accumulation. Moreover, Sakellaris and Spilimbergo (2000) study the relationship between tertiary education enrolment and economic fluctuations for a large number of countries from 1962 to 1992. They focus on foreign students who enrol in US universities and find a strong correlation between enrolment and the business cycle in the sending countries. However, the direction differs depending on the level of development of the country of origin: while enrolment for those from an OECD country is counter-cyclical, it is pro-cyclical for those from a non-OECD country.

Most of the country case studies in Europe also establish a counter-cyclical relationship between enrolment in education and the unemployment rate. Clark (2011) does so in the case of England for the period 1975–2005 while using aggregated data at the regional level and computing the youth unemployment rate as the proportion of 18–19-year-olds claiming unemployment benefits. Gaini *et al.* (2013) establish for France in the period between 1983 and 2009 that the probability of leaving school *falls* less when the unemployment rate *rises* than the probability of leaving school *rises* when the unemployment rate *falls*, but statistically significant differences are mostly found only among 17–19-year-olds. For Switzerland between 1981 and 2001, Messer and Wolter (2010) provide evidence that time-to-degree is shorter with high unemployment, because students are less likely to engage in paid work on the side to finance their studies; thus, they are more likely to study full time and complete their degree earlier. Tumino and Taylor (2015) focus on the school leaving decisions of 16-year-olds in the UK between 1991 and 2008, and find that the youth unemployment rate positively affects school

²Part of the literature has been devoted to the analysis of low- and middle-income countries but, in this case, the analyses usually refer to school-age children. For example, Schady (2004) identifies no effect on attendance rates from the macroeconomic crisis that Peru suffered between 1988 and 1992, but he does find higher mean educational attainment. Skoufias and Parker (2006) show that the 1995 peso crisis in Mexico had no effect on school attendance of teenage boys (12–19 years of age), but did have a negative effect on teenage girls. However, lower attendance among girls did not seem to impede advancement to the next grade. The authors use the event of unemployment of the household head as a proxy for the economic conditions. Finally, Rucci (2003) provides evidence for Argentina during the crisis of 1998–2002. The author concludes that the 55% observed decline in real household income can be associated with a reduction in the probability of attending school of between 4.7% and 12% among 12–17-year-olds.

enrolment among youths in tenant households, while adult unemployment discourages it. In contrast, students from better-off families seem to make their enrolment decisions irrespective of the labour market conditions. To the best of our knowledge, there are no studies exclusively based on Europe as a whole that would show a counter-cyclical relationship of schooling decisions as we do in the current paper. Nor do the aforementioned papers devote their analysis to the period before and after the Great Recession.

Few papers have found a pro-cyclical relationship between schooling and business cycle fluctuations. King and Sweetman (2002) focus on the group of individuals over 25 years of age who have been working for at least 20 weeks and decide to return to education (in what they label ‘retooling’). Using administrative data from Canada between 1979 and 1993, they determine that transitions back into education move in the opposite direction from the unemployment rate and in the same direction as a “help-wanted index” and the natural logs of GDP and investment. The authors conclude that during boom years, workers have more incentive to leave their low-productivity jobs to gain access to higher-paying occupations in the future. In a similar vein, Edwards (1976) also identifies a pro-cyclical response of school enrolment and retention to changes in the business conditions among teenage girls during the postwar period in the United States. By contrast, the effect is not present among boys (except for non-white males, who behave counter-cyclically). The difference is attributed to a lesser degree of variation in the opportunity costs of enrolment among teenage girls.

Finally, a small number of papers have established no association between the business cycle and schooling decisions. The only one based on Europe that we have found is by Vandenberghe (2010). Using data from the EU-SILC (as in the current paper) for 2006 and 2007, the author analyses whether final educational attainment is influenced by the labour market conditions that young people observed when they were 17. His identification strategy is based on first-difference models that capture the impact of changing unemployment rates on educational attainment trends across quasi-cohorts. He does not find any statistically significant correlation between changing labor market conditions at age 17 and subsequent educational attainment. However, note that his results are based on only changes between two consecutive years, and his period of analysis is prior to the Great Recession. Similarly, Kane (1994) determines that state unemployment rates were not related to individual enrolment either for whites or for blacks in the United States through the 1970s and 1980s. Rather, he highlights that changes in tuition fees and increasing average parental education explain the trends. Finally, Polzin (1984), in his analysis of university enrolment in the state of Montana at the beginning of the 1980s, concludes that short-term economic conditions do not influence the decision to enrol in higher education, but they do have an impact on the type of college that is chosen.

Thus, the impact of the Great Recession on schooling decisions in Europe as a whole is not *a priori* defined; it is an empirical question that we undertake in the remainder of the paper.

3. DATA

We use data from EU-SILC in its repeated cross-sectional and longitudinal form.³ The EU-SILC is devised as an output-harmonized data-collection effort by Eurostat and the National Statistical Institutes (NSIs). Eurostat defines a set of target variables, and each NSI is responsible for the data-collection efforts in its country. The EU-SILC has several advantages for the purposes of our analysis: (1) it provides detailed information on the socio-economic and demographic characteristics of individuals and households; (2) it allows a comparative analysis across European regions, with evidence for 28 countries; and (3) it covers a sufficiently long period of time: the years before the start of the Great Recession (2004–2007), the time when countries were hardest hit by the economic downturn (2008–2011) and the years afterwards (up to 2014).

As with other panel data sets, the longitudinal component of the EU-SILC suffers from a number of limitations.⁴ One is that individuals are only followed for four consecutive waves. This implies that in each wave, 25% of the sample is replaced by a new rotational group: thus, for example, we can only observe a possible transition back into education on three occasions for each individual. If a transition into education occurs outside our observational window, we cannot account for it. The longitudinal component has also been questioned for not tracking well those young people who leave the parental home in a number of countries (Iacovou and Lynn, 2013). To make sure that our findings are not driven by the EU-SILC survey design and its tracking rules, we ran our main specification using those countries that are identified as best following young people (namely, Spain, Portugal, Italy, France and Cyprus) (see Iacovou and Lynn, 2013); our qualitative findings remained unchanged (though the level of significance decreased due to the lower number of observations).

Our sample includes young people aged 17–29. We excluded young people turning 16 during the survey year, because they participate only if their birthday is prior to the interview date, which implies lots of missing information. Moreover, individuals aged 16 are still in compulsory education in the majority of countries analysed. In the case of the repeated cross-sectional data, an individual is considered to be *enrolled in education* if she declares that she is currently studying and that her current economic status is as a student. We conditioned the variable to this self-declared main activity information, because it captures the person's own perception of her main activity and it is meant to determine how most time is spent. There are very few exceptions when individuals declare that they are studying, while their main activity status is as an employed, unemployed or inactive person. In these cases, we did not consider them to be enrolled in education. We wanted to

³Note that the repeated cross-sectional data set and the longitudinal data set are made up of two different samples, as provided by Eurostat.

⁴To avoid the duplication of households, researchers need to make a choice as to how the pooled data set is constructed (Iacovou and Lynn, 2013). In our case, for each rotational group, we take the information available from the last wave in which each individual participates in the panel. This way not only are observations not duplicated, but we also make sure that if there was a change between years in the way information is collected, our individual observations are not affected by this.

avoid considering as enrolled in education any individual who may be receiving some type of job training while working or looking for a job.⁵

In the longitudinal data, we consider that a young individual makes a transition *back into education* if she declares that her main activity status is as an employed, unemployed or inactive person at $t-1$ and as a student at t . Thus, we exclude individuals who are students at $t-1$ and individuals with missing information on their labour market status at $t-1$ or at t . By the same token, we consider that an individual is retained in the educational system if at $t-1$ he was a student and declares that he is still a student at t . Again, we disregard individuals with missing information in one of the 2 years.

We derive results for all the countries that are available in both components of the data set, with the exceptions of Croatia and Serbia, because they joined the EU-SILC project only in 2010 and 2013, respectively, and therefore the number of available waves was considered insufficient. We also disregard Germany and Switzerland, because although both countries provide information at the cross-sectional level, there is no longitudinal component. As mentioned, the period under analysis runs from 2004 to 2014, but it should be noted that few countries joined the EU-SILC project later on. Table A1 in the Appendix provides detailed information on the period covered in each country by the repeated cross-sectional and the longitudinal components. The sample contains 898,130 observations in the case of the repeated cross-sectional data set; 235,461 for the longitudinal component of the analysis of transitions back into education; and 222,658 for the analysis of school retention—though the sample can vary slightly in the different regressions, depending on the number of missing values in the control variables used.

Finally, Table 1 summarizes some of the most important characteristics of our samples. As for the dependent variables, 35.1 percent of individuals declare that they are students; about 4.8 percent of young people engage in a transition from employment, unemployment or inactivity to education; and 78.5 percent are school retained. Average age differs in the three samples under consideration, with younger individuals more likely to be present in the sample for the analysis of school retention (mean age at 20.9) and older youths in the analysis for transitions back into education (25.1). Important differences are also observed in terms of demographic characteristics: whereas 74.4 percent of the sample for analysing school retention lives with their parents, only 44.8 percent of those potentially transiting back into education do so. The figure is 66.0 percent in the repeated cross-sectional sample. The percentages for the number of individuals who have a partner and/or have their own children in the different samples are in accordance with the relevant

⁵About 0.4% of those who declare that they are studying and state that their current economic status is as a student do actually also say that they work more than 20 hours a week. In such cases, we considered that they were enrolled in education, as they themselves consider their main activity to be as a student. Also there are a few individuals who say they are studying, while their main activity status is as an employed person, though they work for less than 20 hours a week. In such cases, we coded them as not being enrolled in education. Note that considering them as enrolled would mean an increase of only 1.6% in the pool of individuals enrolled in education. Finally, about 3.2% of those declaring that their main activity status is as a student also say they are not currently in education. In this case, we considered them not enrolled in education. Note that according to the data set guidelines, the “current education activity” variable covers only the formal education system, thus potentially helping us to classify as not enrolled those in non-formal education. In any case, robustness checks indicated that none of our results is dependent on these decisions.

TABLE 1
SUMMARY STATISTICS

Variable	Cross-sectional		Longitudinal (Transitions Back)		Longitudinal (School Retention)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Enrolled in education	0.351	0.477	–	–	–	–
Back into education	–	–	0.048	0.214	–	–
School retained	–	–	–	–	0.785	0.411
Female	0.495	0.499	0.472	0.499	0.507	0.499
Age	23.15	3.753	25.19	2.951	20.96	2.68
Living with parents	0.660	0.474	0.448	0.497	0.744	0.436
Living with a partner	0.224	0.417	0.332	0.471	0.033	0.179
Has own children	0.173	0.516	0.297	0.664	0.011	0.128
Lower secondary school (or less)	0.292	0.455	0.224	0.417	0.285	0.451
Upper secondary school	0.502	0.500	0.518	0.499	0.546	0.498
University degree	0.206	0.404	0.257	0.437	0.168	0.375
Hh. equivalent income (1st quartile)	0.277	0.448	0.242	0.428	0.302	0.459
Hh. equivalent income (2nd quartile)	0.245	0.430	0.245	0.430	0.253	0.434
Hh. equivalent income (3rd quartile)	0.254	0.435	0.279	0.448	0.234	0.423
Hh. equivalent income (4th quartile)	0.223	0.417	0.233	0.423	0.211	0.408
N	898,130		235,461		222,658	

Source: Authors' computation on the EU-SILC, 2004–2014. Weighted results.

age structure. As for the educational level, in the repeated cross-sectional sample 50.2 percent hold a high school diploma and 20.6 percent a university degree. The rest of the sample did not graduate from secondary education. In the longitudinal files, the percentage of university graduates is larger in the sample for the analysis of transitions back into education and smaller for the study of school retention. Furthermore, 27.7 percent of the repeated cross-sectional sample lives in a household with an equivalent income placed in the first quartile, while those in the fourth quartile represent 22.3 percent. Household income is made equivalent by using the modified OECD equivalence scale that gives a weight of 1 for the first adult, 0.5 for the rest of the adult members in a household and 0.3 for children under the age of 14. Note that equivalent income quartiles do not necessarily contain 25 percent of the observations in our sample, as quartiles have been computed for the whole income distribution in each country and per year. By comparison, in the longitudinal sample for the study of transitions back into education, youths are more evenly spread across the different quartiles, while we find more young individuals belonging to the first income quartile among the sample for the analysis of school retention.

4. METHODOLOGY

To understand the potential relationship between changes in the labor market (measured by the unemployment rate) and young people's schooling decisions, we

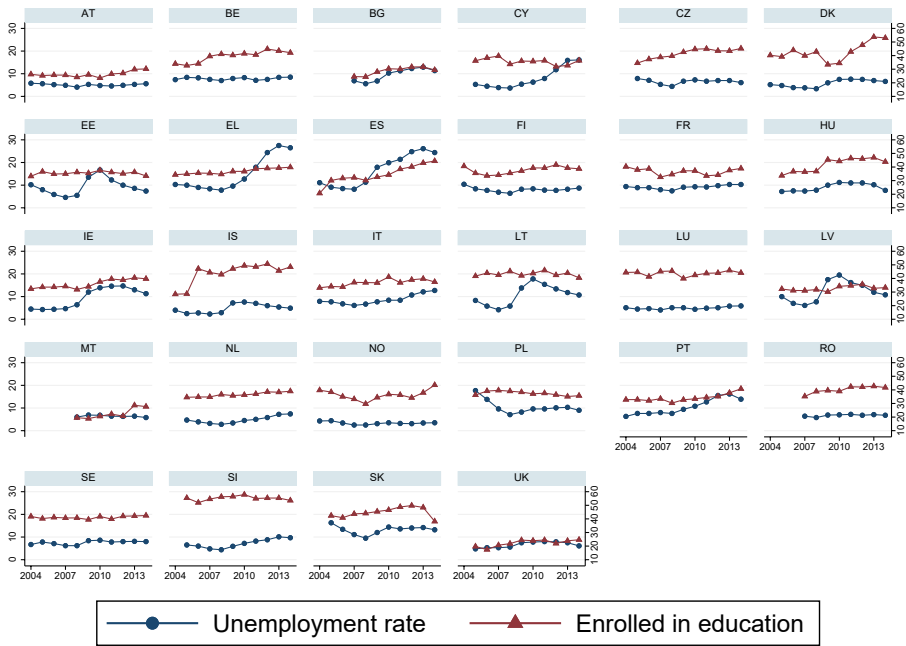


Figure 1. Unemployment Rate Trends at Country Level and Percentage of Young People Enrolled in Education, 28 European Countries, 2004–2014

Source: Labour Force Survey (Eurostat) and EU-SILC repeated cross-sectional microdata from 2004 to 2014. [Colour figure can be viewed at wileyonlinelibrary.com]

merged the EU-SILC samples with information from Eurostat on unemployment rates at the regional level. As the Great Recession had a very diverse impact on the different regions of Europe, we can exploit this variability to capture the relationship between changes in the unemployment rate and our outcomes of interest. We confirm our findings by also using the unemployment rate at country level and the youth unemployment rate and comment on the results in the text whenever relevant.

Figure 1 shows the unemployment rate trends by country for the period between 2004 and 2014, and Figure 2 summarizes the same information by means of a box plot, where the adjacent line shows the lower and upper values, while the box contains the values between the 25th and the 75th percentiles. The dots are outside values, and the diamonds indicate the median. In both figures, it is easy to observe the great variability in the total unemployment rate across the 28 countries analysed. The unemployment rate varies from as low as 2.3 percent in Iceland (for 2007) to as high as 27.5 percent in Greece (for 2013). Note also that while some countries have an unemployment rate that varies within a relatively small range (e.g. Luxembourg, Norway and Romania), others experience a dramatic change, with large differences between the minimum and the maximum values (Spain, Greece, Ireland or Lithuania). The variability in the unemployment rate at the regional level, on which our main results are based, is even larger. When working with data at the regional level, we use information at NUTS (*Nomenclature of*

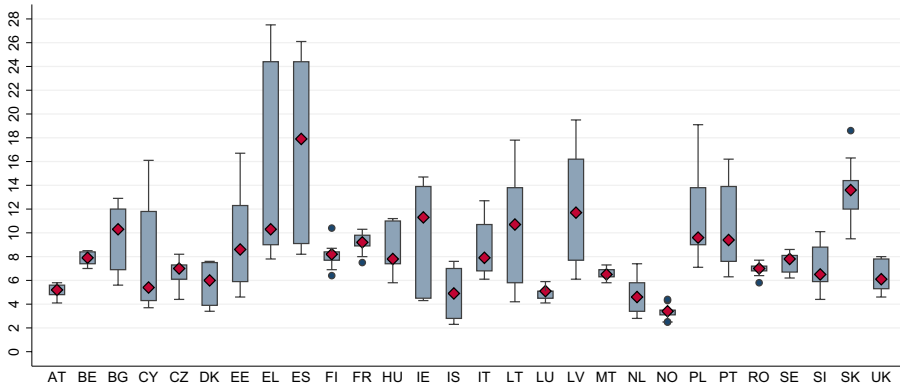


Figure 2. Box Plots for the Unemployment Rate at Country Level, 28 European Countries, 2004–2014

Note: In the figure, the adjacent line shows the lower and upper values, while the box contains the values between the 25th and the 75th percentiles. The dots are outside values, and the diamonds indicate the median.

Source: Labour Force Survey, Eurostat. [Colour figure can be viewed at wileyonlinelibrary.com]

Territorial Units for Statistics) 1 or 2, depending on the information available in the EU-SILC. We use 113 regions.⁶ For the sake of completeness, Figure 1 also details the percentage of young people enrolled in education in each country and per year. As can be seen, in most countries the enrolment rate follows the rising trend of the unemployment rate during the period under analysis.

Our results are based on logit models with fixed effects which we specify as follows:

$$(1) \quad Y_{irt} = \alpha + X_{irt}\beta + Unempl_{rt}\gamma + R_r + T_t + \epsilon_{irt}$$

where subscript i is for individuals, r is for region (or c in the case of the analysis at the country level) and t for time. Y_{irt} represents the outcome of interest, young people’s decision to enrol, return or continue in education. γ is the parameter of main interest as it captures the relationship between changes in the unemployment rate and changes in education attendance. X_{irt} is a vector of control variables that includes gender, age, age squared, living with at least one parent, living with a partner and having one’s own children and household equivalent income quartiles. Note that the inclusion of control variables improves the precision of our estimates, and works also as a robustness check: if labour market conditions are exogenous to enrolment decisions, the estimated effect of the unemployment rate should not change after the inclusion of individual control variables. To check this, in the next section we first present our estimates without any individual control (raw estimates), and then we sequentially add individual and family characteristics. Finally, ϵ_{irt} is the usual error term.

⁶A certain number of (small) countries provide regional codes in the EU-SILC at NUTS-1 level that, in practice, refer to the whole national territory—for example, Cyprus, Latvia and the Slovak Republic, among others. When this occurred, we treated these small countries as regions. We made the same decision when a given country did not provide information at the regional level.

Importantly, we control for region (or country) and time fixed effects, R_i and T_t , respectively. Region fixed effects account for characteristics that are specific to a given region—for example, the cost of education or cultural factors that influence acquisition of a university degree. In turn, time fixed effects control for possible shocks that occur at a point in time throughout Europe—for example, a change in the rules for exchange students within the Erasmus+ programme. Note that it is particularly important to control for year fixed effects (or a linear trend for time) because enrolment has generally increased during the last decades and was likely to increase regardless of the economic downturn. So we need to control for this upward trend to capture the effects of the Great Recession beyond the annual growth rate of enrolment. All the regressions are weighted, and clustered standard errors (either at the regional or at the country level) are used throughout the paper.

At this point it is important to bear in mind that there are various mechanisms by which the macroeconomic environment can influence the decision to enrol in education. The extent to which our findings are able to capture the different mechanisms may depend on the type of analysis that we perform, at regional or country level (Lindo, 2015). We argue that it is more likely that economic conditions at the local level have an influence on the probability of enrolling in education—for example, because of the availability of one's own social and family network—and, therefore, we focus our analysis on the regional level. Yet using data at such a disaggregated level has both advantages and disadvantages. First, results at the regional level tend to be more precise, because the analysis exploits the variation in the economic conditions specific to a region, while also accounting for broader changes. Second, the analysis has greater power due to the inclusion of more fixed effects, which reduce concerns over omitted variable bias. However, an analysis at the regional level cannot account for spillover effects across regions (which an analysis at country level can). For example, potential migration decisions among young people moving away from a region with a high unemployment rate are not captured. Also, the unemployment rate at the regional level is drawn from a smaller number of observations, and thus it could have a larger measurement error. For these reasons, we check the robustness of our results at the country level (see the online Appendix) and discuss them in the text when relevant.

Similarly, there are both advantages and disadvantages to using the total unemployment rate, rather than the youth unemployment rate. Arkes (2007) argues in favour of using the total unemployment rate, because potential sampling error may be less important. As he says, use of the youth unemployment rate could introduce some endogeneity, given that the proportion of young people who choose or do not choose to enrol in education or influence the unemployment rate of their age group. Instead, such an effect is likely to have a minimal impact on the total unemployment rate. On the contrary, though, it can be argued that young people are more likely to make decisions on whether to remain in (or return to) education while keeping an eye on their own age-group opportunities in the labor market, rather than on those of the adult population as a whole. Therefore, in a second analysis, we run our main regressions using the youth unemployment rate, instead of the total unemployment rate. We also check whether our findings are robust to alternative specifications, different standard error adjustments and sample selection. Finally, we carry out a subgroup analysis to explore whether the business

cycle affects differently the human capital accumulation decisions of youths with different characteristics.

5. RESULTS

We present the results in three subsections. First, we use repeated cross-sectional data to investigate the relationship between total enrolment in education and changes in the unemployment rate. In particular, we test whether bad labour market conditions during the Great Recession led more young people to enrol in education. Second, we take advantage of the longitudinal component of the EU-SILC data and investigate whether some young people—who may have given up education in the boom years—decided to return to the educational system when labour market conditions worsened. Finally, we complete the analysis with a brief section on school retention.

5.1. Enrolment in Education

Table 2 displays the main results for the unemployment rate coefficient by estimating equation (1) using the total unemployment rate at the regional level. The dependent variable is an indicator that takes the value 1 if the individual is currently studying and 0 otherwise. First, we present the raw estimates; then we add individual characteristics (gender, age, age squared, living with at least one parent, living with a partner and having one’s own children); and finally, we add dummy variables indicating whether the individual’s household income is in the first (omitted), second, third or fourth quartiles of the income distribution by country and wave. In Panel A, we use the current unemployment rate. Table A2 in the Appendix

TABLE 2
TOTAL ENROLMENT AND THE UNEMPLOYMENT RATE—MAIN RESULTS

	Raw		+ Individual Characteristics		+ Family Income	
Panel A						
UR (t)	0.0163***	(0.0035)	0.0175***	(0.0055)	0.0166***	(0.0054)
Marginal effect	0.0037***	(0.0008)	0.0025***	(0.0008)	0.0023***	(0.0008)
N	870,174		870,011		869,328	
Panel B						
UR (t-1)	0.0174***	(0.0033)	0.0187***	(0.0051)	0.0179***	(0.0051)
Marginal effect	0.0039***	(0.0007)	0.0026***	(0.0007)	0.0025***	(0.0007)
N	870,046		869,883		869,200	
Panel C						
UR (t-2)	0.0211***	(0.0031)	0.0228***	(0.0049)	0.0221***	(0.0049)
Marginal effect	0.0048***	(0.0007)	0.0032***	(0.0007)	0.0031***	(0.0007)
N	869,897		869,734		869,060	

Notes: Results from estimating equation (1) using the pooled EU-SILC cross-sectional microdata from 2004 to 2014. Sample: Youth 17–29 years old. All the regressions contain region and year fixed effects. Individual controls include sex, age, age squared, an indicator variable of whether the individual has a partner, an indicator variable of whether the individual lives with his/her parents and an indicator variable of whether the individual has children. Household income is captured in a set of dummies indicating whether the household is in the second, third or fourth quartiles of the equivalent income distribution (the first quartile is omitted). Standard errors (in parentheses) are clustered at the regional level.

*** $p < 0.01$.

shows all the coefficients of the control variables included in the main regression (Panel A in Table 2). Alternatively, Panels B and C present the results using the unemployment rate lagged by 1 and 2 years, respectively.

The results in Table 2 indicate a positive relationship between the level of unemployment in a given region and enrolment in education. Given that we control for region and year fixed effects, the relationship is net of other possible circumstances that may affect a particular region and other common shocks that may affect all the regions in our sample. As can be seen from Panel A, after controlling for individual characteristics and family income, a 1 percentage point increase in the total unemployment rate at the regional level is associated with a 0.23 percentage point increase in the proportion of young people who are currently studying. Note that an effect of 0.23 percentage points represents 0.7 percent of the baseline mean of our dependent variable, which is 0.335 for the period 2004–2008. Panels B and C show that the marginal effects are larger when the lagged (rather than the current) unemployment rate is considered: 0.25 percentage points for the unemployment rate at $t-1$ and 0.31 percentage points when unemployment is measured at $t-2$. The analysis at the country level confirms our findings, while the magnitude of the estimated effects is 0.02–0.05 greater. As pointed out by Lindo (2015), this is consistent with the idea that the estimated effects of country economic conditions are fully inclusive of spillover effects across regions within a country, whereas more disaggregated analyses are not.

In Appendix Table A6 we show that our findings are robust to the unemployment measure chosen, to different standard error adjustments and specifications and also to the sample of countries under analysis. First, we consider the youth (rather than the total) unemployment rate, and again we find a positive relationship, though the effect is smaller. Second, we show the results when clustering the standard errors at year and at the regional level simultaneously.⁷ In Panels C and D, respectively, we include a general linear trend and region-specific linear trends, and find a slightly larger effect. In Panel E, we run our main regressions with the countries that participate continuously from 2004 or 2005 to 2014, whereas in Panel F we check the robustness of our results by leaving out of our sample those countries that introduced educational reforms during the period of analysis. According to the UNESCO Education Statistics, Hungary, Luxembourg and Latvia introduced changes in their educational systems in 2009, which affected the age of completion of compulsory education. Again, these robustness checks support our main results. Finally, borrowing from Long (2015), we check the robustness of our results to a difference-in-difference approach, with the first difference between the period before and after the recession. We put the beginning of the recession in 2009 and set the variable *post* equal to 1 from 2009 onward. The second difference is between regions in countries greatly affected by the recession versus those slightly affected. We define as *treated* those regions in countries that experienced an increase in the unemployment rate between 2008 and 2013 of more

⁷We follow the multi-way cluster approach suggested by Cameron and Miller (2015). We use the Stata command *logit2*, where *fcluster* is the region and *tcluster* is the year. The magnitude of the effects differs from those in the main analysis due to the fact that the *logit2* command does not allow for the use of weights. Note, however, that the effect found remains positive and statistically significant.

TABLE 3
TOTAL ENROLMENT AND THE UNEMPLOYMENT RATE BY EDUCATIONAL LEVEL

	Raw		+ Individual Characteristics		+ Family Income
A. Enrolment in upper secondary school or vocational program					
UR (t)	0.0192*** (0.0034)		0.0218*** (0.0062)		0.0213*** (0.0062)
Marginal effect	0.0027*** (0.0005)		0.0015*** (0.0004)		0.0015*** (0.0004)
N	866,309		866,146		865,466
B. Enrolment in university studies					
UR (t)	0.0071** (0.0035)		0.0086** (0.0039)		0.0080** (0.0039)
Marginal effect	0.0010** (0.0005)		0.0010** (0.0005)		0.0010** (0.0005)
N	866,309		866,146		865,466

Note: Results from estimating equation (1) using the pooled EU-SILC cross-sectional microdata from 2004 to 2014. Sample: Youth 17–29 years old. All the regressions contain region and year fixed effects. Individual controls include sex, age, age squared, an indicator variable of whether the individual has a partner, an indicator variable of whether the individual lives with his/her parents and an indicator variable of whether the individual has children. Household income is captured in a set of dummies indicating whether the household is in the second, third or fourth quartile of the equivalent income distribution (the first quartile is omitted). Standard errors (in parentheses) are clustered at the regional level. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

than 5 percentage points (Bulgaria, Cyprus, Greece, Ireland, Italy, Lithuania, Portugal, Slovenia, Spain). The remaining regions are in the control group.⁸ The results in Panel F suggest that total enrolment increased after the recession in all regions in our sample, but the increase was even greater in those regions most affected by the economic downturn.

Given that individuals are asked about the level of education in which they are enrolled, next we investigate whether the increase in the total enrolment during the Great Recession is driven by those youths enrolled at university or by those attending either a high school or a vocational programme. To this end, we estimate equation (1) using two alternative dependent variables: first, the dependent variable takes the value 1 if the individual is enrolled in an upper secondary school or in a vocational programme and 0 otherwise; and second, the dependent variable takes the value 1 if the individual is currently attending college and 0 otherwise. The results are displayed in Table 3. As can be seen, in both cases the relationship between education attendance and the unemployment rate is positive and statistically significant, and the magnitude of the effect is similar. These results are consistent with the estimation of a multinomial choice model where different levels of education are alternatives to each other.

In summary, our results suggest that, as a consequence of bad labor market conditions during the period of the Great Recession, more young Europeans decided to enrol in education. This finding is consistent with the literature documenting that schooling decisions are counter-cyclical (Alessandrini *et al.*, 2015;

⁸We estimate the following equation by OLS:

$$(2) \quad Y_{it} = \beta_1 + \beta_2 Post_t + \beta_3 Treated_t + \beta_4 (Post_t * Treated_t) + R_t + T_t + X_{it}\gamma + \epsilon_{it}$$

where X_{it} is a vector of control variables which includes the same individual characteristics as in the last column of Table 2.

Méndez and Sepúlveda, 2012; Heylen and Pozzi, 2007; Dellas and Sakellaris, 2003; DeJong and Ingram, 2001; Betts and McFarland, 1995). However, our estimates for Europe (of between 0.23 and 0.37 per 1 percentage point increase in the unemployment rate) are substantially lower than those for the United States. In particular, among those studies which also use the unemployment rate as a proxy of the business cycle, Méndez and Sepúlveda (2012) find that a 1 percentage point increase in the unemployment rate is associated with an increase of between 0.6 and 0.9 percentage points in the likelihood of someone being in formal education; Dellas and Sakellaris (2003) document a 0.8 percentage point increase in college enrolment (while in our case the increase is only 0.1 percentage points); and Betts and McFarland (1995) estimate an increase of 0.5 percentage points in full-time college attendance.

In the next subsection, we carry out an analysis by socio-demographic characteristics, with the objective of understanding whether different groups have been differently (and even in opposite ways) affected during the period. This could help to explain why our estimates are smaller than those typically found in the United States. The analysis reveals whether the balance between “opportunity costs” and “ability to pay” for education leads to different behaviors across groups. This is relevant because, as Méndez and Sepúlveda 2012, p. 149) point out “while it could be optimal for many individuals to engage in counter-cyclical skill acquisition, the inability to obtain financing in recessions may distort this decision toward acquiring skills ‘procyclically’.

5.1.1. Subgroup Analysis

Our analysis by subgroups considers gender, age and household income quartiles. The results are shown in Table 4. Panel 1 presents the results for the likelihood of being enrolled in education (regardless of level), whereas Panels 2 and 3 present the results for the likelihood of being enrolled in upper secondary school or a vocational programme and of being enrolled in college, respectively. The results in this section are confirmed by specifications that interact the regional unemployment rate with the individual characteristics on the full sample—the only exception being differences by age, which are found to be not statistically meaningful.

As can be seen from Panel 1.A, labor market conditions have a stronger influence on male than on female schooling decisions. The marginal effect for a 1 percentage point increase in the unemployment rate is larger (and estimated with more precision) for men than for women (0.30 versus 0.17 percentage points), with the difference statistically significant at the 95 percent confidence level.⁹ It could be that since girls are more likely to participate in non-compulsory education than are boys, the former somehow make their schooling decisions more independently of the economic environment—that is, most girls could have an education target level not influenced by economic conditions (Gaini *et al.*, 2013). This pattern is also observed in the two educational levels analysed (see Panels 2.A and 3.A), yet tests

⁹We use Wald tests of simple linear hypotheses throughout the paper. Their results can be found in the tables by subgroups and are commented on in the text when relevant.

TABLE 4
TOTAL ENROLMENT AND THE UNEMPLOYMENT RATE—SUBGROUP ANALYSIS

At Regional Level					
	Coeff.	Std. Error	Marg. Effect	Std. Error	<i>N</i>
1. TOTAL ENROLMENT					
A) By gender					
Males	0.0205***	(0.0058)	0.0030***	(0.0008)	445,008
Females	0.0122**†	(0.0056)	0.0017**	(0.0008)	424,320
B) By age					
Younger than 21	0.0273***	(0.0085)	0.0044***	(0.0014)	303,473
21–23	0.0125**†	(0.0053)	0.0027**	(0.0011)	201,889
Older than 23	0.0091*‡	(0.0050)	0.0008*	(0.0004)	363,966
C) By income					
Q1	–0.0036	(0.0063)	–0.0006	(0.0010)	223,627
Q2	0.0234*** ‡	(0.0070)	0.0033***	(0.0010)	215,297
Q3	0.0297*** ‡	(0.0067)	0.0037***	(0.0008)	227,009
Q4	0.0339*** ‡	(0.0087)	0.0040***	(0.0010)	203,395
2. UPPER SECONDARY SCHOOL OR VOCATIONAL PROGRAM					
A) By gender					
Males	0.0278***	(0.0070)	0.0020***	(0.0005)	443,103
Females	0.0141**†	(0.0062)	0.0009**	(0.0004)	422,363
B) By age					
Younger than 21	0.0151**	(0.0070)	0.0027**	(0.0012)	301,664
21–23	0.0302***‡	(0.0060)	0.0014***	(0.0003)	200,414
Older than 23	0.0411*** ‡	(0.0101)	0.0003***	(0.0001)	355,132
C) By income					
Q1	0.0164**	(0.0082)	0.0015**	(0.0007)	222,517
Q2	0.0295*** ‡	(0.0079)	0.0022***	(0.0006)	214,290
Q3	0.0240***	(0.0075)	0.0014***	(0.0004)	226,040
Q4	0.0149**	(0.0061)	0.0007**	(0.0003)	202,619
3. UNIVERSITY					
A) By gender					
Males	0.0099**	(0.0046)	0.0011**	(0.0005)	443,103
Females	0.0064	(0.0043)	0.0008	(0.0005)	422,363
B) By age					
Younger than 21	0.0157***	(0.0050)	0.0016***	(0.0005)	301,664
21–23	0.0046‡	(0.0055)	0.0009	(0.0011)	200,957
Older than 23	0.0063	(0.0049)	0.0005	(0.0004)	362,845
C) By income					
Q1	–0.0167***	(0.0059)	–0.0021***	(0.0007)	222,517
Q2	0.0099‡	(0.0064)	0.0011	(0.0007)	214,290
Q3	0.0218*** ‡	(0.0048)	0.0024***	(0.0005)	226,040
Q4	0.0270*** ‡	(0.0076)	0.0032***	(0.0009)	202,619

Note: See the note to Table 3.

The symbols ‡, † and ‡ indicate differences statistically significant at 0.01, 0.05 and 0.1 (Wald tests) with respect to the first category (reference) in each panel.

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

indicate that the differences between the genders are only statistically significant for those participating in high school.

When we divide the sample into three groups depending on whether the individuals are younger than 21, between 21 and 23 years of age and older than 23, we find that the positive effect between the regional unemployment rate and enrolment is mostly driven by the youngest groups (see Panels 1.B, 2.B and 3.B of Table 4). For every 1 percentage point increase in the unemployment rate, the probability that a young person aged between 17 and 20 is enrolled in education increases by

0.44 percentage points, while the increase in the probability for those older than 23 is 0.08 and is only statistically significant at 10 percent. This is an expected result because the opportunity cost of education is lower for younger people with less experience in the labour market and potentially lower wages (Alessandrini *et al.*, 2015). Tests indicate that differences between the youngest and the oldest groups are meaningful at standard confidence levels in the regional analysis. In the next subsection, we explore whether the effect on total enrolment is mostly driven by (possibly younger) new cohorts or rather by transitions back into education of those who left education during the boom years.

Finally, Panels 1.C, 2.C and 3.C show the results by quartile of household equivalent income. An interesting pattern emerges from this analysis. First, the labour market conditions do not affect the schooling decisions of the poorest, those in the first quartile of the income distribution, who were not as likely to enrol in education during the period as their wealthier peers. Moreover, focusing on the total enrolment of those in the second quartile or above, we can observe that the richer the household (the higher the quartile), the stronger the positive effect of the unemployment rate on decisions to enrol in education—with the differences between the first quartile and the rest statistically significant at 99% both in the analysis at regional and at the country level. Méndez and Sepúlveda (2012) also find a stronger counter-cyclical behaviour of skills acquisition among wealthier people in the United States, but only for those engaged in training activities.

Panels 2.C and 3.C show that this pattern differs, depending on the level of education in which the individual is enrolled. Indeed, as can be seen from Panel 2.C, the rise in the unemployment rate has a greater effect on the likelihood of being enrolled in upper secondary school or in a vocational programme for those in the middle of the income distribution. The marginal effect of a 1 percentage point increase in the unemployment rate increases from 0.15 percentage points for those in the first quartile of the income distribution to 0.22 for those in the second quartile—the difference being statistically significant at 95 percent. Panel 3.C shows that the relationship between the labor market conditions and the likelihood of being enrolled in college is strongly affected by the individual's household income. As a matter of fact, a negative relationship between the unemployment rate and the likelihood of being enrolled in college is found for the poorest group (those in the first quartile), for whom schooling decisions are pro-cyclical.¹⁰ These results support the hypothesis that the rising cost of college education, along with more credit constraints during the Great Recession, distorted the decisions on skills acquisition for some groups of individuals, jeopardizing the opportunities of those with fewer economic resources. On the contrary, the probable reduction in individual and family

¹⁰Moreover, separate regressions by residential emancipation status and additional specifications that use interactions indicate that differences between those who live with their parents and those who live in another type of household are only statistically meaningful at 90% confidence level. When the regression is made simultaneously conditional on the residential emancipation status and the income quartile, the results are weakly suggestive of the possibility that individuals who belong to the first quartile and who are residentially emancipated have a smaller probability of being enrolled in education in association with increasing unemployment than do those living with their parents. Yet these results need to be treated with caution, because in our sample residentially emancipated individuals are slightly more likely to belong to the first income quartile, which could potentially bias our results.

income may decrease the probability of enrolment when the economy enters a recession, because more family members need to be in the labor market to make ends meet. Finally, it could be a selection mechanism: if the education supply is fixed, students from a high social background remaining in the educational system during a recession would take the place of students from lower social backgrounds. Unfortunately, to the best of our knowledge, no data are available to test the mechanisms behind the pro-cyclical college enrolment among the poorest in Europe.¹¹

5.2. *Back to Education*

To gain a more nuanced understanding of the overall trend of rising education enrolment along with growing unemployment rates, in this section we disaggregate the analysis by focusing on a group of young individuals: those who left education at some point in time, were employed, unemployed or inactive, and then decided to return to education as the economy worsened. In this respect, we try to disentangle whether the results presented in the previous section are mostly driven by new cohorts (as suggested by the repeated cross-sectional results) or whether the overall trend can be explained by young people who decide to transit back into education—or whether it can be explained by both groups. To this end, we exploit the longitudinal component of the EU-SILC, which follows individuals during four periods, and create a dependent variable that takes the value 1 if the individual transited from employment, unemployment or inactivity (different from being a student) at time $t-1$ to education at time t , and 0 otherwise.¹²

The results in Table 5 indicate a positive relationship between the level of unemployment in a given region and the decision by young people to make the transition back into education. The effect holds after controlling for individual characteristics and household income, and it is confirmed by analysis at the country level. Table A7 in the Appendix shows all the coefficients of the control variables included. In particular, we find that a 1 percentage point increase in the current population unemployment rate at the regional level is associated with a 0.15 percentage point increase in the proportion of young people who return to education. Given that the

¹¹For example, we would like to test whether the rising cost of college education in those countries that applied austerity measures during the Great Recession (like the UK and Spain) is behind this behavior. Unfortunately, there are no data on fees that are comparable across countries for the period of our analysis. We tried to proxy the cost of college education using data on public spending on tertiary education from 2008 to 2014. The idea is that in those countries where the public spending on education decreased due to the application of austerity measures during the Great Recession, the private cost of college education increased. We define an indicator variable that takes the value 1 if public spending per student (adjusted by inflation) decreased between 2008 and 2014 and 0 if it remained unchanged or increased, and include this variable and its interaction with the unemployment rate. We also tried including the full series of public spending per student in real terms and its interaction with the unemployment rate. The interaction term was always statistically insignificant either for the whole sample or for the first quartile of income. While this evidence suggests that the pro-cyclical relationship for the poorest is not driven by those countries that reduced the public budget in tertiary education during the Great Recession, we think that it is not enough to reject the hypothesis that the rising cost of education affected the decisions on skills acquisition for the poorest.

¹²It is important to acknowledge that the individual's labor market status at a given point in time is in itself an outcome of the economic conditions, and therefore sample selection may be an issue. Despite that, we believe that the longitudinal analysis that we propose here is still useful, to understand whether the counter-cyclical effect found in the previous section is driven by transitions back into education, school retention or both.

TABLE 5
BACK TO EDUCATION AND THE UNEMPLOYMENT RATE—MAIN RESULTS

	Raw		+ Individual Characteristics		+ Family Income	
UR (<i>t</i>)	0.0360***	(0.0086)	0.0387***	(0.0085)	0.0372***	(0.0083)
Marginal effect	0.0016***	(0.0004)	0.0016***	(0.0003)	0.0015***	(0.0003)
<i>N</i>	230,232		229,286		229,266	
UR (<i>t</i> −1)	0.0394***	(0.0075)	0.0437***	(0.0076)	0.0420***	(0.0075)
Marginal effect	0.0018***	(0.0003)	0.0018***	(0.0003)	0.0017***	(0.0003)
<i>N</i>	230,232		229,286		229,266	
UR (<i>t</i> −2)	0.0430***	(0.0078)	0.0484***	(0.0083)	0.0467***	(0.0082)
Marginal effect	0.0019***	(0.0003)	0.0020***	(0.0003)	0.0019***	(0.0003)
<i>N</i>	230,198		229,252		229,232	

Note: Results from estimating equation (1) using the EU-SILC longitudinal microdata from 2004 to 2014. Sample: Youth 17–29 years old. All the regressions contain region and year fixed effects. Individual controls include sex, age, age squared, an indicator variable of whether the individual has a partner, an indicator variable of whether the individual lives with his/her parents and an indicator variable of whether the individual has children. Household income is a set of dummies indicating whether the household belongs to the second, third or fourth quartile of the equivalent income distribution (the first quartile is omitted). Standard errors (in parentheses) are clustered at the regional level.

****p* < 0.01; ***p* < 0.05; **p* < 0.1.

baseline of the dependent variable is lower (0.042) than in the previous section, this effect represents an increase of 3.6 percent. The marginal effects are slightly higher if we consider the lagged unemployment rate: a 1 percentage point increase in the unemployment rate 1 or 2 years earlier is associated with an increase of about 0.17 and 0.19 percentage points in the proportion of young people who return to education, respectively. Our results are robust to the use of the youth unemployment rate, different adjustments of the standard errors and specifications and the sample of countries analysed (see Table A10 in the Appendix). We carry out the same robustness checks as in the previous section, and our qualitative findings remain unchanged. The only exception is the difference-in-difference analysis. In this case, the results suggest that all the effect on the likelihood of transiting back to education is driven by the regions (countries) most affected by the recession (the variable *post* is not statistically significant in this case).

Our results therefore suggest that during the Great Recession, a non-negligible proportion of young Europeans decided to return to education. To the best of our knowledge, Dellas and Sakellaris (2003) is the only other paper to investigate whether individuals who return to the educational system drove the effect on total enrolment in the United States from the late 1960s to the late 1980s. Given that they do not have panel data, the authors look at the results by age and find that the older the individual, the lower the effect; this suggests that their results are mainly driven by the enrolment of new cohorts and that the effect of those returning to education is more limited. They conclude that, in their case, the effect of the business cycle on schooling decisions is permanent, as those who left education do not return to it when economic conditions worsen. In our case (and given that we find a clear effect when we look at those who decide to return to education), it implies that for some young individuals in Europe the effect of the business cycle on their

schooling decisions is transitory: they move out of education in boom times, but return to formal education when economic activity falls off.¹³

5.2.1. Subgroup Analysis

Having found that a proportion of young people return to education during bad economic conditions, we now turn to a subgroup analysis. We explore again whether there are differences by gender, age, educational level and household income, and also by the previous year's labor market status.

The results are displayed in Table 6. As can be seen from Panel A, there are differences by gender (as in the previous section): while a 1 percentage point increase in the regional unemployment rate leads to an increase of 0.20 percentage points in the likelihood of transiting back into education for young men, the magnitude of the effect is much lower (about half) for girls. Differences are statistically significant at 95 percent in the analysis at the regional level and at 99 percent at the country level. Panel B presents the results by age group. The results suggest that the business cycle has a stronger effect on the propensity to return to education among those younger than 23. However, Wald tests indicate that this is not the case, as the differences are not statistically meaningful at any standard confidence level. In this respect, it is important to recall that the sample in this analysis is mostly composed of older youth, as shown in Table 1.

Panel C details the analysis by educational level. Note that although we observe the current educational level, it is unlikely that we are capturing the level reached after the return to education, given that we are studying transitions in a 1-year window. The results indicate that only those who have a high school diploma or lower decide to return to education during a recession. Specifically, a 1 percentage point increase in the unemployment rate is associated with an increase of 0.19 percentage points in the likelihood of a young person who dropped out of high school returning to education, and of between 0.17 percentage points in the case of youths with a high school diploma. By contrast, our findings suggest that poor economic conditions do not lead young people who already have a college degree to enrol in education again. Tests also indicated a higher probability of enrolment among lower-secondary school graduates (or less) and upper-secondary school graduates than among individuals already holding a university degree. As Alessandrini *et al.* (2015) point out, low-productivity individuals tend to react more to changes in the labour market conditions, because they face a lower opportunity cost of education and a higher marginal product of human capital.

We next analyse the effect depending on an individual's initial labor status. As detailed in Panel D, the decision to return to the educational system is counter-cyclical for those who were employed or unemployed 1 year earlier, although the estimates are less precise for the latter group, for whom the number of observations in our sample is substantially lower. In the case of inactive individuals (not students),

¹³To test whether this is a feature of the European countries (in comparison with the United States) or is rather a new trend brought about by the Great Recession is an empirical question that is beyond the scope of this paper. For example, Long (2004) hypothesizes for the United States that college decisions may have become more linked to the development of the economy in recent decades. In any case, it is important to note that the Great Recession in Europe has been different from other periods of economic downturn, in the sense of being particularly hard on young people (Bell and Blanchflower, 2011).

TABLE 6
BACK INTO EDUCATION AND THE UNEMPLOYMENT RATE—SUBGROUP ANALYSIS

	At Regional Level				
	Coeff.	Std. Error	Marg. Effect	Std. Error	N
<i>I. TOTAL enrolment</i>					
<i>A) By gender</i>					
Males	0.0518***	(0.0117)	0.0020***	(0.0005)	123,580
Females	0.0215**†	(0.0086)	0.0009**	(0.0004)	105,548
<i>B) By age</i>					
23 or younger	0.0403***	(0.0075)	0.0035***	(0.0007)	71,353
Older than 23	0.0352***	(0.0135)	0.0008***	(0.0003)	157,554
<i>C) By highest educational level</i>					
Lower secondary school (or less)	0.0497***	(0.0136)	0.0019***	(0.0005)	55,341
Upper secondary school	0.0377***†	(0.0109)	0.0017***	(0.0005)	125,278
College degree	0.0081	(0.0153)	0.0002	(0.0005)	46,249
<i>D) By labor status at t-1</i>					
Employed	0.0423***	(0.0091)	0.0012***	(0.0003)	160,659
Unemployed	0.0282*	(0.0158)	0.0018*	(0.0010)	40,647
Inactive (not students)	0.0155‡	(0.0129)	0.0011	(0.0009)	27,804
<i>E) By income quartiles</i>					
Q1	0.0319**	(0.0135)	0.0016**	(0.0007)	52,217
Q2	0.0272**	(0.0109)	0.0012**	(0.0005)	54,166
Q3	0.0423***	(0.0148)	0.0014***	(0.0005)	63,620
Q4	0.0670***‡	(0.0156)	0.0023***	(0.0005)	58,174

Note: See the note to Table 5.

The symbols ‡, † and † indicate differences statistically significant at 0.01, 0.05 and 0.1 (Wald tests) with respect to the first category (reference) in each panel.

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

none of the specifications yields statistically significant results. This is a very heterogeneous group, which includes permanently disabled individuals, those doing compulsory military service and “other inactive” If the group of young people not in employment, education or training (NEET) belongs in part to this category of “other inactive”, our results indicate that worse economic conditions do not necessarily bring them back to education.

Finally, we explore whether the labor market conditions affect the decision to transit back into education in a different way, depending on household income. As can be seen from Panel E, the effect of an increase in the unemployment rate on the propensity to return to education is positive and statistically significant for all groups, although slightly stronger for those in the highest quartiles of the income distribution. Tests indicate that there are no differences between adjacent quartiles, but differences are statistically significant at 90 percent, for example, between the first quartile (the poorest) and the fourth quartile (the richest), at 95 percent between the second and the fourth quartiles or at 90 percent between the first and the third or fourth quartiles in the analysis at the country level. Thus, unlike in the previous section, we find that transitions back into education are counter-cyclical for all income groups. In this respect, it is important to recall that the results in Panel C showed that transitions back into education are partly driven by lower-secondary

school graduates (or less) potentially going back to complete their studies (which, at that level, does not generally require the payment of fees in the majority of countries). Moreover the sample of potential individuals who make the transition back to education is composed of older youth, who have largely already engaged in several transitions to adulthood and may be able to rely on their own income.

5.3. *School Retention*

For the sake of completeness, we also ran all the specifications for the group of young people who have continued in education. The results are not shown (for reasons of space), but are available from the authors upon request. In this case, the dependent variable takes the value 1 if the individual is a student at $t-1$ and at t , and 0 if the individual is a student at $t-1$ but changed status at t . Naturally, with the data to hand, we cannot distinguish between those individuals who remain in education because their studies have not ended and those who decide to continue studying (possibly moving to a higher educational level) because of the macroeconomic conditions. Nevertheless, the main results indicate a positive relationship between the unemployment rate and school retention; however, the results are not robust across specifications, since the coefficient for the unemployment rate at the country level is not statistically significant when using controls, while the coefficient for unemployment at the regional level is significant at 1 percent in all regressions. In this case, a 1 percentage point increase in the regional unemployment rate is associated with an increase in school retention of between 0.21 and 0.25 percentage points, depending on the controls used. This effect represents 0.3 percent of the baseline mean of the dependent variable (0.783). In Section 5.2, for the case of transitions back into education, we found an effect of 3.6 percent on the dependent variable, which highlights that the counter-cyclical behavior of school enrolment is mostly explained by individuals returning to education. The coefficients for lagged unemployment rates are not precisely estimated in any of the specifications at the country level, while at the regional level the significance drops to 5 percent when the unemployment rate refers to $t-1$ and to 10% for the unemployment rate at $t-2$ and when we use controls.

In the analysis by subgroups, girls present a more robust relationship between rising unemployment rates and the probability of staying on at school—with the regression among boys only statistically significant at the regional level. By age group, once again the relationship is mostly driven by those younger than 23, with no significant sign found among those older. Interestingly, the results indicate that school retention during bad times is mostly driven by university students, with the coefficient for the unemployment rate significant at 5 percent in all regressions. For example, a 1 percentage point increase in the unemployment rate at the regional level increases retention by 0.53 percentage points, while the figure when economic conditions are measured at the country level is 0.74. In other words, growing unemployment rates enhance retention among university students—as was found by Long (2015) for the United States—but the same is not true of those who have not yet graduated from high school. Finally, by household income, once more individuals belonging to the first quartile do not show a higher probability of school retention associated with higher unemployment rates, indicating again the great difficulty in acquiring education for those at the bottom end of the income distribution, compared with their richer counterparts.

6. CONCLUSIONS

This is the first paper to study enrolment, transitions back into education and school retention of young people in 28 European countries during the Great Recession. We analyse the extent to which rising unemployment rates can be associated with more young people being engaged in non-compulsory education. To this end, we use two sources of data: (1) the repeated cross-sectional component of the EU-SILC, which allows analysis of total enrolment, and (2) its longitudinal component, which follows individuals for four consecutive waves, thus permitting the identification of transitions back into education and school retention. The period under analysis starts in 2004 and ends in 2014.

Poor labor market conditions can affect young people's decisions to invest in education in many ways. On the one hand, if there are fewer opportunities in the labor market and worse working conditions, it may be a better alternative to stay longer in the educational system (or to return to it) than to accept a poor job or unemployment. On the other hand, the probable reduction in individual and family income may decrease the probability of enrolment when the economy enters a recession, either because individuals cannot afford tuition fees or student expenses or because more family members need to be in the labour market to make ends meet. In addition, if governments are forced to apply austerity measures that affect educational budgets, this may have an impact on tuition fees and/or on the number and amount of student grants, which may also reduce the enrolment rate. Therefore, depending on which effect prevails (the "opportunity cost" or the "income/budget" effect), one can observe an increase or a decrease in the enrolment rate during an economic downturn.

The main results show that young Europeans were more likely to enrol in education in response to the poor labour market conditions brought about by the recession. A 1 percentage point increase in the overall unemployment rate translated into an increase of between 0.23 and 0.37 percentage points in the probability of being enrolled in education. Moreover, our analysis by educational level revealed that the overall trend is driven as much by those enrolling in non-compulsory secondary education as by university students. As previously documented in the literature for the United States (and also for some European countries), individuals are more likely to react to adverse economic conditions by engaging in education when the opportunities in the labour market are scarce.

In our analysis by socio-demographic characteristics, we found that males and younger individuals are more likely to be enrolled in education in response to rising unemployment; but more important, our results also showed that not all young people had the same chances of being enrolled in education during the period: boys and girls in households at the lowest end of the income distribution (first quartile) are not *equally* more likely to be enrolled in education as their richer counterparts. The results are particularly worrying in the case of university studies: youths in the lowest quartile were actually less likely to be enrolled in university studies during the Great Recession. This is the only pro-cyclical result that we find in the whole paper, indicating that actually the "income/budget" effect overrides the "opportunity cost" for individuals from more disadvantaged backgrounds.

To gain a more nuanced understanding of the overall trend of increased enrolment, we used longitudinal data to isolate the effect of returning to education from

that of staying on at school. Importantly, while we find that both groups can explain the overall trend, it is transitions back into education that have the strongest link with the macroeconomic conditions.¹⁴ This means that in the case of Europe, we can establish a transitory effect of the business cycle on human capital accumulation decisions, whereby those who moved away from education in good times often come back to it. Such a transition is also more likely among men than women—something which may help narrow the gender gap in education. Otherwise, rising unemployment rates have a less robust impact on those who are already in the educational system and stay on at school. The increased trend of transition back into education is mostly driven by lower-secondary school graduates (or less) and upper-secondary school graduates (rather than by those who hold a university degree), which reveals the need for skills acquisition among those with fewer opportunities in the labour market. Possibly because transitions back into education occur mostly at the non-compulsory secondary school level, we find that the likelihood of returning to education is similar across income quartiles.

Our findings suggest that not only did the Great Recession in Europe bring about a change in the pattern of young people's schooling decisions, but it also increased the inequality of opportunities in skills acquisition according to socio-economic characteristics. The reasons underlying our results are difficult to disentangle, given the great heterogeneity of the countries under analysis and the different responses to the Great Recession that each took; but probably education cutbacks in the form of higher tuition fees or a reduced number of scholarships play a part. The educational sector acted as a buffer for many young people during the Great Recession, but it is up to policymakers to make sure that such a cushion exists equally for everyone.

This analysis has several limitations. Our results are necessarily an imperfect measure of the impact of the Great Recession on school attendance, because we cannot control for young people's patterns of emigration in search of labour market or educational opportunities. Moreover, our results based on longitudinal data may be limited by the fact that the EU-SILC survey does not follow all young people equally well in their transition from the parental home in the different countries. Finally, our results may be biased by attrition, something that the EU-SILC can improve upon.

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¹⁴These results were also confirmed by models on the longitudinal sample that interacted the unemployment rate with the individual's status as a student in the previous year. Considering the baseline mean of the dependent variable, we found that a 1 percentage point increase in the unemployment rate raises the enrolment rate by 1.1% among those who were not enrolled in the previous year, while the positive effect on school retention is 0.3%. We would like to thank a referee for suggesting such an analysis.

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SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article at the publisher’s web site:

Appendix A

Table A.1: Countries in the Analysis and Period of Time Covered

Table A.2: Detailed Results of Main Estimates in Panel A of Table 2

Table A.3: Total Enrolment and the Unemployment Rate—Main Results

Table A.4: Total Enrolment and the Unemployment Rate by Educational Level

Table A.5: Total Enrolment and the Unemployment Rate—Subgroup Analysis

Table A.6: Total Enrolment and the Unemployment Rate—Robustness Checks

Table A.7: Detailed Results of Main Estimates in Panel A of Table 5

Table A.8: Back to Education and the Unemployment Rate—Main Results

Table A.9: Back Into Education and the Unemployment Rate—Subgroup

Analysis

Table A.10: Back Into Education and Unemployment Rate—Robustness

Checks