

# The effect of local labour market conditions on educational choices: a cross country comparison

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## **ABSTRACT**

Schooling decisions have a complex nature. Building on the theoretical predictions of the human capital investment model and on previous evidence, we study the relationship between prevailing labour market conditions and schooling decisions in three European countries: Italy, Germany and the UK. The paper contributes to the existing literature by explicitly modelling the role of home ownership in affecting the response to incentives coming from the labour market. The analysis shows that labour market conditions significantly influence the choice of post compulsory secondary education in Italy and the UK, but responses to such incentives are heterogeneous with respect to housing tenure. In Germany, labour markets do not affect the choice of the secondary school track, while they have a significant impact on the transition to tertiary education. As the educational decisions of young people are responsive to changes in the expected gains from education, and bearing in mind the education related goals set by the EU 2020 agenda, policies aimed at raising levels of human capital within the EU should aim at making education a profitable investment.

**Keywords:** Educational outcomes, business cycle, BHPS, Understanding Society, SOEP, SILC.

**JEL Classification:** C21; I21; J40

# 1 INTRODUCTION

Education is one of the five headings of the Europe 2020 agenda for smart, sustainable and inclusive growth with two education specific targets for 2020. These are a fall to below 10% in the school dropout rate and an increase to at least 40% of the share of the population aged 30-34 having completed tertiary education (European Commission, 2010). The importance of upper secondary education is stressed out by the following paragraph (European Commission 2012):

(upper-secondary education is) “... entrenched as a minimum attainment level for all European citizens leaving education and training systems. Young people who leave education and training prematurely lack crucial skills and run the risk of facing serious, persistent problems on the labour market. ... Moreover, they are less likely to be 'active citizens' or to engage in lifelong learning. For society at large, ESL (Early School Leaving) is an obstacle to economic growth and employment”.

The fall in rates of early school leaving, however, has been slower than expected, and an extrapolation of the 2000-2011 trend predicts that the EU would miss the 10% school dropout target for 2020. Hence more effort is needed from the EU member states to reach the target (European Commission, 2012). Our aim in this paper is to identify how the schooling decisions of young people in Germany, Italy and the UK are influenced by prevailing local labour market conditions.

Why should the local labour market influence schooling decisions? According to the human capital investment model (Becker 1962; Card and Lemieux 2001) educational choices have an economic nature: they are made taking into account both the cost and the expected returns of education. Local labour market conditions are likely to affect both dimensions of the choice. On the one hand high levels of youth unemployment reduce the opportunity cost of remaining in education. Intuitively, it is more difficult for a young person to find a job in a period of low labour demand. On the other hand, adult unemployment can influence the expected returns to schooling in two contrasting ways. Firstly an increase in adult unemployment might generate a “discouraged student” effect if it reduces the perceived probability of finding a job in the future. Secondly, it is possible for schooling to be perceived as an insurance against the risk of future unemployment. In the former case high adult unemployment rates would negatively affect returns to education and hence demand for schooling, while in the latter high adult unemployment rates positively affect the demand for schooling (Micklewright et al. 1990).

Our research is particularly timely given the extent to which the “Great Recession” has affected European labour markets, and unemployment rates in particular. Between the second quarter of 2007 and the same quarter of 2011 the EU-27 unemployment rate rose by 2.3 percentage points to 9.4%, an increase of 32%. Young people have been hit the hardest with the youth unemployment rate rising by 5.5 percentage points at the EU level, reaching 20.8% (an increase above 35%). Moreover, unemployment rates have been extremely heterogeneous across countries. For example in Germany unemployment declined both for young people (by 3.5 percentage points) and for adults (by 3 percentage points); in Italy the youth unemployment rate increased by 8.9 percentage points to 27.4%, while adult unemployment rate rose by 1.6 percentage points to 4.8%.<sup>1</sup> Human capital theory suggests that the effect of local labour market conditions on educational choices is ambiguous. Hence the Great Recession may have some long-term positive effects on human capital stock if the net effect of unemployment rates on the demand for schooling were positive. However, it is also possible that the human capital level of the economy has been negatively affected by the crisis,

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<sup>1</sup> Source: EUROSTAT, Labour Force Survey Database.

making economic recovery even harder. Which dominates is an empirical question which we address by exploiting data from three countries with very different educational infrastructures and systems.

Given the heterogeneity of the educational systems, the focus of our analysis varies slightly across the countries studied. For Italy and the UK we focus on the relationship between local labour market conditions and enrolment in post-compulsory education, while for Germany we focus on the relationship between local labour markets and two different educational choices: the lower-secondary school track chosen and the likelihood of attending university after *Gymnasium* – the highest among the Germany secondary school tracks. Section 2 contains a description of the distinctive features of the educational systems of the countries of interest.

Previous research on this topic has focused on a number of countries, datasets and time periods. For example, UK time series data suggest a positive and statistically significant relationship between the unemployment rate and demand for post compulsory education over various periods between 1995 and 2005, although effects are sometimes found to be larger for men (Clark 2011; McVicar and Rice 2001; Pissarides 1981; Whitfield and Wilson 1991). However, UK evidence is less clear-cut from studies using micro-data. Micklewright et al. (1990), using data from the Family Expenditure Survey for the period 1978-1984, find that high levels of regional unemployment tend to reduce the demand for schooling, although this is sensitive to changes in model specification. Rice (1999), using the Youth Cohort Studies for England and Wales for people completing compulsory education in the years 1988, 1990 and 1991, finds that the unemployment rate has a positive effect on school enrolment, but only for men with low levels of educational attainment. Meschi et al. (2011), using data from the Longitudinal Study of Young People in England for the academic year 2006/2007 matched to the National Pupil Database Pupil and Level Annual School Census, estimate a nested logit model, where 16 year olds choose between leaving education and continuing studying in the first stage, and between full-time and part-time education or between full-time employment and unemployment in the second stage. Their analysis shows that the local youth unemployment rates have a significant impact upon the decisions of lower ability pupils. For Spain, Petrongolo and San Segundo (2002) use youth unemployment rates as a proxy of the opportunity cost of enrolling in education and the general unemployment rate as an indicator of the expected returns of education. Using data from the Spanish Labor Force Survey (Encuesta de Población Activa) for the years 1987, 1991 and 1996, the authors find a significant and positive effect of the former on the probability of remaining in education, while the general unemployment rate reduces this probability. Focusing on post compulsory education in Italy, Mocetti (2012) finds that youth unemployment has little impact on the decision of whether or not to leave school after compulsory education, but it does affect the type of secondary school chosen by those remaining in education. In particular, using data from the 2004 and 2005 Labour Force Survey, the author finds that high levels of youth unemployment are associated with a lower likelihood of accessing vocational schools relative to more general academic education.

Beyond labour market conditions, family resources play an important role in determining children's educational decisions. Among others, evidence of a positive relationship between family income and college participation in the US can be found in Cameron and Heckman (2001) and Carneiro and Heckman (2002), while Blanden and Greg (2004) find a strong relationship between household income and educational attainment in Britain. Similar findings also emerge in Germany (Jenkins and Schluter 2002). Two main theories have emerged to explain this relationship. The short term credit constraints hypothesis suggests that families with lower incomes face borrowing constraints as participation in post-compulsory education incurs financial costs, and family economic resources

have a direct effect on children's educational attainment (Kane 1996; Ellwood and Kane 2000<sup>2</sup>). Credit constraints are, in fact, a source of underinvestment in human capital as the marginal cost of the investment in education is higher for constrained individuals, causing them to stop schooling when the marginal return is still relatively high (Lochner and Monge-Naranjo 2011). The positive relationship between family income and school attainments might also be the consequence of long run factors associated with family income. This hypothesis suggests that family income is highly correlated over the child's life cycle and that families with more resources during the child's formative years are able to "better shape the abilities and expectations of their children, who are better able to perform at school" (Carneiro and Heckman 2002). Hence higher family income is associated with higher ability and expectations among children, raising their educational attainment. Although several papers fail to identify a major role for credit constraints in the US (e.g. Cameron and Taber 2004), a stronger relationship between family income and college attendance conditional on ability has been found by Belley and Lochner (2007) using more recent data.

In addition to parental income, several studies suggest that parental assets are important in explaining educational outcomes. Nam and Huang (2009) suggest that assets are a good indicator of the household liquidity level since savings reduce the need for borrowing while tangible assets improve the access to the credit market providing collaterals; moreover, the authors reports that assets may be a better measure than income for socio-economic inequality and a more suitable indicator of long term economic status. As with the family income hypothesis, assets might affect schooling achievement through both a short term borrowing constraint and a long term family background perspective (Huang et al. 2010). On the one hand, parental assets can be directly used to finance education, and hence families with more assets are less affected by borrowing constraints. On the other hand, parental assets may be associated with factors like higher permanent income, better home environment, better schooling or higher family educational expectation.

The home is typically the most valuable and also the most commonly held asset. Lovenheim (2011) studied the effect of housing wealth on college enrolment in the U.S. and reports that, between 1977 and 2005, 85% of college attendees came from families that own a home and finds a positive effect of housing wealth on college enrolment (see also Dietz and Haurin 2003). This effect is larger for families with fewer resources and the results are consistent with the short term credit constraint hypothesis. Beyond financial reasons, Green and White (1997) suggest several other paths through which home ownership might influence children's educational outcomes. They suggest that owning a house may improve management skills which can be transferred to the children. They also argue that home owners might have a greater incentive in monitoring their own children and those of their neighbours to prevent them from engaging in behaviours that might reduce the values of their properties. However, it is also possible that children of homeowners outperform children of non homeowners because their parents are, for some reason, more likely both to buy a home and to raise more successful children. Thus failure to control for parental (unobserved) characteristics, the role of parental preferences toward investment on child outcomes would be wrongly captured by home ownership.

Home ownership has been found to be an important determinant of school leaving decisions in the UK. Micklewright et al. (1990), for instance, show that children in owner occupied households are less likely to leave school at age 16, while Dearden et al. (2009) find that the introduction of the Education Maintenance Allowance had a significant impact mainly among those living in rented accommodation, suggesting that credit constraints may be important. However Jenkins and Schluter

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<sup>2</sup> Cited by Lovenheim (2011)



(2002) report that home ownership does not significantly affect the choice of the secondary school track in Germany.

Our paper contributes to the existing literature by explicitly modelling the role of home ownership, a highly valuable and commonly held asset, in determining how young people respond to labour market incentives. In fact, assets well capture the impact of household resources on educational choices providing a good indicator of (the lack of) borrowing constraints and a better measure than income of the long term household socio-economic status (Nam and Huang, 2009). We draw on data from the German Socio-Economic Panel (SOEP), British Household Panel Survey, Understanding Society and the Italian module of the European Statistics on Income and Living Conditions (IT-SILC). These data are used to derive information on schooling decisions, and household and personal characteristics of the respondents. Local unemployment rates, at the regional level, have been calculated using data from the UK Labour Force Survey (UK-LFS) and from the European Labour Force Survey (EU-LFS) for Germany and Italy. Our analysis shows that local labour market conditions significantly influence schooling decisions and that the effect is heterogeneous with respect to housing tenure, at least in Italy and the UK. This has implications for how the recent Great Recession is likely to have affected the educational decisions of young people from different socioeconomic backgrounds.

The paper is organised as follows: first, the distinctive features of the educational systems of Germany, Italy and UK are described, with a focus on the rules regulating compulsory education. The data and methods used in the analysis of the relationship between local labour market conditions and schooling decision are described in section 2. Data and methods are described in section 3. The results of the analysis are reported and discussed in section 4. Conclusions follow.

## **2 A DESCRIPTION OF THE EDUCATIONAL SYSTEMS OF GERMANY, ITALY AND UK**

The aim of this paper is to identify the extent to which local labour market conditions determine schooling decisions in Germany, Italy and the UK. We focus on slightly different decisions in each country because of differences in the features of the educational systems in each country. In particular, while for Italy and the UK the focus is on the relationship between local labour market conditions and post compulsory schooling decisions, for Germany the focus is on the impact of local labour market conditions on the choice of the secondary school track and then on the probability of accessing tertiary education for those leaving the high school track.

This section contains a brief description of the educational systems of Germany, Italy and the UK. The section is only meant to provide information relevant for our analysis and is not an exhaustive discussion on all the differences in the educational systems of the three countries. We first describe the structure of the educational system in Germany, followed by Italy and the UK.

### **2.1 GERMANY**

The federal structure of the Republic of Germany assigns shared responsibility for the education system both at Federal Government and at the single Länder.<sup>3</sup> General compulsory education in Germany starts in the year in which pupils reach the age of six and, despite some differences across

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<sup>3</sup> Source: Eurypedia (Eurydice Network) <https://webgate.ec.europa.eu/fpfis/mwikis/eurydice/index.php?title=Germany:Overview&oldid=75693>

Länder, it usually lasts for nine years (Eurydice 2011).<sup>4</sup> After completing full time compulsory education, pupils either attend full time general education or vocational school at the upper secondary level, or part-time schooling and vocational training. The part-time schooling and vocational training path usually lasts for three years, according to the duration of the training.

After finishing primary education, which lasts for four grades (six in Berlin and Brandenburg), pupils access lower secondary education. A consultation between schools and parents is at the base of the school choice. Traditionally, three different secondary school paths can be chosen: *Hauptschule* (or low school track) provides a basic general education and it lasts until grade nine (ten where general compulsory education lasts for ten years). A leaving certificate after grade 9 is usually used to gain access to vocational training under the “dual system”. *Realschule* (or middle school track) provides a “more extensive general education” (Eurydice 2011) and it usually lasts until grade ten. A leaving certificate from *Realschule* allows pupils to access schools providing a vocational qualification or entrance qualification to higher education. *Gymnasium* (or high school track) provides an intensified general education. *Gymnasium* covers both lower and upper secondary education and it lasts until grade 12 or 13. At the end of grade 9 a certification is issued for accessing the upper level of the *Gymnasium*. Together with the traditional tracks, comprehensive schools (*Gesamtschule*) and other schools offering more than one type of course of education exists. After grade 10, students from comprehensive schools can be issued with a certificate allowing entry to the upper level of *Gymnasium*.

Access to university and other institutes of higher education can be obtained through several channels. School leavers from some full time vocational institution, like the *Berufsoberschule*, have the possibility to gain the certifications which allows access to at least some tertiary education institutions. For the purpose of this paper it is sufficient to state that a satisfactory mark in the *Abitur* examination after the high school track allows school leavers to access any institution of higher education.

Given prerogatives of the German system, with the strong link between the education/training possibilities after compulsory education and the compulsory secondary track attended, the following analysis for Germany focuses on two different aspects. First I analyse the relationship between local labour market conditions and enrolment in lower secondary school. Then, focusing on *Gymnasium* school leavers, I study the impact of local unemployment rates on university enrolment.

## 2.2 ITALY

The main features of the Italian system relevant to this paper can be summarized as follows: primary school starts at age six and last for 5 years; pupils then enrol in lower secondary school, which lasts for 3 years. At this point, pupils can choose whether to enrol in an upper secondary school (academic or technical/vocational) lasting 4-5 years and enabling the enrolment in university studies, or access the vocational education and training lasting 2 or 3 years and which does not give access to university.

The Italian educational system has been subject to several reforms in the past 15 years<sup>5</sup>. From school year 1999/2000 compulsory education was raised by one year to 9 grades (usually age 15). The obligation to follow formative activities until the age of 18 was also introduced. The obligation could

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<sup>4</sup> In Berlin, Brandenburg, Bremen and Thüringen the duration of compulsory education is ten years; in Nordrhein-Westfalen compulsory education lasts for nine years for the *Gymnasium* and ten for other general education schools.

<sup>5</sup> See Benadussi and Niceforo (2010) for a complete review of the reforms

be fulfilled both within the educational/vocational system and through an apprenticeship. In 2003 a new reform, known as “*riforma Moratti*”, was approved. Among other things, this reform cancelled the rise in compulsory education, but introduced an obligation of following “education and/or formative activities” until the age of 18. While the previous reform foresaw compulsory education “at school” until the end of grade 9, with the new reform education obligations were considered fulfilled by not only attending school but also an apprenticeship from age 15.

From school year 2007 a new definition of the compulsory education was implemented (“*riforma Fioroni*”), where, among other things, a list of “key competences” to be obtained by the age of 16 replaced the traditional compulsory education age. The obligation of receiving “instruction” aimed at acquiring the “key competences” by the age of 16 and at gaining an educational and/or professional qualification within the 18<sup>th</sup> year of birth was hence introduced. Despite the change of focus from compulsory education and formative activities to the acquisition of “key competences”, the practical impact of the reform was limited. The institutions supposed to fulfil the duty of providing those competences were, in fact, the same as those where the obligation of “education and/or formative activities” was fulfilled (Benadussi and Niceforo, 2010).<sup>6</sup>

Given the characteristics of the Italian school system, our analysis for Italy focuses on the extent to which local labour markets influence the choice of continuing education in an academic or technical/vocational school, which gives the possibility to access university, versus leaving school for apprenticeships or vocational education and training.

## 2.3 UNITED KINGDOM

At the time of writing, education in the UK is compulsory between the school term after their 5th birthday and the last Friday in June in the school year they turn 16. After being increased from 15 to 16 in 1972, the compulsory education age in England is due to rise to age 17 from 2013, and to age 18 from 2015. According to the Education and Skills Act (2008), the obligation will be fulfilled through full time education, vocational training and/or apprenticeship.

The analysis for the UK focuses on the impact of local labour markets on the probability of leaving education after the fulfilment of compulsory schooling at age 16.

The next section contains a description of the data and methods used in the analysis.

## 3 DATA AND METHODS

Different data sources have been used for these analyses. Regional local labour market conditions are captured by age and gender specific unemployment rates, constructed using the European Labour Force Survey (EU-LFS) for Germany and Italy and the National Labour Force Survey for the UK. The individual and household characteristics of children and their parents, and their educational decisions, are drawn from different country specific surveys: the German Socio Economic Panel (SOEP), the Italian module of the Statistics on Income and Living Conditions (IT-SILC), and the British Household Panel Survey (BHPS) and Understanding Society. In particular, as well as indicators of the prevalent labour market conditions for youths and adults and housing tenure, information on highest parental education, family income, parental unemployment and household composition are included

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<sup>6</sup> Although subsequent reforms have been implemented in the following years, their content is not of primary importance for the purpose of this paper.

in the analysis. Previous research has shown that these are powerful indicator of a child's educational decisions.

The following sub-sections contain a general description of the surveys used in the analysis. The variables of interests are also introduced and descriptive statistics presented. These subsections are organised by country.

### 3.1 GERMANY

The analysis for Germany focuses on two different transitions. First, the focus is on the extent to which local labour market conditions influence the secondary school track chose, followed by the relationship between local unemployment rates and the probability of accessing tertiary education for those respondents observed to leave the high school track (*Gymnasium*). Data from the European Labour Force Survey (EU LFS) and German Socio-Economic Panel (SOEP) are used.

The EU LFS is used to construct gender-specific youth and adult unemployment rates at a regional level. It is a large sample survey of private households providing detailed annual and quarterly information on various aspects of the working life of respondents. The unit of analysis is individuals aged 15 and over and the overall sample size is about 1.5 million people per quarter. Annual microdata relative to the spring quarter of each year have been used for the period 2002-2004, while 2<sup>nd</sup> quarter data have been used for the period 2005-2010. A regional (*Länder*) and gender specific unemployment rate for 15 to 24 year olds has been computed as a measure of the youth unemployment rate, while a *Länder* and gender specific unemployment rate for 40 to 64 year olds is used as an indicator of adult unemployment rate. Some of the 16 *Länders* have been merged to a contiguous *Länder* when the sample sizes do not allow a robust calculation of age and gender specific unemployment rates. The final dataset contains age and gender specific local unemployment rates for 12 geographical areas. Since EU-LFS microdata are not available for Germany for years before 2002, we only study educational decisions between 2002 and 2010.

The German Socio-Economic Panel (SOEP, v28 – data from 1984 to 2011) provides information on the schooling decisions of respondents and on their individual and household level characteristics. The SOEP is a wide-ranging longitudinal study of private households in place since 1984. Many different topics are included in the survey, ranging from household composition to educational characteristics and biographical data.<sup>7</sup> In particular, the dataset BIOEDU\_v2, containing information on educational transitions for SOEP respondents, has been used as a source of information for the identification of the secondary school enrolment and of the choice made by those exiting from the high school track (*Gymnasium*).

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<sup>7</sup> [http://www.diw.de/en/diw\\_02.c.221178.en/about\\_soep.html](http://www.diw.de/en/diw_02.c.221178.en/about_soep.html)

FIGURE 1: ENROLMENT IN THE “TRADITIONAL” TRIPARTITE GERMAN SCHOOL SYSTEM, BY TRACK

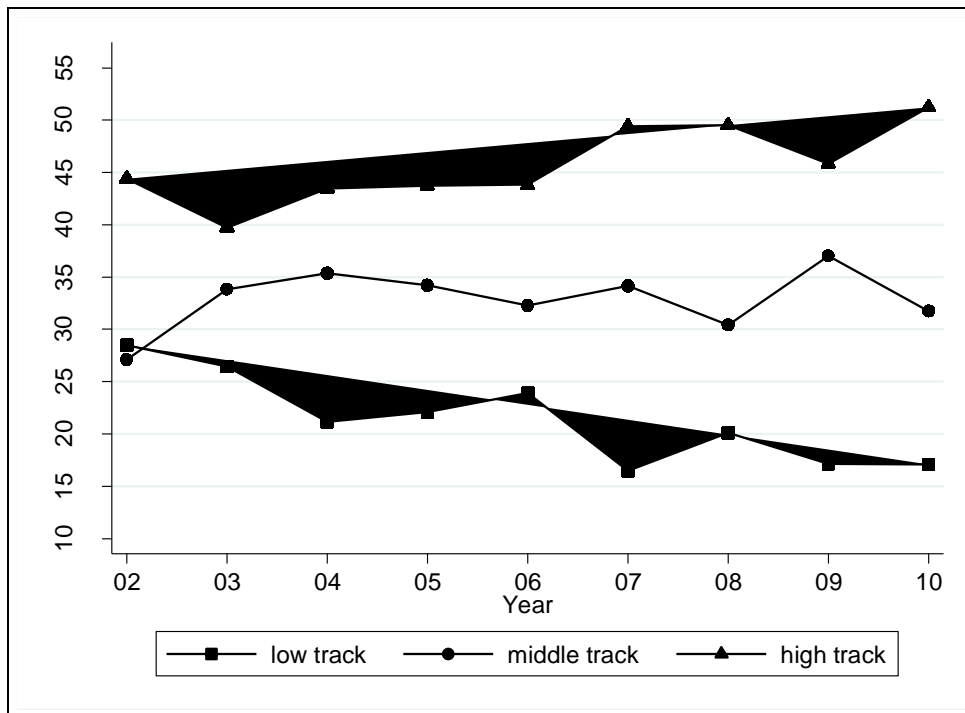


Figure 1 shows the proportion of individuals enrolled in each of the three traditional secondary school tracks in Germany during the years analysed. A trend toward an increase in the enrolment in the high school track is observed in the period analysed, while the chart shows a decreasing trend in enrolment in the low school track.<sup>8</sup> Our variable of interest in the subsequent analysis takes the value 1 if the child is enrolled in the low school track (*Hauptschule*) or the middle school track (*Realschule*) – referred to as the ‘job-oriented track’ – and 0 if enrolled in the high school track (*Gymnasium*).

TABLE 1: DESCRIPTIVE STATISTICS RELATIVE TO THE TRANSITION TO SECONDARY SCHOOL

	N	Mean	Academic (high track)	Job oriented	p-value (Academic=Job oriented)
15-24 UR	2107	10.821	11.074	10.612	0.013
40-64 UR	2107	8.152	8.369	7.972	0.029
Non Home Owner	2107	0.377	0.270	0.466	0.000
Low Parent Edu	2094	0.067	0.028	0.099	0.000
Medium Parent Edu	2094	0.463	0.307	0.592	0.000
High Parent Edu	2094	0.470	0.665	0.309	0.000
Male	2107	0.511	0.499	0.521	0.308
No Parents	2107	0.004	0.001	0.006	0.046
Unempl Parent	1979	0.087	0.037	0.127	0.000
Eq Income Decile	2044	5.696	6.865	4.715	0.000
Number of children in HH	2107	2.164	2.121	2.200	0.044

<sup>8</sup> Pupils choosing comprehensive schools or other schools are not included in the chart. The reason for this is that the analysis focuses on the effect of local labour markets on the probability of enrolling in a “job oriented track” (low or middle school track) versus an “academic oriented track” (high school track) and it is not possible to classify a-priori those schools as “job oriented” or “academic oriented”. The documentation relative to BIOEDU data explicitly advises to focus primarily on differences between the lower and middle school tracks and *Gymnasium*. ([http://www.diw.de/documents/publikationen/73/diw\\_01.c.379412.de/diw\\_datadoc\\_2011-058.pdf](http://www.diw.de/documents/publikationen/73/diw_01.c.379412.de/diw_datadoc_2011-058.pdf))

Table 1 contains descriptive statistics of the variables used in our analysis. Column (2) reports the sample mean for each variable and columns (3) and (4) the mean by type of track chosen. Column (5) contains the p-value of a t-test on the equality of the means of the two groups. The first observation to make is that we find initial evidence in favour of the opportunity cost hypothesis, in that young people entering the more academic-focused high school track on average face higher levels of youth unemployment (11.1% compared with 10.6%). They also face higher levels of adult unemployment (8.4% compared with 8%), which suggests the hypothesis of schooling as an “insurance” against future unemployment expectation. Furthermore the proportion of non home owners is significantly higher among those enrolling in a job oriented track (47%) than among those enrolling in the high school track (27%) – which is an initial indication that children in home-owning families have higher educational attainment than those from non home-owning families. These descriptive statistics also indicate that children with highly educated parents are most likely to follow the academic track (67% compared with 31%) while larger proportions of those with less educated parents follow the job-oriented track (10% compared with 3%).<sup>9</sup> There are no significant gender differences in the enrolment pattern, while having at least one unemployed parent is associated with a higher propensity for enrolment in a job oriented track. Children enrolled in the high school track come, on average, from households with higher equivalised disposable income, in the 7<sup>th</sup> income decile compared to the 5<sup>th</sup> decile among those choosing a job oriented track. The average number of children in the household is higher among those in low-middle school tracks.

**TABLE 2: DESCRIPTIVE STATISTICS RELATIVE TO THE TRANSITION TO TERTIARY EDUCATION**

	N	Mean	University Mean	Non Uni Mean	p-value (Uni=Non Uni)
15-24 UR	774	12.239	12.302	12.173	0.701
40-64 UR	774	10.307	10.093	10.532	0.266
Non Home Owner	774	0.269	0.273	0.265	0.798
Low Parent Edu	771	0.026	0.025	0.027	0.921
Medium Parent Edu	771	0.309	0.234	0.387	0.000
High Parent Qual	771	0.641	0.711	0.568	0.000
Male	774	0.443	0.497	0.386	0.002
No Parents	774	0.025	0.030	0.019	0.288
Unempl Parent	754	0.065	0.049	0.082	0.074
Eq Income Decile	760	6.286	6.622	5.933	0.001
Military service	774	0.189	0.258	0.116	0.000
Age	774	19.326	19.540	19.101	0.000

<sup>9</sup> Parental education is defined as the highest observed education between the parents.

Table 2 summarises variables used for the analysis of the relationship between local labour market conditions and university enrolment among young people leaving from the high school track.<sup>10</sup> These show no differences in home ownership rates between those who enrol in tertiary education and those who do not – about 27% of each group are not homeowners. There is also no relationship between enrolling in tertiary education and the prevailing unemployment rates. The share of respondents with middle-educated parents is higher among those who do not enrol in tertiary education after *Gymnasium* (39% versus 23%), while the opposite is true for students with highly educated parents (56% versus 71%). There is little difference by having low educated parents, probably because few children with such parents enrol in the high school track making this a very selected group. Men have a higher propensity to go to university than women, and the same is true for people who did the compulsory military service after leaving the *Gymnasium*. On average those who enrol in university are in the 7<sup>th</sup> household income decile compared to the 6<sup>th</sup> decile for those who do not enrol in university – consistent both with the credit constraint and higher permanent income hypothesis.

### 3.2 ITALY

Given the characteristics of the Italian educational system, the analysis for Italy focuses on the impact of local age and gender specific unemployment rates on educational decisions after compulsory education. Unemployment rates are constructed using the EU-LFS, while the Italian module of the European Statistics on Income and Living Condition (EU-SILC) for years 2004 to 2010 is used for information on educational choices and the individual and household characteristics of the respondent.

In particular, the educational status of youths aged 16 at the end of the SILC income reference period is used to create a binary variable equal to 1 if the respondent is not enrolled in any school or (s)he is enrolled in a vocational programs not giving access to university, equal to 0 if enrolled in academic or technical/vocational schools giving access to university.<sup>11</sup> The gender specific regional unemployment rates among 15-24 year olds and 40-64 year olds are used as indicators of the unemployment rates faced by young people and adults respectively. These are captured in the spring quarter of the year when the highest education status – lower secondary education – was achieved. Some regions have been merged to a contiguous region when the sample size did not allow a robust calculation of age and gender specific local unemployment rate, resulting in local unemployment rates being constructed for 15 geographical areas.

Figure 2 shows how the share of pupils leaving school or enrolling in vocational training evolved over time. Despite some non negligible variation between years, the trend is stable overall, although with

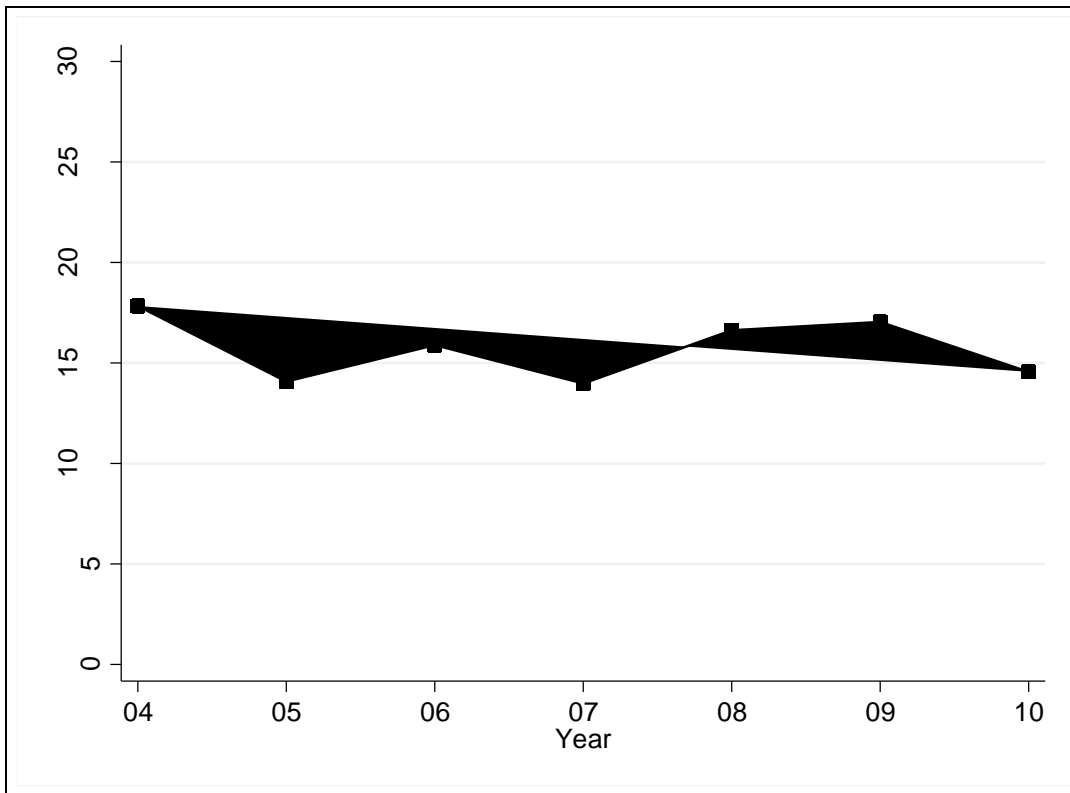
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<sup>10</sup> Using information on the last year observed in the high school track (*Gymnasium*) and on the following spell of education or training, I defined a variable equal to 1 if the respondent reports to be enrolled in university just after finishing secondary education, 0 if not. A one year gap between the end of secondary education and the beginning of university is allowed if the respondent reports to be in compulsory military service. If not observed in tertiary education, only respondents that have been interviewed both 1 and 2 years after the end of secondary education have been retained in the estimation sample.

<sup>11</sup> The estimation sample only includes youths with lower secondary education as highest education achieved since SILC reports only the year when the highest educational qualification was achieved. This choice has drawbacks: those who already finished a 2-3 year vocational program or a 4-5 years program giving access to university are not included in the estimation sample. As a robustness check, if the highest education was higher than lower secondary, I imputed the year when the respondent finished lower secondary education as the year of his/her 14<sup>th</sup> birthday, and used information on current education and highest education achieved to analyses whether they choose an “job oriented” track or a school giving access to university. The results of this analysis are largely in line with those presented here.

noticeable falls in the share of young people not in school or enrolled in vocational programs between 2004 and 2005 and between 2009 and 2010.

**FIGURE 2: ENROLMENT IN THE VOCATIONAL TRAINING OR LEAVING SCHOOL**



**TABLE 3: DESCRIPTIVE STATISTICS RELATIVE TO THE TRANSITION TO SECONDARY EDUCATION, ITALY**

	N	Mean	High school- Voc school Mean	Voc Training- dropout Mean	p-value (3)=(4)
15-24 UR	3497	25.776	26.025	24.445	0.052
40-64 UR	3497	4.928	4.988	4.610	0.017
Non Home Owner	3497	0.286	0.255	0.450	0.000
Low Parent Edu	3497	0.363	0.317	0.608	0.000
Medium Parent Edu	3497	0.470	0.499	0.318	0.000
High Parent Edu	3497	0.159	0.178	0.060	0.000
Male	3497	0.512	0.502	0.564	0.007
No Parents	3497	0.008	0.006	0.015	0.129
Unempl Parent	3497	0.075	0.066	0.125	0.000
Eq Income Decile	3497	4.910	5.071	4.049	0.000
Number of siblings	3497	1.112	1.094	1.205	0.011



Table 3, containing descriptive statistics of the variables used in the analysis, shows that young people enrolled in schools giving access to university face a higher values both of youth (26% compared with 24.4%) and adult (5% compared with 4.6%) unemployment rates. This is consistent youth unemployment reducing the opportunity cost of education and adult unemployment increasing expected return of schooling. The proportion of non home owners is higher among those not enrolling in a school giving access to university (45% versus 26%). Higher parental education is more common among those enrolling in schools giving access to university while low parental education is associated with a lower propensity to enrol in schools providing access to university. A larger proportion of those pursuing vocational education and training or leaving education are men (56%) while 50% of those enrolling in an institution giving access to university are men. Also, those enrolling in schools providing access to university are less likely to have an unemployed parent (7% compared with 13%), and to come from families with higher household income (in the 5<sup>th</sup> decile compared with the 4<sup>th</sup> decile).

### 3.3 UNITED KINGDOM

The analysis for the UK makes use of data from the British Household Panel Survey (BHPS) covering 1991-2008, wave 2 of Understanding Society (relating to 2010) and the UK Labour Force Survey. Data from BHPS and from BHPS sample respondents interviewed in Understanding Society are used to identify educational choices, and the personal and household characteristics of those finishing their compulsory education. The year and month of birth, as well as the date of interview, are used to identify those facing the choice of whether to remain in post-compulsory education or to leave education at age 16. Our dependent variable is equal to 0 if the young person facing this choice reports being in full-time education, and 1 if he/she reports doing something else (employment, unemployment, inactive etc). Data from the UK Labour Force Surveys covering the years 1991-2010 are used to compute the gender-specific rate of unemployment faced by young people (16-24 year olds) and adults (40-64 year olds) at the regional level. These refer to the spring quarter of the last compulsory school year.

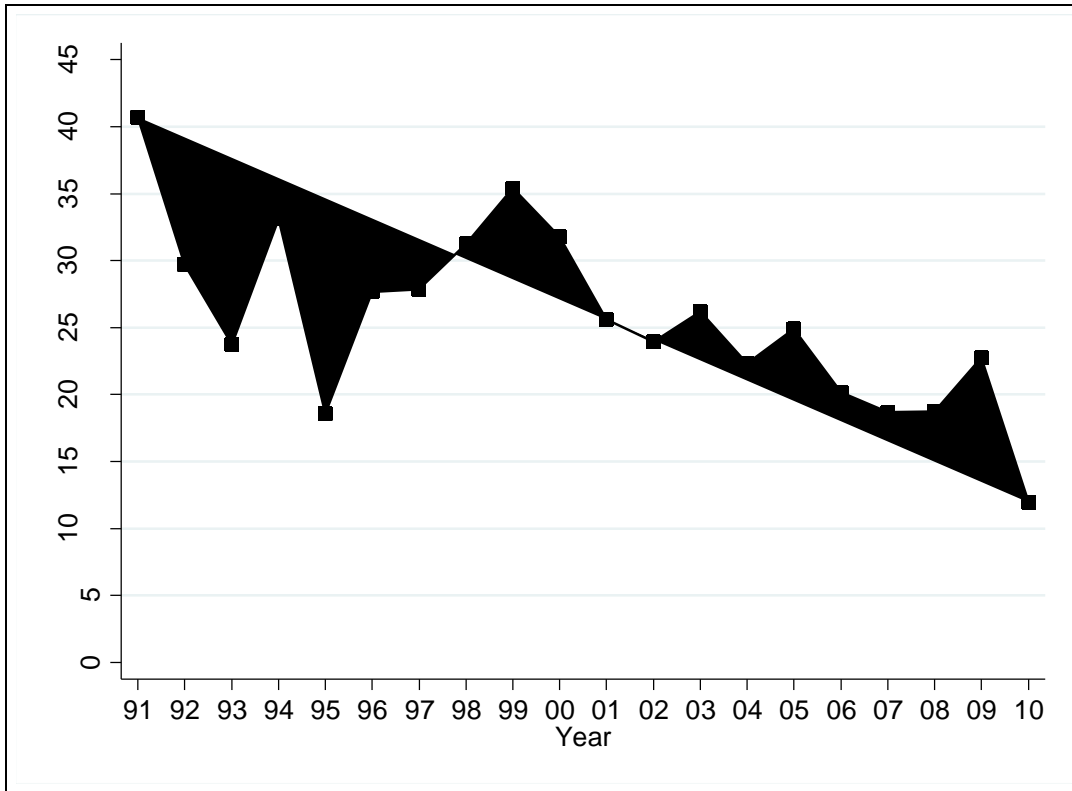
Figure 3 plots the evolution of the school leaving rate at age 16 from the BHPS and Understanding Society. After a tendentially U-shaped pattern before 1999, the school leaving rate decreased in the following years, with a drop between 2009<sup>12</sup> and 2010.<sup>13</sup>

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<sup>12</sup> BHPS respondents have been interviewed within Understanding Society in the year 2010. However, if they completed compulsory education during the 2008/2009 academic year, they have been considered as 2009 entries even if they have been interviewed during 2010.

<sup>13</sup> The irregular pattern observed before 1999 and in 2010 is driven by the relatively small number of observations for those years.

FIGURE 3: DESCRIPTIVE STATISTICS RELATIVE TO THE TRANSITION TO SECONDARY EDUCATION



Note: the x-axis reports the school year when compulsory education finished.

Table 4, containing the descriptive statistics of the variables used in the analysis, shows that leavers tend to face higher levels both of youth and adult unemployment rates than stayers. The proportion of young people with low educated parents is significantly higher among leavers than stayers (66% versus 47%). Leavers are also more likely to be living away from their parents (7.3% versus 1.5%) and men. Furthermore leavers are more likely than stayers to live in families which are not homeowners (42% versus 22%). On the other hand, stayers tends to have more qualified parents and to come from richer families. Moreover, stayers have higher levels of previous education attainment, measured as the number of GCSE passed with mark A\* to C or Scottish Standard Grade (STGR) exams passed with grade 1 or 2.

Hence these descriptive statistics generally show a propensity for non home owners to select into the less education intensive outcomes (Micklewright et. al. 1990), with the exception of the university choice in Germany where no differences across home ownership status emerge. Also choosing a more education intensive path is positively correlated with household income (Carneiro and Heckman 2002). Moreover, a role emerges for parental education, with a higher prevalence of children with more educated parents in the most education intensive outcomes (Micklewright 1989; Mocetti 2012; Checchi et al 2008 ; Jenkins and Schluter 2002) In the following sections we examine how robust these descriptive findings are within a multivariate framework.

**TABLE 4: DESCRIPTIVE STATISTICS RELATIVE TO THE TRANSITION TO SECONDARY EDUCATION, UK**

	N	Mean	Stayers Mean	Leavers Mean	p-value (stayers=leavers)
16-24 UR	4266	13.221	12.801	13.479	0.000
40-64 UR	4266	4.138	4.008	4.401	0.000
Low Parent Edu	4158	0.513	0.467	0.659	0.000
Medium Parent Edu	4158	0.203	0.216	0.170	0.001
High Parent Edu	4158	0.253	0.302	0.096	0.000
No Parents	4266	0.029	0.015	0.073	0.000
Unempl Parent	3914	0.061	0.053	0.082	0.003
Eq Income Decile	4178	4.854	5.121	4.085	0.000
Non Home Owner	4199	0.271	0.221	0.415	0.000
Male	4266	0.488	0.457	0.567	0.000
Number of Siblings	4266	1.289	1.293	1.272	0.610
A*-C GCSE or 1-2 STGR obtained					
0	3930	0.278	0.189	0.535	0.000
1 to 4	3930	0.200	0.177	0.267	0.000
5 to 9	3930	0.364	0.429	0.177	0.000
10+	3930	0.158	0.205	0.022	0.000

### 3.4 METHODS

Assets well capture the impact of household resources on educational choices providing a good indicator of (the lack of) borrowing constraints and a better measure than income of the long term household's socioeconomic status (Nam and Huang, 2009). The aim of this research is to identify how local labour market conditions affect schooling decisions in Germany, Italy and the UK explicitly controlling for the role of home ownership, a highly valuable and commonly held asset.

In particular, for Germany we analyse the impact of local labour markets on the choice of the secondary school track and on the probability of not going to university if the respondent leaves *Gymnasium*. For Italy, the analysis focuses on the choice made after lower secondary education while for the UK, it focuses on how local labour markets influence post compulsory schooling decisions. Each analysis makes use of a dichotomous dependent variable, taking value of one in the "less school intensive" outcome, and 0 in the more intensive outcome. Therefore we estimate a series of binary dependent variable models of the following form:

$$pr(D_i = 1|x, U) = pr(\alpha_1 + \alpha_2 x_i + \alpha_3 U_i + \varepsilon_i > 0) \quad (1)$$

where  $D_i = 1$  if young person  $i$  is observed in the less school intensive outcome, and  $= 0$  otherwise,  $x_i$  is a vector of individual and household characteristics,  $U_i$  captures local labour market conditions, and

the  $\alpha$  are vectors of coefficients to be estimated. The error term  $\varepsilon_i$  is assumed to be logistically distributed, and so equation (1) is estimated using logistic regression.

$U_i$  captures the key explanatory variables of interest. In particular, gender and regional specific youth (15-24 years old) and adult (40-64 years old) unemployment rates are used to capture the strength of the local labour market. On the one hand, we use the youth unemployment rate to capture the opportunity cost of choosing a more education intensive solution. Intuitively, the youth unemployment rate measures how difficult it is for a young person to find a job. Since the less education intensive choices are aimed at early or immediate labour market entry, we expect this to have a negative impact on the probability of choosing the less education intensive outcome (Micklewright et al 1990; Petrongolo and San Segundo 2002). Young people are less likely to want to enter the labour market when unemployment is high. On the other hand, the adult unemployment rate is used to capture the expected returns to education, as it measures the expectation of future unemployment. As reported by Micklewright et al (1990), it is not possible to determine a priori the direction of the impact of adult unemployment. It is possible that a higher adult unemployment rate discourages investment in further education as the expected future returns are low, but it is also possible for education to be seen as a way to escape future unemployment. In the former case, the return to education would be negatively affected by adult unemployment while in the latter case it would be positively affected.

Evidence of an association between home ownership and better schooling outcomes exists in the UK and USA (Dearden et al. 2009; Lovenheim 2011; Micklewright et al. 1990). As with family income, family assets might affect schooling achievement both from a short term borrowing constraint and a long term family background point of view (Huang et al. 2010). Family assets can be directly used to finance education, and hence families with more assets are less affected by borrowing constraints, while they may also be associated with factors like a higher permanent income, better home environment, better schooling, and higher family educational expectations. We directly test whether home ownership influences the way labour market incentives influence educational decisions by interacting the two measures of unemployment with the home ownership condition.<sup>14</sup>

Our estimated specifications control for a range of other individual and household level characteristics such as parental education, current parental unemployment, household income, gender, whether or not the respondent lives with the parents (or whether parental information is available), and number of siblings (or number of children in the household). Previous research has shown that these are powerful indicators of a child's educational decisions. Regional and year dummies are also included in the regressions to capture the effects that are fixed across years for a given region or across regions for a given year.

## 4 RESULTS

This section discusses the estimates of the impact of local labour market conditions on schooling decisions in Germany, Italy and the UK. We present estimated coefficients from logistic regressions as well as the average marginal effects. Different model specifications are used in the regressions. First, we include unemployment rates and home ownership among the regressors, but it excludes interactions between the two. The second model specification includes the interactions between

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<sup>14</sup> We also estimate a model in which we subtract from the unemployment rates their sample means and we introduce all the possible interactions terms between youth unemployment rate, adult unemployment rate and housing tenure. The estimates are highly consistent with those reported in this paper.

unemployment rates and housing tenure, allowing the estimation of different responses of home owners and non home owners to labour market incentives.

## 4.1 GERMANY

Table 5 reports the estimated coefficients from logistic regressions for the analysis of the impact of local labour markets on schooling decisions in Germany. Columns 1 and 2 report the coefficients covering secondary school track choice, while columns 3 and 4 report the estimated coefficients concerning university enrolment. In both cases, the dependent variable takes the value of 1 in the “less school intensive” outcome, identifying enrolment in the low or middle school tracks as opposite to the high school track (*Gymnasium*) in secondary school and not going to university among *Gymnasium* school leavers.

Columns (1) and (2) show that youth and adult unemployment rates have no statistically significant impacts on the probability of choosing the “job oriented” school track relative to the high school track. Despite the theoretical predictions that suggest labour market conditions to be important (e.g. Micklewright et al. 1990), the empirical estimation fails to find supporting empirical evidence. A possible explanation is that at the end of primary school teachers advise pupils on the most appropriate secondary school track for them, and in some cases such advice is binding. Such advices, together with family preferences, are likely to drive the choice of the secondary school track, and hence labour market conditions play a minor role in this choice.

Other coefficients reported in Column (1) suggest that non home owners are significantly more likely to enrol in the low or middle school track than in the high school track. This is consistent with evidence from the UK and the US showing a positive relationship between home ownership and better educational outcomes (e.g. Lovenheim 2011; Micklewright et al. 1990), while it is in contrast with Jenkins and Schluter (2002), who found no significant relationship in Germany. The non interacted home ownership coefficient loses significance in model (2), when interactions with unemployment rates are included.

Table 6 reports the average marginal effects after model (1) and (2). Estimates confirm that local labour market conditions do not play a significant role in affecting the secondary school track enrolment, while pupils from non home owner families are 5.3 percentage points more likely to be enrol in a low or middle school track than home owners.

**TABLE 5: LOGIT COEFFICIENTS, GERMANY**

	Secondary School		University	
	(1)	(2)	(3)	(4)
Youth unemployment rate	0.005 (0.15)	0.022 (0.55)	-0.047* (-1.86)	-0.047* (-1.81)
Adult unemployment rate	0.002 (0.04)	-0.022 (-0.34)	-0.074*** (-3.03)	-0.071*** (-2.66)
Non home-owner	0.281*** (2.64)	0.233 (0.72)	-0.233 (-0.98)	-0.158 (-0.25)
Non home-owner:*	0.005 (0.15)	0.022 (0.55)		
Youth unemployment rate		-0.048 (-1.44)		-0.001 (-0.01)
Adult unemployment rate		0.070* (1.66)		-0.006 (-0.34)
Mid educated parent	0.053 (0.16)	0.035 (0.11)	0.445 (0.66)	0.453 (0.65)
High-educated parent	-0.973*** (-2.61)	-0.987*** (-2.64)	-0.0886 (-0.14)	-0.080 (-0.12)
Male	0.100 (0.82)	0.098 (0.80)	-0.0416 (-0.20)	-0.043 (-0.20)
Eq Income Decile:				
2	0.044 (0.12)	0.0676 (0.18)	0.510 (0.77)	0.507 (0.77)
3	-0.366 (-1.19)	-0.335 (-1.10)	0.600 (0.97)	0.593 (0.98)
4	-0.574** (-2.02)	-0.533* (-1.94)	0.363 (0.82)	0.355 (0.83)
5	-0.873** (-2.46)	-0.851** (-2.44)	0.443 (0.80)	0.438 (0.80)
6	-1.066*** (-3.28)	-1.045*** (-3.22)	0.353 (0.56)	0.344 (0.55)
7	-1.443*** (-5.14)	-1.432*** (-5.15)	0.669 (0.90)	0.661 (0.89)
8	-1.281*** (-4.40)	-1.262*** (-4.37)	0.0950 (0.15)	0.087 (0.14)
9	-1.730*** (-4.89)	-1.717*** (-4.93)	-0.0819 (-0.14)	-0.092 (-0.15)
10	-2.076*** (-5.75)	-2.063*** (-5.71)	-0.145 (-0.26)	-0.153 (-0.27)
Compulsory military service			-0.697*** (-4.96)	-0.696*** (-4.97)
_cons	0.435 (0.49)	0.447 (0.46)	2.004* (1.84)	1.974* (1.75)
Year Dummies	X	X	X	X
Region Dummies	X	X	X	X
<i>N</i>	1913	1913	698	698

*t* statistics in parentheses; a dummy for having at least one parent unemployed is included in the regressions but not reported. Model 1 and 2 also include a dummy for being an orphan (or not having available information for none of the parents) and control for the number of children in the household. Models 3 and 4 dummies for the age at which respondents leave Gymnasium are included but not reported; also a dummy for missing parental education is included but not reported. Only respondents aged 18-21 are included in the regression.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 7 contains the marginal effects on unemployment rates after model 2, computed by housing tenure. The estimates show that the response to changes in the local labour market conditions are not statistically different from zero both for children from home-owning and non home-owning families; moreover, despite having opposite signs, the responses to changes in unemployment rates do not significantly differ between the two groups. The findings confirm that local labour market conditions do not significantly affect the choice of the secondary school track in Germany.

Among other controls, Columns (1) and (2) of Table 5 shows that having highly educated parents is associated with a lower probability of enrolling in “job oriented” schools, confirming the key role of parental education on the education outcomes of their children (Jenkins and Schluter 2002; Checchi and Flabbi 2007). Moreover probability of enrolling in the low or middle school track is inversely related to household income, confirming previous findings that children from richer families have better school outcomes (Jenkins and Schluter 2002).

**TABLE 6: AVERAGE MARGINAL EFFECTS AFTER MODELS 1-2, GERMANY**

	(1)			(2)		
	MFX	se	pvalue	MFX	se	pvalue
Youth Unemployment Rate	0.001	0.007	0.883	0.001	0.007	0.876
Adult Unemployment Rate	0.000	0.009	0.968	0.000	0.010	0.974
Non Home-Owner	0.053	0.020	0.008	0.053	0.020	0.008

**TABLE 7: AVERAGE MARGINAL EFFECTS ON UNEMPLOYMENT RATES BY HOUSING TENURE, MODEL 2, GERMANY**

	MFX	se	pvalue
Youth unemployment rate			
Home owner	0.004	0.008	0.580
Non Home-Owner	-0.004	0.007	0.532
Diff	-0.009	0.006	0.161
Adult unemployment rate			
Home owner	-0.004	0.013	0.734
Non Home-Owner	0.008	0.007	0.236
Diff	0.012	0.009	0.150

Columns (3) and (4) report the estimated coefficients from the logistic regressions related to the choice of going to university after leaving the high school track. The coefficient on the adult unemployment rate is negative and significant in both model specifications, indicating that higher levels of adult unemployment reduce the probability of not going to university for those leaving the high school track. The coefficient on the youth unemployment rate is also negative, but only weakly statistically significant and, more importantly, not robust to different model specifications.<sup>15</sup> Housing

<sup>15</sup> If I exclude from the sample those without parents the coefficient on youth unemployment rate holds the same sign but it loses significance, while the adult unemployment rate remains significant in specification (3) and (4).

tenure at the time of leaving school has no significant effect on the probability of going to university.<sup>16</sup> None of the interaction terms reported in column (4) are statistically different from 0, and so there is no evidence of a differential response to labour market incentives by home-owners and non home-owners. As suggested by Micklewright et al. (1990), education is a way to escape high unemployment, and this seems to be the case for university enrolment in Germany irrespective of home-ownership status.

Neither household income at the time of leaving secondary school nor parental education affect the decision to attend university. These factors have already been shown to be extremely important in increasing the probability of accessing the high school track, so the estimating sample of high school leavers used here is already “selected” (Checchi and Flabbi 2007). Although not statistically significant, it can be observed that people with highly educated parents are more likely to go to university than those with low educated parents, while the probability of going to university increases with income. No significant gender differences are found, while those who go to compulsory military service have then a significantly higher probability of going to university.

The marginal effects from models (3) and (4), reported in Table 8, confirm the relevance of adult unemployment, with a 1 percentage point increase in the adult unemployment rate leading to a 1.6 percentage points reduction in the probability of not going to university. An increase in youth unemployment of the same size leads to a weakly significant fall in the probability of about 1 percentage point.

Table 9 reports the marginal effects from model (4), allowing responses to be different for home owners and non owners. They show that the marginal effect associated with an increase in the youth unemployment rate is negative but only marginally significant for home owners, while it is not different from 0 for non home owners. The marginal effect associated with the adult unemployment rate is, on the other hand, statistically significant both for home-owners and non home-owners. However a test of the equality of the marginal effects for the two groups cannot be rejected at a 5% confidence level.

Hence, our evidence suggests that the adult unemployment rate matters for university enrolment in Germany, but home owners and non owners do not react differently to such labour market incentives.

**TABLE 8: AVERAGE MARGINAL EFFECTS AFTER MODELS 3-4, GERMANY**

	(3)			(4)		
	MFX	se	pvalue	MFX	se	pvalue
Youth Unemployment Rate	-0.010	0.005	0.058	-0.010	0.005	0.061
Adult Unemployment Rate	-0.016	0.005	0.002	-0.016	0.005	0.002
Non Home-Owner	-0.050	0.051	0.323	-0.050	0.051	0.329

<sup>16</sup> As a robustness check, I have used a different definition of the dependent variable. Instead of allowing a 1 year gap only for those observed in compulsory military service before identifying university enrolment I allowed a 1 year gap for each respondent. The results confirm the role of adult unemployment, while non home owners are more likely to access university if the education status is measured up to 2 years after the end of secondary education. The effect, though, disappears in the specification with interactions.



**TABLE 9: AVERAGE MARGINAL EFFECTS ON UNEMPLOYMENT RATES BY HOUSING TENURE, MODEL 4, GERMANY**

	MFX	se	pvalue
Youth unemployment rate			
Home owner	-0.010	0.005	0.066
Non Home-Owner	-0.010	0.010	0.296
Diff	-0.000	0.010	0.980
Adult unemployment rate			
Home owner	-0.015	0.006	0.008
Non Home-Owner	-0.017	0.005	0.000
Diff	-0.002	0.004	0.705

## 4.2 ITALY AND UK

### 4.2.1 BASE ANALYSIS

Table 10 reports the estimated coefficients of a series from logistic regressions aimed at the analysis of the impact of local labour market conditions on schooling decisions in Italy (models (1) and (2)) and the UK (models (3) and (4)).

In the case of Italy the dependent variable is equal to 1 if the respondent is not in school or if (s)he is enrolled in vocational programs not giving access to university, 0 if (s)he is enrolled in schools giving access to university. The choice is recorded for respondents in IT-SILC aged 16 or 17.<sup>17</sup> The relevant unemployment rates are measured at the time when the respondent finished lower secondary education.<sup>18</sup> In the case of the UK, the dependent variable takes the value 1 if the young person left education at age 16 and 0 if (s)he remained in full-time education at the end of compulsory schooling. Unemployment rates are measured on the spring quarter of the last year in compulsory education.

<sup>17</sup> This translates into being aged 16 at the end of the SILC income reference period, hence aged 16 or 17 at the time of the survey

<sup>18</sup> The results of the analysis are robust to different specification of the dependent variable. See footnote 11.

**TABLE 10: LOGIT COEFFICIENTS, ITALY AND UK**

	ITALY		UK	
	(1)	(2)	(3)	(4)
Youth unemployment rate	-0.006 (-0.81)	0.006 (0.65)	-0.014 (-0.90)	0.003 (0.18)
Adult unemployment rate	-0.056 (-1.45)	-0.136*** (-2.79)	-0.006 (-0.19)	-0.063* (-1.69)
Non home-owner	0.613*** (7.24)	0.477*** (2.94)	0.513*** (4.50)	0.534** (2.23)
Non home-owner:*				
Youth unemployment rate		-0.025** (-2.35)		-0.050** (-2.31)
Adult unemployment rate		0.163*** (2.95)		0.151*** (4.35)
Male	0.064 (0.41)	0.045 (0.29)	0.627*** (3.42)	0.624*** (3.38)
Mid-educated parent	-1.011*** (-11.36)	-1.012*** (-11.41)	-0.383*** (-2.90)	-0.395*** (-3.03)
High-educated parent	-1.449*** (-7.51)	-1.454*** (-7.50)	-1.121*** (-7.16)	-1.134*** (-7.43)
Eq Income Decile:				
2	-0.412** (-2.47)	-0.403** (-2.51)	-0.0783 (-0.51)	-0.0810 (-0.53)
3	-0.372** (-2.17)	-0.367** (-2.11)	-0.149 (-0.99)	-0.160 (-1.04)
4	-0.424*** (-2.67)	-0.419*** (-2.67)	-0.0839 (-0.73)	-0.0945 (-0.81)
5	-0.456** (-2.43)	-0.443** (-2.37)	-0.107 (-0.76)	-0.131 (-0.92)
6	-0.733*** (-3.37)	-0.729*** (-3.35)	0.117 (0.77)	0.107 (0.71)
7	-0.650*** (-3.45)	-0.647*** (-3.48)	-0.265 (-1.36)	-0.277 (-1.44)
8	-0.430* (-1.72)	-0.413* (-1.66)	-0.458** (-2.21)	-0.462** (-2.27)
9	-0.527*** (-2.98)	-0.518*** (-2.87)	-0.434 (-1.44)	-0.428 (-1.43)
10	-0.759*** (-2.86)	-0.753*** (-2.94)	-0.863*** (-2.64)	-0.851*** (-2.62)
_cons	-0.734** (-2.46)	-0.668** (-2.10)	-0.420 (-0.96)	-0.337 (-0.73)
Year Dummies	X	X	X	X
Region Dummies	X	X	X	X
N	3497	3497	3796	3796

*t* statistics in parentheses. Dummies for having at least one parent unemployed and for not living with parents and a variable containing the number of siblings in the household are included in the regressions but not reported.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Models (1) and (3) include unemployment rates and home ownership among the regressors, but they exclude interactions between the two. With this model specification, in Italy and the UK unemployment rates do not significantly affect the schooling decisions of young people. Average marginal effects, reported respectively in Table 11 and Table 12, confirm this finding. In particular, in Italy and the UK the coefficients on both the youth and adult unemployment rates have a negative sign, but neither is statistically significant. With this model specification, the lack of an effect of local

labour market conditions on schooling decisions in Italy is in line with the findings of Mocetti (2012). Hence our models do not identify any statistically significant effect for unemployment rates in Italy or the UK, despite theoretical prediction (e.g. Micklewright et al. 1990) suggesting a negative relationship between youth unemployment and school leaving decisions through a reduction in the opportunity cost of further education, and an uncertain relationship between the adult unemployment rate and the demand for schooling through the returns to education argument. However, the estimates confirm that young people living in families that do not own their home have a higher probability of leaving school at age 16 than home owners in the UK, and either to leave school or to enrol in vocational training courses in Italy. This is consistent with previous evidence on educational outcomes (e.g. Micklewright et al. 1990).

**TABLE 11: AVERAGE MARGINAL EFFECTS AFTER MODELS 1-2, ITALY**

	(1)			(2)		
	MFX	se	pvalue	MFX	Se	pvalue
Youth unemployment rate	-0.001	0.001	0.412	-0.000	0.001	0.598
Adult unemployment rate	-0.007	0.005	0.147	-0.008	0.005	0.078
Non Home-Owner	0.079	0.012	0.000	0.079	0.012	0.000

**TABLE 12: AVERAGE MARGINAL EFFECTS AFTER MODELS 3-4, UK**

	(3)			(4)		
	MFX	Se	pvalue	MFX	Se	pvalue
Youth unemployment rate	-0.002	0.003	0.359	-0.002	0.003	0.373
Adult unemployment rate	-0.001	0.005	0.849	-0.002	0.006	0.761
Non Home-Owner	0.091	0.021	0.000	0.092	0.021	0.000

The relationships between schooling decisions, unemployment rates and home ownership are further analysed in model (2) for Italy and (4) for UK.

With respect to Italy, the coefficient on the adult unemployment rate is now negative and statistically significant, meaning that young people in home owning families react to an increase in the adult unemployment rate with a fall in the probability of leaving education giving access to university. Similarly to Model (1), youths from non home-owning families have a higher probability of leaving school or pursuing vocational programs. Moreover, the interaction terms on both the youth and adult unemployment rate with home ownership are statistically significant. In particular, for non home owners an increase in the youth unemployment rate is associated with a reduction in the probability of enrolling in education not giving access to university compared to home owners, while the opposite is true with respect to the adult unemployment rate. Compared with home owners, an increase in adult unemployment is associated with an increase in the probability of leaving school or going into vocational education or training.

The estimated marginal effects by housing tenure, reported in table 13, show that for home owners a 1 percentage point increase in the adult unemployment rate is associated with a reduction in the probability of leaving school or enrolling in vocational programs of 1.4 percentage points, while the effect is positive but not statistically significant for non home owners. Moreover, a test on the equality of these marginal effects is rejected at the 5% confidence level. A 1 percentage point

increase in the youth unemployment rate leads to a reduction in the probability of leaving school or enrolling in vocational programs of 0.3 percentage points. Despite the size of the marginal effect on youth unemployment is relatively small, a test on the equality of these marginal effects is rejected at a 5% confidence level.

**TABLE 13: AVERAGE MARGINAL EFFECTS ON UNEMPLOYMENT RATES BY HOUSING TENURE, MODEL 2, ITALY**

	MFX	se	pvalue
Youth unemployment rate			
Home owner	0.001	0.001	0.523
Non Home-Owner	-0.003	0.001	0.005
Diff	-0.004	0.001	0.004
Adult unemployment rate			
Home owner	-0.014	0.005	0.009
Non Home-Owner	0.005	0.007	0.510
Diff	0.018	0.008	0.019

This evidence shows that in Italy unemployment rates affect educational decisions. In particular home owners and non home owners respond to different labour market incentives. Youths from home-owning families respond to an increase in adult unemployment by increasing demand for schooling, while non home owners react to a higher level of youth unemployment increasing demand for education. This is consistent with the presence of unobserved factors associated with housing tenure that make home owners invest more in education when adult unemployment increases, arguably through an increase in the expected return to schooling; on the other hand, non home owners are responsive to local labour market conditions if they affect the short-term opportunity cost of education.

**TABLE 14: AVERAGE MARGINAL EFFECTS ON UNEMPLOYMENT RATES BY HOUSING TENURE, MODEL 4, UK**

	MFX	se	pvalue
Youth unemployment rate			
Home owner	0.000	0.003	0.856
Non Home-Owner	-0.010	0.005	0.033
Diff	-0.010	0.004	0.016
Adult unemployment rate			
Home owner	-0.009	0.006	0.088
Non Home-Owner	0.019	0.008	0.014
Diff	0.028	0.007	0.000

Model (4) replicates the analysis for the school leaving decision at age 16 for the UK, interacting housing tenure with unemployment rates. The estimated coefficients show that the youth unemployment rate does not have a statistically significant impact on school leaving decisions, while the adult unemployment rate has a negative but only marginally significant impact. Similarly to the

estimates for Italy, youths from renter families have a higher probability of leaving school at age 16 than those living in home-owning families (Micklewright et al. 1990). Moreover, unemployment rates have a statistically significant impact on the school leaving decisions of youths living in not home-owning families. In particular, higher levels of youth unemployment are associated with a reduction of the probability of leaving education at age 16, while an increase in the adult unemployment rate is associated with an increase in this probability. The estimated marginal effects by housing tenure, reported in table 14, show that a one percentage point increase in the youth unemployment rate is associated with a reduction in the probability of leaving school at age 16 for those living in non home-owning families of about 1.1 percentage points. A one percentage point increase in adult unemployment rate is associated with a reduction of 1 percentage point in the probability of leaving school at age 16 for home owners and a statistically significant increase in this probability by 1.9 percentage points for non home owners. A test for the equality of the marginal effects for home owners and non home owners is rejected at a 5% confidence level.

Since it is mainly non home owners that react to incentives from the labour market, our estimates are consistent with the presence of credit constraints (Dearden et al. 2009). In fact, not only are those living in renter families more likely than those in home owning families to leave school at age 16, they are also more sensitive to labour market incentives than those living in home-owning families. In particular, non home owners react to increases in the youth unemployment rate with an increase in the demand for schooling – consistent with an opportunity cost argument – while they react to an increase in adult unemployment rate with a reduction in the demand for schooling – consistent with a “discouraged student” argument and suggesting a negative relationship between adult unemployment and the returns to schooling. These estimates are consistent with the idea that non home owners – who are more likely to be credit constrained – choose to invest in post-compulsory education only if labour market conditions indicate that the net returns are high enough.

Finally, increases in adult unemployment are associated with a marginally significant increase in the demand for schooling for home owners. This, as in the Italian case, suggests the presence of other factors beyond credit constraints that make home owners react positively to increases in adult unemployment, while non home owners reduce demand for schooling.

Estimates on other controls show that parental education plays a major role in affecting schooling decisions both in UK (see also Micklewright 1989) and in Italy (see also Mocetti 2012; Checchi et al 2008). This is consistent with previous research suggesting that children with more educated parents have better access to learning resources, role models, occupational knowledge and informal networks than those with less educated parents (Keller and Zavalloni 1965; Schoon 2006; Vondracek et al. 1986). In the UK men are more likely to leave school at age 16 than women, while household income plays an important role in Italy where students from richer families are less likely to leave school or enrol in vocational training after lower secondary school. This is in line with previous findings (e.g. Carneiro and Heckman 2002).

#### **4.2.2 MODEL EXTENSION: A CLOSER LOOK TO THE UK**

Model (5) further investigates the channel through which parental resources influence school leaving decisions and responses to labour market conditions in the UK by introducing a measure of previous educational attainment among the controls used in equation (4). Past school attainment are measured as the number of good passes in GCSE (grades A\*-C) or Scottish Standard Grade exams (grades 1-2). Since no comparable information is reported in the wave 2 of Understanding Society, hence the analysis is performed for youths interviewed within the 18 waves of the BHPS, who completed compulsory education between the end of the 1990/1991 and the end of the 2007/2008 school year.

Following Cameron and Heckman (2001), previous educational attainment can be interpreted as the outcome of family factors which are associated with long term permanent income and socio economic status of the family. The extent to which the importance of housing tenure is diminished by controlling for child academic ability gives an indication on the channel through which family resources influence school leaving decisions. In particular, if the effect of housing tenure disappears, we can conclude that long term family characteristics, such as higher family permanent income and/or higher family socio economic status, play a primary role in affecting school outcomes as opposed to credit constraints.

Table 15 contains average marginal effects after model (5). When compared to table 12, it emerges that marginal effects on youth and adult unemployment rates continue to be small and not statistically significant; moreover, youths from non home owning families continue to be more likely to leave school at age 16 than youths from home owning families. However, when compared with column (4) of table 12, it should be noted that the inclusion of information on previous education attainment reduces by more than a half the size of the marginal effect on housing tenure. This finding confirms that a considerable amount of the gap in the probability of leaving school at 16 between youths from home-owning and non home-owning households is explained by higher levels of previous education attainment among the former. The result is consistent with the presence of long term factors associated to home ownership and family socio economic status that allow better off families to shape the education abilities of their children, who are better able to perform at school (Carneiro and Heckman 2002). Moreover, our estimates do not rule out the presence of credit constraints as a source of the remaining gap in post-compulsory school enrolment between youths from home-owning and non home-owning families. Finally, as expected, better previous education attainment is associated with a reduction in the school leaving probability.

Table 16 reports marginal effects on the youth and adult unemployment rate by housing tenure. The results are consistent with findings reported in Table 14 and confirm that even controlling for past educational attainment youths from non home-owning families are those who respond the most both to youth and adult unemployment rates. In particular, for this group a 1 percentage point increase in the youth unemployment rate is associated with a reduction in the probability of leaving school at age 16 of 0.8 percentage points; a 1 percentage point increase in the adult unemployment rate is associated with a reduction in the probability of leaving school at age 16 of 2.3 percentage points. In both cases, a test on the equality of marginal effects between youths from home-owning and non home-owning families is rejected at the 5% level.<sup>19</sup>

The results confirm the findings from model (4) on credit constraints being a plausible source of the differential response to labour market incentives among youths from home-owning and non home-owning families.

As a further check, we estimated two versions of models (4) and (5) including family fixed effects. Despite losing statistical significance because of the increase in standard errors, the sign and the sizes of the marginal effects after a fixed effect linear probability model are consistent with those reported in tables 14 and 15, and the coefficients of a fixed effect logit are in line with those estimated after model (4) and (5).

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<sup>19</sup> Previous education attainment might suffer from endogeneity, since GCSE and Scottish Standard Grade are usually taken when students are between 14 and 16 years old. Tumino and Taylor (2013), performing a more detailed analysis focused on the UK, find results that are consistent with those presented in this paper.

**TABLE 15: MARGINAL EFFECTS CONTROLLING FOR PREVIOUS EDUCATION ATTAINMENT, MODEL 5, UK**

	MFX	se	pvalue
Youth Unemployment Rate	-0.002	0.003	0.430
Adult Unemployment Rate	0.004	0.006	0.458
Non Home-Owner	0.040	0.019	0.036
1-4 GCSE-STRGR	-0.113	0.022	0.000
5-9 GCSE-STGR	-0.301	0.021	0.000
10+ GCSE-STGR	-0.391	0.023	0.000

**TABLE 16: AVERAGE MARGINAL EFFECTS ON UNEMPLOYMENT RATES BY HOUSING TENURE, MODEL 5, UK**

	MFX	Se	Pvalue
Youth unemployment rate			
Home owner	0.000	0.002	0.949
Non Home-Owner	-0.008	0.005	0.087
Diff	-0.008	0.004	0.032
Adult unemployment rate			
Home owner	-0.003	0.005	0.542
Non Home-Owner	0.023	0.009	0.009
Diff	0.026	0.007	0.000

Our analysis indicates that labour market conditions play a non-negligible role in affecting schooling decision in Italy and the UK, but the population groups reacting to them are slightly different. For Italy, consistently with the presence of unobserved family characteristics associated to home ownership, home owners and non home owners react to different kind of incentives from the labour markets: youths from home-owning families increase the demand for education when the adult unemployment rate rises, while young people from non home-owning families increase the demand for schooling when the youth unemployment rate increases, i.e. when opportunity cost of education is lower. In the UK, non home owners respond to incentives from the labour markets increasing the demand for schooling when youth unemployment rises and when adult unemployment falls. For non owners, consistently with Mickelwright et al. (1990), youth unemployment reduces the opportunity cost of education while adult unemployment increases expected returns to schooling. The presence of credit constraints is consistent with such evidence, since potentially credit constrained non home owners only choose to increase the demand for schooling when the net gain from education is high enough. The plausibility of credit constraints as source heterogeneous responses to changes in labour market conditions is also robust to the inclusion among the controls of a measure of the previous education attainments of the child, on the ground that family resources play a primary role in affecting child academic ability and aspiration. Similarly to Italy, the presence of specific characteristics associated with home ownership makes young people from home owning families react to a rise in adult unemployment with an increase in demand for schooling; however, this result is not robust to the inclusion of previous education attainment among the controls. In Germany,

estimates suggest that enrolment in lower secondary education is not affected by unemployment rates while demand for university education increase with the adult unemployment rate, arguably through an increase in the expected returns to education.

## 5 CONCLUSION

In this paper we analyse the relationship between prevailing labour market conditions and schooling decisions in three European countries: Italy, Germany and the UK. Following the approach adopted by, among others, Petrongolo and San Segundo (2002), the analysis examines the impact of both youth and adult unemployment rates on different educational choices. The youth unemployment rate captures the opportunity cost of education while the adult rate captures the returns to education. Previous studies find that family resources significantly affect schooling decisions. Assets well capture the impact of household resources on educational choices providing a good indicator of (the lack of) borrowing constraints and a better measure than income of the long term household's socioeconomic status (Nam and Huang, 2009). The paper contributes to the existing literature by explicitly modelling the role of homeownership, a highly valuable and commonly held asset, in affecting the responses to incentives from labour markets

Estimates indicate that the choice of the secondary school track in Germany is not affected by local labour, perhaps because advice from schools and teachers, as well as the ability of the child, are likely to play a primary role in this process. However, family resources and parental education do significantly affect this choice. Labour markets conditions are important for the decision to enrol in tertiary education for those leaving from the high school track (*Gymnasium*). Our estimates indicate that a 1 percentage point increase in the adult unemployment rate increases the probability of going to university by 1.6 percentage points. This is not sensitive to whether or not the young person's family are homeowners, and it indicates that higher level of adult unemployment increases expected returns to education. Estimates also show a weakly significant positive effect of the youth unemployment rate on the probability of enrolling in tertiary education, consistent with the opportunity cost hypothesis.

The importance of local labour market conditions also emerges in the analysis of the post compulsory education choices in Italy and the UK. In particular, when differentiating by housing tenure, it emerges that in Italy home owners react to a 1 percentage point increase of the adult unemployment rate with a reduction of a 1.4 percentage points of the probability of enrolling in a "job oriented" school; young people from non home-owning families react to 1 percentage point increase of the adult unemployment rate with a reduction of a 0.3 percentage points of the probability of enrolling in a "job oriented" school This is consistent with the presence of unobserved factors associated with housing tenure that make home-owners and non home-owner families respond to different incentives from the labour market.

In the UK, focusing on school leaving decisions at age 16, the estimates indicate that the educational decisions of young people from home-owning families are only marginally affected by labour market conditions. However young people from non home owning families react to a 1 percentage point increase in youth unemployment rate with a fall in the probability of leaving school at 16 by between 0.8 and 1 percentage points. This is consistent with the opportunity cost argument. Young people from non home-owning families also respond to a 1 percentage point increase in the adult unemployment rate with increase in the probability of leaving school at age 16 by between a 1.9 and 2.3 percentage point, sign of a "discouraged student" effect associated with adult unemployment. Since it is non home owners who respond to incentives from the labour market, and since our results hold even after controlling for the effect of long term family resources on previous education attainment, we conclude that our findings are consistent with the presence of credit constraints for



non home owners. Non home owners choose to invest in further education only if the returns are high enough. Adult unemployment also has a weak negative effect on the school leaving probability for home owners. This supports the presence of other family characteristics that lead home owners to invest more on their children when adult unemployment is high; the effect disappears when we control for previous education attainment. Overall, these results are consistent with predictions from the human capital investment model and confirm the importance of local labour markets in driving educational investment decisions (Becker 1967; Card and Lemieux 2001; Micklewright et al. 1990).

The Europe 2020 agenda for a smart, sustainable and inclusive growth set two education specific targets that need to be met by 2020: a reduction to below 10% in the school dropout rate and an increase to at least 40% in the share of the population aged 30-34 having completed tertiary education. We have demonstrated that schooling decisions are responsive to incentives from the labour markets and that the expected net gains from education matter. Hence, policies aimed at raising levels of human capital within the EU should aim at making education a profitable investment, also by incorporating the role of local labour market conditions in such evaluations.

Further research is needed to better understand the role of home ownership in influencing the way these incentives are perceived. In particular, future research should aim at better distinguishing the role of credit constraints from the role of family resources, like permanent income, or other family characteristics. In the UK for instance, where potentially credit constrained families are the most responsive to changes in the net gain from education, a deeper understanding of the channel through which home ownership influences school leaving decisions is of primary importance to design policies aimed at making the investment in human capital profitable. A similar argument can be applied to Italy: why do youths from non home-owning families react to changes in the youth unemployment rate, while students from home-owning families invest more in human capital when adult unemployment rate increases? A deeper understanding of these issues is of primary importance for the design of policy aimed at economic recovery and at ensuring that levels of human capital continue to increase within the EU.

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## **ImProvE: Poverty Reduction in Europe. Social Policy and Innovation**

Poverty Reduction in Europe: Social Policy and Innovation (ImPRovE) is an international research project that brings together ten outstanding research institutes and a broad network of researchers in a concerted effort to study poverty, social policy and social innovation in Europe. The ImPRovE project aims to improve the basis for evidence-based policy making in Europe, both in the short and in the long term. In the short term, this is done by carrying out research that is directly relevant for policymakers. At the same time however, ImPRovE invests in improving the long-term capacity for evidence-based policy making by upgrading the available research infrastructure, by combining both applied and fundamental research, and by optimising the information flow of research results to relevant policy makers and the civil society at large.

The two central questions driving the ImPRovE project are:

How can social cohesion be achieved in Europe?

How can social innovation complement, reinforce and modify macro-level policies and vice versa?

The project runs from March 2012 till February 2016 and receives EU research support to the amount of Euro 2.7 million under the 7<sup>th</sup> Framework Programme. The output of ImPRovE will include over 55 research papers, about 16 policy briefs and at least 3 scientific books. The ImPRovE Consortium will organise two international conferences (Spring 2014 and Winter 2015). In addition, ImPRovE will develop a new database of local projects of social innovation in Europe, cross-national comparable reference budgets for 6 countries (Belgium, Finland, Greece, Hungary, Italy and Spain) and will strongly expand the available policy scenarios in the European microsimulation model EUROMOD.

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