Essays on Early Adulthood Dynamics

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XXVI Ciclo

Settore scientifico-disciplinare SECS-P/06

Abstract

Transition into the labour market is a crucial moment for young adults, as it yields a number of choices that may affect their lives not only in the short-term but also in the medium- and long-run. Here, I focus on two key aspects. First, I investigate residential location choices in the first years after leaving full-time education and evaluate the relative importance of individual, family and regional characteristics that lead young adults to move away from the place of origin. Second, I evaluate the impact of experiencing job instability during the first years of the individuals' careers on fertility decisions in the short-run. In both cases, I deal with endogeneity issues and find that individual observable and unobservable characteristics are the main factors that drive these choices in early adulthood.

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Acknowledgments

I am indebted to prof. Marco Francesconi and Giovanni Sulis for their valuable advice and to prof. Romano Piras and participants at the internal seminars for useful comments. I also wish to thank my friends and fellow colleagues Marco Nieddu, Claudio Deiana and Stefano Alderighi for their inestimable help and support, both professional and moral.

Finally, I am immensely grateful to my parents, my sister Francesca and Paolo, who have lovingly and unconditionally supported and encouraged me all the way.

Summary

Transition into adulthood typically involves a number of crucial passages: finishing full-time education; entry into the labour market; leaving home; establishment of an independent household; and entry into marriage and parenthood (Kiernan, 1991). The scope of this thesis is to evaluate two main aspects concerning transition into adulthood: the reasons behind the decision to leave the parental home and the link between job instability and fertility choices in the short run. The focus is specifically on the United Kingdom, which is characterised by a relatively mobile population and flexible labour market.

In the first Chapter, I survey the existing literature on both residential mobility decisions and fertility choices in association to job instability, with a special attention towards labour market entrants.

In the second Chapter, I investigate the link between residential location choices of young adults in the United Kingdom and a number of individual, family and regional features. In the literature, the main driving forces that push young individuals to move are found to be individual preferences and educational attainment, given that more skilled individuals are more likely to stretch out to a wider labour market than their unskilled counterparts (Champion et al., 1998; Krabel and Flöther, 2012; Lø ken et al., 2013). Environmental factors, on the other hand, are important only to some extent, where metropolitan areas tend to have an attractive power and regions characterised by high unemployment rates are often associated with a high number of emigrants Wagner (1990); Berrington et al. (2013).

In my analysis, I first estimate a single-equation ordered probit model and find that graduates, movers and, to a smaller extent, people coming from urbanised areas are significantly more likely

to move farther away from their place of origin, while family characteristics do not seem to matter much. Then, I account for potential endogeneity issues that may be generated by omitted individual ambition by using a semi-ordered bivariate probit model Weiss (1993); Sajaia (2008); Greene and Hensher (2009). Here, schooling is, in turn, positively influenced by educational aspirations of individuals when they were in their early teenage years. When using this two-equation model, I find that graduates are 27 percentage points less likely to stay in the parental household after leaving full-time education and 5 to 11 percentage points more likely to move away compared to less educated youths, whereas these effects in the baseline model range between 14 and 3 to 6 p.p., respectively. Robustness checks carried by using probits and a differently specified ordered probit model confirm the baseline findings.

In the third Chapter, I analyse the short-run effects of experiencing job instability at the beginning of the career on fertility choices. The existing literature, both theoretical and empirical, predicts that the choice of becoming a parent is largely conditioned by individual preferences over parenthood, financial constraints and job-related conditions Butz and Ward (1979); Ahn and Mira (2002); Francesconi (2002). While the demand for children for men is typically subject to a pure income effect, the case of women provides for an additional substitution effect that counterbalances the income effect and may even dominate it, under certain circumstances. The raising concerns about the disruptive effects on fertility of youth unemployment and job instability in general that have been emerging in the last few decades (Del Bono et al., 2015; Auer and Danzer, 2014), are the founding rationale behind my analysis.

After controlling for a number of individual characteristics and coherently with the recent literature, I find that the benchmark Poisson model suggests a negative and significant, although small in magnitude, association between the number of job changes in the first four years of one's career and the number of children born by the fifth year into the labour market. When I allow for the presence of endogeneity between labour market experience and parenthood choices, however, this effect is completely wiped out. This suggests that in the short-run the choice of having a child is independent of fluctuations in employment experience and may, instead, have to do mainly with individual preferences and attitude towards family composition.

Chapter 1

Sources of Residential Location and Childbearing Decisions in Early Adulthood: a Survey

1.1 Introduction

Transition into adulthood typically involves a number of crucial passages: finishing full-time education; entry into the labour market; leaving home; establishment of an independent household; and entry into marriage and parenthood (Kiernan, 1991). These do not necessarily occur in this order and are not all to be experienced by everyone. Yet, getting a job seems to be the critical step that is most commonly associated to a definite passage into being considered an adult (Toulemon, 2010).

In Kiernan's (1991) analysis on British young adults aged 16 to 30, entrance into the labour market is found to be almost contemporaneous to leaving full time education for both young men and young women. These two are the very first steps that the large majority of young adults undertakes in this country: around 90% leave full-time education and enter the labour market by age 19.

The subsequent steps that characterise transition into adulthood generally take place some time after. In particular, leaving the parental household is usually conditional on having a job, because the latter allows the individual to be financially independent, but differently from parenthood, it is not an irreversible commitment and is more widespread, even at younger ages: moving out from one's parental house and marriage are becoming increasingly unrelated, as more young people decide to live independently prior to marriage (Jones, 1987; Toulemon, 2010). Women leave the parental nest almost two years earlier than males, although 30% of them returns home at some stage.[1] Marriage and parenthood occur at a later age: by age 23, 54% of women are married and 30% had at least one child, while the corresponding shares for men are 32% and 15%, respectively (Kiernan, 1991).

Cordón (1997), using data from the Labour Force Survey, argues that the indicators related to this kind of phenomenon show remarkable heterogeneity within Europe, in spite of the overall alignment of EU countries from both the social and the economic perspectives.

[1]Returners are mainly those who moved out to pursue higher education, who are also those who left earlier. This is consistent with the idea that having a job is a prerequisite to living independently and that lack of employment may delay moving out from one's parental house (Jones, 1987). On the other hand, children who moved out to get married are very unlikely to return to the household of origin at any point.

In fact, Billari (2004) identifies two diametrically opposed patterns in age at home-leaving: the 'latest-late' pattern in Southern Europe, where on average youngsters leave home at a late age, when they move in with a partner, and the 'earliest-early' pattern of transition of Nordic countries, where the parental home is left around age 19/20 and is not necessarily linked to union formation processes, with the remaining European societies laying in between the two opposite circumstances.[2] Toulemon (2010) describes an analogous picture, but focuses specifically on gender differences and claims that the gap between men and women, although very large across all European countries, is narrowing in the Southern countries, but widening in Eastern Europe.

Still, while the common belief concerning transition into adulthood trends across Europe during the second half of the twentieth century is for it to be defined as 'early, contracted and simple', Billari and Liefbroer (2010) claim that a new pattern is emerging and that this is characterized as being 'late, protracted and complex': most events occur much later in life compared to the past, they take place within a longer time-span and are relatively many more than those that would occur in the past decades.

The scope of this thesis is to evaluate two main aspects concerning transition into adulthood: the reasons behind the decision to leave the parental home and the link between job instability and fertility choices in the short run. The focus is specifically on the United Kingdom, which is characterised by a relatively mobile population and flexible labour market. In the remainder of this Chapter, I evaluate the existing literature on both residential mobility and fertility choices, with a special attention towards labour market entrants. In the second Chapter I analyse the determinants of geographical mobility in the first years after leaving education. The third Chapter deals with the decision to become a parent in association to different patterns of job experience at the beginning of one's career.

1.2 The Determinants of Geographical Relocation

Age or, rather, the stage of an individual's life course is a very important predictor of mobility, where each sub-group of the population responds to specific determinants and has a distinctive

[2]See also Scherer (2004, 2005).

migration behaviour with respect to other categories. The literature, regardless of the country and the time period examined, agrees on young people being the most mobile subgroup of all, with a peak in the early 20s: "Almost half of all moves within England are undertaken by people aged 16-29 despite the fact that they make up under one-fifth of the total population" (Champion et al., 1998, p. 57). This time of their life generally coincides with them leaving the parental house, finding a job, possibly starting a family and it is characterised by frequent and long-distance moves (Champion et al., 1998).

Among the reasons why this happens, very young people typically have fewer family and asset constraints to account for: they are unlikely to have started a family or to have children and to be house-owners, hence it is much easier for them to change address of residence (Mitchell, 2008).[3] Second, they have a higher net present value of migration than that of older people because they can amortise moving costs over a longer period of time. Aisa et al. (2013) try to model the optimal age to migrate and argue that this would coincide with the youngest age possible.[4] In fact, as individuals stay longer at home, preferences for their place of origin grow stronger and determine, in turn, an increase in the costs of moving.

The mobility behaviour of labour market entrants is typically affected by reasons that can be separated into three broad categories: individual, family and regional characteristics.

1.2.1 Individual attributes

Individual characteristics include both fixed (gender, ability, personal propensities) and time-variant (educational attainment, marital status) attributes.

Gender differences are not particularly striking, with women moving on average at a younger age than men. This should be attributed to the fact that not only women typically marry older men, but they also often follow their male partners, who are the primary earners in the couple,

[3]While marriage is one of the main reasons for individuals to migrate, especially for women, married couples have a much lower mobility than single people. Similarly, parenthood substantially decreases the probability of moving, particularly in families with school-aged children. In both cases, location decisions must account for the maximisation of utility at the household level.

[4]Individuals become potential migrants as soon as they enter the labour market, i.e. at around 18 years old. However, they find that in countries like Spain and Italy migrants are on average older (25-29 years old). They justify the failure of theoretical predictions with the fact that models should not focus on income only but also consider e.g. social factors and human capital (Aisa et al., 2013).

in their migration decisions - i.e. women are "tied movers" (Champion et al., 1998; Lø ken et al., 2013).

Personal inclinations and ties with the place of origin do matter in one's choice of moving. Krabel and Flöther (2012) argue that personal preferences and the willingness to move are a crucial factor in the migration process. They find that the likelihood of moving from the university region for German graduates is higher if the individual has moved in the past, where prior mobility is a proxy for the individual propensity to move.[5] The same phenomenon is found by Kodrzicki (2001) on US graduates, who are 17% and 54% more likely to be mobile later in life if they moved state some time before high-school age and in between high-school and college, respectively. Belot and Ermisch (2009) claim that people with thicker local social networks are less likely to move, possibly because on one hand, the intrinsic value of family and friendship ties is jeopardised by the high costs of maintaining them over long distances; on the other hand, people with a lot of close friends are more likely to hear about jobs nearby rather than at some other locations. On the contrary, those who move generally have weaker social networks and this encourages further movements.

Educational attainment is also one of the biggest predictors of mobility, not only because individuals move to pursue education.[6] In theory, if geographical mobility can be perceived as an indicator for the width of the labour market, one of the following circumstances may occur. It may happen that the higher the level of education, the farther individuals move because they can access a wider range of jobs and better exploit the returns from schooling, while the less skilled would be confined to a narrower labour market (Basker, 2002). On the other hand, it may be the case that the better educated can more easily find a job in the place they live in, while their counterparts struggle and have no other option but to look for better opportunities away (the so-called "poverty effect"). Then, one would observe highly-skilled workers being less likely to move from high-unemployment regions to low-unemployment ones than low-skilled workers (Basker, 2002).

[5] Stark (2003) discusses the existence of a "taste for migration" and its implications.

[6] Champion et al. (1998, p. 98) argue that in England "one of the major migration streams which moves several hundred thousand migrants each autumn is that of students into higher education". In fact, according to (Belfield and Morris, 1999, p. 243), "[o]ver half of students, 54 per cent, move away from their home region to attend HE", while a third does not move region at all, either to study or to find a job. Hillmert (2004), analysing regional mobility of young adults in West Germany, finds that youths in the age class 15-21 years old move mostly for training or education, while for those in the age range 21-34 mobility is predominantly employment-related.

Many of the theoretical contributions centred on migration have modelled this phenomenon jointly with human capital investment choices. Common assumptions are that the returns to schooling away are greater than those at the place of origin and that individuals have a preference for not moving, i.e. they have a preference for their home location.[7] For instance, Stark et al. (1998) use a simple two-period two-country model to show that if the individual is assigned a strictly positive probability of becoming employed away, then she will be more prone to invest in education than the case in which migration is not provided for.[8] Dustmann and Glitz (2011) compute a three-period model where the decision to move is taken by comparing the value functions associated with the two options (to migrate or not), net of moving costs. In case migration occurs, earnings depend, among other things, on the transferability of the human capital across labour markets and on the time spent away. More recently, Kennan (2015) develops a dynamic programming model where migration may occur both before and after graduating from university and costs and benefits of education may vary across areas. By using US data, the author finds that individuals do, in fact, move from low- to high-wage locations in response to economic incentives. He also finds that US states where education is greatly subsidised induce more people to graduate from university and, as a consequence, the level of human capital within the state increases. This is explained by the presence of moving costs: some individuals eventually will move somewhere else but the majority will choose to stay.

In the post-war emipirical literature there is not a clear and consistent evidence of an effect of education on mobility (see, e.g., Wagner (1990) and Quigley and Weinberg (1977)), while in the last decades a general consensus on the existence of a positive correlation has risen (Hillmert, 2004; Hoare and Corver, 2010; Machin et al., 2012). In the literature, this is usually explained as a consequence of two circumstances. First, the existence of endogenous, and often unobservable, individual and family factors (ambition, motivation, encouragement, expectations, etc.) which may push individuals to get better education and, simultaneously, to move more. Second, the labour

[7] In addition, these models often allow for return migration.

[8] This is under the assumption that the wage away is strictly greater than the wage at home and that the cost of schooling coincides with forgone earnings while the individual is into education (see also Stark et al. (1997)). Stark and Dorn (2013b) allow for the inclusion of savings in the model, while Stark and Dorn (2013a) evaluate the role of remittances and family ties of the migrant.

market for these individuals is geographically distributed in an uneven way: while the demand for unskilled or manual workers is by and large the same everywhere, metropolitan areas typically both generate and attract better educated workers, who have higher opportunity costs for not moving because of their higher expected returns to education.[9]

The field of study may also influence the degree of mobility because of the intrinsic characteristics of some jobs and of the employability opportunities (Belfield and Morris, 1999; Buonanno and Pozzoli, 2009; Krabel and Flöther, 2012), while academic performance is found to increase the likelihood of moving (Hoare and Corver, 2010), possibly by picking up some sort of ability effect.

1.2.2 Family and household characteristics

The environment in which an individual is raised is of crucial importance and the characteristics of the parental household need, therefore, to be accounted for. In particular, the past literature has found strong evidence of a persistence in inter-generational socioeconomic status, especially in terms of education and economic outcome. As a consequence, individuals coming from wealthier backgrounds are generally more educated and can afford moving away, while their poorer counterparts choose to live in proximity to their parents in order to enjoy their support and be better protected against labour market shocks (Card, 2001; Kaplan, 2009, 2012) and job insecurity (Becker et al., 2010; Cobb-Clark, 2008).[10]

As far as the composition of the parental household and its merely demographic aspects are concerned, Cobb-Clark (2008) finds that the probability young Australians live with their parents decreases in the number of siblings and if parents are divorced.[11] Similarly, Lø ken et al. (2013) argue that Norwegian young adults are less likely to live near their place of origin when they can count on a higher number of siblings or are at a later birth order, as they have less family responsibilities.

[9] With this respect, however, Rees et al. (1996), based on data from the UK 1991 Census, claim that the people aged 16-29 have been generally moving into urbanised areas even though on average there is some evidence for a "significant redistribution [of the population] both downward and outward" (p. 78), i.e. from large cities to medium/small towns and from urban centres to the outskirts.

[10] See also Berrington et al. (2013). They find that British young adults are more likely to return home if both natural parents live in the parental household, although there seems to be no significant link with their income levels.

[11] See also Smits et al. (2010) and Ermisch (1999). The latter finds that British young adults are more likely to move if they are cohabiting with only one natural parent or if they live in a large household ('congestion effect' in the consumption of the household public goods).

On the contrary, Konrad et al. (2002) find that German older siblings move more than the younger ones, possibly because they can shift the burden of care-giving to their younger siblings through a first-mover advantage. The same reasoning applies to adult children with siblings, who move more than only-children (Rainer and Siedler, 2009).

1.2.3 Regional and macroeconomic features

When dealing with young adults seeking for a job for the first time, local labour market and regional properties of both the areas of origin and of (potential) destination are of great relevance.[12] Each area is, in fact, characterised by three sets of features: attracting or *pull* factors, repelling or *push* factors and characteristics to which people are indifferent to. It is true that these sets are differently defined across people, given individual-specific preferences and characteristics, but some factors seem to generally affect homogeneous sub-groups of people in a similar way (Lee, 1966; Kodrzicki, 2001; Kennan et al., 2011).

In the case of labour market entrants, for instance, the degree of urbanisation seem to have an attracting power because of the creation of agglomeration economies in metropolitan areas (Wagner, 1990; Berrington et al., 2013). Here, the gravitational pull is twofold: not only those people coming from elsewhere are attracted by the higher concentration of jobs, especially high-skilled ones, and by better facilities, but also those who were raised in that area are less keen on moving. This is particularly true for highly skilled individuals, also because inner city areas are very costly in terms of housing and therefore low-income households are induced to move to suburban areas. Similarly, regions with a higher mean wage tend to be more appealing while a high unemployment rate generally pushes residents away (Champion et al., 1998; Mitchell, 2008). Nevertheless, Berrington et al. (2013) find no significant effect of the local unemployment rates on the attractiveness of the location of the parental household.

[12] Much of the theoretical literature is based on the expected net earnings differential between locations. If this differential is in favour of the location different from the one where the individual resides, then migration will occur, and vice versa (Stark et al., 1998; Basker, 2002; Eggert et al., 2010; Dustmann and Glitz, 2011; Kennan et al., 2011; Kennan, 2015). Yet, Stark (2003) argues that there are cases where moving is still optimal even in the absence of a wage differential.

1.3 The Determinants of Fertility Choices

Since the earliest studies on fertility choices, the common approach in the literature sees children as normal goods (Becker, 1960), so that higher earnings are associated with a greater demand for children, and childbearing decisions are taken as a result of a utility maximization problem for the parents.

Butz and Ward (1979) are among the first to propose a static theoretical model of household behaviour where utility is maximised with respect to market goods, leisure and child services. They test their model with U.S. data against the pro-cyclicality of fertility trends and successfully explain its patterns in the post-war period, i.e. the 1950s 'baby boom' and the 1960s baby bust, as resulting from changes in males and females incomes. They find that, when few women are employed, increases in fertility rates are positively driven by increases in males' income levels because this causes a rise in the household overall income and a consequent increase in the demand for children. When the participation rates of women is very high, however, an increase in their wage levels determines a positive income effect on one hand and a negative substitution effect on the other, the latter being generated by an increase in the opportunity cost of women's time, under the assumption that children are the wife's time-intensive users. With respect to the overall effect of a rise in the women's wages, they find a significant and negative relationship with the probability of having a child, suggesting that the substitution effect is the dominating one.

According to Butz and Ward (1979), fertility would increase, or at least go back to the original levels, only in the case of a large fall in participation rates of young women, or if there was a substantial increase in the supply of preschool or day care facilities. This is also predicted by Walker (1995), according to whom government benefits to parents partially offset the effects of wage increases on the opportunity cost of child bearing, in terms of foregone earnings.[13]

Nevertheless, Ahn and Mira (2002) argue that the model of Butz and Ward (1979) is not successful in explaining the subsequent (i.e. the 1990s) fertility trends where the total wage effect for women may have become negative, determining an increase in the demand for children. The

[13]Walker (1995) defines the a shadow price of giving birth in any given period as consisting of three terms: the opportunity cost for the time actually spent caring at home away from paid work; the net direct expenditures; and forgone returns to human capital investments.

authors claim that this discrepancy may rest on Butz and Ward's assumption of continuous labour supply response to wage changes. In the real world, however, women's working hours do not change continuously (i.e. discrete working hours) and therefore an increase in their wage will result in higher fertility, as long as children are normal goods.

Furthermore, Ahn and Mira (2002) extend the model by Butz and Ward (1979) introducing child care services to be purchased on the market.[14] Under the assumption that the price of child care services declines relative to the average female wages, the income effect of female wage changes on fertility becomes even more dominant over the substitution effect.[15] A similar conclusion is reached by Ermisch (1989), who finds that the availability of childcare on the market has a different impact across different categories of mothers: for low levels of income or high prices of market childcare, children are looked after by their mother, given the low opportunity cost that she faces, and for the same reason she is more likely to experience a higher fertility; if the mother earns a relatively high wage, on the contrary, she will purchase childcare on the market but at the same time will have to substitute these services for other consumption goods. Joshi (1990, 1998) confirms this finding when using British data and claims that, given the very little recourse to paid childcare, the mother usually takes responsibility in raising her offspring while the father is the main breadwinner within the household.

Cigno and Ermisch (1989) and Cigno (1991) claim that women undertaking higher investments in human capital will choose to have fewer children; on the contrary, steeper career profiles induce them to have children later. The timing of births, however, may depend both on quality (Becker and Lewis, 1973) or financial considerations Cigno (1983). According to the latter, "women with high initial endowments of human capital will have all their children in the first part of married life and then return to full-time employment, while women with low initial endowments will spread childbearing more evenly over the fertile period".[16]

[14]Del Boca and Locatelli (2006) provide a review of the literature in relation to social policies, job participation and fertility.

[15]In spite of market child care services being supplied mainly by women, and their price being, as a consequence, linked to the average female wages, Ahn and Mira (2002) argue that: (i) as the female participation rate increased, women also tended to work in higher-skilled occupations, and to the extent that child care services are carried out by relatively unskilled labour, their price should fall relative to the average female wage; (ii) as more women work, there is greater pressure for more generous child care subsidies which reduce the net price of child care.

[16]Heckman et al. (1985), instead, claim that women who marry at younger ages have a more rapid pacing of

The explanation by Becker and Lewis (1973), which distinguishes between quantity (the number of children) and quality (the value of their consumption), is based on two key features: on the one hand, the shadow price of children with respect to their number (i.e. the cost of an additional child, holding quality constant) is greater the higher their quality; on the other hand, the shadow price of children with respect to their quality (i.e. the cost of a unit increase in quality, holding the number constant) is greater the larger the number of children. They argue that the income elasticity with respect to quality is larger than that with respect to quantity. As a consequence, increases in the mother's educational attainment determine increases in the quality of children to the detriment of their number, while increases in the mother's wage are associated with a reduction in quantity that is larger than the drop in quality.

More recent literature recognises a degree of simultaneity of labour supply decisions with marriage and fertility choices. As Sheran (2007) argues, however, static models do not seem to be particularly suitable to explain interrelated and dynamic processes such as family formation and childbearing and current and future labour supply.

Barro and Becker (1989) are the first to introduce a growth model with endogenous fertility decisions, where the choice is taken simultaneously to those about consumption, intergenerational transfers and accumulation of capital and accounts for parental altruism (i.e. the utility function of parents depends not only on their own consumption and the number of children, but also on the consumption levels of each child). Francesconi (2002) develops a joint dynamic model of fertility and labour supply of married women, where at each period they can choose whether to have a child and whether to be out of the labour force, in part-time or in full-time employment. Among his findings, he observes that a woman's preferences for children decreases in her level of schooling and in her earnings ability, i.e. "women with a comparative advantage in market work (or, alternatively, whose earnings profiles are the highest) are those with the lowest marginal utility of children; conversely, women with a strong preference for children are those with lower earnings profiles" (p. 374).

Analogous conclusions are drawn by Caucutt et al. (2002), who elaborate a dynamic search model of family formation and labour supply: they find that, even in the absence of returns to

subsequent fertility.

experience in the labour market, high-productivity women delay fertility and have less children: women in the highest wage quintile have 64% of their children at age 27 or older, compared to 42% for women in the lowest wage quintile. Also, by allowing for endogenous marital decisions, they claim that women with high wage levels delay fertility more than women with lower wages because they are pickier than high-wage men about whom they marry. Using U.S. data, they find significant changes in terms of quantity and timing of births over time: since the 1938 birth cohort of mothers, more recent cohorts have fewer kids and have them at later ages, where around 30% of the delay can be explained by the increases in the educational level of women.[17]

1.3.1 Recent Empirical Literature

The empirical literature on fertility is at least as vast as the theoretical one. The branch that specifically examines the determinants of fertility choices at the micro level focuses mainly on the role of labour market status, especially unemployment, both of the woman and within the couple. However, as Del Bono et al. (2015) state, "unemployment is only one aspect of a more general problem, a problem we may call labour market 'instability' and that might be at the roots of the recent trends in fertility rates observed in many European countries" (p. 464).

From a macroeconomic perspective, a number of studies based on relatively recent data observe a positive association between labour force participation and fertility, with many researchers advocating procyclicality of fertility, meaning that the rise in the wage of women during times of economic expansions would yield an increase in fertility rates due to the dominance of the income effect over the substitution effect (Ahn and Mira, 2002; Adserà, 2004; Engelhardt et al., 2004; Adserà, 2011; Goldstein et al., 2013).

González and Jurado-Guerrero (2006) investigate the reasons why women delay childbearing and increase their likelihood to remain childless by comparing four European countries (Italy, Spain, France and West Germany over the period 1994-2001). They argue that the postponement of motherhood can be attributed to both voluntary and involuntary motives. On the one hand,

[17] See also Van Der Klaauw (1996) for a dynamic model that accounts for the joint determination of marital status and labour supply decisions. Similarly, Sheran (2007), following Van Der Klaauw (1996) and Keane and Wolpin (2002), jointly models female labour supply with marriage, fertility and education.

women are increasingly investing in human capital and participating to the labour force, which, along with the widespread use of contraceptives, makes them able to give priority to career and personal development ('preference theory', see also Butz and Ward, 1979). On the other hand, childbearing requires parents, but especially women, to acquire some minimum conditions that would allow them to comfortably engage in such investment. These can be summarised in the following: job stability, a minimum income level, independent housing and some time flexibility. Also, as Easterlin (1973) postulates, experiencing lower standards of living compared to those of one's parents reduces fertility.

González and Jurado-Guerrero (2006) find that having unstable employment relations lowers the propensity of having a first child. At the same time, economically inactive women are more likely to have a child. The authors also investigate the effect of institutional factors, as they are expected to be of high importance, especially in the accommodation of family life with work obligations. They find that, once the partnership is formed, institutional context seems not to matter much, suggesting that this is mainly determining in the transition to an independent household and partnership formation. However, Adserà (2011) argues that high and persistent unemployment rates in the country of residence are associated with both a delay and a reduction in childbearing.[18]

According to Ratcliffe and Smith (2008), "the decline in average family size was driven by two trends – a decline in average family size among women who had children and an increase in childlessness" (p. 9). They show that, over time, there has been a slight increase in the proportion of British childless women (accompanied by a similar trend in one-child women), while the share of mothers of three or more children has decreased more than proportionally. At the same time, the proportion of women having their first child by the age of 30 has been steadily decreasing over the past decades.

More recently, Auer and Danzer (2014) estimate the probability of childbearing when the woman enters the labour market on a fixed term contract. They find evidence for both a postponement of first birth and a reduction in the number of children in the first 10 years after graduation. The results are particularly strong for women with secondary education, while there is no apparent

[18]See Gauthier (2007) for a recapitulation on policy evaluations concerning fertility.

effect for men.

Del Bono et al. (2012, 2015) evaluate the effects of job displacement on the probability of having a child by exploiting plant closures in Austria as an exogenous temporary employment shock.[19] They show that, after ten years, birth rates are reduced by around 10% for displaced women, and the effect is largely driven by white collar women. They also separate the effects of being unemployed from that of incurring in involuntary job separation *per se* and claim that the negative effect on fertility should be entirely attributed to the job loss and not to unemployment, as women revise their choices on childbearing because they need to find a new job and start a new career ('*employability* and *career* effects'). This is particularly true for career-oriented women.

1.3.2 The Effect of Childbearing on Women's Labour Supply

An extensive branch of the literature on fertility also deals with the impact of parenthood on the parents' labour supply, especially the mother's. This specific aspect is not in the scope of this analysis, although mechanisms that are related to what comes after childbearing should not be neglected given its irreversible nature and that choices about family formation necessarily account for expectations about the future labour opportunities of both parents.

Davies et al. (2000) claim that having children affects the woman's opportunities on the labour market not only through an immediate effect on unemployment, due to merely biological factors, but there are also long-term repercussions on her earning power and pension coverage. In fact, couples with dependent children are less likely to have two earners (Joshi, 1998).

Joshi (1990), using British data from the 1980s, estimates that a mother of two earns half as much as she would have done if she didn't have children. When looking at heterogeneous effects, low- and mid-skilled women are found to have much lower participation rates and earnings when they have children, while highly-qualified mothers are only affected temporarily by the birth of a child (Davies et al., 2000). This is in line with what the search model by Erosa et al. (2002) predicts, that is women who break a job match to have children are likely to self-select from the low-skilled end of the distribution of human capital.

[19] Del Bono et al. (2015) are among the few attempts to deal with the endogeneity issues within employment and fertility.

The institutional framework is crucial in determining the impact of childbearing on the woman's labour supply and welfare. In fact, Adserà (2004) compares OECD countries and finds that fertility rates are higher where labour market institutions easily accommodate entry and exit (e.g. USA and Northern Europe), while high unemployment rates and rigid labour markets are associated with lower fertility rates (e.g. Southern Europe). This is because generous maternity benefits and flexible labour markets allow women to re-enter the market after maternity, while in the latter case precarious contracts and high unemployment rates discourage temporary exits that are necessary to the woman to have a child.

1.4 Conclusions

Leaving the household of origin and entry into parenthood, which typically coincide with the first and the last step of an individual's transition into adulthood (Billari and Liefbroer, 2010), both appear to be closely linked to individual-specific traits and preferences and to one's opportunities in the labour market, as a consequence of the fact that "the main requirement 'to be considered an adult' is still to have a full-time job" (Toulemon, 2010).

When it comes to residential location decisions, the main driving forces that push young individuals to move can be reduced to personal attitudes and preferences and to educational attainment, given that more skilled individuals are more likely to stretch out to a wider labour market than their unskilled counterparts. Environmental factors, on the other hand, are important only to some extent, where metropolitan areas tend to have an attractive power and regions characterised by high unemployment rates are often associated with a high number of emigrants. In what follows, I try to assess the relative power of some of these factors, by taking into account the indirect effect through schooling attainment that preferences have on mobility.

The choice of becoming a parent, on the other hand, is generally found to be largely conditioned by financial constraints and job-related conditions, after acknowledging individual preferences over parenthood. While for men the demand for children is typically subject to a pure income effect, the case of women provides for an additional substitution effect that counterbalances the income effect and may even dominate it, under certain circumstances. The raising concerns about the disruptive

effects on fertility of youth unemployment, and job instability in general, are the founding rationale behind the analysis in the last Chapter, where I estimate the effect of having unstable working conditions on the likelihood of having a child in the short-run, once macroeconomic patterns are accounted for.

Chapter 2

Residential Location Choices in Early Adulthood

2.1 Introduction

According to the general framework, individuals choose their residential location depending on the difference between the expected utility from moving away and staying at the home location, which includes both economic and non-economic aspects. Economic elements depend on local labour market conditions such as average unemployment rates, mean wages and housing prices, as well as on individual employment history (Angulo and Mur, 2005; Hatton, 1995). On the other hand, non-economic aspects are related to individual- and household-specific preferences, which embrace the individual propensity to move (Belot and Ermisch, 2009), marriage and parenthood (Lø ken et al., 2013; Mitchell, 2008) and other amenities, such as those associated with quality of life (Kodrzicki, 2001; Kennan et al., 2011).

Young people do not, however, fit in completely into this framework, as not only they have a shorter work history (Böheim and Taylor, 2002), but they are usually found to have different preferences compared to their adult counterparts: they are, in fact, less likely to be married or have children and to own a house (Mitchell, 2008). As a consequence, they face less family and housing constraints and their moving choices must be, then, necessarily driven by different factors.

While there exists a large amount of literature on regional mobility of the labour force in general, the particular condition of young adults who have just exited full time education and are about to enter the labour market has not received much attention. In fact, however, this specific group has its own peculiar set of preferences which do not coincide with the ones of adults in general. It is, then, worthwhile investigating the determinants of moving choices for this subset of the population, also because they are very likely to affect the individuals' future outcomes (Bachmann et al., 2010; Hoare and Corver, 2010; Scherer, 2005). As far as the policy-making indications are concerned, governments may find it desirable to ensure an evenly distributed skilled labour force across areas, as this has repercussions in terms of local development and welfare policies.

In this analysis, I explore the residential location choice of young British adults who have just exited full-time education and are about to enter the labour market. I evaluate the causal effect of a number of factors on their decision to move away from their place of origin. These factors include individual, household and regional characteristics, with an emphasis on educational attainment

and the potential endogeneity issues that may be generated by omitted personal characteristics (i.e. more ambitious individuals may be more inclined to pursue higher levels of education).

I choose to adopt a semi-ordered bivariate probit model (Weiss, 1993; Sajaia, 2008; Greene and Hensher, 2009) that allows me to account for an exogenous source of heterogeneity in schooling decisions which should not affect mobility choices, that is the individual educational aspirations when the respondents are in their early teenage years (10 to 14 years of age).

This is the same approach that has been used, among others, by Armstrong and McVicar (2000), McVicar and McKee (2002). Their analyses are both related to the educational attainment of individuals in Northern Ireland. The first examines how the qualification level reached by individuals changes with respect to the choice of participating to a Youth Training Programme or to colleges in further education. When considering personal factors that may simultaneously affect the decision to opt for a Government training scheme or for further education and the qualification level at the end of the schooling period, the authors find no evidence of selection of students into a specific training programme based on individual characteristics, contrary to what the raw data suggest. In the latter, McVicar and McKee (2002) explore the effect of working part-time while studying on during post-compulsory education performance: estimating a one-equation ordered probit suggests an apparently positive and significant relationship between having a part-time job and the qualification level achieved, but this result is shown to be misleading as, when a semi-ordered bivariate probit is estimated, this relationship becomes negative and insignificant. When only part-time work for working 15 or more hours per week is considered, the coefficient is negative and significant, confirming that part-time work is actually detrimental to examination performance.[1]

Here, I first run a one-equation ordered probit as baseline model, where I find that individual characteristics such as having a degree and having moved in the past positively and significantly affect mobility. The same happens with an indicator for regional urbanisation, while family characteristics do not seem to have a significant effect. Then, I adopt a semi-ordered bivariate probit approach and find that, when including a proxy for ambition in the model, the probability to stay

[1]More recently, Eugenio-Martin and Campos-Soria (2014) model the household cutback decision in tourism expenditure, simultaneously accounting for the destination choice and the fact that the decision of having traveled to a certain place may be conditioned by the need to cut back.

in the parental house decreases by 27 percentage points for graduates (versus 14 percentage points in the baseline model). At the same time, the increase in the likelihood to move within the same District, to a different District or to a different region ranges from 5 to 11 percentage points (it is between 3 and 6 p.p. in the baseline ordered probit). Analogous figures are found when defining mobility on the basis of Travel-To-Work Areas in place of the administrative Districts boundaries. This suggests that individual propensity to get an education may have an indirect effect also on residential choices later in life. The benchmark results are also confirmed by robustness checks.

The reminder of the Chapter is structured as follows: in the next Section, I explain how the sample is selected; in Section 3 I describe the data, in Section 4 I outline the empirical strategy and in the following Section I report the results; Section 6 concludes.

2.2 Data and Sample Selection

The geographical units used in this analysis are the Local Authority District (LAD) and the Travel-To-Work Areas (TTWA). These are the smallest units at which I am able to match all the information drawn from the various sources. According to this methodology, the UK is divided into 408 LADs and 314 TTWAs across 19 Regions.[2]

While LADs constitute a mere administrative classification, TTWAs are intended to approximate self-contained labour markets. The ONS (Office for National Statistics) defines TTWAs according to the following criterion: at least 75% of an area's resident workforce work in the area and at least 75% of the people who work in the area also live in the area. The area must also have a working population of at least 3,500, but many TTWAs are much larger than that (e.g. the whole of London and surrounding area forms one TTWA). As a consequence, in some cases TTWAs overlap LADs and Regions.

By disaggregating the data at such levels, I am able to improve the precision of my analysis and

[2]Districts are defined as at December 2001 and are aggregated in the cases where the population falls below 120,000. TTWAs are currently 243, as defined in 2007 using the 2001 Census information on home and work addresses, but since my data refers to the previous decade, the classification used here backs up to 1991. For details, see BHPS Volume A User Guide (https://www.iser.essex.ac.uk/bhps/documentation/vola/vola.html, last accessed 19/06/2014) and ONS (http://www.ons.gov.uk/ons/guide-method/geography/beginner-s-guide/other/travel-to-work-areas/index.html, last accessed 19/06/2014).

account for intra-regional differences which would otherwise be undetected. Also, by using larger geographical units there would clearly be fewer observed movements between units themselves (Champion et al., 1998). On the other hand, the use of both LADs and TTWAs guarantees the possibility of checking the robustness of the analysis.

2.2.1 The BHPS and the YOUTH datasets

All variables are drawn from the British Household Panel Survey (BHPS), which is a very rich and detailed survey that includes information on all aspects of people's lives. It covers the years 1991-2008 (18 waves) and includes a representative sample of the population of the United Kingdom. All people aged 16 or above living in the eligible households are interviewed. The YOUTH dataset relies on the young person's questionnaires, which are submitted by all children aged 11 to 15 who live inside the households interviewed within the BHPS programme. The variable used to correct endogeneity in this analysis is drawn from this dataset.

Table 2.1: Sample selection

Description	Obs	Individuals	%
BHPS raw data	238,922	32,336	100.00
Only young adults (aged 35 or under)	57,017	11,203	23.86
Only indiv who left edu since start of the survey	27,004	2,814	11.30
Only waves 5-18	24,240	2,737	10.15
Only non missing YOUTH info	13,577	1,350	5.68

I restrict the original BHPS sample to young adults aged 15-35 years, for whom the first observation is at 25 years old or below (see Table 2.1). Then, I keep all individuals who experience a transition out of full-time education and into employment, unemployment or inactivity.[3] Given that some people record multiple transitions by going in and out of education with some interruptions, I do not consider as undergoing transition those who suspend their studies for one year while living with their parents (i.e. those who take a sabbatical year). As for the rest, I only take into account the transition corresponding to the attainment of their highest academic qualification. This way, I should be able to, at least partially, get rid of casual and temporary employment that young people often take in order to earn some money during their studies and before finding a more stable job.

[3]Inactivity is specifically intended as "family care", while workers in maternity leave are listed among the employed. People in long term sickness or disabled are excluded from the sample.

Table 2.2: Sample size by years from transition

t	0	1	2	3	4	5
n	1350	1148	889	693	515	389
f	991	847	683	533	412	317
k_d	236	221	201	187	166	143
k_t	179	174	148	143	127	113
%	100	85.04	65.85	51.33	38.15	28.81

Note: t, n, f, k_d, k_t are the number of years since transition, of individuals, of families, of Districts and of travel-to-work-areas, respectively.

Then, the sample is further restricted to those individuals who have been previously interviewed in the YOUTH record, in order to ensure consistency when using IV. This includes dropping the first four waves (years 1991-1994) of the survey, as the YOUTH survey starts in 1994.

Thus, the final sample consists of 1350 individuals who were in full-time education at the previous period and are now in the labour market or inactive (Table 2.2). They come from 991 different households, spread over 236 Local Authority Districts and 179 Travel-To-Work-Areas. I follow these people up until the fifth year after their transition into the labour market, while the estimates reported in this analysis are all referred to the time span in between the second and the fifth year. I choose this particular scheme in order to allow for adjustments that people may undertake right after they terminate their educational career.[4]

2.2.2 Attrition issues

Unfortunately, the sample size decreases quite quickly: the sample drops to two thirds by the second year after leaving education and to around 30% by the fifth year (see Table 2.2). On the other hand, the sampling rules in the BHPS are such that there is no particular reason why bias from sample selection should arise. The sample members interviewed at wave one of the BHPS constitute the Original Sample Members (OSM), while from the next wave onwards: (i) any baby born to an OSM is automatically listed an OSM; (ii) people moving in with an OSM or people living in an household where an OSM moves in become Temporary Sample Members (TSM) and are interviewed only as long as they live with the OSM. A small subset of TSM become OSM

[4]For instance, a large share of graduates returns to the parental house in the first year after graduating and then moves out again (Jones, 1987).

(i.e. if they have a child with an OSM), but the others are eventually dropped from the sample. Hence, a share of TSM are dropped at every round because no longer eligible to be interviewed, while the eligible adults who could not be traced in the following wave because out of scope make up a small percentage of the sample: e.g. 3.6% in wave 9 and 5.15% in wave 14. Moreover, with respect to the entire sample, "the BHPS attempts to follow all movers who remain in Britain and, although attrition among migrants is higher than among non-migrants, Buck (2000) reports that almost 75% of movers between waves 1 and 2 were traced" (Böheim and Taylor, 2002, p. 372). It may be the case, then, that the loss of observations in my final sample of labour market entrants is largely due to young adults' propensity to share their accommodation with peers of the same age who are eventually dropped simply because of sampling rules.[5] Hence, the bias arising from sample selection should be negligible.

2.2.3 Geographical variables

Part of the literature makes a clear distinction between the concept of residential mobility and that of internal or interregional migration, the latter being referred in particular to longer distance moves which are generally combined with a change in employment or socioeconomic status.[6] On the other hand, residential mobility is primarily related to changes in housing type. Consequently, moves within a certain radius or within specific administrative unit boundaries are often excluded because they still potentially allow commuting to the place of work and do not necessarily imply a major change in social group: Wagner (1990), having access to continuous data, uses a cut-off at 50 kilometres, while others set it at specific territorial levels (Belfield and Morris, 1999; Kodrzicki, 2001; Böheim and Taylor, 2002; Krabel and Flöther, 2012; Lø ken et al., 2013).

The BHPS offers two types of information on residence changes: a continuous variable, measuring the distance of the last residential move in kilometres (the variable 'distmov'), and some categorical indicators on the Local Authority District (LAD) and the Travel-To-Work-Area (TTWA) where the individual lives at each wave.

Using a continuous measure would be ideal, but the variable 'distmov', as it stands, is not

[5] For details, see the BHPS User Manual, Volume A.
[6] See, for instance, Cadwallader (1992).

suitable for the purpose of this analysis. In fact, this would be sufficient if individuals were moving only once, but since many of them move repeatedly and my purpose is to define how far they move from their place of origin in each period, I cannot recover any valuable information on the spatial pattern of their moves. In fact, the information I can gather from the variable 'distmov' is, in some cases, misleading: consider, as an example, an individual who lives in her parental household in London at t_0 and who were to move to Glasgow at t_1 and then to Reading at t_2. Then, the distance measured by the variable 'distmov' would only be reliable when considering the individual's first move at t_1, while the subsequent move would not be accounted for properly (the distance from Glasgow to Reading would be reported, instead of the correct one from London to Reading).

At the same time, a simple dummy variable indicating whether the individual has moved in the past year would not provide enough information. Hence, following Böheim and Taylor (2002), I choose to rely on the data regarding the District and the TTWA of residence at each wave and on the details about the household composition.

The first step involves the identification of the starting point, i.e. the household of origin, where the individual's parents live. I take into consideration the fact that some individuals, while still living in the parental household after transiting out of education, may move to another place *with* their parents. Therefore, I account for these moves and define the household of origin as the one in which the individual is last observed living with her parents. I also check whether the parents' household can still be considered as an attractive locus for adult children after they move out. In principle, individuals may have less incentives to return to their place of origin if their parents have moved to another place and this may cause some bias. Only an irrelevant percentage of families move after their adult children leave the house.

Once the household of origin is defined, following Böheim and Taylor (2002), I build two ordered categorical indicators, namely 'mobility (by District)' and 'mobility (by TTWA)', which are based on the District and the TTWA of residence, respectively. The variable 'mobility (by District)' takes value 0 to 3 if the individual has not moved from the parental household, moved within her District of origin, moved across Districts but within the same region, moved across regions, respectively. Accordingly, the variable 'mobility (by TTWA)' takes values 0 to 3 if the individual has not moved

from her parental household, moved within her TTWA of origin, moved across TTWAs but within the same region, moved across regions, respectively.

The use of this approach certainly improves the efficiency of distance measuring in this particular context. Nevertheless, it does have weaknesses: e.g. two adjacent Districts may belong to two different regions and therefore be accounted for as far from each other and, vice versa, two distant Districts may belong to the same region and, consequently, they may mistakenly be considered as near to each other. Also, being the data collected once a year, I have no information on potential movements that may happen in between observations from one year to the other. Hence, in some cases there may take place multiple moves within a same year that I cannot account for. This introduces some measurement bias and an understatement of the frequency and extent of mobility patterns that I cannot currently disentangle.

2.3 Descriptive analysis

At the year when they leave education, individuals are 18 years old on average and 65% leave education with O levels or A levels, while around 12% has at least a first degree (see Table 2.3). When exiting full-time education, the great majority goes into employment (almost 75%). On the other hand, 22% is unemployed and only 3% is inactive. One individual out of five has been observed moving in the past, either alone or along with her parental household.

Two out of three had high educational aspirations when aged 10 to 14. This variable is constructed using the YOUTH panel of the BHPS. Here, young respondents in eligible households are asked whether, once the minimum compulsory schooling is reached, they are willing to go to 6th form or college or if they intend to leave school.

On average, individuals have 2 siblings and come from a household where there were many books. Almost 30% has a highly educated mother. These variables should pick up the degree of open-mindedness and the attitude towards education within the parental household.

As far as the residential location of the individuals in the sample is concerned, the vast majority still lives with their parents immediately after leaving education (see Table 2.4): only 15% moved

Table 2.3: Descriptive statistics at t_0

Variable	Obs	Mean	Std. Dev.	Min	Max
Mobility$^\sharp$ (by District):					
- *No move*	1305	0.849	0.358	0	1
- *Moved within District*	1305	0.076	0.265	0	1
- *Moved across Districts*	1305	0.022	0.147	0	1
- *Moved across regions*	1305	0.053	0.224	0	1
Mobility$^\sharp$ (by TTWA):					
- *No move*	1305	0.849	0.358	0	1
- *Moved within TTWA*	1305	0.081	0.273	0	1
- *Moved across TTWAs*	1305	0.022	0.147	0	1
- *Moved across regions*	1305	0.048	0.213	0	1
Other mobility indicators$^\sharp$:					
- *Moved from parental hh*	1305	0.151	0.358	0	1
- *Moved to different District*	1305	0.075	0.264	0	1
- *Moved to different TTWA*	1305	0.070	0.255	0	1
- *Moved to different region*	1303	0.062	0.242	0	1
Gender (1=*female*)	1350	0.516	0.500	0	1
Age	1350	18.412	1.863	15	27
Qualification:					
- *No qualifications*	1257	0.232	0.422	0	1
- *O levels*	1257	0.375	0.484	0	1
- *A levels*	1257	0.274	0.446	0	1
- *First degree or higher*	1257	0.119	0.323	0	1
Status:					
- *Self-employed*	1350	0.014	0.118	0	1
- *Employed*	1350	0.737	0.440	0	1
- *Unemployed*	1350	0.218	0.413	0	1
- *Maternity leave*	1350	0.002	0.047	0	1
- *Family care*	1350	0.029	0.168	0	1
Previous mobility*	1350	0.207	0.406	0	1
Educational Aspiration	1350	0.662	0.473	0	1
Birth position	1014	2.044	1.110	1	10
Number of siblings	1017	1.956	1.371	0	11
Mother's education (1=further or higher qualification)	965	0.373	0.484	0	1
Books in parental hh (1=*lots*)	979	0.493	0.500	0	1
District of origin urbanised$^\sharp$ (pop>10,000) at t-1	1224	0.725	0.447	0	1

Note: * Takes value 1 if the individual is observed moving before leaving education. $^\sharp$ Missing for those individuals whose District or TTWA of origin could not be recovered.

out of the parental household and just about 6% moved to a different region.[7] After two years, these percentages rise to 28% and 9%, respectively. Five years after transiting out of education, one out of two individuals lives on her own, but most of them didn't move much far: 33% still live in the same District as their parents and 38% didn't leave the TTWA of origin.

Figure 2.1 shows the distribution of the place of residence (with respect to the household of

[7]Percentages related to moves across regions slightly differ depending on their definition due to the overlap of some TTWAs, LADs and Regions.

Table 2.4: Residential location over time

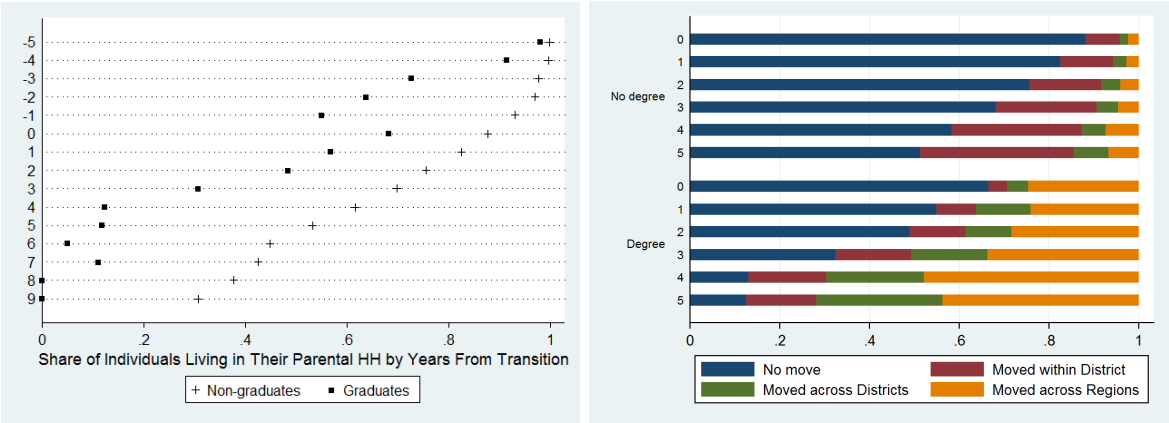
	at t_0	at t_2	at t_5
Mobility (by District):			
- *No move*	84.90%	71.76%	47.93%
- *Moved within District*	7.59%	15.96%	32.90%
- *Moved across Districts*	2.22%	4.59%	9.33%
- *Moved across regions*	5.29%	7.69%	9.84%
Mobility (by TTWA):			
- *No move*	84.90%	71.76%	47.93%
- *Moved within TTWA*	8.12%	17.68%	37.56%
- *Moved across TTWAs*	2.22%	3.56%	5.70%
- *Moved across regions*	4.75%	7.00%	8.81%
Other mobility indicators:			
- *Moved from parental hh*	15.10%	28.24%	52.07%
- *Moved to different District*	7.51%	12.28%	19.17%
- *Moved to different TTWA*	6.97%	10.56%	14.51%
- *Moved to different region*	6.22%	9.41%	11.92%

Note: t_0, t_2 and t_5 identify zero, two and five years from transition, respectively.

origin) by education and years from transition. The left panel summarises the share of youths who live in the parental household in each year before and after transition. It is evident how the share of those people who eventually graduate from university suddenly drops at the third year before transition (year -3), which should coincide with the time when a number of them moves out to go live near the chosen university. On the other hand, at year 0, i.e. the first year after leaving full-time education, some of them return home (Jones, 1987) before moving out again at an increasing rate. Conversely, less educated individuals start moving out from the parental household around the time of leaving education but they do so at a much slower rate: at the sixth year into the labour market, around one in two non-graduates still lives with her parents, while most of the youths who went to university have moved out.

Similar evidence is provided by the right panel in Figure 2.1. Here, it is straightforward to note that graduates move much sooner from the parental household and are also more prone to move to a different region (i.e. long-distance relocation) compared to the less educated individuals. The latter are, on the contrary, more likely to move within the same district as the one where their parents live. Moreover, this pattern clearly persists over time (from year 0 to year 5 from transition into the labour market).

Figure 2.1: Residential location by education and years from transition



Note: the dot plot on the left shows the share of individuals living in the parental household from the fifth year before transition to the ninth year after transition; the bar plot on the right depicts the distribution in percentages of the residential location by education and by years from transition (zero to five years after transition).

2.4 Empirical Strategy

In this Section, I outline the empirical strategy. I start with an ordered probit model, which is the natural benchmark model to use given the characteristics of the dependent variable. Then, I employ a semi-ordered bivariate probit model, which allows me to account for the endogeneity of educational achievement, by allowing this variable to depend on the individual's prior educational aspirations. This model is the appropriate one to be employed, as confirmed by the ρ parameter being statistically different from zero. Finally, I run two robustness checks. The first one consists of running four separate probit models on four different dummies that are derived from the original dependent variable. The second check provides an ordered probit model, where the educational variable is a categorical variable.[8]

A similar, although not identical, methodology is also used by Böheim and Taylor (2002). Using the data from the BHPS, they look into the decision to move of British adults. First, they estimate the probability of moving as determined by employment status and housing tenure, then they use a bivariate probit model to account for the simultaneous determination of migration and employment status changes. Finally, they distinguish the effect between short- and long-distance movers with

[8]Ideally, this latter model could be implemented as bivariate ordered probit model but unfortunately the number of exogenous variables is not sufficient to ensure identification.

a multinomial logit model. The approach chosen for this analysis, however, differs from the one in Böheim and Taylor (2002) because it relies on contrasting assumptions, which derive mainly from the characteristics of the sample of reference. In the case of young adults it does not seem appropriate to account for employment history and housing tenure, while it should be the case for educational achievements and household of origin's features.

2.4.1 Ordered Probit Model

The aim of this analysis is to investigate how far from their place of origin young adults move, accounting for a number of individual, family and regional features. The empirical model to be estimated is, then:

$$M_{it} = E'_{it}\beta_0 + X'_{it}\beta + \varepsilon_{it}, \tag{2.1}$$

where M_{it} is the distance of individual i from her parental household at time t. This variable takes values 0 to 3 if the individual has not moved, moved within her District of origin, moved across Districts but within the same region, moved across regions, respectively. The District of origin is defined as the one where the individual's parental household is located. Mobility choices depend on the educational attainment E_{it} and on other characteristics X_{it}, which include individual, family and regional features, as well as regional and time dummies.[9]

I do not include factors associated with the region of destination because of practical reasons: while I can easily identify the LAD of destination for those who move, it is impossible to determine a potential destination for the stayers. Nevertheless, the sets of factors associated with the place of origin has a clearly heavier weight in the migration process because individuals have a better knowledge on the actual situation of that specific area, while information on the area of prospective destination is generally incomplete or inexact (Lee, 1966).

Given the nature of the model described in Equation 2.1, the baseline empirical model is estimated as a single-equation ordered probit model (Greene and Hensher, 2009). This is based on a latent variable framework, such that there exists a latent variable M^*_{it} which is related to the

[9]Household and regional indexes are omitted here in favour of a simpler notation.

explanatory variables as follows:

$$M_{it}^{*} = E_{it}'\beta_0 + X_{it}'\beta + \epsilon_{it}, \tag{2.2}$$

where the error term is normally distributed with zero mean and unit variance. The observed outcome is clearly M_{it}, where:

$$M_{it} = \begin{cases} 0 & \text{if } M_{it}^{*} \leq \alpha_1; \\ 1 & \text{if } \alpha_1 < M_{it}^{*} \leq \alpha_2; \\ 2 & \text{if } \alpha_2 < M_{it}^{*} \leq \alpha_3; \\ 3 & \text{if } \alpha_3 < M_{it}^{*}. \end{cases}$$

and where α_j $(j = 0, ..., 3)$ are the estimated cut-off points.[10]

2.4.2 Semi-Ordered Bivariate Probit Model

Endogeneity problems may arise as highly educated individuals may be driven to move farther away because of hidden characteristics such as ability or ambition. Therefore, estimating the model as in Equation 2.2 above alone, may lead to biased estimates of β_0 (Greene and Hensher, 2009). A way to reduce such a bias is to account for factors that may affect educational attainment, so that the model includes simultaneously a mobility equation (Equation 2.2) and an education equation, which is determined as follows:

$$E_{it} = S_{it}'\theta_0 + X_{it}'\theta + \upsilon_{it}. \tag{2.3}$$

Here, S_{it} is a binary indicator for whether the respondent intended to stay in school when she was in her early teenage years. The estimated model is, hence, based on the latent variable E_{it}^{*}:

$$E_{it}^{*} = S_{it}'\theta_0 + X_{it}'\theta + u_{it}. \tag{2.4}$$

[10]The choice of the probit over the logit model is due to the fact that the extensions used in the following part of the analysis "do not fit comfortably into the ordered logit framework" (Greene and Hensher, 2009, p. 222), therefore I choose to discard the logit model simply for consistency. In what is presented in this subsection, however, relying on one model or the other makes little difference in terms of result.

The observed outcome E_{it} is defined as follows:

$$E_{it} = \begin{cases} 0 & \text{if } E_{it}^{*} \leq \tau_1; \\ 1 & \text{otherwise.} \end{cases}$$

where τ_1 is the estimated cut-off point in Equation 2.4.

The variable S_{it} is constructed as follows: in a previous session of the BHPS, called YOUTH, respondents aged 10-15 are asked whether once reached the minimum compulsory schooling they are willing to go to 6th form or college or if they intend to leave school.[11] I restrict the sample to those aged 10-14 in order to ensure an adequate lag between the time of the report and the actual choice and, then, construct a variable that takes value 1 if the individual intends to pursue education and value 0 otherwise.[12] This should be a proxy for ambition and it should pick up the individual's attitude towards education. While this is likely to be correlated with the schooling level eventually attained by individuals at the end of their academic path, there is no reason to think it expresses any sort of anticipation effects on their future choices in terms of residential location, as the question itself is purely referred to the willingness to stay in education after the compulsory leaving age has elapsed.

In order to account for the endogeneity in the model, I allow the error terms from Equations 2.2 and 2.4 to be distributed according to a standard bivariate normal distribution with zero mean, unit variance and correlation ρ: $E(\epsilon_{it}) = E(u_{it}) = 0$, $var(\epsilon_{it}) = var(u_{it}) = 1$ and $cov(\epsilon_{it}, u_{it}) = \rho$. Hence, I estimate a semi-ordered bivariate probit model (see Greene and Hensher, 2009 and Sajaia, 2008 for details).[13] Identification is guaranteed by the inclusion of S_{it} in Equation 2.4 only (Sajaia, 2008).

[11] The exact phrasing in the questionnaire is: "*Do you want to leave school when you are 16, or do you plan to go on to sixth form or college?*".

[12] In case of multiple observations for the same individual, who may be interviewed more than once when aged 10-14, I report the modal value. Whenever the distribution of values for the same individual is bimodal, I prudently choose the smallest value in order to avoid overestimation.

[13] The model is estimated by Maximum Likelihood using the Stata command `cmp`.

2.4.3 Further Checks: Probit and Ordered Probit Models

As additional checks, I also estimate four separate probit regressions and an ordered probit model with a slightly different specification with respect to the main model.

I decompose the ordered multinomial mobility variables (both the one based on Districts and the one constructed on TTWAs) and generate four binary variables: whether the respondent has moved at all from her parents' house, whether she has moved to a different District, whether she has moved to a different TTWA, and whether she moved to another region. The estimated probits, then, look like the model in Equation 2.2, but the dependent variable is now a dummy that is equal to 1 if the individual has moved and equal to 0 otherwise. This decomposition is intended to confirm the main findings of the previous models.

The ordered probit model, on the other hand, is specified as in equation 2.2, except for the fact that educational attainment, E_{it}, is no longer a binary variable but an ordinal multinomial variable that takes values 0 to 3 as follows: $E_{it} = 0$ if the respondent does not have any qualifications, $E_{it} = 1$ if she attained O-Levels, $E_{it} = 2$ if she attained A-Levels, and finally, $E_{it} = 3$ if she has a first degree or above. Therefore, we can define:

$$E_{it} = \begin{cases} 0 & \text{if } E_{it}^* \leq \pi_1; \\ 1 & \text{if } \pi_1 < E_{it}^* \leq \pi_2; \\ 2 & \text{if } \pi_2 < E_{it}^* \leq \pi_3; \\ 3 & \text{if } \pi_3 < E_{it}^*. \end{cases}$$

2.5 Results

2.5.1 Ordered Probit

Estimation results from the baseline ordered probit using District boundaries are reported in Table 2.5, Columns (1)-(3). While individual and regional features seem to have a significant impact on location choices young adults, family characteristics do not appear to be so important: having a degree and being a female appear to have a significant and positive effect, as well as having previously experienced a move. The lagged degree of urbanisation of the District of origin does

Table 2.5: Estimates Ordered Probit

Dependent variable	(1) O-Probit mobility (by District)	(2) O-Probit mobility (by District)	(3) O-Probit mobility (by District)	(4) O-Probit mobility (by TTWA)
Degree	1.097***	0.434***	0.465***	0.436***
	(0.164)	(0.150)	(0.175)	(0.169)
Gender		0.448***	0.462***	0.497***
		(0.072)	(0.098)	(0.095)
Age		0.182***	0.188***	0.189***
		(0.029)	(0.030)	(0.030)
Prior mobility		0.586***	0.594***	0.612***
		(0.115)	(0.130)	(0.130)
Birth order		0.041	-0.005	-0.007
		(0.040)	(0.051)	(0.049)
No. of siblings			0.041	0.057
			(0.037)	(0.038)
Mother's education			0.036	0.035
			(0.127)	(0.123)
No. of books			0.091	0.087
			(0.114)	(0.112)
Urbanisation			0.207**	0.222**
			(0.094)	(0.099)
Cut-off 1	0.615***	4.827***	5.181***	5.238***
	(0.043)	(0.689)	(0.709)	(0.702)
Cut-off 2	1.382***	5.690***	6.047***	6.224***
	(0.092)	(0.663)	(0.692)	(0.692)
Cut-off 3	1.778***	6.122***	6.468***	6.571***
	(0.086)	(0.671)	(0.690)	(0.669)
Observations	2,208	2,048	1,847	1,847
Year Controls	YES	YES	YES	YES
Regional Controls	YES	YES	YES	YES
Time Frame	t2-t5	t2-t5	t2-t5	t2-t5
Log pseudolikelihood	-2077.617	-1814.064	-1620.019	-1568.554

*** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses, clustered at the region of origin level. APEs are reported in Table A2.1.

also affect positively and significantly mobility. Family features, on the other hand, do not seem to have a significant impact on the outcome variable.[14]

I also run the same regression on a slightly differently defined dependent variable, in order to verify consistency of the previous estimates (Table 2.5, Column (4)). Here, mobility is defined on the TTWA instead of LADs and estimates confirm the main findings, in terms of both significance and sign.

In terms of magnitude, not much can be said just by looking at the betas in Table 2.5. Thus, I

[14]When excluding prior mobility from the specification, there are not relevant changes in magnitude and significance of coefficients.

estimate the Average Partial Effect of achieving a degree. Since the explanatory variable in question is a binary variable, the APE is calculated as:

$$Pr(M_{it} = j|E_{it} = 1) - Pr(M_{it} = j|E_{it} = 0). \tag{2.5}$$

Then, I can observe the increase in the probability of choosing the location j when a given individual achieved a degree. Similarly, I calculate Average Partial Effects of having moved in the past, having an educated mother and coming from an urbanised area (see Table A2.1). Columns (1)-(4) refer to mobility outcomes defined on Districts, while Columns (5)-(8) are based on mobility outcomes as specified using TTWAs. On average, the probability of not moving at all from the parental household is 14 percentage points lower for graduates than it is for non graduates when mobility defined on Districts is used. On the other hand, the probability of moving within the same District, across Districts and across regions, is respectively 6, 3 and 6 percentage points higher for those who achieved a degree with respect to non-graduates. Not surprisingly (Krabel and Flöther, 2012), having moved in the past appears to have an even higher impact on current mobility: those who were observed moving are, on average, 18 percentage points less likely to live with their parents and 7 percentage points more likely to live away (3.6 p.p. to move across Districts). On the other hand, coming from a urbanised District slightly increases the probability of moving farther away from one's place of origin. This suggests that individuals coming from very scarcely populated areas (i.e. Districts with less than 10,000 residents) tend not to move much. Finally, the effect of family characteristics such as the educational level of the mother is very low (and not significant). Very similar effects are found when the outcome variable is defined over TTWAs.

2.5.2 Semi-Ordered Bivariate Probit

Results are reported in Table 2.6. Column (1) shows estimates of the baseline (single-equation) ordered probit model and Column (2) displays the same estimates for the two-equation semi-ordered bivariate probit.

I first perform a LR test to verify whether $\rho = 0$. If that was the case, then the semi-ordered bivariate probit model would not be suitable because the error terms from the two equations (ϵ_{it}

Table 2.6: Estimates Semi-Ordered Bivariate Probit

	(1)	(2)	
	O-Probit	Semi-O Bivariate Probit	
Dependent variable	Mobility (by District)	Degree	Mobility (by District)
Degree	0.465***		0.866**
	(0.175)		(0.438)
Educational aspirations		0.518**	
		(0.215)	
Gender	0.462***	-0.098	0.460***
	(0.098)	(0.158)	(0.103)
Age	0.188***	0.425***	0.155***
	(0.030)	(0.043)	(0.050)
Prior mobility	0.594***	0.543***	0.531***
	(0.130)	(0.169)	(0.121)
Birth order	-0.005	-0.113	-0.003
	(0.051)	(0.113)	(0.051)
No. of siblings	0.041	-0.032	0.044
	(0.037)	(0.094)	(0.038)
Mother's education	0.036	0.336**	0.004
	(0.127)	(0.154)	(0.123)
No. of books	0.091	0.281	0.078
	(0.114)	(0.294)	(0.108)
Urbanisation	0.207**	-0.236	0.217**
	(0.094)	(0.267)	(0.087)
Constant		-11.105***	
		(1.222)	
Cut-off 1	5.181***		4.488***
	(0.709)		(1.086)
Cut-off 2	6.047***		5.351***
	(0.692)		(1.077)
Cut-off 3	6.468***		5.770***
	(0.690)		(1.067)
Observations	1,847	1,853	
Year Controls	YES	YES	
Regional Controls	YES	YES	
Log pseudolikelihood	-1620.019	-1957.337	
ρ		-.256**	

*** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses, clustered at the region of origin level. APEs are reported in Table A2.2.

and u_{it}) would be uncorrelated - i.e., "the bivariate model becomes a pair of univariate models" (Greene and Hensher, 2009, p. 224). I can reject the null hypothesis that $\rho = 0$ and therefore I can claim that a joint estimation of both equations is needed. In addition to this, I test whether the cut-offs are equal to each other and always reject the null hypothesis. Also, the model passes the RESET test for mis-specification.

The coefficient of the educational aspiration variable in the education equation is positive and

significant. This confirms the hypothesis that respondents who had higher educational aspirations during their early teenage years are indeed more likely to obtain a degree. As expected, older individuals and those whose mother has some kind of further education are also more likely to graduate from university. The estimated coefficients of the mobility equation are consistent with the baseline model, both in terms of sign and of significance.

Average Partial Effects calculated for the mobility equation in the semi-ordered bivariate model are coherent with expectations: magnitudes almost double with respect to the baseline, suggesting that this model may be capturing a stronger impact of education on mobility for those individuals who are more ambitious (Table A2.2). An explanation for this may be that these individuals experience lower costs of moving because of their relatively less important psychological costs of moving and are therefore more keen on leaving the area of origin and benefit from higher returns from education in a distant location.

The likelihood of staying in one's parental household is now 27 percentage points lower for graduates with respect to non-graduates, while those who gained a first degree are 11, 5 and 11 percentage points more likely to move within the same District, across Districts and across Regions, respectively. The relative weight of prior mobility is now reduced, but still significant, as the two-equation model allows to clean the effect of ambition on residential choices: previous movers are now 16 percentage points less likely to stay in their parental household and 6 percentage points more likely to move away (within District or across Regions - the likelihood of moving across Districts increases by 3 percentage points) than individuals who have never moved while in full-time education. The effect of family (mother's education) and regional (urbanisation of area of origin) characteristics, on the other hand, does not change with respect to the previous one-equation ordered probit model.

2.5.3 Probits

I split the two mobility outcome variables used so far and generate four different binary variables: one which is equal to 1 if the respondent has moved from the parental household and equal to 0 otherwise; one which takes value 1 if the individual has moved to a different District or farther and

0 otherwise; one which is equal to 1 if the individual resides in a different TTWA or farther and equal to 0 otherwise; and finally one which takes value 1 if the respondent has moved across regions and 0 otherwise. On these variables I run four separate probits (Table 2.7).

Table 2.7: Estimates Probits

	(1)	(2)	(3)	(4)
	Probit	Probit	Probit	Probit
Dependent variable	Moved out of parental hh	Moved to other District	Moved to other TTWA	Moved to other Regions
Degree	0.155	0.590***	0.589***	0.648***
	(0.193)	(0.169)	(0.164)	(0.189)
Gender	0.632***	0.172	0.300**	0.143
	(0.114)	(0.161)	(0.132)	(0.162)
Age	0.234***	0.148***	0.137***	0.143***
	(0.035)	(0.035)	(0.032)	(0.034)
Prior mobility	0.571***	0.617***	0.627***	0.577***
	(0.161)	(0.140)	(0.177)	(0.154)
Birth order	-0.023	0.008	0.017	0.117
	(0.055)	(0.082)	(0.070)	(0.096)
No. of siblings	0.089*	-0.064	0.007	-0.173***
	(0.050)	(0.051)	(0.072)	(0.058)
Mother's education	-0.057	0.210	0.199	0.222
	(0.141)	(0.153)	(0.152)	(0.156)
No. of books	0.098	0.254**	0.255*	0.034
	(0.123)	(0.105)	(0.130)	(0.174)
Urbanisation	0.279***	-0.091	-0.006	0.173*
	(0.103)	(0.106)	(0.163)	(0.105)
Constant	-6.215***	-4.885***	-5.062***	-5.794***
	(0.797)	(0.857)	(0.811)	(0.857)
Observations	1,846	1,786	1,816	1,753
Year Controls	YES	YES	YES	YES
Regional Controls	YES	YES	YES	YES
Time Frame	t2-t5	t2-t5	t2-t5	t2-t5
Log likelihood	-988.694	-584.753	-536.636	-427.788

*** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses, clustered at the region of origin level. APEs are reported in Table A2.3.

Estimates and Average Partial Effects (Tables 2.7 and A2.3, respectively) partially confirm the previous results, although it needs to be pointed out that the dummies are constructed in a slightly different way with respect to the original variables used in the ordered probit estimations. Individual characteristics maintain the same positive sign and high significance as in the ordered probit model, except for gender in Columns (2) and (4). Family features, again, do not appear to have a consistently significant effect on the probability of moving, although the probability of moving long-distance is significantly and negatively affected by the number of siblings. This result

would not support the hypothesis of a 'congestion effect' in the consumption of public goods within the household Ermisch (1999), even though it does not provide sufficient evidence to rule it out. In addition, the individuals who were raised in a urbanised District are significantly more likely to move from their parents' house with respect to those who come from rural areas, but the effect fades for moves concerning farther locations.

Table A2.3 shows the Average Partial Effects on the probability of moving. As stated before, the average effect on the probability to move out of the parental household is not statistically different from zero when comparing graduates with non-graduates. This may be explained by the fact that individuals that have ended their full-time studies are eventually destined to leave their parents' house, irrespective of the educational level attained. On the other hand, graduates are 11 percentage points more likely to move to a different District than non-graduates. Similarly, the probability of moving to another TTWA and across Regions increases, respectively, by 9.5 and 8.6 percentage points for those who achieved a degree with respect to less educated individuals. Individuals who were observed moving in the past are, on average, significantly more likely to be living out of their parental household and also to have moved to another District or Travel To Work Area (by 11 and 10 percentage points, respectively) or to a different Region (by around 8 percentage points) with respect to young people who never moved out of the household of origin while in education. Again, the level of education of the mother does not seem to affect residential choices of the offsprings, while coming from a urbanised area is associated with a 8 percentage points increase in the likelihood of moving out from the parental household.

2.5.4 Additional Ordered Probit Model

As a further check, I decompose the educational attainment and define an ordered multinomial variable that takes values 0 to 3 if the individual has no qualifications, O levels, A levels, first degree or above, respectively.

Consistently with the previous evidence, the coefficients of individual and regional characteristics are positive and significant, while family features do not appear to have a significant effect on mobility Table 2.8.

Table 2.8: Estimates Ordered Probit

Dependent variable	(1) O-Probit mobility (by District)	(2) O-Probit mobility (by District)	(3) O-Probit mobility (by District)
Qualification: O levels	-0.094	-0.206*	-0.214**
	(0.076)	(0.117)	(0.097)
Qualification: A levels	0.132	-0.125	-0.136
	(0.081)	(0.098)	(0.097)
Qualification: Degree+	1.108***	0.293*	0.309*
	(0.183)	(0.152)	(0.171)
Gender		0.458***	0.471***
		(0.073)	(0.098)
Age		0.184***	0.189***
		(0.027)	(0.028)
Prior mobility		0.593***	0.599***
		(0.117)	(0.135)
Birth order		0.033	-0.008
		(0.039)	(0.050)
No. of siblings			0.033
			(0.037)
Mother's education			0.051
			(0.124)
No. of books			0.106
			(0.114)
Urbanisation			0.199**
			(0.090)
Cut-off 1	0.649***	4.717***	5.045***
	(0.075)	(0.685)	(0.684)
Cut-off 2	1.419***	5.581***	5.914***
	(0.090)	(0.658)	(0.668)
Cut-off 3	1.817***	6.012***	6.335***
	(0.097)	(0.669)	(0.666)
Observations	2,208	2,048	1,847
Year Controls	YES	YES	YES
Regional Controls	YES	YES	YES
Log pseudolikelihood	-2072.015	-1810.278	-1616.723

*** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses, clustered at the region of origin level. Reference category: Qualification: No qualifications. APEs are reported in Table A2.4.

In the ordered probit, achieving O-levels appears to reduce the likelihood of moving, compared to not having any qualifications at all. On the other hand, graduates still have a higher probability to move than uneducated individuals, although the significance of coefficients follows an irregular pattern: graduates are, in fact, 10 percentage points less likely to keep on living with their parents with respect to individuals with no qualifications, whereas their likelihood of moving to a different District and a different Region increases by 3 and 5 percentage points, respectively, compared to

their uneducated counterparts (Table A2.4).

2.6 Conclusions

The aim of this analysis is to assess the relative weight of individual, family and regional characteristics on the choice of residential location for young adults, with respect to their place of origin. In particular, I focus on educational attainment, prior mobility, mother's education and urbanisation of the area of origin as the potential factors that may drive relocation decisions of young adults at the beginning of their career. I find that the decisive features in the choice of moving are identifiable in the educational attainment and the mobility history of these young individuals. Conversely, family background characteristics do not seem to significantly contribute to mobility decisions and regional attributes are of relatively little importance.

I also account for potential endogeneity problems arising from omitted unobservable individual characteristics, therefore I use educational aspirations in the early teenage years as a proxy for ambition. In doing so, I employ a two-equation semi-ordered bivariate probit approach and find that, when considering more ambitious students, educational attainment has a much bigger impact on the distance from the place of origin: graduates are 27 percentage points less likely to live in the parental household after finishing full-time education and 11 percentage points more likely to move to another region (the corresponding figures in the baseline model are 14 p.p. and 6 p.p., respectively). This might be due to ambition reducing the relative psychological costs of moving for the single individual.

Consistently with the previous literature, having moved at least once in the past years has also a fairly big effect on mobility, which may be due to having previously experienced a loss in social ties and therefore being less attached to the place of origin as defined in the analysis. On the other hand, family characteristics, including the educational qualification of the mother, do not appear to have a significant role. Finally, coming from a urbanised area seems to slightly increase the likelihood to move.

Chapter 3

Timing of Childbearing in Early Adulthood

3.1 Introduction

As widely documented in the last few years, average fertility rates have substantially decreased in the OECD countries, while female participation rates to the labour force has been increasing steadily over the years: Ahn and Mira (2002) document that, in the period 1970-1995, average fertility has gone from 2.45 to 1.63, while female participation rates has risen from 44.1% to 60.8%. More recently, since the year 2000 fertility rates have started to rise again, as Goldstein et al. (2013) find for most European countries, although the Great Recession of 2008 has had mixed effects depending on the country analysed.[1]

Some argue that the increase in women's participation to the labour force has been enhanced by the introduction and use of atypical employment contracts, especially part-time and temporary contracts, which should have made possible to help women match job obligations with family needs (see, e.g., Scherer, 2004, 2009). On the other hand, some streams of the literature claim that these types of employment yield non-negligible negative social costs that appear to translate into "greater career instability, higher unemployment risks, lower upward mobility chances and [...] a considerable risk of remaining trapped in fixed-term employment, [...] poorer working conditions and higher (subjectively assessed and objective) employment insecurity" (Scherer, 2009, p. 529). As a matter of fact, the decline in fertility seems to have started contextually, therefore the two phenomena may be somewhat linked (Ahn and Mira, 2002; De La Rica and Iza, 2005; Auer et al., 2013; Auer and Danzer, 2014).

However, as Del Bono et al. (2015) point out, employment experience is hardly exogenous to fertility decisions and reverse causality issues are to be carefully dealt with. They claim it may be the case, in fact, that women who experience a higher instability in the labour market (i.e. they either work less or undertake careers with lower returns and higher uncertainty) do so because they expect to have children in the near future. On the other hand, it could be that women who are about to start a family tend to look for a more stable and secure job in view of the financially important commitment that comes with the birth of a child. Coefficients on job instability would

[1]The authors find that total fertility rates have had little response to the shocks in the labour market in most Western and Northern European countries, while they document a significant and negative association between fertility and unemployment rates in Southern, Eastern and Central European countries Goldstein et al. (2013).

be biased towards zero in the first scenario while they would be biased upwards in the latter.

In this analysis, I investigate the impact of job instability in early career, measured as the number of paid employment spells over the first four years of labour market experience, on short-run fertility choices for British young adults. In view of the potential endogeneity of employment history, that may depend on unobservable characteristics and personal preferences, I choose to instrument the number of job spells during early career with the share of temporary workers among employees by industry and by region, as in Del Bono et al. (2015).[2]. This is to be considered exogenous to the individual because variations in the demand for fixed-term contracts are largely and unilaterally set by the employers, especially within the public sector (IPPR, 2010), with permanent contracts being, *ceteris paribus*, strictly preferred over temporary ones by workers (Booth et al., 2002; De La Rica and Iza, 2005).

The idea behind this strategy is that people who experience a highly unstable job market history may choose to delay childbearing because they do not feel comfortable in opting for such a long-term commitment such as having children (González and Jurado-Guerrero, 2006). If the instability is due to involuntary reasons, it may be the case that less able workers find it more difficult to find a suitable job match. At the same time, if the job instability comes from voluntary motives, i.e. career-oriented workers may choose to switch jobs more easily in view of better career prospects, it may be the case that these people have a preference for delaying childbearing (or for childlessness) because of their comparative advantage on the labour market (Francesconi, 2002). In either case, the use of the exogenously driven pattern in temporary employment should rule out any kind of individual-related motives and isolate the effect of employment conditions on the timing of childbearing.

I estimate a Poisson model for count data with endogenous regressors, as suggested by Windmeijer and Santos Silva (1997), where the GMM estimation provides consistent estimates for the parameters of interest.

My investigation consists of the estimation of a benchmark Poisson model as a starting point on the entire mixed-gender sample. Here, I find a negative and significant effect of job instability

[2]This is also suggested by Auer et al. (2013)

on fertility outcomes at the fifth year after leaving full time education. When running IV-Poisson, the effect of the job instability variable loses significance, while all the remaining covariates still present the same coefficients, suggesting that having a high job mobility in the first years of one's career may not be an undermining factor in terms of fertility choices in the short-term. Rather, prior educational attainment appears to have a greatly negative and increasing impact, with graduates having around 0.31 less children by the fifth year compared to individuals with low levels of schooling. I run the same specifications on the only-women sub-sample and find noticeably coherent results.

Very similar findings are also given by the specifications that only refer to individuals with a spouse (i.e. people who are either married or cohabiting with their partner). Interestingly, having a partner that works seems to decrease the number of children born to an individual, but if the partner is a male, the number of children is predicted to increase dramatically.

The reminder of this chapter is structured as follows: in the next two Sections, I describe the sample selection process and the data; in Section 4 I outline the empirical strategy and in the following Section I present the results; robustness checks are in Section 6 and Section 7 concludes.

3.2 Data and Sample Selection

All variables are drawn from the 18 waves of the British Household Panel Survey (BHPS).[3] Data on the total fertility rate and the average age of women at first birth come from the Office for National Statistics (ONS), while those on the share of temporary employees by industry and by region are calculated from the UK Labour Force Survey, waves 1990-2008.

I take all individuals at their fifth year after leaving education and evaluate their fertility outcome, defined as the number of own children living in the household, at that time. I only consider men and women who are childless at the time they enter the labour market. People who are still in education or have children during that time are, in fact, most certainly facing all sorts of uncertainties and may therefore generate self-selection bias.

My main variable of interest is the number of paid employment spells during the individual's

[3]See Chapter 2, Section 2.2 for a brief description of the main dataset.

early career, which serves as a measure for employment instability. The most popular measures for job instability in the related literature are the type of contract (especially temporary vs permanent) under which the worker is (or was) employed and her employment status (De La Rica and Iza, 2005; González and Jurado-Guerrero, 2006; Scherer, 2009; Huttunen and Kellokumpu, 2010; Del Bono et al., 2015; Auer and Danzer, 2014). Since I do not have information on the worker's number of temporary spells in the previous years, I approximate this by using the number of all employment spells, under the assumption that if individuals experience numerous jobs in a year, there must be a high chance that they have contracts of fixed length because, *ceteris paribus*, a worker would always prefer to stay into permanent, rather than temporary, employment (Booth et al., 2002; De La Rica and Iza, 2005). Furthermore, Scherer (2004) argues that in Great Britain "short employment spells have a negative impact on prestige, also when controlling for job position. It might thus be assumed that very short employment spells signal very precarious careers in the British case" (p. 385).

In the literature, various lengths (often data-driven) are used to define a worker's early career: they can vary from one to three years (Stumpf, 2014) to five years (Lindberg, 2009; Gebel, 2011), to up to seven (Gicheva, 2013), eight (Light and McGarry, 1998), and ten years (Carroll and Powell, 2002) after education completion. I set the length of early career to the first four years after leaving education for several reasons. First of all, sample size issues force me to restrict the length to the minimum. On the other hand, the number of years must be congruous. Most importantly, though, I choose four years for consistency with the 2002 Fixed Term Employees' Regulation, that imposes a maximum of four years renewals for fixed term contracts, after which the employee can only be offered a permanent contract. However, despite expectations, this Regulation did not have a clear impact on the total number of temporary workers as intended here (fixed-term and temporary agency contracts altogether), also because it only affects fixed-term contracts and excludes temporary agency contracts (Salvatori, 2014). Unfortunately, this makes the Regulation unsuitable to evaluate variations in the employment instability of individuals in my sample.[4]

[4]In addition, as the Regulation was implemented in 2002, individuals who would be fully affected by the new rules would have ended their 'early career' only in 2006 or 2007, which would, in turn, have allowed evaluating their fertility outcome in 2007 or 2008, restricting the sample of the potential treated to a few dozens of individuals. Nevertheless, in my sample the average number of job spells before and after the Regulation entered into force does not exhibit meaningful differences (3.47 and 3.75, respectively).

In order to gather all information on the number of employment spells during the early career for each individual, I isolate all people who have left education since the start of the survey. This considerably reduces the sample size to a fifth of the original sample (see Table 3.1), although there is no reason why this should yield any type of sample selection bias.[5]

Table 3.1: Sample selection

Description	Obs	Individuals (of which females)	%
BHPS raw data	238,922	32,336 (16,937)	100.00
Only indiv who left edu since start of the survey	47,829	7,597 (3,862)	20.02
Exclude indiv. with less than 5 obs	24,685	2,152 (1,117)	10.33
Only completed edu	22,363	1,928 (1,004)	9.36
Only childless indiv when left edu	20,189	1,740 (855)	8.45

My final sample is made of 1,740 individuals, 855 of which are women, whom I observe for at least five consecutive years, starting from their first year after leaving education to their fifth year on the labour market. This is the time when I evaluate the individuals' fertility outcomes.

3.3 Descriptive Statistics

My final sample is composed of people who are, on average, 24 years old (Table 3.2). Almost a third of them gained at least a first degree, while around 60% attained some lower qualification. As a proxy for the socio-economical level of the family of origin, I look at the employment status and the educational attainment of the mother when the respondent was 14 years old. Around a forth of the sample have a mother who had a high-skilled job, while 68% have a mother who did not work at all. At the same time, only around 22% has an uneducated mother, while the share of highly educated mothers is almost 40%.[6]

In the first year after leaving education, the vast majority of individuals in the sample is on the labour market, with 14% of unemployed, while only 2.6% are inactive.[7] Most people work

[5] See also Subsection 2.2.2 in Chapter 2 for a discussion on attrition in the data.

[6] Information on the employment status or the education of the father is not useful here, as it is available for only a few individuals.

[7] As far as treating self-employed individuals is concerned, it is true that this type of employment carries very high levels of uncertainty and self-employed workers should consequently be dropped. On the other hand, though, not only the share of self-employed in the sample is very low (less than 2% in the first year after leaving education), but also there is no real reason why the amount of uncertainty associated with self-employment should differ from that of a short fixed-term contract when the variable capturing job instability is the number of spells in paid employment.

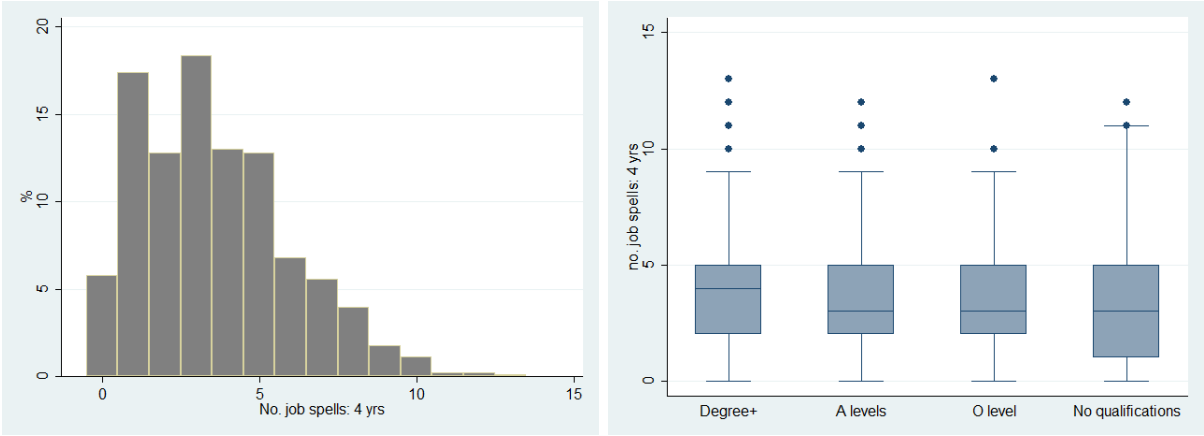
Table 3.2: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Sex	1623	0.492	0.500	0	1
Age*	1623	24.490	3.802	19	39
Marital status*:					
- *Never married*	1623	0.567	0.496	0	1
- *Married*	1623	0.433	0.496	0	1
Highest qualification:					
- *First degree or higher*	1502	0.286	0.452	0	1
- *A levels*	1502	0.296	0.457	0	1
- *O levels*	1502	0.258	0.438	0	1
- *No qualifications*	1502	0.160	0.367	0	1
Mother's employment status$^{\sharp}$:					
- *Not working*	1618	0.675	0.469	0	1
- *Low-skilled job*	1618	0.082	0.275	0	1
- *High-skilled job*	1618	0.243	0.429	0	1
Mother's educational attainment$^{\sharp}$:					
- *No qualifications*	1229	0.224	0.417	0	1
- *Some qualifications*	1229	0.388	0.488	0	1
- *Higher education*	1229	0.388	0.488	0	1
Housing tenure†:					
- *Owned*	1506	0.122	0.327	0	1
- *Mortgage*	1506	0.526	0.499	0	1
- *Social housing*	1506	0.179	0.384	0	1
- *Rented*	1506	0.173	0.379	0	1
Parents in hh†	1530	0.688	0.464	0	1
Employment status†:					
- *OLF (Out of the Labour Force)*	1514	0.026	0.160	0	1
- *Self-employed*	1514	0.018	0.135	0	1
- *Employed*	1514	0.816	0.387	0	1
- *Unemployed*	1514	0.139	0.346	0	1
Monthly gross pay†	1175	838.968	566.33	0	7534.20
Sector of job†:					
- *Self-employed*	1282	0.025	0.156	0	1
- *Private firm*	1282	0.745	0.436	0	1
- *Civil service/Government*	1282	0.121	0.326	0	1
- *NHS/Higher edu*	1282	0.070	0.256	0	1
- *Other*	1282	0.039	0.194	0	1
Spouse has a job*	679	0.885	0.319	0	1
Spouse's monthly gross pay*	583	1368.686	1094.18	0	13039.50
Average no. of jobs in early career	1613	3.603	2.408	0	13
Average no. of weeks worked in early career	1613	37.031	16	0	52
Has children after 5 years	1623	0.156	0.363	0	1
No. of children after 5 years	1623	0.206	0.524	0	3
No. of children after 6 years	1401	0.278	0.609	0	3
General fertility rate*	1623	58.246	2.510	54.20	63.30
Claimant count (% of national avg)*	1623	101.169	51.27	16.70	282.93

Note: † in the first year after leaving education; * in the fifth year after leaving education; $^{\sharp}$ when the individual was aged 14.

in the private sector and the average monthly gross pay is just above GBP 800.00. On average, individuals change in between 3 and 4 paid jobs per year and work for approximately 9 months

Figure 3.1: Distribution of the Number of Job Spells during Early Career



Note: Entire sample; the histogram on the left shows the distribution of the number of job spells in the sample by number of spells; the boxplot on the right illustrates the distribution by qualification level attained.

each year. Figure 3.1 shows the distribution of the number of jobs during early career: while 6% never worked in the first four years after having ended full-time education, 77% of the individuals in the sample experiences at least two spells in the same period (left panel). The right panel in Figure 3.1 depicts the distribution of job spells by educational level. As suggested by Figure 3.2, a higher number of paid jobs in a given year is associated to lower levels of income earned during the same year.[8] This is consistent with interpreting frequent job changes as a proxy for job instability.

As far as the housing tenure is concerned, at the time of entering the labour market, most individuals live in a house with a mortgage (53%) or for rent (17%), while 18% are in social housing. Nevertheless, almost 7 out of 10 live with their parents at that time, which is not surprising given their young age.[9]

After five years from transition out of full time education, 43% of the sample are married or cohabiting with their partner, while the rest have never been married.[10] Of those who are married or cohabiting, 90% have a partner in the labour market, who earns on average a monthly gross pay of GBP 1,370.00.[11]

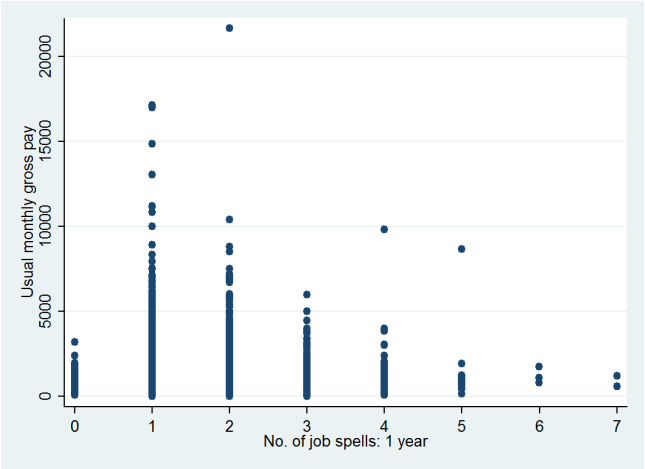
[8] A negative association is also found by Booth et al. (2002) and Salvatori (2014), both referring to British data (the BHPS and the LFS, respectively).

[9] Compare the analysis in Chapter 2.

[10] A negligible fraction (less than 1%) is either widowed (1 individual), separated, or divorced. I treat them as "married", as they have a similar likelihood of parenthood to the married people, although results do not differ if these observations are dropped.

[11] Note that the average monthly pay at 5 years after leaving education for the sampled individuals is GBP 1390.00.

Figure 3.2: Average Pay vs. Number of Job Spells in a Year



Note: Entire sample; the number of job spells refers to the past year (up until Sep 1st), while the average monthly gross pay (in GBP) evaluated in the month of Sep in the same year. The positive earnings when the number of jobs is zero is due to this slight discrepancy in the definition of the variables, although this is the case only for 23 individuals out of 260 who have not worked in that year.

The average number of children born after five years is 0.2, i.e. for every 100 individuals, 20 children are born. This variable is constructed using the number of own children living in the household. As pointed out by Ratcliffe and Smith (2008, p. 5), "infant mortality and household reconstitution will result in measurement error. However, low rates of child mortality and the fact that the overwhelming majority of children stay with their natural mother in the event of family breakup act to reduce the effect of these factors in practice". A second problem that may arise from the use of this variable is that older women may have children who have now left home: "assuming that women start having children from age 16, the selection problems may arise from as young as age 32" Ratcliffe and Smith (2008, p. 5). In this analysis, however, only individuals who are childless at the start of their labour market experience are considered, therefore this possibility is ruled out.[12]

The increase in the average pay from the first year is certainly to be attributed to tenure and job experience.

[12]This also excludes drop-outs from education due to the birth of a child.

3.4 Empirical Strategy

In order to estimate the effect of early career employment experience on the timing of fertility, the empirical model becomes:

$$C_{irt+5} = exp(J'_{ir\bar{t}}\beta_0 + X'_{irt}\beta + T'_{irt+5}\gamma + \delta_t + \mu_r) + \epsilon_{irt}, \tag{3.1}$$

where C_{irt+5} is the number of children born to individual i in region r at time $t+5$, where t is the year when the individual has left school. The main variable of interest is defined as the number of paid employment spells during the first four years of labour market experience, or 'early career' (Light and McGarry, 1998; Booth et al., 2002). This is included into $J_{ir\bar{t}}$, where $\bar{t}$ indicates the years t to $t+4$. Individual (X_{irt+5}) and macroeconomic (T_{irt+5}) controls are also included, as well as year and region fixed effects. As I am dealing with count data, the model is estimated with a standard Poisson model (Windmeijer and Santos Silva, 1997), hence the exponential specification.

In view of the presence of endogeneity in the model, I instrument the number of jobs during the individuals' early career with the share of temporary workers by industry and by region in a given year. These are drawn from the Labour Force Survey (UK) and are computed as the within-industry and within-region share of temporary employees over the total number of employees for the relevant years.[13] Following Windmeijer and Santos Silva (1997), I use a GMM estimator with additive error terms.[14]

Evidently, the share of employees working under temporary contracts is correlated with the number of employment spells an individual undertakes in a given year: the higher the share of temporary workers, the more likely is an individual to work under a temporary contract himself, meaning that there is a higher chance of reporting multiple spells in a given year. In fact, I find a positive correlation between the number of jobs and the share of temporary workers. At the same time, this is to be treated as completely exogenous to the worker. First, according to IPPR (2010), the public administration employs around 40% of temporary workers in the labour market, which means that variations in the the labour demand for this kind of contracts are by far imposed

[13] See Table A3.1 and Figures A3.3 and A3.2 for a description of the series.
[14] The model is estimated by GMM using the Stata commands `poisson` and `ivpoisson`.

exogenously by the government. Secondly, as De La Rica and Iza (2005) claim, for any worker, permanent contracts are strictly preferred to fixed-term contracts as they are on average better paid and more stable. Hence, any worker would always choose a permanent contract over a temporary one, given the option (Booth et al., 2002).

By instrumenting the worker's early career job history as described above, I try to clean its impact on the timing of fertility and rule out any effect that may be driven by preferences and unobservable characteristics. A similar approach is used by Del Bono et al. (2015), who instrument unemployment experience of displaced workers with unemployment fluctuations at the seasonal and the industry level.[15]

For the same simultaneity issues mentioned above (De La Rica and Iza, 2005), I do not consider any information on the current employment status, including earnings and current housing tenure. I only allow for housing tenure in the first year after leaving education, which could possibly pick up variations in the socio-economical background.[16] Simultaneously, this ensures avoiding reverse causality where e.g. social housing may be assigned to low-income individuals in view of the fact that they have one or more dependent children in their household.[17] On the other hand, educational attainment is not endogenous to fertility, as argued by Sander (1992) and Wooldridge (1997) .

The individual's marital status, although potentially endogenous, is included in the main specifications because it is generally a prerequisite to childbearing.[18] In order to ensure the inclusion of the marital status does not drive my results, I also run the model on a sub-sample of individuals who live with their partner (legally married or cohabiting).

As an additional check, I run the same specifications using a Probit model, where the dependent variable takes value equal to one if the individual has at least one child by the fifth year and zero otherwise. Finally, I evaluate the main fertility outcome at the sixth year after exiting full-time

[15]This is also suggested by Auer et al. (2013).

[16]See Robustness Checks in Section 3.6.

[17]Moreover, I ignore government benefits to families with children because of two reasons: in the time period I consider, while child benefits are provided to all families regardless of their income and wealth levels, child tax credit is aimed at low-income families. Still, when having a child, these individuals already have expectations concerning their eligibility to the tax credit. The second reason is that this information is not fully available in the data, but only for 131 individuals.

[18]Recall married individuals, here, include both legally married people and those cohabiting with a partner.

education in order to verify consistency of the estimates.[19]

3.5 Main Results

The benckmark Poisson model ((Column (6), Table 3.3)) seems to confirm a significant and negative correlation between the number of jobs in early career and fertility at the fifth year after entering the labour market, where the effect is quantifiable as a decrease of the predicted number of children by 7% for every additional employment spell. At the average, this corresponds to a decline of 0.01 children (i.e. one less child born every 100) for every additional employment spell (see Table A3.2 in the Appendix for Average Partial Effects). Indeed, this is a very small effect in magnitude, although significant.

However, when instrumenting the number of jobs in early career with the share of temporary employees (Column (7), Table 3.3), the effect seems to vanish. The first stage should identify the association between the share of temporary jobs by sector and region and the individual measure of job instability, where the higher the number of temporary workers, the higher the probability of experiencing multiple spells of paid employment for the single individual.[20] In the second stage, this results in a positive but not significant coefficient (0.049) of the number of job spells on the fertility outcome variable. This may suggest that after cleaning the effect of personal preferences and unobservable characteristics that may influence the timing of fertility through one's employment history, having an (job-wise) unstable early career does not seem to affect fertility choice in the short run. In other words, what may appear to influence negatively childbearing is not job instability *per se* but, possibly, some unobserved characteristics that may push workers towards a more unstable career.[21]

Such a hypothesis is corroborated by the associations depicted in Figure A3.1. Women who are married by the fifth year after entering the labour market and who, at the beginning of the period (i.e. the first year), agreed with the statement: "A husband's jobs is to earn money; a wife's job

[19] See Robustness Checks in Section 3.6.

[20] The test for over-identifying restrictions (Hansen's J) is passed (p-value=0.6224).

[21] I also run separate regression by age class as in Auer et al. (2013), finding the same insignificance in the coefficients of interest.

Table 3.3: Estimates Poisson: Entire Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson	IV-Poisson
Dependent variable	Children	Children	Children	Children	Children	Children	Children
	(5 yrs)	(5 yrs)	(5 yrs)	(5 yrs)	(5 yrs)	(5 yrs)	(5 yrs)
No. jobs (4 yrs)	-0.066**	-0.035	-0.067**	-0.068**	-0.068**	-0.068**	0.049
	(0.030)	(0.030)	(0.028)	(0.033)	(0.029)	(0.029)	(0.049)
Age		0.084***	0.042**	0.047**	0.044**	0.046**	0.052**
		(0.021)	(0.020)	(0.021)	(0.020)	(0.021)	(0.022)
Gender		0.825***	0.422***	0.442***	0.417***	0.449***	0.618***
		(0.141)	(0.139)	(0.159)	(0.139)	(0.140)	(0.159)
Qualification: degree+		-1.031***	-1.304***	-1.128***	-1.266***	-1.262***	-1.408***
		(0.213)	(0.201)	(0.244)	(0.205)	(0.213)	(0.223)
Qualification: a levels		-0.966***	-1.078***	-0.867***	-1.034***	-1.113***	-1.371***
		(0.202)	(0.195)	(0.228)	(0.197)	(0.203)	(0.205)
Qualification: o levels		-0.604***	-0.633***	-0.556***	-0.604***	-0.663***	-0.695***
		(0.180)	(0.163)	(0.197)	(0.164)	(0.166)	(0.166)
Married			2.244***	2.086***	2.261***	2.213***	2.458***
			(0.211)	(0.238)	(0.213)	(0.216)	(0.255)
Mother: some qualifs				-0.287*			
				(0.170)			
Mother: further qualifs				-0.268			
				(0.194)			
Mother: low-skilled job					-0.345	-0.392	-0.391
					(0.275)	(0.297)	(0.277)
Mother: high-skilled job					-0.052	-0.121	-0.365*
					(0.151)	(0.155)	(0.195)
General fertility rate						-0.277***	-0.323***
						(0.097)	(0.102)
Claimant count						-0.001	0.000
						(0.001)	(0.001)
Constant	-1.799***	-3.771***	-3.506***	-3.705***	-3.581***	12.255**	12.949**
	(0.512)	(0.783)	(0.822)	(0.963)	(0.822)	(5.794)	(6.099)
Observations	1,613	1,502	1,502	1,174	1,497	1,449	1,426
Year Controls	YES	YES	YES	YES	YES	YES	YES
Regional Controls	YES	YES	YES	YES	YES	YES	YES
Only women	NO	NO	NO	NO	NO	NO	NO
Only Married	NO	NO	NO	NO	NO	NO	NO
Pseudo R-Squared	0.045	0.092	0.223	0.209	0.225	0.229	.
Log-likelihood	-876.565	-761.050	-650.720	-529.235	-645.617	-618.096	.

*** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses. Reference categories: 'Qualification: none', 'Mother: not employed', 'Mother: no qualifs'. Both the Poisson and the IV-Poisson models pass the RESET test for mis-specification. Average Partial Effects and complete first stage estimates are in Tables A3.1 and A3.2 in the Appendix, respectively.

is to look after the home and family" (i.e. more family-oriented women) have on average a much lower employment experience during their first year into the labour market compared to those who disagree with this statement (i.e. more career-oriented women). The number of jobs undertaken is evidently much lower on average when the woman has had at least a child by the fifth year

after exiting full-time education, but the difference between family- and career-oriented women still holds. Although this evidence is a mere correlation and it is based on self-reported attitudes and opinions, it still helps to understand what may be the mechanism underlying childbearing choices in relation to the individual's employment patterns. It may be the case, then, that the negative effect of job instability on childbearing found in the benchmark Poisson model is strongly driven by individual attitudes towards women's employment choices, rather than being purely linked to economic motives.

Females appear to be more likely to have children, although this result may be driven by how fertility is measured and especially by children being more likely to live with their mothers, therefore it must be handled with caution.[22]

Prior educational attainment displays a significant correlation to fertility in every specification of the model: consistently with the previous literature (Cigno and Ermisch, 1989; González and Jurado-Guerrero, 2006; Ratcliffe and Smith, 2008), I find that the higher the educational level, the lower the probability of childbearing. Ceteris paribus, graduates are predicted to have around 0.35 less children than people with the lowest levels of schooling.[23] Being married is, as expected, associated with a higher number of children (0.36 children more), while the social status of the respondent's mother, which should be a proxy for the family background, does not appear to have any appreciable effect on fertility. I also control for the level of schooling of the respondent's mother in order to ensure the employment status of the mother correctly picks up the socio-economic level of the family of origin and find little significance, though having a mother with at least some qualification is associated with a lower probability of having children compared to having an uneducated mother.[24] National statistics on the claimant count (i.e. the number of people claiming job benefits) at the District level seem to have a negligible effect on individual choices. On the other hand, higher fertility rates at the national level are negatively associated with the number of children, perhaps because general fertility rates refer to the whole population, which is on average much older than the individuals in my sample, and because of the increasing

[22] See Section on Descriptive Statistics.

[23] See Table A3.2 in the Appendix for APEs.

[24] The employment status of the mother is preferred to her educational attainment for sample size reasons, as the latter variable is only available in wave 13 and therefore its use determines a drastic reduction in the sample size.

Table 3.4: Estimates Poisson: Married Individuals

Dependent variable	(1) Poisson Children (5 yrs)	(2) Poisson Children (5 yrs)	(3) Poisson Children (5 yrs)	(4) Poisson Children (5 yrs)	(5) IV-Poisson Children (5 yrs)	(6) Poisson Children (5 yrs)	(7) IV-Poisson Children (5 yrs)	(8) Poisson Children (5 yrs)	(9) IV-Poisson Children (5 yrs)
No. jobs (4 yrs)	-0.084***	-0.059**	-0.059**	-0.058**	-0.066	-0.059**	-0.041	-0.073**	-0.033
	(0.030)	(0.028)	(0.028)	(0.029)	(0.046)	(0.029)	(0.046)	(0.030)	(0.044)
Age		0.055***	0.055***	0.056***	0.058***	0.077***	0.089***	0.077***	0.085***
		(0.019)	(0.019)	(0.020)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
Gender		0.055	0.060	0.097	0.206	0.206	0.341**	-0.673**	-1.176***
		(0.130)	(0.131)	(0.132)	(0.147)	(0.135)	(0.160)	(0.290)	(0.329)
Qualification: degree+		-1.374***	-1.353***	-1.336***	-1.596***	-1.225***	-1.410***	-1.218***	-1.334***
		(0.202)	(0.204)	(0.213)	(0.220)	(0.221)	(0.232)	(0.218)	(0.226)
Qualification: a levels		-1.161***	-1.139***	-1.219***	-1.506***	-1.017***	-1.073***	-1.027***	-0.991***
		(0.197)	(0.199)	(0.206)	(0.206)	(0.210)	(0.203)	(0.206)	(0.191)
Qualification: o levels		-0.673***	-0.655***	-0.694***	-0.858***	-0.527***	-0.592***	-0.522***	-0.602***
		(0.169)	(0.171)	(0.173)	(0.173)	(0.179)	(0.196)	(0.182)	(0.197)
Mother: low-skilled job			-0.254	-0.320	-0.110	-0.302	-0.259	-0.347	-0.295
			(0.281)	(0.306)	(0.269)	(0.314)	(0.287)	(0.320)	(0.293)
Mother: high-skilled job			0.004	-0.071	-0.179	-0.098	-0.257	-0.114	-0.327*
			(0.155)	(0.159)	(0.184)	(0.159)	(0.174)	(0.158)	(0.172)
Spouse has job						-0.773***	-1.059***	-1.224***	-1.896***
						(0.148)	(0.153)	(0.199)	(0.236)
Spouse has job * Male spouse								1.131***	2.140***
								(0.334)	(0.396)
General fertility rates				-0.204**	-0.284**	-0.189*	-0.312***	-0.197**	-0.362***
				(0.096)	(0.117)	(0.099)	(0.119)	(0.097)	(0.119)
Claimant count				-0.001	0.001	-0.001	0.001	-0.001	0.002
				(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	-1.306**	-1.800**	-1.827**	9.947*	13.494**	9.027	15.047**	9.921*	17.758**
	(0.620)	(0.887)	(0.887)	(5.596)	(6.828)	(5.756)	(6.939)	(5.680)	(7.031)
Observations	699	650	649	633	626	612	605	612	605
Year Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Regional Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Only women	NO	NO	NO	NO	NO	NO	NO	NO	NO
Only Married	YES	YES	YES	YES	YES	YES	YES	YES	YES
Pseudo R-Squared	0.053	0.089	0.090	0.098	.	0.117	.	0.126	.
Log-likelihood	-571.389	-499.054	-497.526	-476.000	.	-453.160	.	-448.574	.

*** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses. Reference categories: 'Qualification: None', 'Mother: not employed'. Average Partial Effects are in Table A3.1 in the Appendix.

delay in childbearing documented in the last decades (Ratcliffe and Smith, 2008).

All the main baseline results are confirmed when running a Probit model (See Table A3.4 in the Appendix), where the dependent variable takes value one if the individual has at least a child by the fifth year and zero if she is childless: an additional employment spell decreases the probability of having given birth by the fifth year by 0.79 percentage points, while graduates are 20 percentage points less likely to have a child.[25]

Table 3.4 shows results for the sub-sample of married or cohabiting couples. Here, results do not seem to change much. The coefficients for the number of jobs in early career are still negative and significant in the benchmark specifications. This is slightly less pronounced compared to the entire population sample, as one would expect in the case of people who already engaged in the

[25]These are Average Partial Effects.

process of family formation. In fact, the model predicts 0.02-0.03 children less for each additional job spell. Again, when instrumented with the share of temporary jobs, this coefficient loses all significance (see Table A3.2, Columns (3)-(8) for APEs). When focusing on individuals with a partner, (De La Rica and Iza, 2005, p. 69) find that "the delaying effect of education on entry into maternity disappears", suggesting that "married (or cohabiting) women are more likely to give up their career prospects than women without a partner". Here, the effect of schooling is still negative and highly significant.[26]

A result that seems to be consistent with the theoretical predictions is that having a partner that works decreases the number of children by 71%, but if the reference individual is a female (i.e. the partner is male), then the number of children is predicted to increase by 210%. This result is perfectly in line with the theoretical predictions that identify a positive effect of the male's employment characteristics on fertility, while working women are less likely to have children (Butz and Ward, 1979; Caucutt et al., 2002; Francesconi, 2002). Unfortunately, the available data is not detailed enough to discriminate between the effect of full-time versus part-time employment.[27]

Also here, coefficients estimated with the Probit model are coherent with the ones of the benchmark Poisson model, with an estimated decrease of the probability of having a child by the fifth year by 1.7 percentage points, given an extra employment spell during the individual's early career (see Table A3.4, Columns (2)-(4), in the Appendix).

Substantially similar results are found when running the same model on a sub-sample only made of women (Table 3.5). A higher number of jobs during early career is associated with a significant reduction of fertility in the first five years after leaving education. Even if the effect is still very small in magnitude (0.03 children less for every additional employment spell, see Table A3.2 in the Appendix), it is three times higher with respect to the one for the entire sample.[28]

When using IV and accounting for the endogeneity of the variable of interest, however, even this small effect disappears, as well as the effect of the educational attainment. As in the case of

[26]It must be acknowledged, however, that their sample consists only of women with a partner, while here I pool both men and women because of sample size issues. Still, I control for gender in all specifications.

[27]I am aware of endogeneity issues generated by the inclusion of job characteristics, even if related to the partner, but in the absence of a suitable instrument this is the best I can do.

[28]Also compare Probit estimates in Table A3.4 in the Appendix.

Table 3.5: Estimates Poisson: Women Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson	IV-Poisson
Dependent variable	Children	Children	Children	Children	Children	Children	Children
	(5 yrs)	(5 yrs)	(5 yrs)	(5 yrs)	(5 yrs)	(5 yrs)	(5 yrs)
No. jobs (4 yrs)	-0.133***	-0.101***	-0.115***	-0.112***	-0.116***	-0.112***	-0.016
	(0.037)	(0.038)	(0.037)	(0.041)	(0.037)	(0.038)	(0.053)
Age		0.063***	0.037	0.056**	0.042*	0.045*	0.066***
		(0.023)	(0.024)	(0.024)	(0.024)	(0.024)	(0.025)
Qualification: degree+		-0.959***	-1.077***	-1.105***	-0.982***	-0.978***	-1.182***
		(0.250)	(0.246)	(0.281)	(0.253)	(0.257)	(0.297)
Qualification: a levels		-0.992***	-1.024***	-0.925***	-0.942***	-0.979***	-1.215***
		(0.247)	(0.251)	(0.277)	(0.255)	(0.260)	(0.271)
Qualification: o levels		-0.646***	-0.599***	-0.653***	-0.545***	-0.559***	-0.624***
		(0.208)	(0.194)	(0.223)	(0.197)	(0.197)	(0.235)
Married			1.369***	1.315***	1.396***	1.373***	2.344***
			(0.197)	(0.228)	(0.198)	(0.201)	(0.297)
Mother: some qualifs				-0.428**			
				(0.198)			
Mother: further qualifs				-0.320			
				(0.228)			
Mother: low-skilled job					-0.432	-0.425	-0.012
					(0.342)	(0.360)	(0.311)
Mother: high-skilled job					-0.221	-0.253	-0.608***
					(0.192)	(0.197)	(0.231)
General fertility rate						-0.311***	-0.420***
						(0.119)	(0.135)
Claimant count						-0.002	0.000
						(0.001)	(0.001)
Constant	-1.483**	-2.392***	-2.272**	-3.239***	-2.437***	15.070**	-258.725***
	(0.596)	(0.885)	(0.924)	(1.097)	(0.928)	(7.078)	(3.305)
Observations	794	743	743	608	740	727	714
Year Controls	YES	YES	YES	YES	YES	YES	YES
Regional Controls	YES	YES	YES	YES	YES	YES	YES
Only women	NO	NO	NO	NO	NO	NO	NO
Only Married	NO	NO	NO	NO	NO	NO	NO
Pseudo R-Squared	0.078	0.095	0.157	0.168	0.162	0.171	.
Log-likelihood	-510.407	-457.293	-425.929	-349.669	-420.347	-407.650	.

*** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses. Reference categories: 'Qualification: None', 'Mother: no qualifs', 'Mother: not employed'. Average Partial Effects are in Table A3.1 in the Appendix.

the previous estimates on the entire sample and the sub-group of married or cohabiting individuals, the loss in significance of the coefficient associated with the number of job spells may be due to parenthood choices being driven mainly by unobservable characteristics, or 'family-taste', which is also suggested by the correlations depicted in Figure A3.1 in the Appendix.

3.6 Robustness Checks

3.6.1 Living Arrangements of the Young Adult

I also look at fertility choices while accounting for living arrangements at the time of entering the labour market (Table A3.5 in the Appendix). In particular, I include: (*i*) the housing tenure and (*ii*) whether the individual was still living with her parents. Coefficients are consistent with the previous specifications, both in magnitude and in significance. This is particularly important to ensure that the results concerning fertility outcomes are not affected by the living arrangements of the young adult.[29]

Living in the parental household appears to significantly reduce the likelihood of childbearing in the next five years. At the same time, living in a house that is provided by the local government (social housing) or that is under mortgage seems to increase the number of children born compared to individuals who live in a house that is fully owned. Nevertheless, significance is not consistent when I use the IV-Poisson model, suggesting that there is no substantial relation between fertility choices and living arrangements, at least at this stage of these people's life.

3.6.2 Fertility at the Sixth Years after Leaving Full-Time Education

In order to check consistency of the estimates, I also run the model with respect to the sixth year after individuals leave full-time education (Table A3.6). The sample size is slightly smaller now, but coefficients are very similar to those estimated in the previous Section.

In particular, the negative and significant effect of the number of jobs during the early career that is found in the benchmark Poisson model also disappears when using IV-Poisson, where the benchmark model predicts the same decrease of 0.01 children for every additional employment spell (i.e. one less child born every 100) as the one predicted by estimates evaluated five years after leaving full-time education in Table 3.3. Again, the effect of the educational level attained is negative and increasing with respect to having no schooling and being married or cohabiting with a partner increases the likelihood of having an additional child.

[29] See Chapter 2.

3.7 Conclusions

The recent literature has been increasingly interested in the concurrence of two different phenomena in the industrialised countries: the rise in the labour force participation for women and the increased delay in childbearing. With the strikingly diffusion of fixed-term contracts, many researchers worry that the job instability created by these and similar forms of atypical employment may hinder fertility choices of young adults, by leading couples to postpone or reduce childbearing (Ahn and Mira, 2002; De La Rica and Iza, 2005; González and Jurado-Guerrero, 2006; Scherer, 2009; Auer et al., 2013). All of these works, however, only capture simple associations between having a fixed-term or temporary contract and fertility outcomes, rather than isolating a casual effect. To the best of my knowledge, Del Bono et al. (2015) run one of the few analyses that account for endogeneity of the employment status and characteristics. While they specifically isolate the effect of job displacement, I contribute to the literature by looking into the effect of employment instability on short-term fertility decisions after accounting for exogenously driven variations in the individual's job history. The topic is of great interest for the policy-maker that may wish to intervene in favour of an enhancement of fertility rates and to stem the effects of childbearing delays that the recent literature have documented in the last few decades.

I measure job instability with the number of paid employment spells during an individual's early career and estimate its effect on fertility at the fifth year after leaving full-time education. In the benchmark model, I find a significant and negative effect of job instability, coherently with most of the existing literature. When I use the share of temporary workers as an instrument, however, I find that the coefficient of interest loses significance, suggesting that having an unstable career in the first years into the labour market alone does not hinder the timing of childbearing in the short run.

In line with the literature (Cigno, 1983; Cigno and Ermisch, 1989), I also find that education has a significant impact on parenthood, with less educated individuals being more likely to have children and the negative effect of schooling increasing in magnitude the higher the level attained. Cigno and Ermisch (1989) suggests that this is due to the fact that women who undertake higher investments in human capital choose to have fewer children. On the other hand, married women

are characterised by a higher probability of having children when their partner is employed, as predicted by economic theory (Butz and Ward, 1979; Ahn and Mira, 2002; Francesconi, 2002).

The main contribution of this analysis, however, consists of finding that employment instability of young adults appears not to be so important for fertility decisions in the short run. An explanation to these findings may be that the choice of having a child in the first years after leaving full-time education is only marginally related to fluctuations in employment experience and may, instead, be particularly dependent of individual preferences and attitude towards family composition. Nonetheless, it must be pointed out that the empirical strategy is such that the individuals considered are particularly young and therefore the effect, or the lack of it, is to be expected to change as these individuals become older and accumulate employment experience. The structure of the dataset, however, does not allow a more thorough analysis. Looking in depth into the timing of childbearing choices, including completed fertility, may be in the scope of future investigation. Further study may also allow to separately disentangle the effect of voluntary and involuntary job mobility during the individuals early career on fertility decisions.

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Appendix

Table A2.1: Estimates Ordered Probit: APEs

	(1) No move	(2) Moved within District	(3) Moved across Districts	(4) Moved across Regions
Degree	-0.144***	0.058***	0.028**	0.058***
	(0.051)	(0.022)	(0.011)	(0.020)
Prior mobility	-0.184***	0.074***	0.036***	0.074***
	(0.039)	(0.018)	(0.009)	(0.016)
Mother's education	-0.011	0.004	0.002	0.004
	(0.039)	(0.016)	(0.008)	(0.016)
Urbanisation	-0.064**	0.026**	0.013**	0.026**
	(0.028)	(0.012)	(0.005)	(0.012)

	(5) No move	(6) Moved within TTWA	(7) Moved across TTWA	(8) Moved across Regions
Degree	-0.135***	0.062***	0.021**	0.051***
	(0.050)	(0.024)	(0.010)	(0.018)
Prior mobility	-0.189***	0.087***	0.030***	0.072***
	(0.038)	(0.021)	(0.008)	(0.014)
Mother's education	-0.011	0.005	0.002	0.004
	(0.038)	(0.017)	(0.006)	(0.014)
Urbanisation	-0.068**	0.032**	0.011***	0.026**
	(0.030)	(0.014)	(0.004)	(0.012)

*** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses, clustered at the region of origin level. APEs in Columns (1)-(4) and (5)-(8) refer to Columns (3) and (4) in Table 2.5, respectively.

Table A2.2: Estimates Semi-Ordered Bivariate Probit: APEs

	(1) No move	(2) Moved within District	(3) Moved across Districts	(4) Moved across Regions
Degree	-0.265**	0.108*	0.050**	0.106**
	(0.129)	(0.057)	(0.026)	(0.049)
Prior mobility	-0.163***	0.066***	0.031***	0.065***
	(0.036)	(0.017)	(0.007)	(0.015)
Mother's education	-0.001	0.001	0.001	0.005
	(0.038)	(0.015)	(0.007)	(0.015)
Urbanisation	-0.066***	0.027**	0.013***	0.027**
	(0.026)	(0.011)	(0.005)	(0.011)

*** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses, clustered at the region of origin level. APEs refer to Column (2) in Table 2.6.

Table A2.3: Estimates Probits: APEs

	(1) Moved out of parental hh	(2) Moved to other District	(3) Moved to other TTWA	(4) Moved to other Regions
Degree	0.047	0.107***	0.095***	0.086***
	(0.058)	(0.028)	(0.026)	(0.022)
Prior mobility	0.173***	0.112***	0.101***	0.077***
	(0.048)	(0.023)	(0.027)	(0.018)
Mother's education	-0.017	0.038	0.032	0.030
	(0.043)	(0.028)	(0.025)	(0.021)
Urbanisation	0.084***	-0.016	-0.001	0.023
	(0.030)	(0.019)	(0.026)	(0.014)

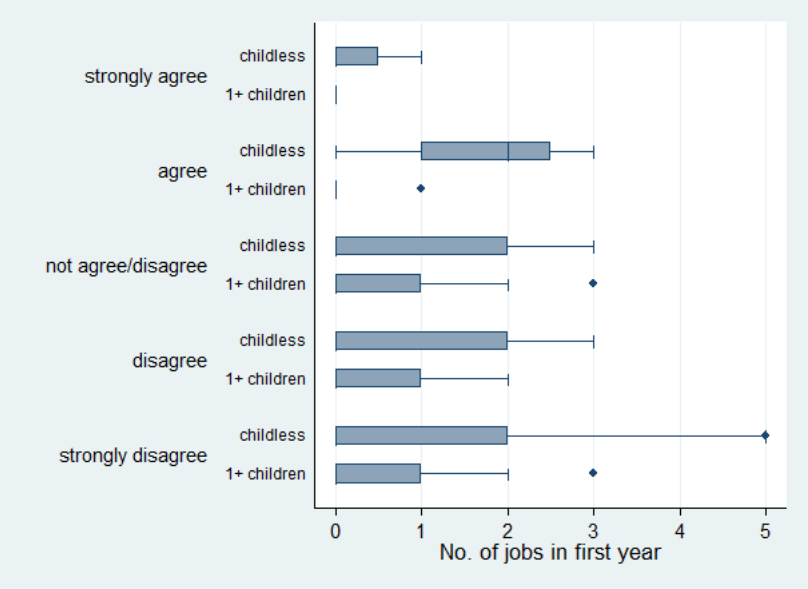
*** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses, clustered at the region of origin level. APEs refer to Columns (1)-(4) in Table 2.7, respectively.

Table A2.4: Estimates Ordered-Probit: APEs

	(1) No move	(2) Moved within District	(3) Moved across Districts	(4) Moved across Regions
O levels	0.068**	-0.028**	-0.014**	-0.026**
	(0.030)	(0.013)	(0.007)	(0.012)
A levels	0.044	-0.018	-0.009	-0.017
	(0.031)	(0.013)	(0.007)	(0.012)
Degree +	-0.104*	0.033**	0.022	0.049*
	(0.058)	(0.017)	(0.013)	(0.029)
Prior mobility	-0.185***	0.074***	0.036***	0.074***
	(0.040)	(0.019)	(0.009)	(0.016)
Mother's education	-0.016	0.006	0.003	0.074
	(0.038)	(0.015)	(0.008)	(0.006)
Urbanisation	-0.061**	0.025**	0.012**	0.024**
	(0.026)	(0.011)	(0.005)	(0.011)

*** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses, clustered at the region of origin level. APEs refer to Column (3) in Table 2.8.

Figure A3.1: Number of Jobs by Fertility and Attitude towards Family Roles



Note: Sub-sample of 429 married or cohabiting women; marriage and motherhood are evaluated at the fifth year after leaving full-time education; agreement categories refer to the statement "*A husband's jobs is to earn money; a wife's job is to look after the home and family*" and are evaluated at the time of transition into the labour market.

Table A3.1: Region and SIC Codes

Region Code	Region	SIC Code	SIC
1	Inner London	0	Agriculture, forestry & fishing
2	Outer London	1	Energy & water supplies
3	R. of South East	2	Extraction of minerals,
4	South West		manufacture of metals, mineral products & chemicals
5	East Anglia	3	Metal goods, engineering & vehicles industries
6	East Midlands	4	Other manufacturing industries
7	West Midlands Conurbation	5	Construction
8	R. of West Midlands	6	Distribution, hotels & catering (repairs)
9	Greater Manchester	7	Transport & communication
10	Merseyside	8	Banking, finance, insurance, business services & leasing
11	R. of North West	9	Other services
12	South Yorkshire		
13	West Yorkshire		
14	R. of Yorks & Humberside		
15	Tyne & Wear		
16	R. of North		
17	Wales		
18	Scotland		
19	Northern Ireland		

Note: The Standard Industrial Classification (SIC) codes are based on the 1980 classification.

Figure A3.2: Temporary Employees by Region

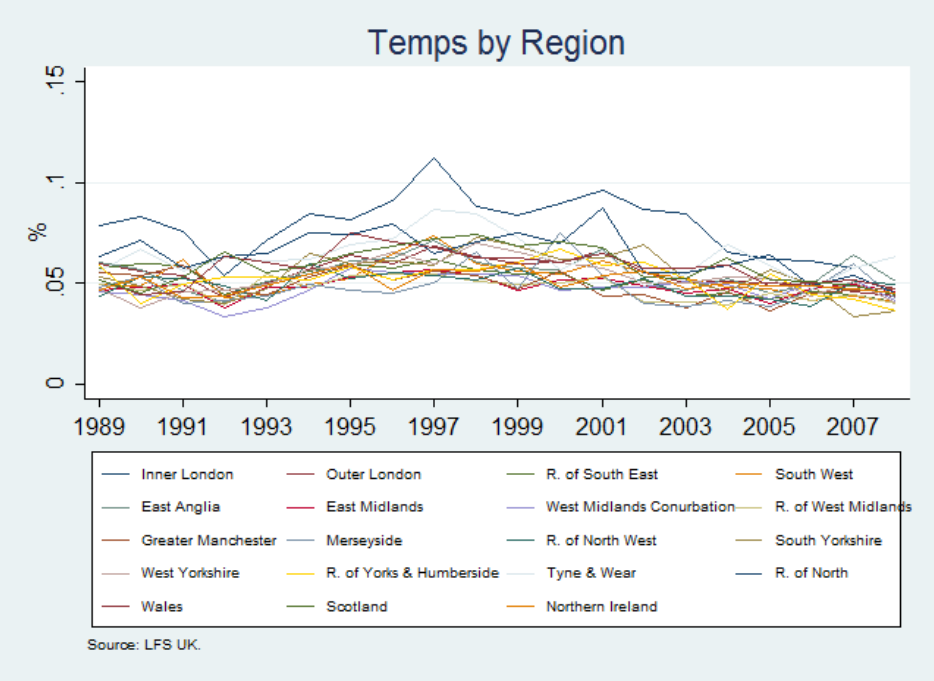


Figure A3.3: Temporary Employees by SIC

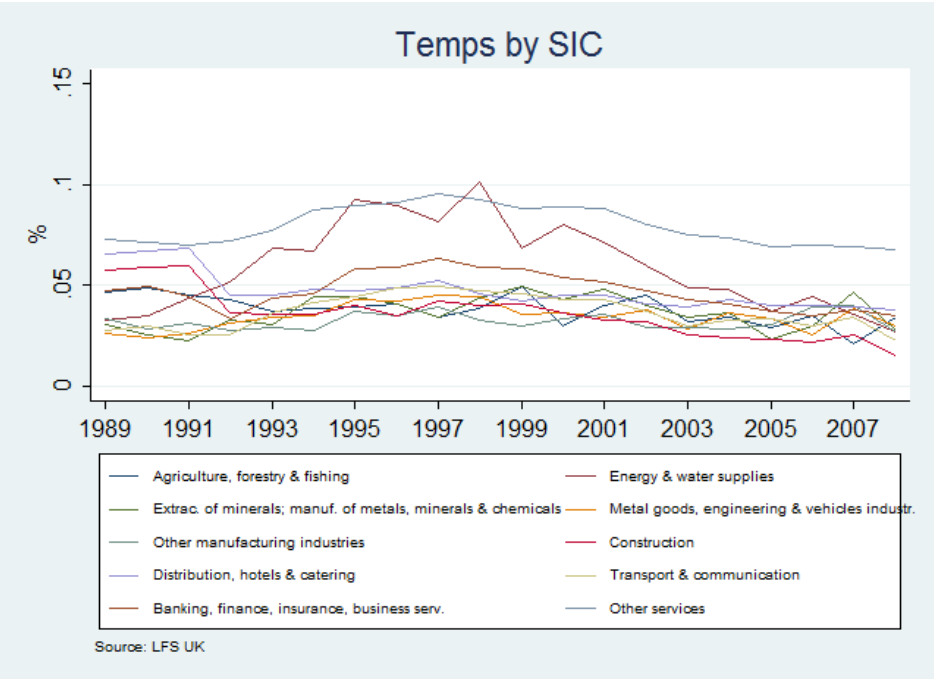


Table A3.2: APEs

	(1) Poisson APEs	(2) IV-Poisson APEs	(3) Poisson APEs	(4) IV-Poisson APEs	(5) Poisson APEs	(6) IV-Poisson APEs	(7) Poisson APEs	(8) IV-Poisson APEs	(9) Poisson APEs	(10) IV-Poisson APEs
No. jobs (4 yrs)	-0.0135**	0.00732	-0.0232**	-0.0202	-0.0239**	-0.0126	-0.0296**	-0.0100	-0.0309***	-0.00296
	(0.00580)	(0.00733)	(0.0114)	(0.0144)	(0.0118)	(0.0142)	(0.0121)	(0.0134)	(0.0106)	(0.0101)
Gender	0.0843***	0.0849***	0.0379	0.0617	0.0812	0.101**	0.0732	0.102***		
	(0.0253)	(0.0202)	(0.0513)	(0.0427)	(0.0527)	(0.0467)	(0.0503)	(0.0387)		
Age	0.00905**	0.00773**	0.0223***	0.0180***	0.0312***	0.0271***	0.0312***	0.0259***	0.0125*	0.0124***
	(0.00427)	(0.00337)	(0.00835)	(0.00660)	(0.00880)	(0.00653)	(0.00887)	(0.00668)	(0.00678)	(0.00474)
Qualification: degree+	-0.345***	-0.306***	-0.782***	-0.794***	-0.666***	-0.593***	-0.663***	-0.540***	-0.350***	-0.317***
	(0.0766)	(0.0606)	(0.171)	(0.150)	(0.161)	(0.135)	(0.160)	(0.122)	(0.112)	(0.101)
Qualification: a levels	-0.323***	-0.303***	-0.748***	-0.775***	-0.602***	-0.516***	-0.604***	-0.461***	-0.350***	-0.322***
	(0.0744)	(0.0565)	(0.166)	(0.142)	(0.157)	(0.128)	(0.156)	(0.115)	(0.109)	(0.0955)
Qualification: o levels	-0.233***	-0.203***	-0.531***	-0.574***	-0.386***	-0.351***	-0.383**	-0.332***	-0.240**	-0.212**
	(0.0684)	(0.0537)	(0.156)	(0.134)	(0.147)	(0.128)	(0.149)	(0.117)	(0.0989)	(0.0914)
Married	0.357***	0.275***							0.314***	0.291***
	(0.0306)	(0.0244)							(0.0385)	(0.0264)
Mother: low-skilled job	-0.0682	-0.0542	-0.113	-0.0339	-0.110	-0.0762	-0.125	-0.0868	-0.104	-0.00258
	(0.0439)	(0.0334)	(0.0949)	(0.0795)	(0.101)	(0.0765)	(0.0993)	(0.0770)	(0.0738)	(0.0664)
Mother: high-skilled job	-0.0240	-0.0512**	-0.0286	-0.0532	-0.0396	-0.0757	-0.0457	-0.0947**	-0.0670	-0.0984***
	(0.0299)	(0.0255)	(0.0625)	(0.0528)	(0.0630)	(0.0490)	(0.0622)	(0.0471)	(0.0494)	(0.0323)
Spouse has job					-0.312***	-0.324***	-0.454***	-0.576***		
					(0.0613)	(0.0469)	(0.081)	(0.074)		
Spouse has job * Male Spouse							0.510***	1.026***		
							(0.190)	(0.368)		
General fertility rate	-0.0550***	-0.0481***	-0.0810**	-0.0872**	-0.0762*	-0.0953***	-0.0797**	-0.110***	-0.0854**	-0.0791***
	(0.0197)	(0.0154)	(0.0382)	(0.0360)	(0.0398)	(0.0366)	(0.0393)	(0.0362)	(0.0333)	(0.0256)
Claimant count	-0.000	-0.000	-0.000	-0.000	-0.001	0.000	-0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	1,449	1,426	633	626	612	605	612	605	727	714
Only women	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES
Only married	NO	NO	YES	YES	YES	YES	YES	YES	NO	NO

*** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses. The dependent variable is no. of children after 5 years. APEs in Columns (1) to (2) refer to Columns (6) and (7) in Table 3.3 (entire sample); Columns (3) to (8) refer to Columns (4) and (9) in Table 3.4 (sub-sample of only married); and Columns (9) and (10) refer to Columns (6) and (7) in Table 3.5 (sub-sample of only women).

Table A3.3: Estimates IV-Poisson: First Stage

Dependent variable	Poisson No. jobs (4 yrs)	Dependent variable	Poisson No. jobs (4 yrs)	Dependent variable	Poisson No. jobs (4 yrs)
Year 1: SIC 1 * Temps by SIC	-13.216**	Year 1: region 6 * Temps by region	-2.818	Year 3: region 11 * Temps by region	24.861
	(6.104)		(13.180)		(17.823)
Year 1: SIC 2 * Temps by SIC	-32.782***	Year 1: region 7 * Temps by region	5.880	Year 3: region 12 * Temps by region	7.074
	(8.579)		(11.408)		(14.953)
Year 1: SIC 3 * Temps by SIC	-22.799***	Year 1: region 8 * Temps by region	-9.817	Year 3: region 13 * Temps by region	14.337
	(7.844)		(13.578)		(15.371)
Year 1: SIC 4 * Temps by SIC	-30.801***	Year 1: region 9 * Temps by region	-9.914	Year 3: region 14 * Temps by region	-10.551
	(8.238)		(12.045)		(13.257)
Year 1: SIC 5 * Temps by SIC	-27.216***	Year 1: region 10 * Temps by region	4.980	Year 3: region 15 * Temps by region	21.004*
	(9.090)		(13.056)		(11.450)
Year 1: SIC 6 * Temps by SIC	-19.969***	Year 1: region 11 * Temps by region	5.198	Year 3: region 16 * Temps by region	0.054
	(6.334)		(14.099)		(11.289)
Year 1: SIC 7 * Temps by SIC	-23.732***	Year 1: region 12 * Temps by region	12.289	Year 3: region 17 * Temps by region	5.324
	(7.457)		(11.869)		(12.703)
Year 1: SIC 8 * Temps by SIC	-16.125***	Year 1: region 13 * Temps by region	10.689	Year 3: region 18 * Temps by region	5.829
	(5.693)		(10.388)		(13.492)
Year 1: SIC 9 * Temps by SIC	-11.090***	Year 1: region 14 * Temps by region	15.863	Year 4: region 1 * Temps by region	-4.688
	(3.374)		(10.733)		(7.906)
Year 2: SIC 1 * Temps by SIC	19.981**	Year 1: region 15 * Temps by region	-17.245	Year 4: region 2 * Temps by region	-11.268
	(7.889)		(12.406)		(9.756)
Year 2: SIC 2 * Temps by SIC	23.361**	Year 1: region 16 * Temps by region	-5.153	Year 4: region 3 * Temps by region	-14.535
	(9.256)		(10.517)		(11.748)
Year 2: SIC 3 * Temps by SIC	23.902**	Year 1: region 17 * Temps by region	2.847	Year 4: region 4 * Temps by region	-19.495*
	(9.514)		(9.911)		(11.474)
Year 2: SIC 4 * Temps by SIC	34.024***	Year 1: region 18 * Temps by region	13.577	Year 4: region 5 * Temps by region	-13.005
	(10.114)		(10.888)		(10.042)
Year 2: SIC 5 * Temps by SIC	29.607***	Year 2: region 1 * Temps by region	-2.158	Year 4: region 6 * Temps by region	-7.814
	(10.903)		(9.414)		(12.148)
Year 2: SIC 6 * Temps by SIC	23.402***	Year 2: region 2 * Temps by region	-2.932	Year 4: region 7 * Temps by region	-11.984
	(7.972)		(13.933)		(13.032)
Year 2: SIC 7 * Temps by SIC	23.530**	Year 2: region 3 * Temps by region	-5.144	Year 4: region 8 * Temps by region	-21.592
	(9.826)		(15.107)		(14.877)
Year 2: SIC 8 * Temps by SIC	21.849***	Year 2: region 4 * Temps by region	10.931	Year 4: region 9 * Temps by region	-2.042
	(7.237)		(14.516)		(14.911)
Year 2: SIC 9 * Temps by SIC	12.030***	Year 2: region 5 * Temps by region	-24.968	Year 4: region 10 * Temps by region	1.093
	(4.168)		(16.553)		(15.810)
Year 3: SIC 1 * Temps by SIC	1.816	Year 2: region 6 * Temps by region	11.075	Year 4: region 11 * Temps by region	-30.316*
	(6.669)		(15.980)		(17.800)
Year 3: SIC 2 * Temps by SIC	3.162	Year 2: region 7 * Temps by region	4.694	Year 4: region 12 * Temps by region	-10.181
	(10.972)		(14.701)		(11.624)
Year 3: SIC 3 * Temps by SIC	4.303	Year 2: region 8 * Temps by region	17.592	Year 4: region 13 * Temps by region	-24.947**
	(10.366)		(23.158)		(10.901)
Year 3: SIC 4 * Temps by SIC	5.273	Year 2: region 9 * Temps by region	6.787	Year 4: region 14 * Temps by region	-15.063
	(11.971)		(16.842)		(9.815)
Year 3: SIC 5 * Temps by SIC	2.013	Year 2: region 10 * Temps by region	-1.303	Year 4: region 15 * Temps by region	-21.915*
	(11.983)		(15.408)		(11.466)
Year 3: SIC 6 * Temps by SIC	2.142	Year 2: region 11 * Temps by region	-6.276	Year 4: region 16 * Temps by region	-14.062
	(8.686)		(17.193)		(9.072)
Year 3: SIC 7 * Temps by SIC	0.245	Year 2: region 12 * Temps by region	1.419	Year 4: region 17 * Temps by region	-11.007
	(10.235)		(14.922)		(9.932)
Year 3: SIC 8 * Temps by SIC	-0.230	Year 2: region 13 * Temps by region	4.024	Year 4: region 18 * Temps by region	-6.110
	(7.901)		(13.906)		(9.383)
Year 3: SIC 9 * Temps by SIC	-0.287	Year 2: region 14 * Temps by region	0.000	Age	-0.005
	(4.528)		(0.000)		(0.006)
Year 4: SIC 1 * Temps by SIC	0.714	Year 2: region 15 * Temps by region	11.778	Gender	-0.021
	(6.267)		(14.740)		(0.036)
Year 4: SIC 2 * Temps by SIC	5.613	Year 2: region 16 * Temps by region	16.706	Qualification: degree+	0.099
	(7.507)		(12.715)		(0.068)
Year 4: SIC 3 * Temps by SIC	-1.594	Year 2: region 17 * Temps by region	6.636	Qualification: A levels	0.092
	(7.808)		(11.584)		(0.056)
Year 4: SIC 4 * Temps by SIC	-2.516	Year 2: region 18 * Temps by region	-9.171	Qualiication: O levels	0.065
	(8.448)		(12.659)		(0.054)
Year 4: SIC 5 * Temps by SIC	-0.819	Year 3: region 1 * Temps by region	5.754	Married	0.081**
	(9.597)		(10.366)		(0.034)
Year 4: SIC 6 * Temps by SIC	1.026	Year 3: region 2 * Temps by region	11.896	Mother: low-skilled job	-0.045
	(6.407)		(14.232)		(0.057)
Year 4: SIC 7 * Temps by SIC	0.398	Year 3: region 3 * Temps by region	15.995	Mother: high-skilled job	0.061
	(7.354)		(16.294)		(0.041)
Year 4: SIC 8 * Temps by SIC	0.428	Year 3: region 4 * Temps by region	8.850	General fertility rates	-0.010
	(5.763)		(14.998)		(0.034)
Year 4: SIC 9 * Temps by SIC	0.476	Year 3: region 5 * Temps by region	15.004	Claimant counts	0.000
	(3.359)		(13.648)		(0.000)
Year 1: region 1 * Temps by region	4.226	Year 3: region 6 * Temps by region	-3.391	Constant	1.648
	(7.403)		(16.011)		(2.241)
Year 1: region 2 * Temps by region	4.721	Year 3: region 7 * Temps by region	8.583		
	(9.972)		(15.927)	Observations	1,426
Year 1: region 3 * Temps by region	3.470	Year 3: region 8 * Temps by region	14.776	Year Controls	YES
	(11.815)		(22.926)	Regional Controls	YES
Year 1: region 4 * Temps by region	-1.840	Year 3: region 9 * Temps by region	15.780	Only women	NO
	(11.263)		(18.652)	Only Married	NO
Year 1: region 5 * Temps by region	15.969	Year 3: region 10 * Temps by region	-7.128	Pseudo R-Squared	0.050
	(14.526)		(15.512)	Log-likelihood	-3041.849

*** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses. The dependent variable is no. of job spells in the first 4 years.
See Table A3.1 for definitions of regions and SICs. Reference categories: 'SIC 0'; 'region 19'; 'Qualification: none'; 'Mother: not employed'.

Table A3.4: Estimates Probit Model

	(1)	(2)	(3)	(4)	(5)
	Probit	Probit	Probit	Probit	Probit
Dependent variable	Has children	Has children	Has children	Has children	Has children
	(5 yrs)	(5 yrs)	(5 yrs)	(5 yrs)	(5 yrs)
No. jobs (4 yrs)	-0.045**	-0.054**	-0.050*	-0.061**	-0.074***
	(0.021)	(0.025)	(0.027)	(0.027)	(0.028)
Age	0.023	0.037**	0.057***	0.060***	0.031
	(0.016)	(0.019)	(0.021)	(0.021)	(0.020)
Gender	0.454***	0.090	0.171	-1.180***	
	(0.096)	(0.116)	(0.123)	(0.369)	
Qualification: degree+	-1.031***	-1.346***	-1.253***	-1.295***	-1.007***
	(0.173)	(0.229)	(0.242)	(0.246)	(0.227)
Qualification: a levels	-0.860***	-1.178***	-1.023***	-1.065***	-1.018***
	(0.159)	(0.214)	(0.223)	(0.226)	(0.208)
Qualification: o levels	-0.491***	-0.692***	-0.533**	-0.532**	-0.581***
	(0.143)	(0.211)	(0.218)	(0.222)	(0.191)
Married	1.491***				1.061***
	(0.119)				(0.137)
Mother: low-skilled job	-0.345*	-0.214	-0.205	-0.226	-0.441*
	(0.191)	(0.229)	(0.237)	(0.243)	(0.234)
Mother: high-skilled job	-0.106	-0.017	-0.028	-0.029	-0.191
	(0.117)	(0.136)	(0.141)	(0.141)	(0.150)
Spouse has job			-0.837***	-1.413***	
			(0.199)	(0.257)	
Spouse has job * Spouse is male				1.525***	
				(0.397)	
General fertility rate	-0.207***	-0.164*	-0.156*	-0.175*	-0.270***
	(0.073)	(0.090)	(0.092)	(0.094)	(0.092)
Claimant count	-0.001	-0.001	-0.001	-0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	9.983**	8.891*	8.512	10.075*	14.223***
	(4.359)	(5.317)	(5.413)	(5.535)	(5.509)
Observations	1,449	633	612	612	727
Year Controls	YES	YES	YES	YES	YES
Regional Controls	YES	YES	YES	YES	YES
Only women	NO	NO	NO	NO	YES
Only Married	NO	YES	YES	YES	NO
Pseudo R-Squared	0.266	0.130	0.160	0.179	0.211
Log-likelihood	-454.453	-338.073	-317.675	-310.697	-296.104

*** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses. The dependent variable takes value one if the individual has at least a child by the fifth year and zero otherwise. Reference categories: 'Qualification: none', 'Mother: not employed'.

Table A3.5: Estimates Poisson: Living Arrangements

	(1)	(2)	(3)	(4)
	Poisson	IV-Poisson	Poisson	IV-Poisson
Dependent variable	Children	Children	Children	Children
	(5 yrs)	(5 yrs)	(5 yrs)	(5 yrs)
No.jobs (4 yrs)	-0.063**	0.082	-0.056*	0.075
	(0.030)	(0.048)	(0.030)	(0.048)
Age (at t0)	0.016	0.044**	0.010	0.032
	(0.022)	(0.022)	(0.022)	(0.023)
Qualification: degree+	-1.188***	-1.735***	-1.164***	-1.619***
	(0.229)	(0.236)	(0.232)	(0.244)
Qualification: a levels	-0.994***	-1.747***	-0.981***	-1.637***
	(0.219)	(0.283)	(0.216)	(0.271)
Qualification: o levels	-0.571***	-0.583***	-0.562***	-0.626***
	(0.173)	(0.189)	(0.172)	(0.187)
Mother: low-skilled job	-0.308	-0.403	-0.288	-0.302
	(0.287)	(0.311)	(0.286)	(0.340)
Mother: high-skilled job	-0.112	-0.151	-0.097	-0.143
	(0.152)	(0.174)	(0.152)	(0.167)
Married	2.210***	2.920***	2.199***	2.784***
	(0.207)	(0.320)	(0.207)	(0.295)
Housing: mortgage	0.556**	1.008***	0.419	0.785*
	(0.249)	(0.300)	(0.374)	(0.445)
Housing: social	0.688**	1.038***	0.389	0.512
	(0.285)	(0.350)	(0.416)	(0.505)
Housing: rent	-0.133	-0.127	-0.522	-0.898*
	(0.316)	(0.377)	(0.427)	(0.527)
Parents in hh	-0.639***	-0.878***	-0.971**	-1.270**
	(0.160)	(0.195)	(0.480)	(0.567)
Housing: mortgage * Parents in hh			0.154	0.081
			(0.495)	(0.584)
Housing: social * Parents in hh			0.434	0.598
			(0.532)	(0.613)
Housing: rent * Parents in hh			1.380**	2.289***
			(0.589)	(0.702)
General fertility rate	-0.268***	-0.264**	-0.261***	-0.316***
	(0.097)	(0.112)	(0.097)	(0.107)
Claimant count	-0.002	-0.000	-0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	12.597**	7.851	12.570**	10.195
	(5.698)	(7.144)	(5.693)	(15.982)
Observations	1,428	1,406	1,428	1,406
Year Controls	YES	YES	YES	YES
Regional Controls	YES	YES	YES	YES
Only women	NO	NO	NO	NO
Only married	NO	NO	NO	NO
Pseudo R-Squared	0.240	.	0.245	.
Log-likelihood	-599.797	.	-596.029	.

*** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses. The dependent variable is the no. of children after 5 years. Reference categories: 'Qualification: none', 'Mother: not employed', 'Housing: owned'.

Table A3.6: Estimates Poisson: Six Years After F-T Education

	(1)	(2)	(3)	(4)	(5)	(6)
	Poisson	IV-Poisson	Poisson	IV-Poisson	Poisson	IV-Poisson
Dependent variable	No. children	No. children	No. children	No. children	No. children	No. children
	(6 yrs)	(6 yrs)	(6 yrs)	(6 yrs)	(6 yrs)	(6 yrs)
No. jobs (4 yrs)	-0.062**	0.066	-0.047*	-0.007	-0.102***	-0.071
	(0.027)	(0.049)	(0.027)	(0.047)	(0.035)	(0.065)
Age	0.052***	0.074***	0.064***	0.077***	0.037*	0.028
	(0.018)	(0.017)	(0.017)	(0.016)	(0.021)	(0.021)
Gender	0.506***	0.592***	0.197	0.235*		
	(0.128)	(0.138)	(0.120)	(0.123)		
Qualification: degree+	-1.050***	-1.374***	-1.140***	-1.469***	-0.900***	-1.047***
	(0.182)	(0.180)	(0.178)	(0.178)	(0.221)	(0.242)
Qualification: a levels	-0.789***	-1.090***	-0.906***	-1.124***	-0.824***	-0.801***
	(0.176)	(0.171)	(0.175)	(0.169)	(0.222)	(0.247)
Qualification: o levels	-0.454***	-0.572***	-0.486***	-0.609***	-0.508***	-0.421**
	(0.155)	(0.154)	(0.158)	(0.159)	(0.186)	(0.205)
Married	2.009***	2.383***			1.265***	1.784***
	(0.199)	(0.241)			(0.186)	(0.228)
Mother: low-skilled job	-0.325	-0.242	-0.251	-0.142	-0.200	-0.046
	(0.242)	(0.219)	(0.250)	(0.225)	(0.273)	(0.296)
Mother: high-skilled job	-0.076	-0.257	-0.012	-0.119	-0.022	0.187
	(0.141)	(0.158)	(0.148)	(0.160)	(0.172)	(0.194)
General fertility rates	-0.105	-0.059	-0.107	-0.042	0.002	0.108
	(0.085)	(0.087)	(0.091)	(0.092)	(0.094)	(0.103)
Claimant count	0.000	0.000	0.001	0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Constant	2.018	-2.626	3.850	-1.559	-2.956	-8.766
	(5.128)	(5.131)	(5.487)	(5.502)	(5.602)	(6.203)
Observations	1,248	1,229	631	626	627	615
Year Controls	YES	YES	YES	YES	YES	YES
Regional Controls	YES	YES	YES	YES	YES	YES
Only women	NO	NO	NO	NO	NO	NO
Only Married	NO	NO	YES	YES	NO	NO
Pseudo R-Squared	0.207	,	0.082	,	0.128	,
Log-likelihood	-699.145		-554.668		-467.099	.

*** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses. The dependent variable is the no. of children after 6 years. Reference categories: 'Qualification: none', 'Mother: not employed'.