Postponement and recuperation of fertility in Italy.

The role of education.

(Preliminary version, please do not quote)

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Abstract

Using data from the Italian Multiscopo we investigate the effect of higher education on fertility timing in Italy. While it is widely demonstrated that women with higher education tend to postpone the birth of the first child, it is still unclear whether they then recuperate on second and higher order births. Using a simultaneous equation approach, we jointly estimate an ordered probit for reached level of education and hazard functions for first, second and higher order births, controlling for women's unobserved characteristics and allowing correlation between the two processes. Final results show a negative effect of higher education on all birth orders, but a positive correlation coefficient between fertility and high education. We then developed a framework for a simulation in order to perform sensitivity analysis of the parameter estimates. This simulation analysis allows us to simulate fertility histories for younger cohorts and to change the characteristics of the original sample and therefore to assess whether these changes affect the overall fertility.

1. Introduction

Mean age of childbearing has increased substantially in most European countries in the period 1980-2004. In particular, mean age at first childbearing is now on average 3 or 4 years more than it was 30 years ago. In Italy mean age at first childbearing is now around 30. Postponement of motherhood is an interesting phenomenon since it does not simply affect the timing of fertility, but it also strongly contributes to the reduction of the fertility quantum. Indeed it seems that postponement is one of the main causes underneath the fertility decline in most of the western countries, and that there exists a negative correlation between age at first birth and completed fertility.

One of the possible causes of postponement of childbearing is the higher level of education reached by women. Indeed education has a double effect on timing of childbearing. A first direct effect is that women spend more years attending school, and so they delay all the transition to adulthood's processes: leaving the parental home, forming a new household and having children. Since educational attainment is rarely compatible with childbearing, the risk of becoming a mother is less for women who are still enrolled in educational programs. A second indirect effect is that the opportunity cost of having a child rises with education. Higher education is usually associated with better jobs, higher wages and better career opportunities. Becoming a mother often means reducing working hours and partly giving up these opportunities. Nevertheless, although it has been shown that education has a negative effect on timing of first childbearing, it is still unclear whether those with higher education are able to recuperate through higher order births.

Recuperation means that children are given birth very closed to each others, so to reach the desired level of fertility. Indeed the fact the higher educated women tend to postpone the birth of the first child does not necessarily imply that their complete fertility will be lower. It is possible that women who tend to delay first birth, have incentives to anticipate the birth of second or third child. Some authors argues that highly educated women are favoured by an income effect, which allows them to afford more children; empirical evidences were found in Scandinavian countries, mostly for younger cohorts (Kravdal, 2001; Olah, 2003; Hoem et al, 2001; Kravdal, Øystein & Rindfuss, Ronald R. 2007). Others instead argue that that the recuperation effect, if it exits, is not entirely due to higher education, but also to other hidden factors, such as the income provided by the partner (assortative mating) or just by a "tempo effect", since having the first child later may speed up the birth of the second one.

Nevertheless the relationship between high education and fertility is quite complicate: indeed the fertility behaviour can be endogenously related to the level of education reached by the women:

there can be some personal characteristics that affect both outcomes, for example a strong preference to be in the labour market may induce a women to study more and have less children (Bratti 2003).

In this paper, using data from the Italian Multiscopo we investigate the effect of higher education on the fertility timing in Italy. We develop two models, one in which we simultaneously estimate hazard functions for transition to first, second and higher order parities, allowing for unobserved heterogeneity to be correlated between the processes, and the second one it is an extension where we also estimate an ordered probit for the level of education reached by each woman. This allow us to analyse the interaction between level of education and fertility behaviour, controlling for potential endogeneity among the two processes. Finally we develop a framework for a simulation in order to perform sensitivity analysis of the parameter estimate. This framework allows us to change the characteristics of the sample and therefore to assess how these changes affect the overall fertility.

The structure of the paper is as follow: section 2 reviews theoretical relation between education and fertility timing; section 3 describes the data and the variables used; section 4 discusses the statistical models; section 5 and 6 reports the main findings; finally the last section draws some conclusions.

2. Related literature

In the past decades all demographic events have been postponed: leaving the parental home, forming a new union, getting married and becoming a parent are being experienced on average later in life than ever before. This trend has been very significant in the explanation of fertility decline of the past years, and the literature suggests few main points underpinning the delay of motherhood.

The first cause has to do with the idea of the “second demographic transition” (STD), first explained by Ron Lesthaeghe and Dirk Van de Kaa: according to their theory many demographic changes, including postponement of childbearing, are to a large extent due to ideational shifts, in particular to the increased emphasis on individual autonomy, the rejection of institutional control, the rise of values associated with the satisfaction of individuals’ ‘higher-order needs’, and the growth in gender equality.

A second explanatory factor could be the uncertainty and economic insecurity that young couples experience when they want to form a new household. Uncertainty in the labour market condition, or general economic instability may lead to a delay of childbearing and household formation, until individuals feel more secure and their income become more stable and reliable. Another possible explanation could be the so called “contraceptive revolution”: after the legalization of abortion and the spread of various contraceptive methods, women are more in control of their fertility.

The main subject of our research however, is how higher educational level reached by women in Europe in the last four decades influences fertility timing. Recent economies demand a highly educated and flexible workforce, and more years of schooling are required by the law, consequently in Europe and also in Italy half of the people aged 20 to 24 are enrolled in educational programs, and women constitute the 50% of these graduate and postgraduate students. Women’s enrolment in education has a direct effect on fertility: theories suggest that during the years of schooling, women concentrate time and efforts on studying, and not on starting a family, being that educational attainment is scarcely compatible with childbearing. This view is supported by numerous studies which have illustrated that being in education strongly reduces the risk of having first child (see for example Rindfuss, Morgan and Swicegood 1988; Blossfeld and Huinink 1991; Kravdal 1994; Blossfeld 1995; B. Hoem 2000; Baizán, Aassve, and Billari 2003). A second direct effect of prolong education is a delay of economic independence, which leads to a delay of all the adulthood transitions processes: leaving the parental home, forming new households and becoming parents. Moreover education affects the timing of parenthood also in many indirect ways. The first regards the job market: higher educated women face a higher opportunity cost of childbearing than lower educated women; indeed higher education is usually associated with better jobs, higher wages and better career opportunities, so once a woman finishes studying she will rather work and exploit her education than stay home and have a child. Another explanation could rely in the fact that economically independent women do not see marriage as an advantage from the economic point of view, so compared to the less educated, they tend to delay marriage and consequently childbearing. A further indirect effect has to do with the values and mentality which characterized highly educated people. Educated people’s values are usually more oriented to economic independence, autonomy and self realisation, and less to family and motherhood. Notice also that higher educated women are usually able to better control their fertility than less educated women, since they usually experience sexual intercourse later in life and have better access to contraceptive methods.

While it is widely demonstrate that highly educated women start their fertility career later than less educated women, it is still unclear whether they recoup on higher order births, if this was true the level of education would not be so significant for the actual completed fertility. Recuperation means that children are given birth very closed to each others, so even if the first birth happens later in life, women could have incentive to accelerate second and third births, in order to reach the desired level of fertility. Empirical studies performed in Scandinavia and Western Europe countries have tried to assess the effect of education on second and third birth. In Norway there are significantly higher second and third birth rates for women with the highest level of education than for women with lowest level, net of age (Kravdal, 2001). The same was found true for second birth rate in Sweden (Olah, 2003) and for third birth rate in Austria (Hoem et al, 2001). The main explanation for recuperation comes from the fact that education positively affects fertility through the income effect. Since higher educated women usually gain higher wages, they strongly contribute to household income which can allow to support a larger family. Richer families have more resources and can afford for example, private childcare, which make working life and family more compatible. Another explanation could be that work oriented women accelerated childbearing and space their births close to each other. This allows them to quickly go back to work, which reduces childcare related employment interruptions, minimizes both forgone earnings and risks of a devaluation of human capital (Taniguchi 1999). However these hypotheses are true for countries where women are in the condition to go back to full time job, countries where a good childcare service is provided (see Scandinavian countries). In Italy, child care system is quite different and reflects the male breadwinner model (Esping- Andersen 1999): public care is scarce and women have to rely on private institutions.

However in a previous studies analysing the Italian case Rondinelli et all (2006), found that women with higher predicted wages (proxy of higher education) have the first child later than women with low predicted wages, but there is a strong recuperation effect, and by the age of 40 high earning women have caught up with low earning women almost completely.

Nevertheless if we want to estimate the real effect of high education on birth of second or third child, we have to consider that there are other variables that affect timing of second birth, and whose effect can be wrongly attributed to education if we do not control for them

The first one is known as time-squeeze effect or tempo effect: since women with high education have their first child at older ages, they have less available time to complete their desiderate fertility. Given that they have less time to get a second or a third child they will squeeze the births more closely to each other. So the positive effect of high education on birth of second child could be just a time effect. Time squeeze effect has been tested on a West German sample by Kreyenfeld (2002), the results were that the relationship between the age at first birth and the transition rate to the second child is basically negative. Also Gerster et al. (2007) in their study about effects of education on second birth found that there might be a weak pattern of women who for some reason get their first child relatively late to squeeze their births together, but this does not apply especially to women with a higher education. In a paper analysing the ECHP Bratti and Tatsiramos (2008) found that the tempo effect differs from countries to countries, and it is negative in Mediterranean countries, Ireland and UK, and positive, thought not significant in France, Belgium and Denmark.

On the other side the time squeeze hypothesis has been proved Strandberg-Larsen (2007) in a study on second birth in Denmark. They showed that women who become mother for the first time at older age tend to squeeze high order births close to each other, independently on the level of education reached by the women. The second aspect is the fact that usually people tend to chose partners with similar level of education (assortative mating). Highly educated women will probably be in a relationship with highly educated men, who earn high salaries. So even in the absence of a good public care provision the men's salary could be sufficient for either paying for private childcare, allowing women to go back to work, or to fully support a family in case a women decide to give up her job and take care of the children by herself. If this is the case, the positive effect of women's education on transition rates to second birth, could be offset by the indirect income effect brought by the partner. On two previous studies about the effect of education on higher order births, after controlling for the partner's educational attainment, Kreyenfeld (2002), found that the effect of the woman's education becomes insignificant and Koppen (2006) found that the positive effect of education weakens. A final aspect has been argued by Kreyenfeld (2002) and is referred to as the self-selection effect. In her study about second births in West Germany, she argues that highly educated women who have a first child are a selected sample, composed by women with preference for children and with family oriented values. So the fact that women with high education have higher transition rates to second birth may be due to self-selection. Indeed when a highly educated woman, with high wage prospect, has to deicide whether to have a child she faces a hard choice: either she opts for career, giving up the idea of having a child, or she opts for a bigger family, partially giving up her career, stopping working or at least reducing her working hours. Similar study was done by Bratti and Tatsiramos (2008) for the ECHP countries, where they find that lot of the fertility behaviour can be explained by different "preference" for children.

Our paper consider all these previous founding, since we simultaneously estimate transition to first second and higher ordered births, controlling for unobserved heterogeneity, and including in the regressions level of education of the partner and age at first birth, but we also add a second specification in which we also estimate an order probit for educational level so to better control for the strong endogenous relationship between the two processes.

3. Data

We use data from the first wave (2004) of the Multiscopo, the Italian counterpart of the Generation and Gender Survey (GGS). We selected women born between 1935 and 1974, that is women who are aged 30 to 70. Although the original sample included also younger women we decided to keep just the ones who had completed education at the time of the interview. Our sample is composed by 11960 women. In Table 1 we summarize some descriptive statistics of the sample, through the main variables we use in the analysis.

Table 1 : Descriptive statistics

Level of education	Low	58,4%
	Medium	32,3%
	High	9,3%
Year of birth	1935-1944	22,4%
	1945-1954	26,6%
	1955-1964	28,2%
	1965-1974	22,7%
Region	North	43,2%
	Center	18,4%
	South	38,4%
Average number of siblings		2,58
Level of education of the mother	Low	91,5%
	Medium	7,3%
	High	1,2%
Level of education of current partner	Low	48,6%
	Medium	24,4%
	High	7,0%
	No current partner	20,0%
Mother was at home when woman was 14	Yes	62,1%
	No	37,9%
Sample size		11960

Education is divided in three levels: low, medium and high according to the ISCED classification. Low stands for education up to middle school, medium up to high school and high stands for university and post university degrees.

Women are then divided according to cohort of birth, geographic region (Nord, Centre and South of Italy) so to control for general characteristics that may influence fertility and education.
We also add a variable for the number of siblings, which is supposed to positive influence the number of children each woman will have, and the level of education of the mother, which is a good predictor for the level of education of the woman. We include also level of education of the partner since higher education of the partner means more monetary resources which should positively influence fertility.

4. The model

As previously explained we focus on two models. The first one simultaneously estimates transition rates to first, second and higher order births; while the second it is just an extension of the first, which also estimates an ordered probit for the level of education reached by each woman. In both models each birth is seen as a separate process, to which is associated an hazard function. We further assume that the shape of the baseline hazard follows a piecewise-linear Gompertz model.
Going back to a more general theory of survivor analysis we usually face two kinds of individuals: the ones who actually experienced the event, which in our case are those women who experienced a birth of order n, and the ones which have not experienced the event yet, that is women who did not yet gave birth to a child of order n. The latter women are right censored. For first birth, women are considered to become at risk of having a child from age15 and end time is age at which the woman gave birth to the child; while for second birth women are considered to be at risk from the age at which they gave birth to the first child, and the same reasoning applies to all higher order births; end time for censored events will be age of 50, since we consider that women after that age are not fertile anymore.
The hazard functions for first, second and higher order births are described by the following equations:

$$\ln r^1(t) = r_0^1(t) + \beta^1 X + \varepsilon$$

$$\ln r^2(t) = r_0^2(t) + \beta^2 X + \varepsilon$$

$$\ln r^3(t) = r_0^3(t) + \beta^3 X + \varepsilon$$

While the ordered probit for level of education, included just in model 2, as specified as follows:

$$y^* = \alpha X + \lambda \qquad \begin{array}{lll} y = 1 & if & y^* \le \tau_1 \\ y = 2 & if & \tau_1 < y^* \le \tau_2 \\ y = 3 & if & y^* > \tau_2 \end{array}$$

Where βs and αs are vectors of parameters corresponding to the covariates *X* and *ε* is the error in the hazard equations, which capture the "unobserved heterogeneity". For unobserved heterogeneity we mean factors typical of a woman that can not be catched by other variables, but that are common in all the regressions for first, second and third child. We assume that *ε* is normally distributed and has a zero mean. We also assume that *ε* is not correlated with all the other observable regressors. Through the estimate of the standard deviation of *ε* it is possible to catch the effect of some characteristics of each woman that can not be captured by the other variables, but that influence the hazard rate of first and second child. It is important to estimate the three models jointly, indeed the error term, common in all the regression, is a sort of random effect which is constant in the three functions, so to capture personal characteristic of each woman.

In the second specification we extend the previous model adding a further equation, using an ordered probit model to estimate the probability of reaching a given level of education. This new equation is estimated simultaneously with the three previous ones, and we allow their errors, *ε* and λ to be correlated: we expect that there will correlation between the unobserved heterogeneities of the two processes, since they are strictly related one another. Identification in the births equation is ensured by the fact that it is a repeated event; while this is not the case for the ordered probit, however identification should be ensured by the functional form of the model itself. We are also assuming that the unobserved heterogeneity is fixed over time, although we are aware that due to changes in preference, for example after the birth of a child, these unobserved components may change, but we assume they don't.

To estimate the parameters we use the aML software, where we can define the spline and use it to parameterize the shape of the baseline log-hazard function. We can define any number of nodes at any desired location. In our estimate we set nodes at 2, 4, 6, 9, 12 years since the starting time. Starting time is 15 years for first child, and age at which a women as the first child for second child. Given 5 nodes we will have 6 slopes: from the starting point until 2 years, between 2 and 4 years and so on. For second and higher order births we introduce age at first birth as a spline. The nodes are set at age 20, 25, 30 and 35

5. Results

In the first model we estimate simultaneously hazard function for first, second and higher order births, controlling for unobserved heterogeneity. In the table below we report hazard rates for transition to first, second and higher births. The reference categories are women with medium education.

As you can see women with lower education have higher risk of having any birth than women with medium or high education. Highly educated women have a lower risk of having a first child, compared to women with low or medium education; therefore our data confirm the postponement hypothesis. While we do not have significant results for second or higher order births, however the risk of having a second or third baby is not as low as the risk of having the first, but we do not find any evidence of recuperation effect for highly educated women.

We notice that the standard deviation of the error term is positive and significant, and we can suppose that there are some personal characteristic of each woman that affect the probability of having the first, the second and the third child. These characteristics could be interpreted as a propensity for babies and bigger family, independent from other background characteristics.

In Annex 1 you find all the coefficient associated with the other covariates. Looking at the coefficient associated with the level of education of the partner, we found that women who are in a relationship with highly educated men are less at risk of having the first child, but more at risk of having the second and the third one, however the coefficient for second and higher order births are not significant; hence we do not find evidence of a strong income effect of the partner.

In the equations for second and higher order births we included also nodes capturing the effect of the age at which the woman gave birth to the first child. We obtain 5 slopes, the first one from age 15 to age 20, the second from age 20 to 25 and so on. Slopes are positive and significant for women who have the first baby between 25 and 35, while are negative for the ones who had her after age 35. Hence the tempo effect is there but up to certain point: if the first birth happen after age 35, it does not help progression to other births.

As for the other control variables we observe that women from older cohort are more at risk than the ones from younger cohort to have both the first and the second child; southern women are more at risk than women from the North and the Centre, in all parities; women who attend church regularly are more at risk of having a second child than less religious women

Table 1: Hazard rates for first, second and higher ordered birth

Level of education	***Parity 1***	***Parity 2***	***Parity 3***
Primary	1.822 *** (0.036)	1.236***(0.042)	1.313 ***(0.084)
Secondary	1	1	1
Tertiary	0.561 ***(0.071)	0.922 (0.071)	1.01 (0.145)
ε (fertility)	0.753***(0.040)		

Estimating the second model we find that the negative effect of having an higher education is much stronger than before: indeed having an higher education negatively affect all the births, not only the first one.

As for the other covariates, we do not find many differences with the previous model. (See annex 2)

Notice that the standard deviation of both errors are positive and significant, and that also their correlation coefficient is positive and significant. This last result can be interpreted as heterogeneity among women in terms of education and fertility decisions, indeed it can be that not all women with high education tend to delay fertility. In fact, a large positive draw of the unobserved component in education is positively associated with high fertility. So the positive correlation between the two processes capture the preferences of those women who prefer to have high education and to have many children.

Other background characteristic behave as expected in the ordered probit equation: women from the younger cohorts, from the North of Italy, and with less siblings have more probability of reaching an high level of education, and the some it is true for women whose mothers had higher education too.

Table 2: Hazard rates for first, second and higher ordered birth, simultaneously estimating ordered probit for educational level.

Level of education	***Parity 1***	***Parity 2***	***Parity 3***
Primary	4.137 *** (0.061)	2.743 ***(0.064)	2.832 *** (0.093)
Secondary	1	1	1
Tertiary	0.282 ***(0.081)	0.462 *** (0.080)	0.492 ***(0.150)

- *Standard deviations and correlation coefficient.*

ε (fertility)	0.8482 *** (0.035)
λ (education)	3.606 ***(0.226)
ρ (correlation coefficient)	0.702 *** (.027)

6. Simulation

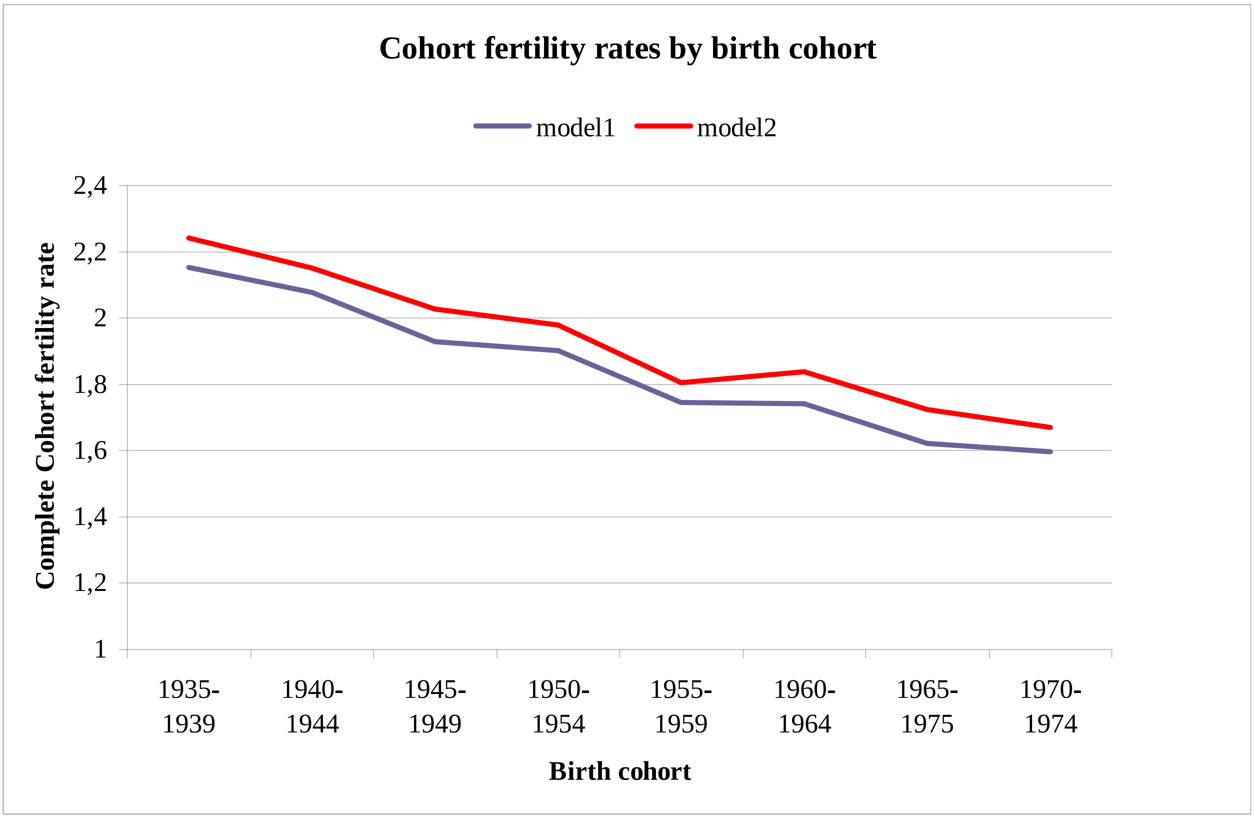
Given the significant effect of education on fertility timing and quantum we developed a framework for a simulation in order to perform sensitivity analysis of the parameter estimates. The simulation analysis, already used by Aassve et all (2006)1 allows us both to simulate complete fertility histories for younger cohorts and to change by the characteristics of the original sample and therefore to assess whether this changes lead to further postponement and recuperation and how they affect the overall fertility.

Each women is simulated from age 15, and from this age we simulate duration to first birth. If the duration is shorter than 35 years (that is birth happen before age of 50) the women is assigned a birth, and then we simulate duration for the second child, and so on. If the duration is longer than 35 years, then the individual is right censored and no birth is assigned. We also simulate the unobserved heterogeneity, drawing for each individual a value from the normal distribution. Notice that all the other covariates are assumed to be fixed, therefore the simulated women have the same background characteristics (cohort, level of education, number of sibling,…) as the original sample.

The simulation model seems to replicate the original data quite well since the simulated sample fits perfectly the original one in terms of duration and on number of births.

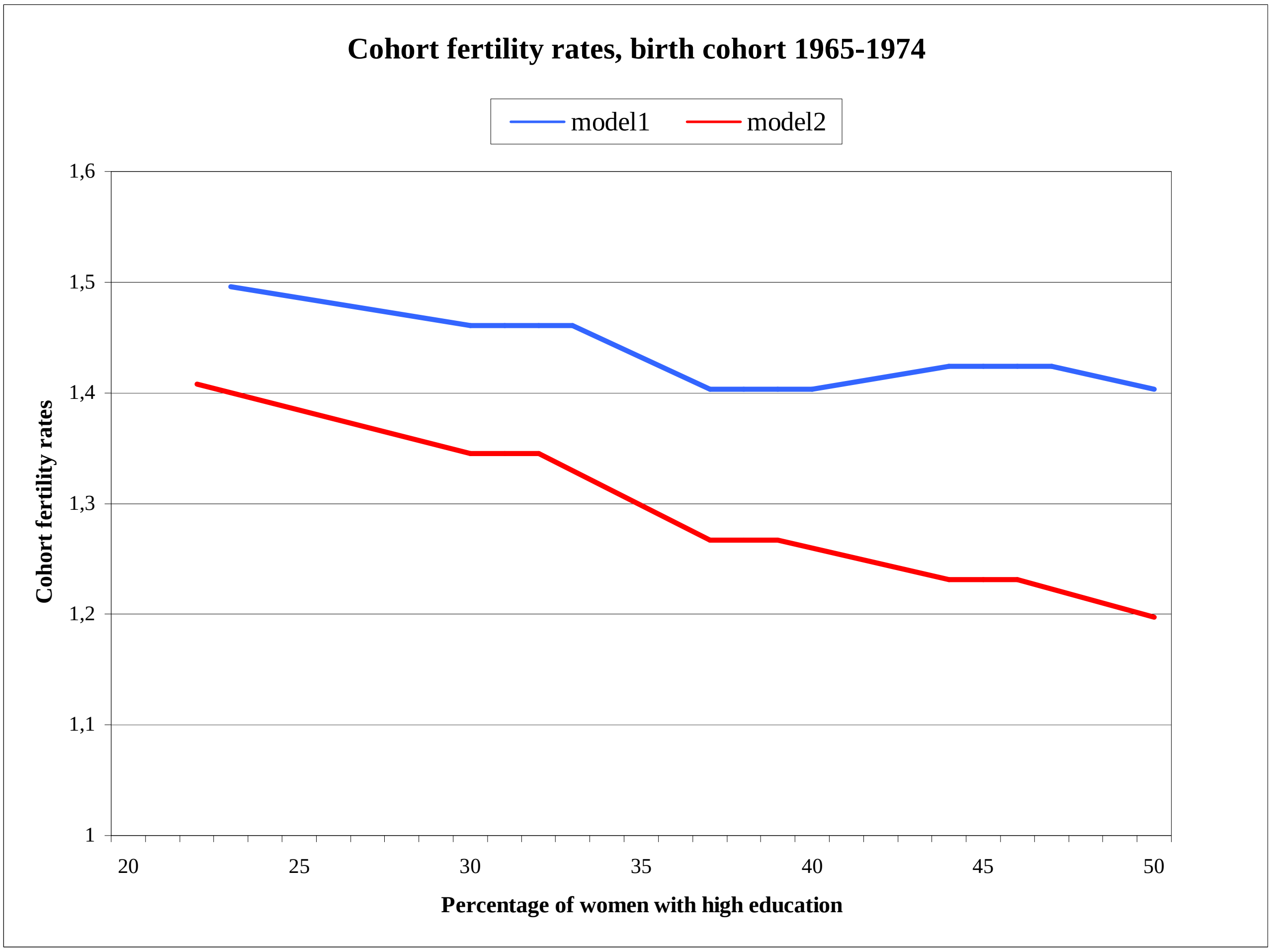
In the first simulation we set the censoring year to 2025, so to allow younger women to complete their fertility histories. This exercise is useful to see how the cohort fertility rates change over time: as we can observed in the graph below the Cohort Fertility Rate is decreasing from one cohort to the other, under both models as we reasonably expected.

[1] 2 Aassve A, S Burgess, C Propper and M Dickson (2006) "Employment, Family Union, and Childbearing Decisions in Great Britain, Journal of Royal Statistical Society Series A Vol 169(4):781 – 804 [ISSN 0964-1998]



In the second simulation we keep just women born between 1965 and 1974, and we simulate their fertility up to 2025, however in this trial we change the characteristics of the original sample increasing the percentage of women with high education.

We first decrease the percentage of women with low education to the 20%, since this is the current OCDE average, and the we play with the remaining 80%. Women that originally had high education are left unchanged, while we randomly select women with medium education and assume they have an higher degree. Then we calculate the cohort fertility rate in the different simulated datasets. In the figure below we graph the cohort fertility rate, for women born between 1965 and 1974, according to the percentage of women who are assumed to have a high level of education, based on the parameters estimates of the two models. In model 1 we notice a little decrease, but the maximum difference is of 0,1; while in model 2 the decrease in cohort fertility rate is more evident, since the coefficient associated with high education negatively affected all birth parities, therefore an increase in the percentage of women with higher education, leaving all the other characteristics unchanged, decrease the cohort fertility rate.



7. Conclusion

In this paper we try to understand the effect of having an high education on fertility timing and quantum in Italy. We develop two model, one in which we simultaneously estimate transition rates to first, second and higher parities, controlling for unobserved characteristics. Our estimate show that having an higher education postpone the birth of the first child, while it doesn't seem to affect timing of second or third child. The effect of partner education is negative on the birth of the first child, but it doesn't affect other births; hence we do not find evidence of a strong income effect of the partner. Tempo effect is significant for women who had their first child between age 25 an 35: they are more at risk of having a second child, compared to women who had the first one earlier or later. Moreover we find a positive and significant effect of the unobserved heterogeneity, proving that there are some characteristic of a woman that can not be capture by other variables, but that affect transition to all parities, we can interpret this result as a stronger preference for children.
The second model is an extension of the first one, in which we add to the fertility equation another equation estimating an ordered probit for the level of education reached by each woman. We allow the error terms of the two processes (the fertility and the progression to education) to be correlated.

While the estimate for most of the covariate do not change significantly in the two model, we find that having an high education reduce the risk of all the parities, not only of the first one; therefore it seems that women with higher education are less a risk of having babies in general, however we also find a positive and significant correlation between the error terms of the two processes. This last result can be interpreted as an heterogeneity among women in terms of preferences for education and fertility: while in general women with higher education seem to have less children and have them later, there are also women who prefer both to have children and to pursue high education.

We finally develop a framework for a simulation which allowed us to do two things: we first simulate fertility histories up to 2025, so to let each women, also the ones from the younger cohorts, to finish their fertility histories. We then calculate the cohort fertility rates for each cohort and we observed that those rates are lower for younger cohorts. Second we keep just women from the younger cohort and again simulate their fertility history up to 2025, however this time we also change some of the characteristics of the sample: we assumed that an higher percentage of women had an higher education, and through many simulation we managed to see how cohort fertility rate would change according to the percentage of women in the sample with high education. We found that if more women have higher education cohort fertility rates decrease.

Annex 1

Estimate for the fertility equations

	Parity 1		Parity 2		Parity >2	
	Estimate	*Standard error*	*Estimate*	*Standard error*	*Estimate*	*Standard error*
Nodes for duration	0,924	0,064	1,515	0,055	1,239	0,086
	0,435	0,023	0,066	0,023	-0,111	0,039
	0,308	0,017	-0,038	0,027	-0,239	0,042
	0,131	0,016	-0,232	0,027	-0,233	0,036
	0,165	0,017	-0,243	0,040	-0,239	0,049
	-0,151	0,008	-0,203	0,033	-0,191	0,044
Nodes for age at first birth			-0,008	0,080	0,083	0,119
			0,020	0,017	-0,020	0,022
			0,051	0,013	0,051	0,018
			0,038	0,012	0,019	0,021
			-0,194	0,016	-0,221	0,037
Constant	-7,735	0,199	-5,255	0,412	-6,591	0,615
Low Education	0,600	0,036	0,212	0,042	0,272	0,084
High Education	-0,579	0,071	-0,081	0,071	0,010	0,145
Centre Italy	0,149	0,037	0,109	0,041	-0,215	0,085
South Italy	0,266	0,029	0,615	0,036	0,507	0,062
1 sibling	0,008	0,050	0,094	0,059	0,041	0,224
2 siblings	0,160	0,049	0,268	0,058	0,181	0,119
>2 sibligs	0,226	0,045	0,486	0,054	0,422	0,109
Mother low education	0,076	0,061	-0,151	0,064	-0,187	0,127
Mother high education	0,080	0,167	0,231	0,156	0,300	0,303
Partner low education	0,224	0,038	-0,093	0,041	0,171	0,084
Partner high education	-0,118	0,075	0,104	0,070	0,058	0,147
No current partner	-0,599	0,051	-0,349	0,060	-0,029	0,121
Birth cohort 2	0,269	0,036	-0,227	0,039	-0,360	0,070
Birth cohort 3	0,194	0,037	-0,394	0,042	-0,563	0,077
Birth cohort 4	-0,199	0,043	-0,453	0,050	-0,488	0,097
Regular church attendance	0,015	0,036	0,082	0,040	0,032	0,078
Mother was homemaker	-0,088	0,027	0,039	0,030	0,093	0,056
Firstborn	0,112	0,031	0,081	0,035	0,001	0,064
Error's standard deviation	**0,753**	**0,040**				

Annex 2

Estimate for the fertility equations

	Parity 1		Parity 2		Parity >2	
	Estimate	*Standard error*	*Estimate*	*Standard error*	*Estimate*	*Standard error*
Nodes for duration	0,923	0,064	1,518	0,055	1,245	0,086
	0,433	0,023	0,064	0,023	-0,104	0,039
	0,302	0,016	-0,415	0,027	-0,233	0,042
	0,127	0,015	-0,232	0,027	-0,226	0,036
	0,166	0,017	-0,245	0,040	-0,232	0,049
	-0,154	0,007	-0,203	0,033	-0,186	0,044
Nodes for age at first birth			-0,009	0,079	0,061	0,114
			0,014	0,017	-0,023	0,022
			0,040	0,011	0,043	0,017
			0,044	0,013	0,011	0,020
			-0,195	0,016	-0,224	0,037
Constant	-7,750	0,196	-5,210	0,403	-6,403	0,583
Low Education	1,420	0,061	1,009	0,064	1,040	0,093
High Education	-1,267	0,081	-0,773	0,080	-0,710	0,150
Centre Italy	0,132	0,037	0,088	0,042	-0,241	0,084
South Italy	0,252	0,030	0,596	0,035	0,477	0,060
1 sibling	-0,006	0,050	0,076	0,059	0,016	0,120
2 siblings	0,088	0,049	0,190	0,058	0,092	0,116
>2 sibligs	-0,003	0,046	0,249	0,055	0,168	0,107
Mother low education	-0,419	0,064	-0,646	0,070	-0,703	0,127
Mother high education	0,305	0,169	0,467	0,156	0,502	0,301
Partner low education	0,222	0,036	-0,090	0,040	0,172	0,081
Partner high education	-0,108	0,072	0,100	0,067	0,064	0,143
No current partner	-0,596	0,049	-0,342	0,058	-0,014	0,117
Birth cohort 2	0,422	0,038	-0,068	0,041	-0,170	0,071
Birth cohort 3	0,478	0,041	-0,097	0,046	-0,237	0,078
Birth cohort 4	0,123	0,047	-0,126	0,053	-0,133	0,097
Regular church attendance	-0,033	0,035	0,031	0,040	-0,028	0,076
Mother was homemaker	0,047	0,027	0,079	0,031	0,135	0,056
Firstborn	0,144	0,032	0,110	0,035	0,031	0,064
Error's standard deviation	**0,848**	**0,035**				

Estimate for the educational level equation

	Estimate	*Standard error*
Birth cohort 2	1,989	0,167
Birth cohort 3	3,215	0,217
Birth cohort 4	3,470	0,229

Mother medium education	4,150	0,273
Mother High education	6,459	0,523
Centre Italy	-0,200	0,107
South Italy	-0,097	0,088
1 sibling	-0,187	0,134
2 siblings	-0,562	0,136
>2 sibligs	-2,146	0,174
Regular church attendance	-0,449	0,084
Mother was homemaker	0,415	0,084
Firstborn	0,321	0,091
tau1	2,462	0,215
tau2	7,433	0,446
Error's standard deviation	**3,606**	**0,227**
Correlation coefficient	**0,702**	**0,027**

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