

An analysis of late fertility in Italy: the role of education

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Abstract Fertility levels in developed countries have declined dramatically in the late XXth century. The decline was a consequence of different causes, among them the rapid increase in female education. As women invest in their educational and professional careers, they begin postponing family formation and childbearing.

In this paper, by using data from the Istat Multipurpose Survey of Families and Social Subjects 2003, we study the impact of female education on postponement and subsequent recovery after age 35 of first and second birth, controlling for the cohort and the working condition. We estimate multiprocess models, in order to evaluate the possible selection effect, as women who are childless at 35 may be a non random subset.

Our results show a relevant impact of education both in the postponement and recovery. There are also relevant differences by geographical area and cohort, with youngest cohorts and northern regions having a stronger positive effect on late fertility.

Keywords: fertility and family, late fertility, education

1 Introduction

At the beginning of the XXIst century, low levels of fertility were observable across most developed countries. The spreading of low fertility is connected with the general process of delayed family formation (Billari et al., 2006).

Although there are some differences across the countries, the postponement of the transition to motherhood is generally characterized by both an increase in average age

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at first birth and a decrease in juvenile fertility (age 15-29). As a consequence, a growing proportion of births occur at older ages (Goldstein et al., 2009). In fact, in 2006 in all Western European countries more than 40% of births were born from mothers aged 30 and older (Eurostat, 2010).

Despite these general trends, Europe remains very heterogeneous. High age at first birth is not always associated with lowest low fertility. For example, although Sweden and the Netherlands have a quote of births from mothers older than 29 (56% and 55% in 2006) not far from the Italian one (58%), they have remarkably higher fertility levels (respectively 1.85 and 1.72 children per woman in 2006 against the Italian 1.35).

One salient driving force behind this change in the timing of childbearing is the increasing number of women with a high investment in human capital. Andersson et al. (2009), for example, show that in European Nordic countries, women with a university degree were the first to begin postponing entry into motherhood, and continue to make up the majority of those women who significantly delay having their first child (see also Toulemon, 2005, with regard to France, and Kneale and Joshi, 2008, with regard United Kingdom).

The increase in female education is considered to be an important element in the New Home Economics theory (Becker, 1991; Blossfeld, 1995), but also one of the leading aspects of the second demographic transition (Lesthaeghe and Neels, 2002; Pinnelli, 1995). In fact, scholars point to increased female education and female economic autonomy as among the principal factors which have shaped new patterns of family formation and postponed parenthood (Sobotka, 2004). When the first birth is delayed, women increase their possibility of obtaining well-paid employment, a result of their education, accumulation of on-the-job skills, and experience (McDonald, 2000).

Another prominent force behind the process of birth postponement is life course individualization, as hypothesized by proponents of the second demographic transition. A modernized society, open to social and cultural changes, allows couples and individuals to develop a more individualized lifestyle, in which having children becomes one of many possible choices (Van de Kaa, 2004). Thus, the decision to have an (additional) child – also at older ages – may be considered as an enrichment of one's personal life and that of the couple, a means of self-fulfilment and parental satisfaction. It is remarkable also to note that couples with higher levels of education may be more likely to seek such self-realization through individualized choices.

Thus, in developed countries ever more women hold university degrees, and after having postponed forming a family in order to invest in their personal development and professional career, they may then decide to *make up for lost time* (i.e. recover their fertility) to achieve – at least to some degree – the desired number of children.

2 Italian background

Italy is a country characterized by very low fertility levels since the early 1980s. The country reached a record low in the mid 1990s, recording a TFR of 1.2. Fertility rates since then have gradually increased, up to today's current fertility level of 1.41 children per woman (Istat, 2009a). Even if one considers cohort fertility, rather than looking at period measures, Italian fertility levels still result particularly low, about 1.56 children

per woman for the 1965 cohort and 1.45 for the 1970 cohort, and up to the present there has been no indication that the decline in total cohort fertility has come to an end (Caltabiano, 2008). Moreover, both cohort and period levels of fertility are among the lowest in western Europe (Council of Europe, 2006).

Childlessness also increased, since the cohorts of women born in the 1960s (De Rose, Racioppi, and Zanatta, 2008). Frejka (2008) points out that the Italian cohort born in 1965 will have the highest proportion of childless women (about 24%), the lowest proportion of women with two children (37%), and one of the lowest percentages of women with three or more children (16%) in Europe.

However, if low fertility was a consequence of renouncing early maternity that begun with the generations born at the end of the 1950s and became increasingly common and widespread throughout the country with the birth cohorts of the 1960s, the recent increase in fertility can be partly explained by the recuperation of postponed births among older age groups (Caltabiano et al., 2009).

Women education has played a prominent role in shaping Italian fertility: the postponement of childbearing until older ages and the marked renunciation of marriage and children are widespread among more educated women. This is particularly true among women from parental families with poor financial and cultural resources (Rosina, 2004).

Moreover, the role of women education has become more and more significant in influencing overall timing and intensity of fertility, as the quote of women holding a university degree is continuously increasing in succeeding cohorts, surpassing the corresponding quote of males since cohorts born in the late 1960s (Istat, 2009b).

Recent empirical data, however, demonstrate that the negative impact of education levels on fertility has progressively lessened over time, to the point that it disappears, or even reverses direction (Dalla Zuanna and Impicciatore, 2007). In fact, a recent trend has been observed in Italy as well, in which couples with greater cultural and economic resources have a higher propensity to have children (Rosina and Testa, 2009).

Finally, there are significant differences at a regional level in these patterns. First postponement and then recuperation started earlier in the northern regions of Italy, due to a different social and economic background. In southern regions, on the other hand, period fertility continues to decline, showing modest signs of recovery. Moreover, the increase in the number of women with higher education is slower in Italian southern regions (Istat, 2009b).

This study analyzes the determinants at an individual level of “late fertility” (entry into motherhood after the age of 35) in Italy, focusing on first and second birth. In fact, the recovery of fertility in Italy is often linked to the possibility of having the first child early enough that the woman is not forced to renounce having a second child (Rosina and Colombo, 2004). It is therefore of crucial importance to examine whether a change in the reproductive behaviour in the late thirties has occurred among the youngest generations, and especially for first order fertility.

3 Data and Methods

We conducted this analysis using data from the most recent Istat survey on reproductive behaviour: “*Famiglia e Soggetti Sociali*” (Multipurpose Survey of Families and Social

Subjects) carried out in 2003. A representative sample of 49,541 individuals belonging to 19,227 families was interviewed. We selected 9,138 women born between 1945 and 1963, aged 40 to 58 at the time of the interview. These women almost completed their reproductive life (women born in 1945-1960 had 98-99% of their overall cohort total fertility rate before age 41).

We estimate some statistical models to test the significance of the different determinants of late fertility, focusing on education. We expect to find a growing association between the propensity to have the first and second child in the woman's late 30s and post-secondary education among the youngest generations of women.

The statistical specification of the model applied in this analysis is derived from the framework developed by Lillard (1993). We use an event history approach, modelling time elapsed from age 35 to the birth of the first child. To take into account the individual heterogeneity we include the appropriate casual effect.

For first order births we add a probit model - assessing the hazard to reach age 35 childless vs. having at least one child - to control for the selectivity introduced in the model (Heckman, 1979). If all selection operates through observed covariates, the EHA may be estimated only by using data about childless women at 35. However, if there is correlation between the two processes, estimation made using only this sub-sample produces biased coefficient estimates due to a possible self selection mechanism.

The model is therefore the following:

$$\ln h_i(t) = \sum_j a_j x_{ij} + \delta$$

$$z^* = \sum_j b_j x_{ij} + \varepsilon$$

where $z = 0$ if $z^* \leq 0$; $z = 1$ if $z^* > 0$; $\ln h_i(t)$ is observed if and only if $z = 1$.

The $\{x_{ij}\}$ denote the covariates. The random variables δ and ε capture the unobserved heterogeneity, and are assumed to have a joint bivariate normal distribution ($\rho_{\delta\varepsilon}$ is the correlation between the unobserved heterogeneity terms of the process). Finally, the selection equation requires its unobserved heterogeneity component ε to have predetermined unit variance (Lillard and Panis, 2003).

A similar model was used to analyze the determinants of second order births postponement and recovery. The explanatory variables in both models are birth cohort, women's level of education (controlling for the women's father education), geographical area of residence, occupational status, number of brothers and sisters, mother's working condition when the interviewee was 14, age at first birth (only for second order). For the reasons specified in the previous section, we are here mainly interested in the role of cohort, education and female autonomy. The other variables are here considered only as a control.

Model estimation was performed using full-information maximum likelihood, as implemented in the aML 2.09 package (Lillard and Panis, 2003). The t-statistics are based on the BHHH procedure (Berndt et al., 1974).

Finally, we also estimated our models separately for women residing in Northern and in Southern Italy which, as seen, have quite different demographic and socio-economic histories (Santini, 1995; Rosina, 2004).

4 Results

We found that, as expected, the propensity of a woman to remain childless until her late 30s has steadily increased among the younger generations, mainly in the North-Centre, and this is most apparent among the educated women (table 1, panel A).

Occupation and timing of a woman's entry into the labour market are also important. The women who have never worked tend to have a first child earlier. On the other hand, women who began working after 30 years of age were more likely to be childless with respect to those who had entered the labour market earlier.

Previous results on fertility recover (Caltabiano et al., 2009) are also largely confirmed by the event history analysis models on the probability of having a first child after age 35 (table 1, panel B). The effect of higher education is indeed positive. Also the cohort effect is in the expected direction.

It is interesting to note that the difference between the last two cohorts (1959-63 and 1964-68) is not significant on postponement (probit model) whereas it is stronger and significant on the recuperation after 35 (EHA model). This seems to suggest a growing capacity to recover for the younger cohorts, especially in Northern Italy.

Table 1: Interdependent Probit model on the probability to be childless at 35 years old and Event History Analysis model on the risk of having a first child after age 35, Italian women born in 1944-1968.

<i>Covariates</i>	<i>Italy</i>	<i>North centre</i>	<i>South islands</i>
<i>Panel A:</i>			
<i>Probit model (postponement)</i>			
Area of residence (ref. Centre)	1.00	1.00	-
North west	1.29 ***	1.31 ***	-
North east	1.19 **	1.21 ***	-
South Islands	1.06	-	-
Education (ref. Low education)	1.00	1.00	1.00
Medium education, Father low educ.	1.44 ***	1.52 ***	1.28 ***
Medium educ., Father med.-high educ.	1.77 ***	2.01 ***	1.30
High education, Father low education	2.75 ***	3.12 ***	2.27 ***
High educ., Father medium-high educ.	2.96 ***	3.30 ***	2.30 ***
Cohort (ref. 1964-68)	1.00	1.00	1.00
1959-63	0.92	0.91	0.91
1954-58	0.74 ***	0.72 ***	0.77 **
1949-53	0.64 ***	0.57 ***	0.75 **
1944-48	0.65 ***	0.55 ***	0.83 *
Occupation (ref. Never worked)	1.00	1.00	1.00
1 st work < age 30, dependent, fixed term	1.22 ***	1.15	1.30 **
1 st work < age 30, dependent, permanent	1.17 ***	1.13	1.30 ***
1 st work < age 30, freelance	1.21	1.31	1.05
1 st work age 30-34	1.46 ***	1.40 **	1.63 ***
Mother occupation (ref. Housewife)	1.00	1.00	1.00
Mother worked	1.00	1.03	0.93
Effect of one brother/sister more	0.97 ***	0.95 ***	0.99

<i>Panel B:</i>			
<i>Event History model(recuperation)</i>			
Area of residence (ref. Centre)	1.00	1.00	-
North west	1.08	1.16	-
North east	1.20	1.20	-
South Islands	1.06	-	-
Education (ref. Low education)	1.00	1.00	1.00
Medium education, Father low educ.	1.40	1.64 *	1.29
Medium educ., Father med.-high educ.	1.63 *	2.09 **	1.87
High education, Father low education	2.22 ***	3.30 ***	1.49
High educ., Father medium-high educ.	2.65 ***	3.89 ***	2.43
Cohort (ref. 1964-68)	1.00	1.00	1.00
1959-63	0.51 ***	0.33 ***	0.67
1954-58	0.38 ***	0.19 ***	0.66
1949-53	0.29 ***	0.14 ***	0.47 *
1944-48	0.29 ***	0.13 ***	0.55
Occupation (ref. Never worked)	1.00	1.00	1.00
1 st work < age 30, dependent, fixed term	1.37	0.94	2.01 *
1 st work < age 30, dependent, permanent	1.21	1.06	1.15
1 st work < age 30, freelance	1.42	1.21	1.52
1 st work age 30-34	1.04	0.98	0.97
Mother occupation (ref. Housewife)	1.00	1.00	1.00
Mother worked	1.10	1.24	1.12
Effect of one brother/sister more	0.99	1.01	0.97
<i>Unobserved heterogeneity</i>			
Delta (u. h. probit model)	1.00	1.00	1.00
Epsilon (u. h. EHA model)	1.83 ***	2.40 ***	1.65 **
Rho (correlation between u. h.)	0.13	0.40 ***	-0.10

*** p<0.01, ** 0.01<p<0.05, * 0.05<p<0.10

Finally, if the women's education and birth cohort have a prominent role in shaping the postponement of childbearing both in northern and southern Italy, this is not true for fertility recover, that is almost absent in southern regions, as macro level data show (Caltabiano, 2008). Moreover, in southern regions the two processes result uncorrelated, whereas in northern Italy we found a positive and significant correlation between postponement and recuperation.

Results for the second order fertility (here not presented) show that the risk to delay the arrival of the second child after the mid 30s is increasing only for women residing in the South, while in the northern area a decline of postponement emerges in younger cohorts. Occupation and timing of a woman's entry into the labour market are also significant: women who already work or begun working in their thirties are more likely to remain with only one child. Women education is not significant in the postponement of the second child.

In the EHA model on the transition to the second child after age 35 the estimated effect of education is positive for women holding a university degree. This result is analogous to what we found on the analysis on the arrival of the first child. As expected, the cohort effect shows a continuous increase in the recovery process in the Northern Italy.

Thus, signs of recovery exist, and are more evident in contexts and social categories where childcare services are more readily available and economic conditions are better, gender asymmetries are less evident and post-modern values are more diffused.

5 Discussion

Our hypothesis, that ever more women who hold a university degree among the youngest generations will delay forming a family, in order to invest in their personal development and professional careers, and will then recover postponed fertility in their late 30s, is empirically supported by our applied models.

We investigated both the determinants of postponement and recovery of first and second order births after age 35, using data from the 2003 Istat multipurpose survey on the family “Famiglia e soggetti sociali”, finding that the role of education is particularly significant in northern regions of Italy. This result is consistent with the recent research showing the positive effects of education on fertility (Dalla Zuanna and Impicciatore, 2007).

However, if women with higher levels of education tend to also have the resources needed in order to pay for services, such as childcare, in the private sector, we wonder about the future fertility of less educated women. Increased efforts on the part of institutions and policies to reduce the direct and indirect costs of childrearing might lessen the constraints that reduce fertility choices among the less affluent families (Boccuzzo et al., 2008).

The present fertility recovery is undoubtedly related to the rising interest that in the last ten years has been given to policies aimed to the conciliation of work and family. The political debate has focused on issues such as parental leave, childcare provision, economic sustain to families with children, access to part-time employment, women return to the job market after childbearing. Nevertheless, this recent interest was not so often followed by effective measures (Del Boca and Rosina, 2009).

Even if we believe that our findings are particularly useful for the understanding of the evolution of Italian fertility, our research has some limitations. Further analyses along these lines could, by using a multilevel approach, correlate reproductive behaviours with the territorial distribution of childcare services (Baizan, 2009), and more generally, with the strategies individuals employ in their efforts to balance family and work commitments.

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