Income and Childbearing Decisions: Evidence from Italy.

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ABSTRACT

During the early 1990s, Italy has been one of the first countries to reach lowest-low fertility, i.e. below 1.3 children per woman. In this paper we focus on the period during which such fertility levels arose in order to assess the impact of income on fertility decisions. So far, analyses have suffered from the lack of appropriate data; we create a new data set making use of two different surveys from Bank of Italy (SHIW) and ISTAT (Labor Force Survey) and we apply discrete-time duration models. For first births, we find evidence of non-proportional hazards and of some 'recuperation' effect: women with high predicted wages tend to delay the first birth, subsequently recuperating. For second and third births, instead, the availability of a good child-care system seems to play a key role and income exhibits small intensity. In a final section, we explore the possible effect on fertility of an increase in financial support for poorer families that took place in 1999.

Keywords: lowest-low fertility, income and childbearing, timing of births.

JEL Classification: J13, J18, C41

NON-TECHNICAL SUMMARY

During the last two decades of the Twentieth Century, Italy has been, together with Spain, the first country to reach the so called lowest-low fertility, i.e. below 1.3 children per woman. During this period, total fertility has sharply decreased, while both the percentage of women having completed at least upper secondary school and female labor force participation have significantly increased. Given this setting, it is of primary interest to establish the extent to which women's educational attainment and potential income, and therefore their opportunity cost, may affect their childbearing decisions. As Billari and Kohler (2004) point out, the emergence of the lowest-low fertility in Southern Europe is not connected to the steep increase in childlessness but it is due to the sudden decrease of the progression to the second, third and subsequent children.

Combining two different data sets (from the ISTAT Labor Force Survey and the Survey of Households' Wage and Wealth led by the Bank of Italy in 2002), we estimate the effect of wage on the postponement of motherhood. The wage effect is negatively correlated with having children, the magnitude, however, varies according to parity. Consistent with the opportunity cost theories, wage has a strong and negative effect in the timing of first birth and women with higher wages tend to delay motherhood. We find a non-proportional hazard and a recuperation effect (even if not complete), suggesting that women with higher wage start to have children later, but recuperate after some time. Furthermore, there is no evidence that institutional effects are responsible for the postponement of maternity. Different is the pattern for second and third birth: the wage effect is always negative but it has smaller intensity when compared to the first one. Nevertheless, in line with Ermisch (1989), we find evidence of institutional effects affecting the decision of having more than one child: the risk of experiencing a second and third birth is higher for a Northern woman because she is more confident in the availability of childcare.

It is reasonable to suppose that increasing financial support to households with children may have an impact on the probability of having the third and fourth child, mainly for poorer households. To this extent, the Welfare Minister Livia Turco (law number 448 of the Year 1998) introduced two policy measures with the explicit purpose of supporting poor households with children. These two measures could cause a significant increase in income for low-income families, covering a non-negligible proportion of the cost of an additional child. Our estimates give some support for the law having an impact. But this effect is not clearly identifiable and quantifiable given our methodological approach, which in turn is driven by the data available. Despite this limitation our results provide interesting evidence of the key role wage plays in fertility decisions.

Introduction

In this paper we assess the effect of income on fertility in Italy during the period 1983-2003. During this period, fertility levels have significantly declined and in the middle of the period (around 1992-1993) passed the critical thresholds of 1.3 children per woman defining so-called lowest-low fertility. Moreover, during the same period Italian women have increased their educational attainment and labor force participation. Given this setting, it is of primary interest to establish the extent to which women's educational attainment and potential income, and therefore their opportunity cost, may affect their childbearing decisions.

So far, research has been hampered by the availability of data combining fertility and income. We overcome this problem by combining two different data sets. Data from the Labor Force Survey (ISTAT, 2003) are used in order to reconstruct the basic demographics and the fertility history of a woman. In order to link these features with potential income [1], we use income and earnings data from Bank of Italy (Households Income and Wealth, 2002). Data from Bank of Italy's survey are thus used to predict women's potential income, which is then introduced as explanatory variable in discrete time hazard regression models for first, second, and third births. In order to obtain a measure of the income we use a Tobit model, censoring the augmented log-wage at the smallest value of the a-incremented log-income distribution.

Women aged between 15 and 40 years in 2003, linked with their co-residing children at the moment of the interview, are our unit of analysis. Our measure of predicted income is used in order to assess its impact on childbearing and timing of birth decisions. We are mainly interested in showing if income plays a key role in the postponement of motherhood in Italy and its different impact in the transition to first, second and third birth. More specifically, we assess if socioeconomic features are the only determinants in such a transition or if other socio-cultural situations are responsible for delaying motherhood and deciding whether to have the second and third birth.

The remainder of this paper is organized as follows. In Section 1 we review the existing literature and describe the main features of the Italian setting as far as childbearing decisions are concerned. Section 2 provides a description of the data and methods we use. In section 3 we present our main results. Section 4 includes concluding remarks and some policy considerations.

[1] In this paper we use the word income which stands for wage (i.e. income per hour).

1 Background

1.1 Previous Literature

Becker (1960), analysing fertility decisions from an economic perspective, suggests a positive correlation between the number of children and the household income, after controlling for contraceptive knowledge. Highly educated (potential) mothers, however, tend to substitute the number of children with child quality (see Becker and Lewis, 1973). Since both production and rearing of children are time intensive, an increase in wage rates induce a negative substitution effect on the demand for children (see for instance Mincer 1963, Becker 1965). As a result women's labor supply, and therefore income, is endogenous because of its relation to education, which in turn is a proxy for human capital. To this extent, theoretical research on fertility (like Becker 1981; Willis 1974; Hotz et al.1997) shows that women's income is negatively associated with childbearing as a higher income increases her opportunity cost of children. In other words, with high earnings, it becomes more expensive for her to take time away from work to rear children. In general the opposing income effect is unlikely to outweigh the negative substitution effect. Overall therefore we would expect the effect from women's wages to be negative. For men, in contrast, the income effect tends to dominate since they spend less time on rearing children, though the magnitude of these effects will vary across countries and birth parity (Butz and Ward 1979; Willis 1973).

Ermisch (1989) offers an extension to the simple Beckerian framework. The main idea is that the effect of women's income on fertility depends on the availability of external childcare. In the presence of costly external childcare, women with very high earnings, traditionally having a high negative opportunity cost of childbearing, may instead have more children, because they are more able to afford external childcare. Those with very low income or wages are less likely to afford external childcare, but may still have higher fertility due to low opportunity costs. In this scenario both low and high income women will have more children, whereas those with middle income will have lower fertility (i.e. lower demand for children). The argument depends of course on the availability of childcare. We might expect such effects in Scandinavian countries, whereas in Italy we expect to see more of the traditional pattern.

Over the last two decades, research has shifted towards investigating the timing of births rather than completed fertility (see for instance Heckman and Walker 1990). In these studies, hazard rate models are used to analyze the timing and spacing of births. Most of the empirical studies about fertility dynamics show that women with high wages (i.e. high opportunity cost of having children) have births later compared to women with lower opportunity costs. There is also ample evidence to suggest that presence of children has a significant negative impact on the woman employment probability (see Heckman and Macurdy 1980; Mroz 1987). Thus, women's labor supply and fertility are joint decisions, and cannot be analyzed separately.

Likewise, the decision of entering parenthood has to be formulated by considering the timing. A couple may want to pay attention to the cost of having a child *early*, comparing it with the cost of having the child *later*. In such a way, the optimal age of having the first birth can be seen as a trade-off between investment in human capital and career planning (see Gustafsson, 2001). As emphasized by Cigno and Ermisch (1989), Cigno (1991, chapter 8) and Gustafsson and Wetzels (2000), it is important to take into account possible consequences of lifetime earnings given different scenarios of birth timing.

For many women it may be optimal to delay motherhood until the opportunity cost of childcare (with respect of her career) have decreased, leading her to first complete education and establishing herself in the job market, before entering motherhood. Formally, timing of first birth is a function of the opportunity cost of time and the foregone human capital cost (Cigno, 1991, Chapter 8; Gustafsson 2001). However, the effect of income on the timing of births may work through different paths. Gustafsson (2005) suggests that, for Swedish young individuals, the postponement of formal education works by delaying couple formation rather than by delaying parenthood once the couple is formed. So, family policies may have a pro-natalist effect in allowing Swedish couples to have the first child earlier.

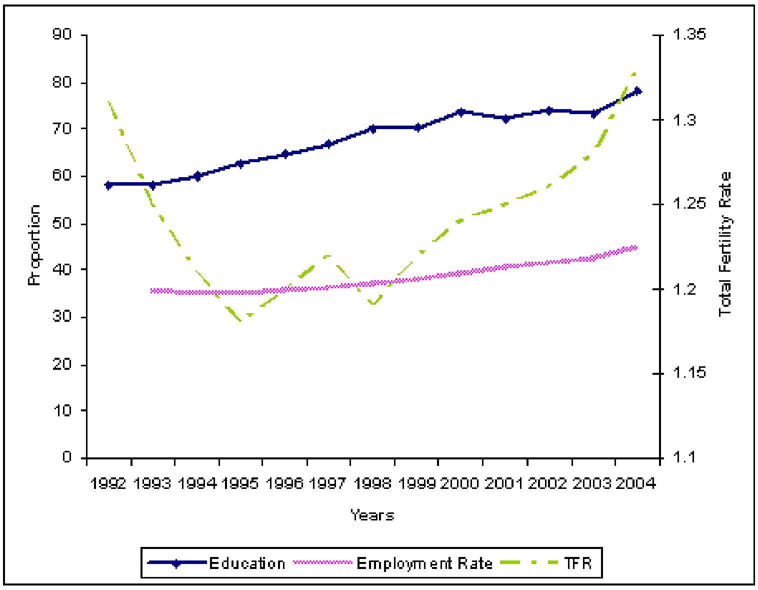
A different interpretation is offered by Amudeno-Dorantes *et al.* (2005) asserting that college-educated mothers can profit from delaying motherhood, because they are in a position to negotiate a family-friendly work environment with flexible work schedules.

A large part of the existing literature argues that women's responsibility for child-rearing may reduce her time in paid work. Joshi (1990), for instance, analyze how work patterns can be different (in terms of switching from full time to part time work or not employed) by comparing mothers with a childless women. The causal direction is explained through the impact of children on the women's job market opportunities and their level of income. In contrast to Joshi, we analyze here instead the impact of income on childbearing.

1.2 The Italian setting

In this paper the interest lies in how income affects motherhood decisions in Italy. We start from some stylized facts depicted in Figure 1. During the last two decades of the Twentieth Century, total fertility has sharply decreased, while both the percentage of women having completed at least upper secondary school and female labor force participation have significantly increased.

Figure 1: Education, Fertility and woman participation rates in Italy

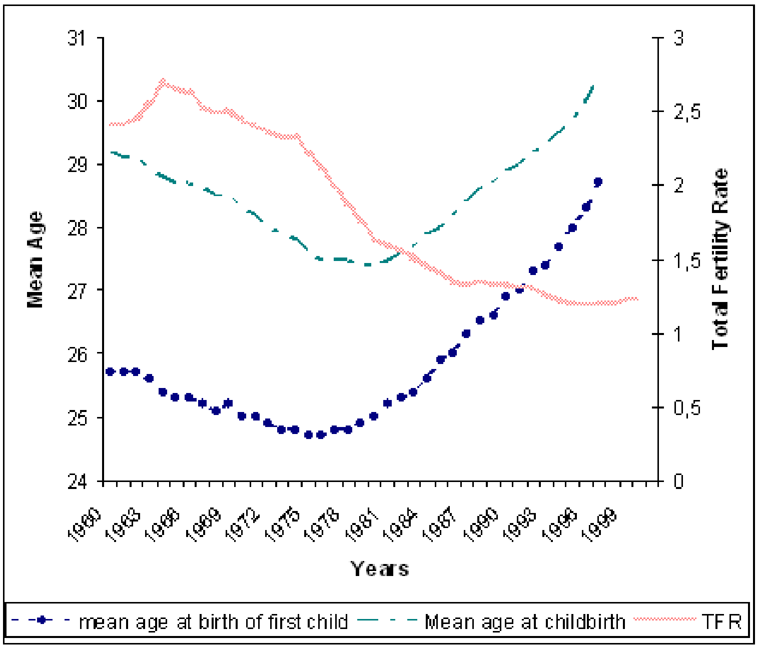


Source: EUROSTAT. Fertility rates: 1998 and 1999 are provisional values and 2000, 2001, 2002 are estimated values. Education is the percentage of the female population aged 20 to 24 having completed at least upper secondary education. The female employment rate is calculated by dividing the number of women aged 15 to 64 in employment by the total female population of the same age group.

During the same period, the mean age of mothers at first birth has increased over time: it was 25 years in 1980, 26.9 in 1990, reaching a level of 28.0 in 1995 and 28.7 in 1997 (see table 2). As Kohler, Billari and Ortega (2002) point out Italy has been, together with Spain, the first country to reach the threshold of so-called lowest-low fertility, i.e. below 1.3 children per woman. de la Rica *et al.* (2005) show that the decision whether to get married for Spanish men is strongly and negatively correlated with unstable job contracts or not working. However, for women the presence of a fixed-term contract does not play a key role in the decision whether to get married compared to the effect it exerts in delaying motherhood. The authors assert that the presence of an insecure labor market may be one of the reason for the fact that the Spain has highest age of entering motherhood among European countries. For the Italian case, however, knowledge about the effect of socio-economic variables (more specifically, income) on timing of birth is lacking.

It is now well known that the emergence of the lowest-low fertility in Southern Europe is not connected to a steep increase in childlessness (Billari and Kohler, 2004). Available parity-specific data on fertility show that most of the fertility decline in Italy during the last twenty years is due to the sudden decrease of the progression to the second, third and subsequent children. As a consequence, the probability to have a first child has not changed in spite of the tremendous economic and social changes characterizing Italy during the second half of the 20th century (see Dalla Zuanna, 2004).

Figure 2: Mean age at first birth, at childbirth and TFR.



Source: Council of Europe (2001), *Recent Demographic Developments in Europe*. Mean age of women at childbearing is the mean age of women when their children are born. For a given calendar year, the mean age of women at childbearing can be calculated using the fertility rates by age (in general, the reproductive period is between 15 and 49 years of age).

Economic factors might thus shape a) the timing of first birth more than the probability of ever having a first birth and b) the timing and the probability of ever having births of higher order. Data from opinion surveys support this idea. In a recent survey (2002) on a sample of mothers aged around 42, living in five Italian cities, women gave reasons for why they had stopped at the parity they actually experienced. Concerning the transition to the third birth (i.e. women who stopped at two children), economic reasons were cited as important for women who experienced a worsening of their financial situation after the birth of the first and second child. Women argue that monetary transfers for the first three years after the birth of a third child, or a lower but longer financial incentive, could have changed their decision to stop at parity two (De Santis and Breschi, 2003). Although being possibly biased as an ex-post motivation, this role of economic factors is specific for third birth.

It is thus reasonable to suppose that increasing financial support to households with children may have an impact on the probability of having the third and fourth child, mainly for poorer households. To this extent, the Welfare Minister Livia Turco (law number 448 of the Year 1998, Turco's law from now on) introduced two policy measures with the explicit purpose of supporting poor households with children. The measures of the law were introduced in 1999. The first measure provided a cash transfer of around 110 Euros per month for households with at least three children under 18 who had low household income levels (i.e. less than 15,000 Euros a year before taxation). This amount grew slowly year on year, following the life-cost index and it reached around 120 Euro a month in 2001. The share of households receiving this transfer has been particularly sizeable for larger households, especially in Southern Italy. About 300 million Euros were transferred in total in 1999 and 2000. The second measure had relatively mild restriction on income levels and it provided a monetary transfer to households in which one of the partners (typically woman) was not employed. The transfer, for a period of 5 months, was a monthly amount of 100 Euros in 1999, 155 in 2000, 260 Euros in 2001 and 2002. A significant share of women received this transfer, especially in the South. The two measures could also be simultaneously received, in an additive way. They were introduced for the anti-poverty purpose of assisting families with many children, who are at risk of being poor; they were not introduced as pro-natalist measures, but could be implicitly pronatalist (Whittington et al., 1990). Indeed, these two measures could cause a significant increase in income for low-income households, covering a non-negligible proportion of the cost of an additional child.

2 Data and Methods

Micro evidence on the relationship between the timing and the spacing of births has been scarce for the Italian case, mostly because of the absence of wage and income data linked with fertility histories. The data requirement for estimating the impact of income on the timing of births is demanding: we need panel data with a long time dimension or retrospective data on the complete employment and fertility histories. Usually, and this is our case, a researcher has available only cross section data or panel data with a short time dimension. Fertility histories may be reconstructed on the basis of the age of the children in the household but the complete labor market history of the women in the household will be more difficult or even impossible to reconstruct. This is because one observes for each household the number of children present and the employment status of the women in the household only at the time of the interview.

Unfortunately none of the currently available Italian data sets contain all the required information. The Bank of Italy's SHIW (Survey of Italian Households' Income and Wealth) contains detailed information on employment and income of family members, labor market activities, payment instruments and forms of savings, socio-demographic characteristics of the household. However, the sample size is too small to conduct fertility analysis, particularly for third births. The Labor Force Survey, collected by the Italian Institute for Statistics in 2003, provides detailed information on the family structure, labor market, work experience, part time and full time employment. The main drawback of this survey is that it does not collect information on household earnings and income. The sample size is however large and suitable for fertility analysis.

In order to overcome the these limits, we combine the two data sets. We use the Bank of Italy data set to estimate earnings equations, and match the predicted earnings to the ISTAT data set.

2.1 Bank of Italy's SHIW

The Survey of Italian Households' income and Wealth started during the 1960's. Its main aim was to collect information on income and savings of Italian households. During the past few years, however, new questions about payment instruments and different forms of savings have been introduced. The survey collects information on more than 22,100 individuals (8,011 households) with 13,536 individuals receiving an income. From the survey we have information about the activity of the employees (their total net income, average worked number of hours, hours of paid overtime), about the members of the professions, sole proprietors and free-lances, contingent worker employed on none account (if they worked all year or only for part of the year, their net earnings and average worked number of hours), about the family businesses, active shareholder/partner, pensioners and other income such as scholarship, alimony etc. For each individual we have the annual income and their wages.

Our unit of analysis is the woman. We only consider households where it is possible to link each woman with their co-residing children. In total this produces a sample of 20,003 individuals.

2.2 Labor Force Survey

The Italian Labor Force Survey is a quarterly and continuous survey implemented by ISTAT (Italian National Institute of Statistics) since 1959. For each year four waves are carried out. The survey collects information on more than 300,000 households, which constitutes around 800,000 individuals (1.4 per cent of total national population) distributed over 1,351 municipalities (out of 8,000). The labor force survey is the principal data source for assessing the Italian labor market. The sample design is a two stage rotating sample design with stratification of the primary units (municipalities). Each household is included first in two waves, then left out for two waves and then included in another two waves. The Survey offers different sections dealing with demographic characteristics of the households, present job (with all the information taken from the month before the interview), job experience, looking for a job, relationship with public employment centers. However, there are no retrospective fertility histories available. Instead we know the number of children (and their age) living in the household where the woman is either the household head or the spouse of the household head.

Every woman has been linked with their co-residing children at the moment of the interview and thus includes some adopted children or stepchildren but exclude any offspring who might have died or moved away. In Italy mortality at adult age is low and children of divorced parents are almost exclusively living with their mothers and a very low proportion of young individuals leave the parental household before 23. Nevertheless, in order to ensure that the recorded children are the only ones of the mother, we limit the analysis to only include women who are 40 or less in 2003. Given that the mean age of leaving home is rather high in Italy it is unlikely that we loose many observations. We also drop all households where we were unable to link children with mothers (i.e. male head of the household with no wife and all single men). In this way we ended up with a sample of 34,914 women. Unfortunately, we are not able to use information of husbands since we only know the marital status of a woman in 2003. As a result we are prevented from reconstructing retrospective marriage histories. A similar problem is present for widows.

Tables 1 and 2 report the relevant sample statistics. Table 1 shows that the mean age at first birth is 26.2 years when the mean is evaluated over the period

Table 1: Mean age at fist, second and third birth per Regions and level of Wages.

		Wage<=25th percentile	Wage>=75th percentile
Transition to 1st birth:			
	26.2	22.2	29.6
South	25.0	22.5	30.5
Centre	26.7	20.5	29.7
North	27.1	18.6	29.4
Transition to 2nd birth:			
	28.9	25.9	32.1
South	27.9	26.2	32.7
Centre	29.5	25.1	31.9
North	29.9	21.9	32.0
Transition to 3rd birth:			
	30.8	29.2	33.4
South	30.4	29.4	34.1
Centre	31.3	27.7	33.1
North	31.3	23.8	33.2

Source: Own Calcutation from ISTAT, Labor Force Survey, 2003. The percentiles refer to the distribution of expected hourly income from the estimated wage equation. The means are for closed birth interval only (computed only for women experiencing a birth).

1983 to 2003 for all ages included in the sample (i.e 15-40). While poor women in the North starts to have children early, women in the South tend to delay motherhood until they are 22.5. Transition to second birth takes place about 3 years after the first child is born with high income mothers in the South delaying more than the other ones. The third birth, instead, seems to succeed the second one with a shorter interval: if a woman is having a third birth she only wait, on average, 2 years since the previous one. Again, poor mothers living in the North tend to concentrate their fertility history in a shorter span of their life: they start at 18.6 and end it after 5 years (conditional on reaching the threshold of the 3rd birth).

Table 2 reports the financial situation of an average woman, where average refers to the fact that individual income is mean centered. Median income increases over time at decreasing rate as shown in the wage equation of the appendix A. For a poor woman, income grows quickly until it reaches the zero threshold at age 29, but a different setting is offered by a high income woman who shows a positive, even if slow, increasing income since the age of 19.

2.3 Methods

Our methodological strategy can be summarized in three steps. First we estimate wage equations based on the Bank of Italy data. Second we match predicted

Table 2: Median Hourly Wage per ages of an average woman.

Age	Median wage per ages of woman	Median wage for woman with low income (25th perc.)	Median wage for woman with high income (75th perc.)
15	-1.511	-2.659	-1.068
16	-1.338	-2.485	-0.895
17	-1.159	-2.319	-0.629
18	-0.874	-2.159	-0.314
19	-0.469	-2.006	0.489
20	-0.273	-1.477	0.635
21	-0.133	-1.143	0.776
22	0.001	-0.987	0.909
23	0.231	-0.782	1.088
24	0.448	-0.662	1.224
25	0.620	-0.549	1.399
26	0.790	-0.299	1.582
27	0.909	-0.198	1.783
28	1.077	-0.092	1.994
29	1.164	0.036	2.082
30	1.321	0.197	2.192
31	1.449	0.271	2.374
32	1.524	0.300	2.597
33	1.585	0.456	2.502
34	1.639	0.510	2.556
35	1.686	0.557	2.603
36	1.719	0.598	2.644
37	1.753	0.632	2.678
38	1.788	0.659	2.705
39	1.747	0.570	2.745
40	1.824	0.557	2.740

Source: Own Calcutation from ISTAT, Labor Force Survey, 2003. A negative wage means it is smaller than the average wage per age.

wages onto the ISTAT data using common characteristics of women in both data sets. Third, we create three data sets of women being at risk of the first, second and third birth. In the third step we also investigate if the introduction of Turco's law in 1999 had any impact on the risk of having the third birth.

The details of estimation of wage equations is given in Appendix A. The estimation of the impact of predicted (and time-varying) income $\hat{\omega}_i$ on fertility is implemented through a set of discrete time event models. Consider a series of P predictors $X_{1ij}, X_{2ij}, ..., X_{Pij}$ and let x_{pij} denote individual i 's values for the pth predictor in time j. The hazard function is defined as:

$$h(t_{ij}) = Pr[T_i = j | T_i \geq j \text{ and } X_{1ij} = x_{1ij}, X_{2ij} = x_{2ij}, ..., X_{Pij} = x_{Pij}]$$

that is, the population value of discrete-time hazard for person i in time period j is the probability that he or she will experience the target event in that time period, *conditional* on no prior event occurrence *and* his or her particular values for the *P* predictors in that time period (see for example Jenkins, 1995).

We estimate a variety of models and the specified baseline is different depending on birth parity:

- *Baseline for the model of the first birth* is:

$$logit(h_{ij}) = [\alpha_{15} A_{i15} + ... + \alpha_{40} A_{i40}]$$

where A_{ih}, $h = 15, ..., 40$ are dummy variables indicating a non-parametric specification of time and

$$A_{ih} = \begin{cases} 1 & \text{if } i\text{th woman is } h\text{-years old} \\ 0 & \text{Otherwise} \end{cases}$$

- *Baseline for the model of the second birth* is:

$$logit(h_{ij}) = [\beta_1 D_{i1} + ... + \beta_{25} D_{i25}]$$

where D_{ik}, $k = 1, 2, ..., 25$

$$D_{ik} = \begin{cases} 1 & \text{if } i\text{th woman is observed after } k\text{-years from the birth of the first child} \\ 0 & \text{Otherwise} \end{cases}$$

so that D_{ik} is a function of the spell, duration, from the first birth. (The baseline is similarly specified for the third birth).

In order to asses the impact of income of fertility different specification of the model are offered:

- *General Income Effect*

$$logit(h_{ij}) = [\delta_1 P_{i1} + ... + \delta_J P_{iJ}] + \pi_1 \hat{\omega}_i + \pi_2 \hat{\omega}_i^2$$

where

$$P_{ig} = \begin{cases} A_{ih} & \text{if first birth is under study} \\ D_{ik} & \text{if second/third birth is under study} \end{cases}$$

- *Income Effect and Duration Effect*

$$logit(h_{ij}) = [\delta_1 P_{i1} + ... + \delta_J P_{iJ}] + \pi_1 (\hat{\omega}_i * P_{i1}) + \pi_2 (\hat{\omega}_i * P_{i2}) + ... + \pi_J (\hat{\omega}_i * P_{iJ}) + \gamma H_i$$

and

$$H_i = \begin{cases} 0 & \text{if first birth is under study} \\ \text{age first child}_i & \text{if } i\text{th woman is at risk of second birth} \\ \text{age second child}_i & \text{if } i\text{th woman is at risk of thrid child} \end{cases}$$

and (age first child)$_i$ is the age at which the woman had the first child (a woman is at risk of the second child since she had the first one).

- *Institutional/ Cultural Effect*

$$logit(h_{ij}) = [\delta_1 P_{i1} + ... + \delta_J P_{iJ}] + \pi(\hat{\omega}_i * \sum_{k \in \{S,N,C\}} d_{ik}) + \tau(\sum_{k \in \{S,N,C\}} d_{ik}) + \gamma H_i$$

where $k \in \{South, Centre, North\}$ and

$$d_{ik} = \begin{cases} 1 & \text{if } i\text{th woman lives in the } k\text{th region} \\ 0 & \text{Otherwise} \end{cases}$$

- *Turco's Law (1999)*

$$logit(h_{ij}) = \tau(\sum_{k \in \{S,N,C\}} d_{ik}) + N_i + F_i + F_i * N_i$$

where $j = 1983, ..., 2003$ and

$$F_i = \begin{cases} 1 & \text{if } i\text{th-woman has low wage (predicted distribution)} \\ 0 & \text{otherwise} \end{cases}$$

$$N_i = \begin{cases} 1 & \text{if } j \geq 1999 \\ 0 & \text{if } j < 1999 \end{cases}$$

3 Results

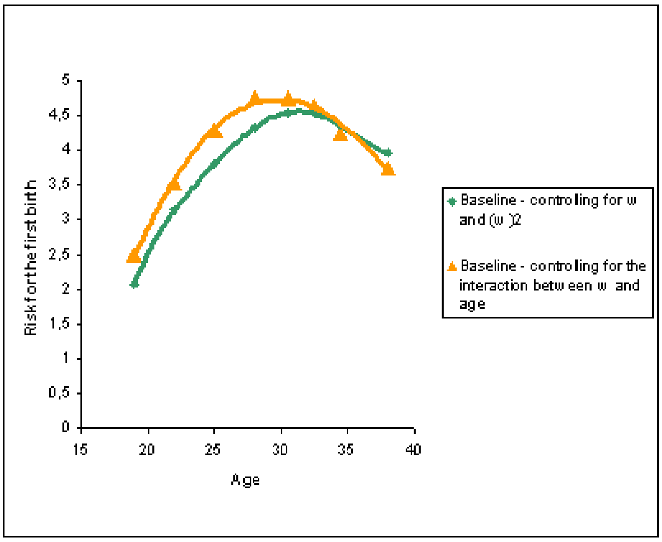
In this section we present results showing how wage may affect the risk of having the first, second and third birth. We conclude the section by including the empirical evidence concerning Turco's Law. The estimations ignore the effect of the man's income, because we are not able to go back and reconstruct retrospectively when a woman got married (we only have information about the marital status in 2003).

3.1 First Birth

In general, the baseline hazard depicts an inverse U-shape. In the case of the first birth, controlling for wage and wage squared only, we find a maximum when women are aged 30 to 31 years.

This effect overestimates the mean age of Italian mothers at the first birth. In 1997, for example, the average age at first birth was 28.7 (See Council of Europe (2001), *Recent Demographic Developments in Europe*). As shown in Figure 3, once we control for interactions between age and wage (an anticipation effect),

Figure 3: Baseline for the First Birth



Notes: Women between 15 and 18 are the reference group.

the baseline hazard is shifted to the left, resulting in a mean age for the first birth between 27 to 28.

The general effect of women's wage is negative (-0.407): the higher the wage, the lower is the risk of entering motherhood. The effect of wage is however non-linear. It is approximated by a second order polynomial, with a positive squared coefficient (a convex function) and negative first order coefficient. This means that until the wage reaches its minimum[2], every additional unit of wage has a decreasing impact on the risk of the first birth, but afterwards wage is positively correlated with motherhood.

In table 3 we report the estimated coefficients for women being at risk of the first birth where wage has been stratified by age and interacted with region. This allows us to understand how wage impacts on first birth after controlling for age and cultural or institutional effects. In column 3 we can see wage has a strongly and negative effect on the risk of the first birth for young women, the effect becoming closer to zero at the age of 34-35. This means wage is one of the determinants of the postponement of motherhood within high wage women. As a consequence, when they are 36 or over the risk for the first birth clearly depends and is affected (positively) by wage. When controlling for regions (column 5), we mostly find the

[2]2,907, i.e. (0.407/2*0.070)

same negative path for younger women but the turnover point is now between 32-33 years (even if not significative). After 34 years, every additional unit of wage decrease the likelihood to experience motherhood. (Potential) Central mothers are less at risk of first birth when compared with the Southern: a similar path (bigger in absolute value) is showed by Northern mothers. However, when controlling for cultural and institutional effects, high wage Northern women are less likely to become mothers for the first time compared to the Southern one.

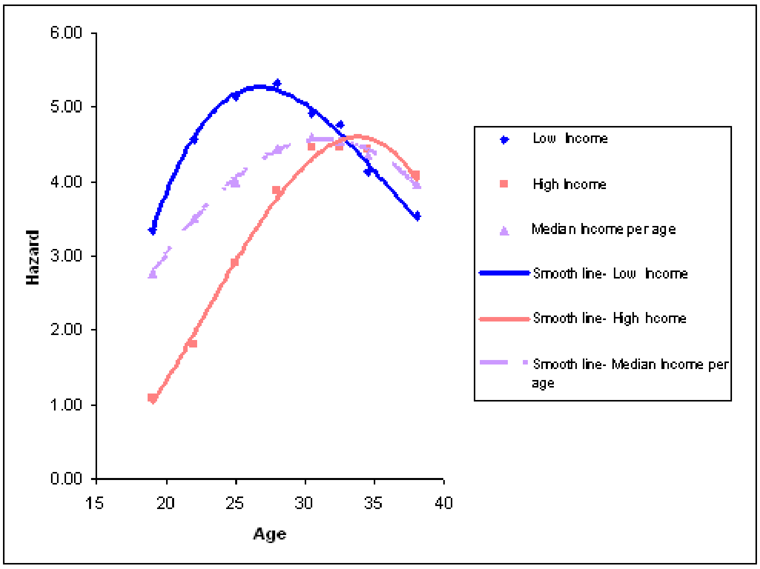
Table 3: Discrete-time logit hazard regression: Wage and First Birth

Variable	**Coeff.** (1)	**(S.E.)** (2)	**Coeff.** (3)	**(S. E.)** (4)	**Coeff.** (5)	**(S. E.)** (6)
General Wage Effect:						
Wage	-0.407**	(0.007)				
$(\text{Wage})^2$	0.070**	(0.003)				
Wage and age:						
Inc. × age (15-17)			-0.770**	(0.067)	-0.698**	(0.068)
Inc. × age (18-20)			-0.508**	(0.022)	-0.436**	(0.023)
Inc. × age (21-23)			-0.620**	(0.015)	-0.540**	(0.017)
Inc. × age (24-26)			-0.494**	(0.014)	-0.409**	(0.016)
Inc. × age (27-29)			-0.330**	(0.015)	-0.244**	(0.018)
Inc.× age (30-31)			-0.104**	(0.021)	-0.021	(0.025)
Inc. × age (32-33)			-0.064*	(0.027)	0.018	(0.029)
Inc. × age (34-35)			0.070†	(0.037)	0.152**	(0.039)
Inc. × age (36-40)			0.121*	(0.048)	0.206**	(0.050)
Region effect:						
Center					-0.244**	(0.022)
North					-0.191**	(0.020)
Wage and region:						
Wage× Center					-0.008	(0.019)
Wage× North					-0.058**	(0.017)
Intercept	-6.167	(0.057)	-6.561**	(0.143)	-6.355**	(0.148)

Notes: †p<0.01; *p<0.005; **p<0.001. Reference category for Region is South. Baseline not reported.

In order to better understand how different levels of wage may affect the timing of first birth, we simulate the paths for a low and high wage woman. We choose two extreme situations. A low wage woman has an wage set to the 10th percentile of the hourly wage distribution, while a high wage woman has predicted hourly wage equal to the 90th percentile of the distribution. Both paths are plotted together with the hazard of the median wage woman. Figure 4 shows a non proportional hazard: low wage women are more at risk of experiencing the first birth when they are very young, reaching the maximum hazard level when they are 25-30. High wage women tend to delay, maximizing the likelihood for the first birth when they are 30 or over. The median wage per age has an intermediate position. When the three paths cross (at age 32) low, median and high wage women experiences similar risks though with the difference that low wage women have already reached their maximum, the median woman is at the maximum risk level and the high wage woman is get to reach the maximum.

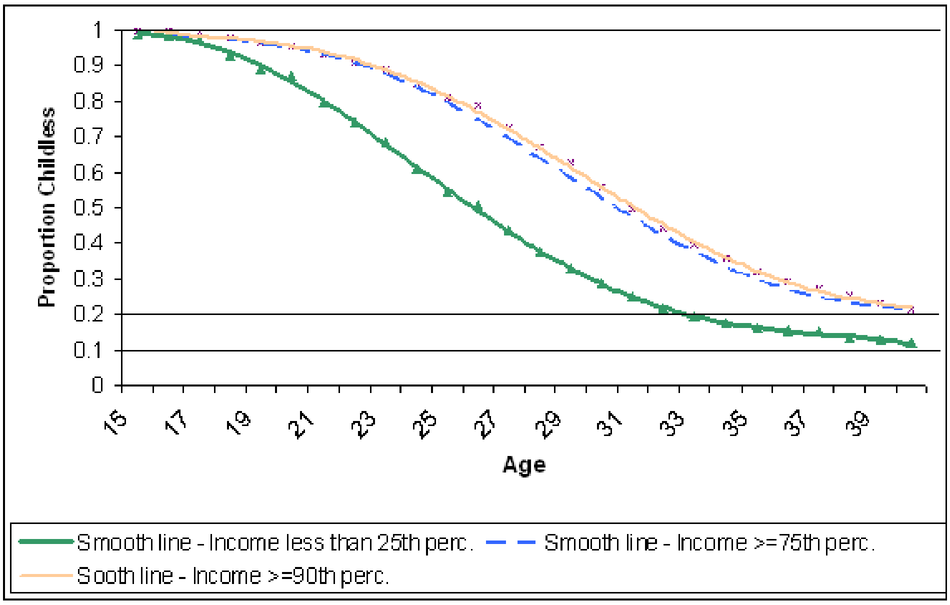
Figure 4: Timing of first birth for a low and high wage woman



Notes: Low and High Wage are constant through age.

The simulated survival curves in Figure 5 indicate a significant recuperation effect, though not complete. Women with high wage start their motherhood later, but recuperate after some time, while poor women start earlier. This pattern is rather stable, and persist also when we define a high wage women equal to the 75th percentile of the wage distribution, and a low wage woman at the 25th percentile. We find that higher wages have their primary effect on postponement of first birth so that when wages are higher, pregnancy tends to be concentrated in a shorter span of the life cycle that starts later in life. This is in line with the opportunity cost theory (see Heckman and Walker,1990): few employed mothers would quit their job to have children if an exit from the labor market could seriously damage their future labor market prospects (Boix, 1997). This effect would be more important the greater the uncertainty in the labor market or the higher the unemployment rate. This is one of the reasons why Central and Northern regions exhibits negative estimated coefficient for the risk of the first birth when compared to the South (where there is higher uncertainty related to the labor market).

Figure 5: Predicted Survival Curves to Transition into Motherhood from Table 3 by level of predicted wage.



Notes: Median predicted survival per ages with wage evaluated with a mobile threshold (25th, 75th, 90th percentile) per ages.

The paths may also be explained in terms of recruitment policies which differ across regions. As firms often recruit and prefer young talents prior to motherhood rather than women in the post-parental phase, this might reinforce postponement incentives (see Gustafsson, 2001). The negative coefficients of the interaction between wage and region (column 5 of table 3) can therefore be explained by the large presence of public jobs in the South where working women are mostly employed in teaching or administrative activities, mainly driven by a lack of private firms. Women working in public sectors tend to have permanent contracts and pre/post maternal paid periods, providing a high level of stability (i.e. low likelihood experiencing job redundancy). In the North, in contrast, the style of work life changes considerably, with a much higher prevalence of private firms. To this extent women from the North, normally with higher wage levels, are forced to postpone motherhood until they reach a certain position in their career planning. Consequently depreciation of women's human capital due to temporary absence from the labor force due to childbearing, might be more severe compared to women in the South. Another argument which is consistent with the negative interaction between wage and region is that, presumably, mothers with higher career prospects decide to postpone maternity until they obtain a more stable labor market situation (e.g. getting a permanent contract (see de la Rica *et al*, 2005 for an explanation for the Spanish case). Unfortunately given our data reconstruction of women's job history is not possible, which makes it difficult to verify these hypothesis. However, it seems there is no institutional/cultural effect involving the decision of when give the first birth. If this was the case, we should have found a positive coefficient for the interaction of wage with North where a more efficient child care system is set up in order to help working mothers to conciliate job and family decisions.

3.2 Second and Third Birth

A woman is at risk of second birth if she has already had one birth. She is at risk of third birth only if she has already experienced two previous births. A trivial consequence of this obvious fact is that the age of a woman at the time she becomes at risk may affect second (and third) birth fertility (see Heckman *et al*, 1990). Our estimates in table 4 prove that the higher the age of first birth, the less is the risk of second birth (-0.014). The coefficient for the age of second birth is smaller than the previous one, meaning that the risk of having a third child is strongly negatively correlated with the age at which second birth took place. In other words, mothers who tend to delay first birth are less at risk of having a second birth and those who delay the second have lower likelihood of having a third. Also in this case wage has a negative effect on fertility at a decreasing rate. The main difference is that while the wage effect for second birth is negative and significative, the coefficient for the third birth is near zero and not significative, indicating that the wage effect plays a marginal role in third births.

Looking more specifically at how wage may affect transition to second and third births as reported in table 5, we find the coefficients to be of similar intensity when controlling for wage and interaction with duration, region effects and institutional effects (see age at the first and second birth in table 4 and table 5). Wage has a negative impact on the probability of second birth one to two years after the first birth (column 1 of table 5). This is either because households prefers to spend additional wage on the first child or because it is the moment women tend re-enter the labor market. Even if her wage increases, she has little incentive to use it for rearing another child. The situation is different after three to four years. In this case an increase in wage has a positive effect on second birth. A similar pattern is followed by women at risk of third birth. The wage effect is negative immedi-

Table 4: Discrete-time logit hazard regression: General Wage Effect for second and third birth

Variable.	Coefficient	(Std. Err.)	Coefficient	(Std. Err.)
	Transition to second birth		Transition to third birth	
General Wage Effect:				
Wage	-0.073**	(0.009)	-0.0004	(0.020)
(Wage)^2	0.066**	(0.005)	0.099**	(0.012)
Age at first birth	-0.014**	(0.003)		
Age at second birth			-0.102**	(0.006)
Intercept	-3.615**	(0.078)	-2.166**	(0.193)

Notes: †*p<0.01;* **p<0.005;* ***p<0.001. Baseline omitted.*

ately after second birth and becomes positive (though not significant) three to four years after the second birth. This suggests that the timing for second and third birth is positively induced by socioeconomic variables only three to four years after having experienced previous birth. Afterwards, the risk of giving a new birth decreases as we move away from the date of the preceding birth. This is perfectly in line with Heckman *et al* (1990) point of view concerning 3th birth in Sweden: when wages are higher there is a primary effect in reducing third birth and a secondary effect that forces pregnancy to be concentrated in a shorter span of life cycle.

Table 5 shows that people living in the Center and North are less likely to experience a second/third birth compared to the South. But table 5 also reveals a clear institutional/cultural effect underlined by the interaction of wage and region. An additional unit of wage for a woman in the North increases her risk to have a second/ third birth. One might argue that this reflects confidence in the child-care system among working mothers living in the North and Center (see del Boca *et al*, 2005 for a complete explanation). In Southern Italy, crêches are not widespread and working mothers tend to prefer informal child care, i.e. babysitters and grandmothers living nearby. When any of these two conditions is not satisfied, having another child means additional costs in terms of searching for childminders. The decision of having a second or third birth, even if in presence of higher wage, is not straightforward. Different is the situation in the North, where the large presence of public and private services offers a more reliable child-care system that also facilitates childcare even when children are very young.

3.3 Turco's law (1999)

As we point out in the theoretical background, Italy has been one of the first countries to reach the so-called Lowest-low fertility during the early 1990 (Kohler *et*

Table 5: Discrete-time logit hazard regression: Wage and Region effect for second and third birth.

Variable	Coefficient (1)	(Std. Err.) (2)	Coefficient (3)	(Std. Err.) (4)
	Transition to second birth		Transition to third birth	
Age at first birth	-0.031**	(0.003)		
Age at second birth			-0.116**	(0.007)
Wage and duration:				
Wage ×dur (1/2)	-0.046†	(0.026)	-0.015	(0.058)
Wage ×dur (3/4)	0.069**	(0.017)	0.051	(0.040)
Wage ×dur (5/6)	-0.064**	(0.019)	-0.028	(0.044)
Wage ×dur (7/9)	-0.150**	(0.024)	-0.097*	(0.046)
Wage ×dur (10/13)	-0.168**	(0.044)		
Wage ×dur (10/14)			-0.328**	(0.064)
Wage ×dur (14/25)	0.130	(0.092)		
Wage ×dur (15/24)			-0.273	(0.219)
Region effects:				
Center	-0.432**	(0.031)	-0.304**	(0.074)
North	-0.489**	(0.026)	-0.248**	(0.065)
Wage and Region:				
Wage × Center	0.008	(0.029)	0.110	(0.078)
Wage × North	0.225**	(0.022)	0.274**	(0.054)
Intercept	-2.842	(0.084)	-1.552**	(0.205)

*Notes: †p<0.01; *p<0.005; **p<0.001. Ref. category for Region is South. Baseline not reported. Dur (1/2)= See section 2.3.*

al., 2002). Many researchers have focussed on the existence of an unmet need for family-friendly policies as one of the reasons behind lowest low fertility (see for example Demeny, 2003). However, there is little scientific evidence concerning the impact of policies on fertility in a lowest-low setting. Moreover, there seems to be a general skepticism in the literature of whether public policies may have an impact on choices concerning fertility.

Table 6 considers only women being at risk of third birth, excluding 2003.

Table 6: Discrete-time logit hazard regression: Assessing the impact of Turco's Law.

Variable	Coefficient	(Std. Err.)
Region (Ref. North):		
South	0.105*	(0.050)
Center	-0.183*	(0.073)
General trend (Ref. trend before the law):		
After 1999	-0.207**	(0.048)
Poor after the law (Ref. poor women before 1999):		
Poor after 1999	0.202†	(0.113)
(*Not poor: Wage>15th perc. distribution*)		
Poor	0.356**	(0.069)
Intercept	-4.836**	(0.077)

Notes: †*p<0.01;* **p<0.005;* ***p<0.001. Baseline omitted.*

Generally women living in the South are more at risk of third birth when compared to the Northern ones. After the introduction of the law, the general period effect is negative confirming the lowest-low fertility for Italy. However, if we restrict the attention to the sub-group of poor women, it is clear that after 1999 they are at a higher risk of having a third birth when compared to the sub-group of poor women before the introduction of the law. Moreover, an additional unit of wage for a poor woman increases the probability of having a third child, and the effect is statistically significant at the 10 percent level. Cross tabulating the constructed poverty measure and the Region, we observe that 90 percent of the poorest women are living in the South. This confirms Official Statistics (Lelleri and Marzano, 2002) showing that a significant share of households living in the South (see table 7) received this transfer.

The impact of the law is, however, very much dependent on the specification of the poverty threshold. If we choose, for example, the 25th percentile of the distribution as threshold, the law does not seem to have much effect. The law could, reasonably, affect the fertility decision of very poor women because, only for this particular sub-group, the money transfer could produce a non-negligible proportion of the cost of having an additional child. But there can also be other factors

Table 7: Percentage of families receiving Turco's Law

	1999	**2000**
Percentage of families with three or more children under 18:		
North	14.8	16.2
Center	21.7	23.7
South	58.8	64.2
Percentage of women receiving the second measure over total live births:		
North	11.9	12.3
Center	22.8	24.1
South	51.3	56.5

Source: Lelleri and Marzano, 2002

(we cannot control for) influencing the positive coefficient for a poor woman after 1999, not related to the law. Indeed, figure 6 shows that after 1999 fertility of poor women increased, but we cannot be sure whether this is due to the law or not.

In many respect the results are consistent with Gauthier (2001): "Overall, thus, the multivariate studies provide mixed conclusions as to the effect of policies on demographic and economic behavior, once other factors such as education, wage etc. are controlled for. The effect, if any, tends to be small. Methodological issues may be at the basis of these inconclusive findings..." (see also Gauthier, 2004). We can argue that the Law had an impact, but we are not able to estimate precisely the magnitude of its influence on increasing the rate of third births in Italy. The main difficulty lies with availability of data.

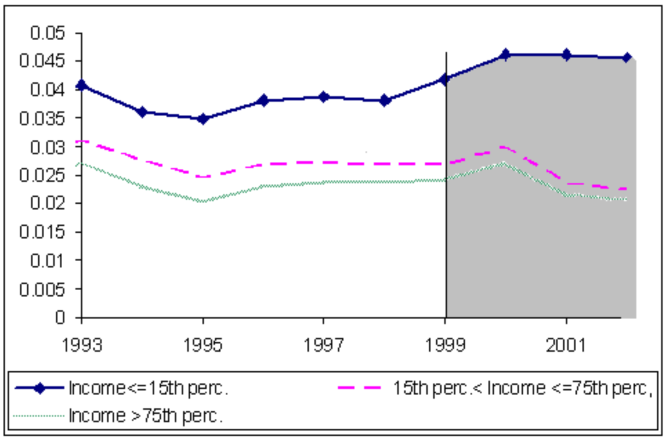
In order to asses the causal effect we need to use Regression Discontinuity techniques (or similar) that identifies the impact of the policy measure with the shift in the regression line before and after the law is introduced. The main problem is that our instrument (the wage) that discriminates between treated (who received the money) and not treated is estimated and we are not able to clearly identify the group of compliers (see Hahn *et al.*, 2002 for an explanation). This is because we need to identify the impact of the law on wage and how wage of poor households changed after receiving the benefit from the State.

4 Summary and Concluding Remarks

The aim of this paper is to find an empirical connection between the striking increase in women's labor force participation and the delay in motherhood and the transition to second and third birth in Italy, though the impact of potential outcome.

Using two different data sets (from the ISTAT Labor Force Survey and the

Figure 6: Mean Predicted Hazard 1993-2002.



Notes: Fertility from 1993-2002: mean predicted hazard per year of a discrete-time logit event history model where wage has been stratified in low (less then 15th perc. of the distribution), medium (15th perc.< Wage<= 75th perc.), high (>=75th perc.). In grey the area where Turco's law could influence fertility.

Survey of Households' Wage and Wealth led by the Bank of Italy in 2002), we estimate the effect of wage on the postponement of motherhood. We have made use of two steps. First, we first estimate a wage equation including detailed controls for women's educational attainment using a Tobit model. Second we use the predicted wage as a regressor in discrete time hazard models for the transition to first, second and third birth. We find that the wage effect is negatively correlated with having children. The magnitude, however, varies according to the birth order. Wage has a strong negative effect in the timing of first birth. Consistent with opportunity cost theories women with higher wage tend to delay motherhood. Our estimates suggests a non-proportional hazard and a recuperation effect (not complete). Women with higher wage starts having children later, but recuperate after some time, while poor women starts earlier. Furthermore, there is no evidence that institutional or cultural effects are responsible for the postponement of maternity.

The pattern is different for second and third births. The wage effect is always negative, but it has smaller intensity compared to the first birth. The coefficient for third birth is close to zero, confirming that wage plays a relatively small role in this decision. Nevertheless, we find evidence of institutional differences in the decision of having more than one child. The empirical evidence for birth order two and three is in line with Ermisch (1989) indicating that the effect of women's wage depends on the availability of external child care. More specifically, an additional unit of wage for a Northern woman increase the risk of experiencing a second and third birth because they are more confident in the availability of childcare.

We conclude the empirical analysis by focussing on a public policy implemented in Italy in 1999 (Turco's law) which supported (through monetary transfers) households with children. Our estimates give some support for the law having an effect. But it is not clearly identifiable and quantifiable given our methodological approach, which in turn was driven by the data available. Despite this limitation our results provide interesting evidence of the key role wage plays in fertility decisions.

A Appendix

Wage equations are commonly estimated (see for instance Mincer,1974) by linear regression where the dependent variable is the natural log of the reported wage. Typical variables to be included are age and age squared, education (either in terms of years of education or as a dummy variable reflecting the educational level), type of education, work experience, number of children, age of the children, ethnicity, region, profession. In theory we can estimate separate wage equations for men and women within the status of working persons and pensioners. We do exclude pensioners: women in pensionable age are excluded as we limited our analysis to those who are 40 or less. Male are not considered because of the established unit of analysis. Husbands' income is ignored: since we only know the marital status in 2003 (and information about the wedding date is not provided) we are prevented from reconstructing it retrospectively. However, there will be women who are recorded with zero wage simply because they do not work. The problem is that they might have chosen not to work because they would receive relatively low wage. In terms of the economic theory, they do not work because their offered wage is lower than their reservation wage (i.e. the lowest wage for which they would chose to work). If we choose those who work in our wage equation only, we do get a selection bias. One standard solution for this problem is to estimate a participation equation using a probit model (the so-called generalized Tobit or Tobit of second type, see Gourieroux 2000).

Consider the market wage (Y_{mi}) and the reservation wage (Y_{ri}) of person i specified as following:

$$Y_{mi} = x_i\prime\beta + \epsilon_i$$

and

$$Y_{ri} = z_i\prime\gamma + \nu_i$$

so that the observed wage is given by:

$$Y_i = \begin{cases} Y_{mi} & \text{if } Y_{mi} \geq Y_{ri} \\ 0 & \text{Otherwise} \end{cases}$$

with:

$$Y_i = \begin{cases} x_i\prime\beta + \epsilon_i & \text{if } \epsilon_i - \nu_i \geq z_i\prime\gamma - x_i\prime\beta \\ 0 & \text{Otherwise} \end{cases} \tag{A.1}$$

The two step estimation provides a first step for the estimation of a probit model for the probability to be in the labor market and a second step for the estimation of the regression model with an additional variable (the inverse Mill's ratio) using the sub-sample of individual with $d_i = 1$, where:

$$d_i = \begin{cases} 1 & \text{if } Y_{mi} \geq Y_{ri}, & \text{i.e. a woman works} \\ 0 & \text{if } Y_{mi} < Y_{ri}, & \text{i.e. a woman does not work} \end{cases}$$

In our case, we are prevented from using this standard solution because of the combination of two different and independent data sets. Mapping the predicted Bank of Italy income into the ISTAT data set requires to have exactly the same variables in both data sets. Including information about the husbands as regressors (i.e. $z_i\prime$) in the participation equation attenutate the bias of the coefficients but we impute, to the women of the ISTAT data set, a predicted income which captures year by year the presence of an additional wage even if we cannot address [3] the presence of an husband for that year.

Given this setting, the lack of data available and the data mapping we estimate a Tobit model (a Tobit model of the first type or Tobit with deterministic censure, see Tobin 1958) which censors the wage distribution at selected (upper or lower) point. The woman wage equation is left censored at zero.
Define:

$$\begin{cases} Y: & \text{Hourly Observed Wage} \Rightarrow \text{min (Y)=0;} \\ a: & \text{Positive Constant;} \\ W = Y + a: & a - \text{augmented Wage} \Rightarrow \text{min (W)=a;} \\ w = \lg W: & \Rightarrow \text{min (w)= lg } a. \end{cases}$$

Given this definition,

$$Y_i = \begin{cases} Y_{mi} & \text{if } Y_{mi} \geq 0 \\ 0 & \text{if } Y_{mi} < 0. \end{cases} \tag{A.2}$$

[3]problem of retrospectively constructing the marital status.

We are interested in taking $\lg$ of A.2, but the logarithm of zero is $-\infty$. Taking a positive constant a and assuming that $W_i = Y_i + a$, we get:

$$W_i = \begin{cases} a + x_i\prime\beta + \epsilon_i & \text{if } \epsilon_i \geq x_i\prime\beta \\ a & \text{Otherwise} \end{cases}$$

with $\min(W_i) = a$ and:

$$w_i = \lg(W_i) = \begin{cases} \lg(a + x_i\prime\beta + \epsilon_i) & \text{if } \epsilon_i \geq x_i\prime\beta \\ \lg(a) & \text{Otherwise} \end{cases}$$

and $\min(w_i) = \lg a$.

$\lg a$ is the lower bound for the log-wage distribution and it is the point of censure of the Tobit model. All the observations with augmented log wage less than $\lg a$ are censored. If we apply to this model a standard OLS, the estimates are biased and inconsistent.

If we denote $\hat{\omega}_i$ the log hourly predicted wage, the wage equation we estimate becomes:

$$\hat{\omega}_i = \hat{\beta}_0 + \hat{\beta}_1 \text{age}_i + \hat{\beta}_2 (\text{age})_i^2 + \hat{\beta}_3 \sum_{j=1}^{8} \text{education}_{ij} + \hat{\beta}_4 \sum_{j=1}^{20} \text{region}_{ij} \qquad \text{(A.3)}$$

where $(\text{education})_{ij}$ are eight dummy variables for different levels of education attained from the ith woman and $(\text{region})_{ij}$ are twenty dummy variables, one for each of the Italian regions. Table 8 presents the estimated coefficient from an hourly wage equation for women (using Tobit).

The selected sample in table 8 contains 4,749 women in the condition of being mothers, i.e. less than 45 years, not pensioners and not studying. 2,601 of these women are censored because they exhibit a zero wage.

As we expected, the coefficient for age is positive and for age squared is negative: this is in line with the economic/econometric literature that wage increase with age but at decreasing rate. Our results confirms the classical way to take education as a proxy of wage: the larger you study the more you earn. We can see that the coefficients associated with education go in the right direction: moving from lower level of education to higher level induces a gain in terms of hourly wage rates. We do not include position in the woman wage equation because it is not provided the the Labor Force Survey. To be more precise, the ISTAT Survey asks women position only at the time of the interview and we are no able to reconstruct it back in 1983. The hourly wage does not exhibit very large variability across different region of Italy, even if there is a clear tendency of lower hourly wage in the South (linked both with the presence of public job and the percentage of women not working) when compared to the North one.

Table 8: Hourly Woman Wage Equation: Tobit

Variable	Coefficient	(Std. Err.)
Equation 1 : model		
age	0.276**	(0.021)
$(\text{age})^2$	-0.003**	(0.000)
Middle School	0.530**	(0.092)
Professional Secondary School Diploma	1.246**	(0.137)
High School	1.541**	(0.096)
Short Course University Degree	2.118**	(0.301)
Bachelor's Degree	2.458**	(0.124)
Post-Graduate Qualification	3.375**	(0.772)
Piemonte	1.744**	(0.171)
Valle d' Aosta	1.339*	(0.658)
Lombardia	1.477**	(0.165)
Trentino	2.099**	(0.258)
Veneto	1.321**	(0.181)
Friuli	1.553**	(0.229)
Liguria	1.675**	(0.196)
Emilia Romagna	1.881**	(0.170)
Toscana	1.608**	(0.181)
Umbria	1.782**	(0.208)
Marche	1.728**	(0.197)
Lazio	0.767**	(0.188)
Abruzzi	1.024**	(0.220)
Molise	0.967**	(0.320)
Campania	-0.143	(0.182)
Basilicata	1.466**	(0.325)
Calabria	1.107**	(0.230)
Sicilia	0.191	(0.179)
Sardegna	1.065**	(0.208)
Intercept	-7.157**	(0.509)
Equation 2 : sigma		
Intercept	1.715**	(0.030)

*Notes: †p<0.01; *p<0.005; **p<0.001. Ref. group for education: none and elementary school. Ref. group for regions: Puglia.*

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