REPRODUCTIVE CHANGE IN TRANSITIONAL ITALY
INSIGHTS FROM THE ITALIAN FERTILITY SURVEY OF 1961

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1. Introduction

In a previous paper always on the Italian Census of 1961 (Breschi, Fornasin, and Manfredini, 2013), we have investigated the fertility decline process in Italy based on the reproductive histories of ever-married women that such a survey exceptionally collected. That article shed some light on the pivotal role that female education played on fertility especially in the first stages of the demographic transition. Our starting point were four case-studies – Turriaco, Novellara, Casalguidi, and Alghero – whose reproductive histories were used to trace, at the individual level, the changes in the reproductive pattern during that exceptional period of the demographic history of Italy.

In the present paper, we intend to take a step forward by improving some of the limits of the previous article. First, we have enlarged our dataset by including four more populations. The issue of representativeness is key for Italy given its great variability in demographic systems and patterns of demographic transition. Differences were in fact present not only between regions, but also within the same region. The coastal town of Alghero, for instance, was not representative of the whole Sardinia, especially of its interior, as well as Turriaco was not representative of the mountain area of Friuli, which accounts for a large part of the region. Moreover, Southern Italy, with its peculiar demographic system and cultural aspects, was not represented at all in the previous paper. This is the reason why we included two traditional populations of Sardinia (Austis/Seulo and Macomer), another one from the mountain area of Friuli (Lauco) and one from Campania (Massa Lubrense), situated close to Naples. Second, in the previous paper the analyses were based only on completed-fertility women. This was done to conform our paper to the analyses already done by ISTAT on the census of 1961, but restricted the research to women born prior to 1912. However,

this limitation prevented us from taking fully advantage of the potentialities of this source. In particular, the analysis did not considered all those women with incomplete fertility which were the protagonists of the last and determinant stage of fertility decline. Women born after 1911 are in fact likely to be more educated, and therefore more open to innovation and modernization ideas (Cleland 2001; Van de Putte 2007), such as more awareness and use of innovative systems of fertility control (Cleland and Jejeebhoy 1996). Moreover, they are more likely to participate in the labor force thereby delaying access to marriage (United Nations 1995; Chaudhury 1984). In short, the more women are young at the census of 1961, the more they are likely to have independence and autonomy within the family, an element that is positively associated with woman's education (Dyson and Moore 1983; Basu 2002).

2. The 1961 Fertility Survey

Our starting point is the "Family sheets of the 10th General Census of the Population – 15 October 1961", in particular its section VI, which has two parts (fig. 1):

- "A. Information on marriage" assess each ever-married woman living in the family, including the date (month and year) of her most recent/current marriage, the possible date (month and year) of widowhood (spouse's date of death) or divorce/separation, the birth years of parents, and the dates (start and end) of possible previous marriages;

- "B. Information on children from current and possible previous marriages" record the number and sex of children ever born and the number and sex of those still alive at the time of census (whether they lived with the parental family or not). The year of birth of all children is also recorded (without gender distinction) – which perhaps represents the greatest novelty of this survey compared to that of 1931.

This data can then be combined with information regarding each ever-married woman taken from other sections of the family sheet (such as date and place of birth, education, professional status and field etc.), or put in relation to characteristics of other members of the family group and/or the

household's living conditions (possessory title, number of rooms, presence of bathroom, availability of drinking water etc.). Albeit with a certain degree of approximation, it is possible to reconstruct the complete reproductive history (in terms of intensity and frequency) of the women born before 1911, and the incomplete history of those born afterward.

FIGURE 1. Section VI of the census return. Reconstruction of the reproductive history of all ever-married women living in the family

As typical of retrospective analysis, the Fertility Survey of 1961 also poses problems of selection bias. The principal factor causing selection bias is mortality, with high-fertility women being more at risk of dying from complications during pregnancy or childbirth than low-fertility ones. This mortality differential would have caused a selection against high-fertility women in the census of 1961, which would also have resulted in an artificially lower completed family size for these groups. If we assume that non-educated and low-SES women were those with the highest fertility, any positive evidence of this differential between educational and/or SES groups can be considered *a fortiori* robust.

2.2 ISTAT publications about the 1961 Fertility Survey

The first statistics elaborated from the data of the 1961 Fertility Survey were produced by ISTAT only in 1974. This publication referred almost exclusively to "children born alive to women married only once before the age of 45 up to 1961", a criteria that was adopted to simplify the data processing and number of tables (ISTAT 1974: 9). Moreover, the analyses were conducted in a longitudinal perspective, using birth cohorts of ever-married women.

Table 1 reports the number of children ever born (total and partial) of women married only once before the age of 45 by birth cohort. This data refers to the entire country and its geographical divisions. Despite the obvious limitations inherent to this type of comparison (figures are undoubtedly affected by variations in age at marriage and selection by mortality and migration, even for generations born before 1912), what emerges is the large variability over time and across regional districts. As for changes over time, completed family size for whole Italy dropped from 4.4 to 3.3 children ever born per married woman (-25%) between the generations born before 1887 and those born between 1907 and 1911. This decrease was much more pronounced for North-Western Italy (-29.2%) and much less for Southern Italy (-9.1%), denoting the more rapid diffusion of birth control practices in the North (Livi Bacci 1977). This evidence is confirmed by the trend of the ratio

of completed family sizes of South and North-Western Italy, which grows steadily passing from 1.38 for the generations born before 1887 to 1.77 for the 1907-1911 birth cohorts.

TABLE 1. Completed (born before 1912) and incomplete (born after 1911) family size of ever-married women (married once and before 45 years of age) recorded at the census of 1961, Italy.

| Birth cohort	Italy	North-west	North-east	Centre	South	Islands
Completed fertility						
< 1887	4.38	3.60	4.89	3.97	4.96	4.65
1887-1891	4.17	3.33	4.48	3.73	5.04	4.63
1892-1896	3.82	3.00	3.95	3.39	4.81	4.48
1897-1901	3.73	2.92	3.74	3.31	4.87	4.42
1902-1906	3.58	2.78	3.47	3.14	4.81	4.39
1907-1911	3.30	2.55	3.06	2.86	4.51	4.18
Incomplete fertility						
1912-1916	3.01	2.32	2.72	2.60	4.07	3.93
1917-1921	2.72	2.08	2.39	2.32	3.69	3.66
1922-1926	2.40	1.87	2.11	2.07	3.21	3.18
1927-1931	1.98	1.56	1.76	1.75	2.56	2.59
1932-1936	1.42	1.11	1.27	1.28	1.78	1.89
1937-1941	0.89	0.67	0.82	0.79	1.08	1.20
1942+	0.57	0.47	0.62	0.50	0.57	0.66
Total	2.64	2.08	2.50	2.32	3.42	3.29

Source: Our calculations on data taken from ISTAT 1974.

Note: Regions included in the various districts. North-West: Piedmont, Lombardy, Val d'Aosta, and Liguria; North-East: Veneto, Friuli Venezia-Giulia, Trentino Alto-Adige, and Emilia Romagna; Centre: Tuscany, Umbria, Marche, and Lazio; South: Abruzzi e Molise, Campania, Puglia, Basilicata, and Calabria; Islands: Sicily and Sardinia.

The north-south differential starts slowly to narrow with the generations with incomplete fertility (born after 1911), being still around 1.6 for the birth cohorts 1937-41. This is clearly appreciable from the next figure below (fig. 2), where the national, the minimum and the maximum regional values for each birth cohort are plotted. Besides a clear tendency towards an overall reduction in the number of children ever born for generations with completed fertility, it is possible to appreciate a general reduction of the difference between the maximum and the minimum regional value of fertility, which, after having peaked for the birth cohorts 1912-16, rapidly narrows with the following generations. Looking at the single regions, Liguria (and, to some extent, Piedmont and Tuscany) shows the lowest figures of completed family size over generations, proving to be the region forerunner of fertility decline in Italy, whilst Basilicata and Sardinia are the regions presenting the highest values. On the other hand, Friuli Venezia Giulia and Emilia Romagna show

the fastest pace of reduction for the birth cohorts with completed fertility (over 40% fewer children for the birth cohorts 1907-11 compared to the birth cohorts born before 1887), whilst Sardinia emerges as the region with the slowest demographic transition in the whole country[1], with a completed family size that is conversely still on the rise.

FIGURE 2. Completed (born before 1912) and incomplete (born after 1911) family size of ever-married women (married once and before 45 years of age) recorded at the census of 1961. National, minimum and maximum regional values.
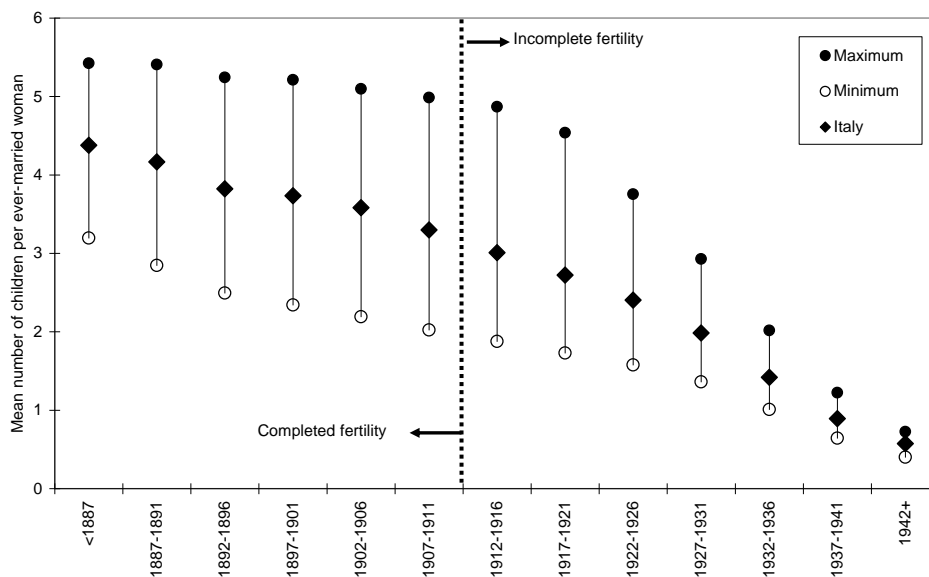
Source: Our calculations on data taken from ISTAT 1974.

3. The eight populations studied

The eight populations investigated belonged to different Italian regions, and they have been selected with the aim to represent different demographic contexts (see table 1) and socioeconomic structures. Turriaco, Lauco and Novellara are municipalities located in the regions where the decline of fertility was faster and more intense, namely Friuli Venezia Giulia and Emilia Romagna. Turriaco is a little community of Northeastern Italy, situated in the plain of the Isonzo River, only 15 km from the former Yugoslavian, now Slovenian, border. It became part of the Italian territory only after the

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[1] The slow fertility decline in Sardinia (which featured a sharp fall after the end of the 1960's) has been examined by a number of scholars over recent years. For a synthesis of this within the national panorama, see Santini 2008.

First World War. It counted 2,265 inhabitants on average, the majority of which were involved in shipbuilding after a long history of agriculture. This economic and occupational pattern is confirmed by the residential pattern, which saw the overwhelming majority of the population (97%) living in the centre of the village and only a little minority living in the countryside. In our view, Turriaco should represent the rapid fertility decrease of a northeastern Italian population, feature here accentuated by the non-agricultural nature of the community studied.

Lauco is a mountain municipality encompassing a group of villages situated on the Eastern Alps, not far from the Austrian border, at an altitude of about 800 m. As many other communities of this area, it was characterized by seasonal and temporary emigration of men, especially toward France, which was necessary to supplement the meager income deriving from a local economy largely based on subsistence agriculture. Migrants were in large parte involved in construction activities. This poor economy is the reason for the steady decline in population size started after the First World War, which brought the inhabitants from 3,154 at the census of 1921 to 2,127 at the census of 1961.

Novellara and Casalguidi are two populations located, respectively, at the heart of the Po plain, less than 20 km North of Reggio Emilia, and in the Tuscan municipality of Serravalle Pistoiese, close to the city of Pistoia. Novellara, over 10,000 inhabitants on average, and Casalguidi, just 4,800, are both communities that reflect the typical pattern of rural sharecropping communities whose economy underwent a dramatic industrial transformation. However, the two populations represent two different demographic contexts: Casalguidi is located in one of the Italian regions, Tuscany, forerunners of fertility decline, and Novellara is situated, as already mentioned, in one of the regions, Emilia Romagna, with the fastest decline in fertility since the end of the 19th century. The socioeconomic change caused by industrialization, a real economic revolution in the plains of North and Central Italy, caused both a decline in the proportion of population living in the countryside[2]

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[2] It passed from 75.7% and 69.3% in 1921, respectively in Casalguidi and Novellara, to 52% and 35% in 1961.

and a drop in agricultural employment,[3] to such a point that in 1961 agriculture, especially in Emilia and Tuscany, no longer formed the backbone of the economy. In particular, local peasant populations more closely associated to the sharecropping system were disappearing (Becattini 1975). Based on a labor-intensive rural economy, the sharecropping family relied on the domestic working force to compete for the best contractual conditions and the best farms. In turn, the need of a large domestic working force caused higher fertility, the necessity to follow a patrilocal form of living arrangement after marriage and a family organization based on a joint family system. The dissolution of this world, which had obvious and substantial effects on local fertility levels, was then sanctioned only a few years after the census of 1961, when sharecropping was formally abrogated.

As for Southern Italy, we have considered four municipalities from Sardinia – the Italian latecomer in fertility decline – and one from Campania as a comparison. The communities from Sardinia represent the various socioeconomic contexts of the island: Alghero is a town of around 27,000 inhabitants situated on the northwestern coast of Sardinia; Macomer is a large municipality of Central Sardinia (about 8,000 inhabitants in 1961) situated at the crossroad of important roads and railroads; and, finally, Austis and Seulo are two smaller municipalities (1,482 and 1,772 inhabitants respectively) in the inland of Sardinia characterized by a large predominance of agriculture. Alghero and Macomer represent two different facets of the urban society of Sardinia. While Alghero presented many faces – the urban socioeconomic structure of the city centre, the sea-related activities typical of the harbor, and the rural economy of the city surroundings – Macomer relied prevalently on industry and commerce (Brigaglia, 2008). To sum up, both the populations present, at the census of 1961, a variegated socioeconomic structure, characterized by the presence of farmers and traders, skilled and unskilled workers, as well as people involved in transport activities, associated to the sea in Alghero and to the railroad in Macomer. Given the large size of the population of Alghero, we have decided to analyze only a sample of 3,521 inhabitants, about

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[3] In 1961, the proportion of people involved in agriculture was 34.3% in Casalguidi and 46.8% in Novellara.

13% of total population, mostly made up of residents of the town centre, fact that enhances the urban nature of the population studied.[4] On the other hand, Austis and Seulo should represent the typical rural society of Sardinia, when not, in the case of Seulo, secluded and isolated populations involved in traditional rural activities (Mattone and Sanna, 1994). This selection makes it possible to investigate whether Sardinia was a unique "immobile" demographic system or rather a variegated population with different micro-demographic systems.

To conclude, Massa Lubrense is a municipality overlooking the Gulf of Naples and counting 9,158 inhabitants at the census of 1961 living scattered in about twenty small villages. The economy was mostly based on agriculture and commerce, but sea-related activities were present as well. The existence of specialized cultivations in the area was a factor limiting emigration flows at the beginning of the 20th century (Filangieri, 1910).

It is worth stressing that we are describing recent changes, which should be kept in mind when discussing fertility trends and changes. The majority of women interviewed for the census of 1961 came from generations who had grown up in a world with very different social norms and customs, where agriculture was still very much central in the lives of most individuals.

4. The analysis of the reproductive history of ever-married women.

*4.1 A descriptive analysis of fertility in the eight populations*

Before entering in detail in the description of the fertility patterns of the eight communities studied, it is worth stressing that the analyses presented hereunder will take into consideration ever-married women with either completed or incomplete fertility.[5] In accordance with how ISTAT devised its tables, stillborn have been excluded from the analysis.

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[4] As a comparison, the rural degree of the population sample was 37.8% in 1961.

[5] Although imposed by data availability (the census only reports the reproductive history of ever-married women), the focus on ever-married women precludes any insight into the relationship between marriage and literacy/SES, element that could have itself played a role in the mechanisms of fertility decline.

Figure 3 shows the trend of the general fertility rate over time.[6] This cross-sectional measure has been computed by projecting retrospectively the reproductive history of ever-married women recorded in the census of 1961. It is obviously a rough measure of fertility as it is potentially biased by different mortality patterns among birth cohorts, and, most of all, it determines a different age structure by period, the younger the more we go back in time. However, this index has been used in publications of the "Istituto Centrale di Statistica" about vital statistics of the interwar period at the provincial level, whose values are consistent with those here presented for specific municipalities, especially the largest ones. Thus, despite the intrinsic limits of the index as for the "real" levels of fertility, the plot here below allows in any case to appreciate its trend in the various case-studies here analyzed.

FIGURE 3. General marital fertility rate in the eight populations studied.
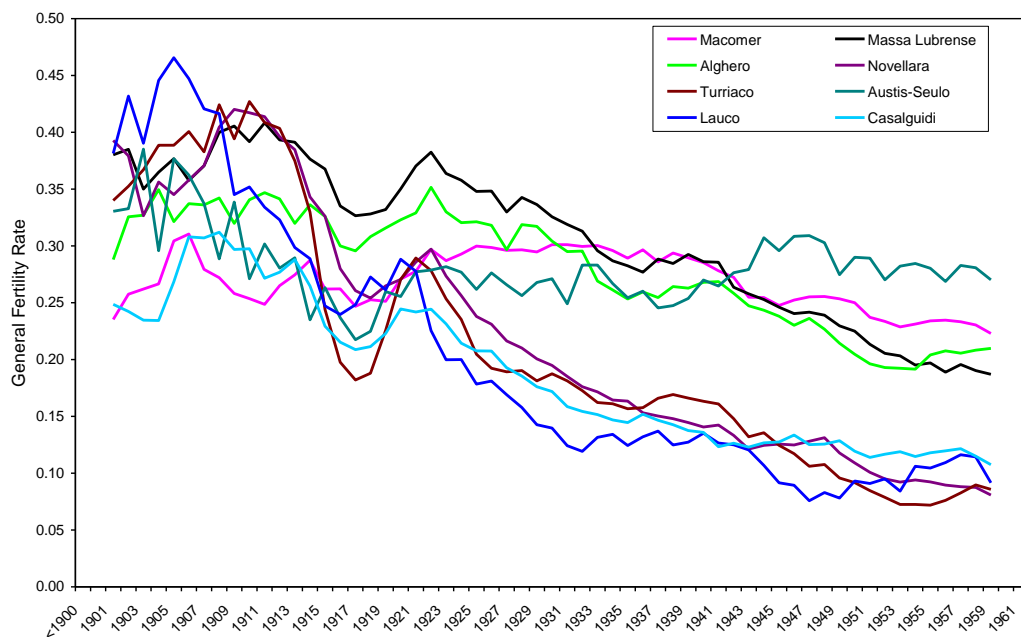
What emerges clearly is different evolution of fertility over time in the North-Central populations compared to the Southern ones. The former populations show a slower pace of fertility reduction, especially if compared to the latter ones, where the drop in fertility is much more rapid. Some

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[6] This index is calculated as the ratio of the total number of live births in year t to the number of resident married women 15-49 years in the same year.

heterogeneity is present also within the same region, as in Sardinia, where the urban populations of Macomer and especially Alghero show more substantial decreases in fertility than the rural populations of Austis and Seulo. Sardinia is also the region where the effects of WWI on fertility were more limited, especially if compared with the dramatic drops in the populations more directly involved in the conflict.

A more robust and correct measure of fertility that takes into consideration both completed and incomplete reproductive histories might be the number of children ever born to women of a given marriage duration, say ten years. Notwithstanding ten years represent often only a part of the whole marriage life, it is a period long enough to highlight possible changes in the fertility levels and reproductive pattern, especially in a transitional phase, but at the same time it is also not so long as to curb substantially the number of married women involved in the analysis.[7] In this view, the descriptive statistics shown below are based on first marriages celebrated up to 1951, which lasted ten years or longer and whose bride's age at first marriage was below 40 years.

Table 2 shows the number of children per married woman for a marriage duration of 10 years by marriage cohort and population. The results are consistent with those presented in table 1 and prove one again the great demographic delay of Sardinia compared to the other populations here considered. All the three Sardinian municipalities show only very small reductions in the mean number of children per married woman, being still over 3 children for the marriage celebrated after WWII. The gap appears to increase even in comparison with the other Southern community analyzed, Massa Lubrense, which shows a more marked drop in fertility, passing from 4.2 to 2.7 children per married woman. As for Central and Northern communities, it is evident their role of

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[7] It is also to remind that until 1929 the Italian State recognized as legal unions only those marriages celebrated by a civil celebrant. This law caused the reaction of the Church State, which called couples to boycott it by marrying only in church. Only some of them decided, after some years and especially after the birth of children, to regularize their position by marrying also in the Town Hall, with the consequence that many women considered in this analysis were actually living with their husbands long before the official date of marriage. Thus, the period of ten years here considered could actually underestimate the real marriage duration.

Italian forerunners of fertility decline, with values that for the last marriage cohort are below 2 children per married woman.

TABLE 2. Number of children per married woman for a marriage duration of 10 years. Marriage cohorts.

Municipality	<1916		1916-45		1946-52	
	Women	Ch/Wmn	Women	Ch/Wmn	Women	Ch/Wmn
Lauco	73	3.9	233	2.5	23	2.0
Turriaco	78	3.9	355	2.3	82	1.7
Novellara	328	5.8	1433	3.0	484	1.7
Casalguidi	151	3.2	658	2.3	205	1.8
Massa Lubrense	194	4.2	785	3.8	257	2.7
Alghero	111	4.0	417	3.6	65	3.6
Austis-Seulo	36	3.3	173	3.4	57	3.7
Macomer	127	3.1	666	3.5	207	3.0
Total	1098	4.3	4720	3.1	1380	2.3

Note: Only first marriages and age at marriage<40 years.

The evolution of fertility levels shown in the previous table goes hand in hand with variations in age at first marriage. In all the populations, age at first marriage increases, sometimes even remarkably, between the first and the second marriage cohorts considered. In the cohort 1946-52, the increases with respect to the 1916-45 cohort are smaller, and in two cases (Novellara and Massa Lubrense) age at first marriage even decreases.

TABLE 3. Woman age at first marriage. Marriage cohorts.

Municipality	<1916	1916-45	1946-52
Lauco	23.8	24.9	25.9
Turriaco	20.8	23.5	24.5
Novellara	22.8	24.2	23.7
Casalguidi	21.6	22.7	23.8
Massa Lubrense	23.7	25.5	25.1
Alghero	22.7	24.2	24.4
Austis-Seulo	21.5	25.1	26.2
Macomer	21.7	23.6	24.1

Note: Only first marriages with a duration of 10 years and age at marriage<40 years.

A last interesting socio-demographic aspect worth to stress is the proportion of first marriages with premarital births.[8] It represents an element with many implications in social life, in particular it can be considered an important factor to figure out the extent and importance of marriage as the socially recognized institution of procreation (Knodel, 1988). In the light of the innovation-diffusion theory of demographic transition, premarital births and premarital conceptions declined would have declined, in parallel with marital fertility, due to the spread and diffusion of contraception (Cleland, 2001; Knodel and van de Walle, 1986). An alternative view is that "during the initial stage of the fertility transition, non-marital childbearing may have reflected a liberal attitude towards reproduction for some. In turn, this liberal attitude in a "bastardy-prone subsociety" may also have been positively associated with early stopping behaviour" (Van Bavel, 2007: 42).

Our data have been grouped by region because of the few cases observed in some of the municipalities analyzed. The results shown in table 4 are anyway self-explaning. Premarital births were quite common in Friuli (over 13% among women married before WWII and still over 7% afterwards) and not rare in the populations of Novellara and Casalguidi (between 6% and 9%).

TABLE 4. Proportion of first marriages with premarital births. Marriage cohorts.

Region	<1916	1916-45	1946-52
Friuli	13.6	14.2	7.2
Central Italy	5.9	9.4	6.4
Campania	0.0	0.0	0.0
Sardinia	0.8	0.8	2.3
Total	4.6	6.1	3.3

Note: Only first marriages with a duration of 10 years and age at marriage<40 years. Central Italy groups Novellara and Casalguidi together because of their common sharecropping history. Actually, Novellara is situated in a region that is normally assigned to Northeastern Italy.

Conversely, they were definitely rare when not completely absent in Southern Italy. Since the census of 1961 records only the reproductive history of ever-married women, we do not know if the

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[8] Any insight into premarital conceptions is impossibile because the census of 1961 does not record the month of birth of children.

absence of prenuptial births in the South is due to forced shotgun marriages or to the social stigma attached to pregnant unmarried women, which prevented them from marrying.

Thus, it would seem that in the Italian case-studies here analyzed premarital births are associated with populations forerunners in fertility decline rather than with populations not yet controlling their reproduction. This aspect of Italian fertility transition would anyway deserve more *ad-hoc* studies and analyses.

4.2 Demographic transition at the individual level. Some determinants of fertility across marriage cohorts

It has been widely demonstrated – also in the descriptive analyses carried out on the census of 1961 (ISTAT 1974; Livi Bacci 1977) – that many elements do play a role in shaping the reproductive pattern of couples. However, univariate analyses are not fit to highlight the complex role of the many factors (biological, socioeconomic, and cultural) that are potentially determinant in modifying and influencing human fertility.

Potential predictors of fertility of ever-married women were sought using poisson regression, whose coefficients have been expressed in relative terms through incidence-rate ratios (IRR).[9] The female population analyzed consists of women married once before 40 years of age for a marriage duration of 10 years. The focus is therefore on the number of children in the first ten years of marriage. The explanatory variables introduced in the models are addressed to capture the effects of women's individual history as well as socioeconomic and cultural background. Marriage cohorts are aimed at highlighting a possible decline in the number of children across cohorts, as descriptive analysis would suggest, controlling for age at first marriage. Birthplace and level of education focus on aspects of women's cultural background, which have previously received much attention as key elements in fertility control. Birthplace is aimed at capturing the effects on marital fertility associated to immigration, which might involve women with different social and cultural values as

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[9] The adequacy of Poisson models has been tested by means of the Hosmer-Lemeshow goodness-of-fit statistics.

well as different levels of educational attainment. Despite this analysis cover periods of large migration flows, both internal and abroad, immigration of married women to the various municipalities here considered was sustained for the very largest part by intraregional movements. To highlight possible differentials in marital fertility connected to displacement of women, we were therefore forced to adopt a smaller administrative subdivision, namely the provincial district.

As for education attainment, we have used three categories: No education, Primary school (reference category), Secondary school and degree. This categorization is somehow forced by the very low level of schooling of Italian women of that period. In Italy, compulsory education was firstly introduced in 1877, when 5-year children were obliged to attend primary school for three years, up to 8 years of age. This obligation was then extended to 12 years of age in 1911 and to 14 years in 1923. Notwithstanding the law provided penalties for parents who failed to observe this obligation towards their children, the vast majority of children, especially from the lower strata of the population, left school after very few years. This delay in education policies, especially on the female side, is the reason for the very high levels of women without any education shown in table 5, where they represent the majority in the marriage cohorts before 1916, they are still one out of three in the interwar period, and drop to 13% only in the marriage cohorts 1946-52. Obviously, in that period education level was strictly associated with socioeconomic status (SES). This is why we needed to control for SES. Actually, SES may affect education through many of the same intermediate variables influenced by education: openness to new ideas and new behaviors, independence from religious principles, age at marriage, infant mortality, impact of direct and indirect costs of children, and access to techniques of fertility control. Information directly retrieved from census returns regarding house characteristics were used as proxies of economic status, such as house ownership, total number of rooms and an indicator of house quality. Homeownership was common in the Northern communities of Lauco and Turriaco (over 70%) and in the Sardinian municipalities of Austis and Seulo (88%) as well as in Macomer (54%). In the city of Alghero and Massa Lubrense, vice versa, boarders were predominant, whereas in the populations of Novellara

and Casalguidi there was still a large part of sharecropping contracts (over 22%), although about 40% were homeowners. Lastly, the "house quality" index was constructed using the presence/absence of specific facilities (water, toilet, bathroom, electricity, gas and heating), based on the idea that the higher the number of facilities, the higher the quality of the house and the socioeconomic status of the family. The assumption here is that women had experienced the same housing conditions recorded in the census of 1961 throughout their first ten years of marriage, which is a rather strong hypothesis. However, if we had used information on woman's occupation, the problem would have been more or less the same as even this piece of information does not have a time-dependent nature, and it also suffers from indeterminacy problems, given that most married women are indicated as housewives and their husbands as retired. A last variable included in the models concerns the geographical localization of the municipalities studied – Central (reference category), North, and South – to control for the different stage of demographic transition in such areas. Four models were run (tab. 5): an overall model and three models concerning different marriage cohorts: <1916, 1916-45, and 1945-52.[10] The results shown in table 5 once again prove the progressive decline of fertility across marriage cohorts (overall model), which appears to be more remarkable for women married after WWII.

Likewise expected, is the demographic delay of Southern Italy with respect to the populations situated in the rest of the country. The Sardinian communities and Massa Lubrense show higher fertility levels in the first ten years of marriage compared to Central-Northern populations. This gap gets greater across marriage cohorts, peaking after WWII when a married woman living in Southern Italy had a number of children in ten years of marriage that was 73% higher than one resident in Northern and Central Italy.

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[10] Multicollinearity among independent variables has been tested for all models using the Variance Inflation Factor (VIF). The results suggest the absence of collinearity in all the models, with VIF values below the critical cutoff (VIF<10).

**TABLE 5**. Poisson regression of the number of children for 10-year marriages. Incidence-rate ratios.

Variables	<1916		1916-45		1945-61		Overall	
	Freq.	IRR	Freq.	IRR	Freq.	IRR	Freq.	IRR
Marriage cohort (ref. <1916)							15.3	1.000
1916-45							65.6	**0.809**
1946-52							19.1	**0.651**
Age at first marriage	22.3	**0.992**	24.0	**0.983**	24.5	**0.982**	23.8	**0.985**
Birth place (ref. Province district)	88.5	1.000	83.3	1.000	79.6	1.000	83.4	1.000
Elsewhere	11.5	0.972	16.7	0.983	20.4	**1.114**	16.6	1.008
Educational qualific. (ref. Primary)	38.6	1.000	67.1	1.000	81.6	1.000	65.5	1.000
None	60.4	1.011	30.7	**1.138**	13.0	**1.151**	31.8	**1.117**
Lower super., Super., University	1.0	**0.709**	2.2	**0.842**	5.4	**0.831**	2.6	**0.834**
House possession (ref. Own)	57.1	1.000	50.0	1.000	41.6	1.000	49.5	1.000
Lease	25.9	**1.088**	32.5	**1.059**	36.2	1.056	32.2	**1.073**
Other forms (sharecropping, etc.)	15.3	**1.128**	15.4	**1.073**	18.6	1.041	16.0	**1.076**
Unknown	1.7	0.971	2.1	**0.861**	3.6	**0.792**	2.3	**0.865**
House quality (ref. Low)	16.8	1.000	14.9	1.000	15.2	1.000	15.2	1.000
Medium	72.8	1.018	71.7	1.013	67.0	**0.898**	70.9	0.993
High	10.4	0.992	13.4	0.992	17.8	0.920	13.8	0.983
Geographic localization (ref. Centre)	43.6	1.000	44.2	1.000	49.9	1.000	45.2	1.000
North	13.8	1.098	12.4	1.051	7.5	0.975	11.7	**1.072**
South	42.6	1.038	43.3	**1.519**	42.6	**1.734**	43.1	**1.443**
Women	1,095		4,709		1,375		7,179	
Births	4,165		13,746		3,112		21,023	
Log-pseudolikelihood	-2,222.1		-8,641.7		-2,191.5		-13,152.3	

Figure 4, which plots the IRRs of the interaction between marriage cohorts and population geographic localization, better describes the marked drop in marital fertility across marriage cohorts occurred in the populations of Friuli and Central Italy and the permanence of a demographic system of *ancient regime* (at least in marital fertility levels) in the Southern populations, resulting in a larger reproductive differentials across marriage cohorts.

Age at marriage presents an overall and significant negative relationship with offspring size in the first ten years of marriage, which might be premise of a negative effect also on completed family size. Education and SES appears both as determinants in shaping marital fertility in the first 10 years of marriage. Education attainment unequivocally reaffirms its decisive role in the decline of fertility during the transitional process. Overall, no educated women appear to experience the highest levels of marital fertility, with an offspring size 12% larger than women with primary

education, whereas secondary school leavers are the ones with the lowest levels, with 17% smaller offspring size with respect to the reference category.

FIGURE 4. Interaction Marriage cohorts * Geographic localization. Incidence-rate ratios.
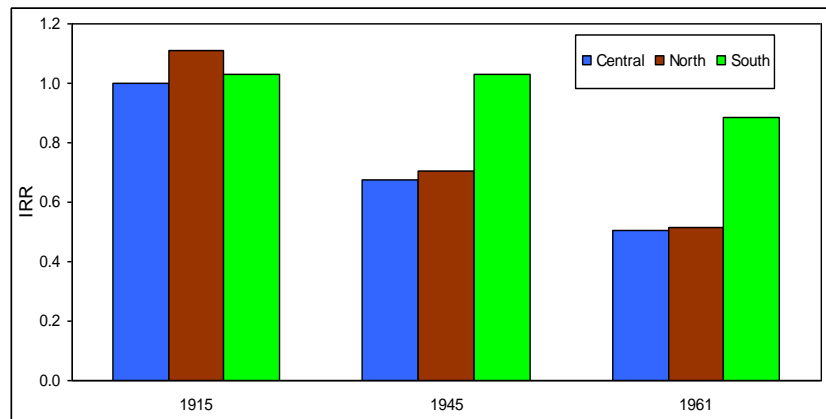

Even in this case the interaction between marriage cohorts and education attainment provides a better understanding of the relationship between education attainment and marital fertility across marriage cohorts (fig. 5). It is evident that women with secondary education are forerunners in fertility control, presenting a definitely and significantly smaller offspring size (-38%) compared to primary school leavers already in the marriage cohorts before 1916. This gap in marital fertility among education levels seems then narrowing across marriage cohorts, especially on account of the decrease in marital fertility among no educated women but especially among primary school leavers, who show only a slightly higher fertility than married women with secondary education in the last marriage cohort 1945-52. This seems suggesting that high-educated women were the main actors of fertility decline in the first phases of fertility transition, but primary school leavers were the most responsible of the drop in fertility occurred across the marriage cohorts here considered, that is in the central stage of fertility transition. Non-educated women were latecomers, although showing themselves a progressive drop in marital fertility in the first 10 years of marriage. As for SES variables, only the tenure status of households appears to affect marital fertility. Homeownership is usually intended as a proxy of good household wealth and wellbeing, although it

takes different meanings in the various contexts. In the populations of Friuli, for instance, almost everyone had a house but general living conditions of the inhabitants were really harsh.

FIGURE 5. Interaction Marriage cohorts * Education Level. Incidence-rate ratios.
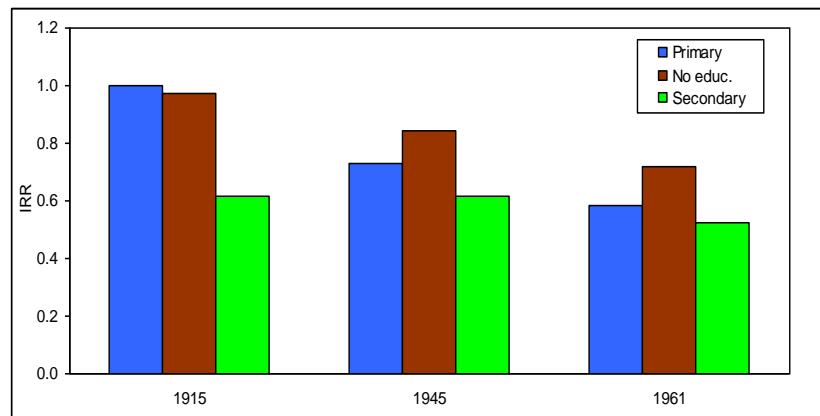
On the other hand, a sharecropper in Novellara or Casalguidi could have better living conditions and a higher wellbeing status than a farmer or wood-cutter in Lauco. Overall, it appears that homeowners had lower marital fertility than the other forms of tenure status of households, especially in the earlier marriage cohorts. After introduction of an interaction between geographic localization of populations and tenure status of households (results not shown for the sake of brevity), it emerges that homeowners had the lowest fertility in Central and Southern Italy, whereas in Friuli women living in rented houses were the ones to have the smaller offspring size in the first 10 years of marriage. Thus, high-education and good living conditions appear to be two key determinants of fertility decline, whose depressive effects are more marked in the first phases of transition.

The last model to be estimated includes a variable indicating whether or not a woman had a prenuptial birth. This model has been run only on women with completed fertility just to circumvent some of the drawbacks of the descriptive analysis and to investigate more adequately the possible association between completed family size and the presence of prenuptial births during the transitional process. More precisely, we have analyzed completed-fertility women married once before 45 years, still married at the age of 50, and with at least one child. Due to overdispersion of

count data, we have used the negative binomial regression instead of the Poisson regression. The variable about prenuptial births has three categories – woman with a prenuptial birth, woman who had a child in the same year of marriage, and woman with no prenuptial birth – which it reflects the necessity to differentiate the group of women giving birth in the same year of marriage due to the impossibility to know whether the baby was the consequence of a premarital conception or not. For the other covariate, the model is identical to the "overall model" of table 5. We have also estimated a further model in which the interaction between prenuptial birth and marriage cohort has been introduced with the aim to check for a change over time of the relationship between prenuptial births and completed family size.

TABLE 6. Negative binomial regression of completed family size. Incidence-rate ratios.

Variables	Freq.	IRR	IRR
Marriage cohort (ref. <1916)	24.0	1.000	1.000
1916-45	74.0	**0.795**	**0.724**
1946-52	1.1	**0.774**	0.931
Prenuptial birth (ref. Yes)	6.3	1.000	1.000
Birth in the same year of marriage	18.9	**0.872**	**0.790**
No prenuptial birth	74.8	**0.807**	**0.758**
1916-45 * *Birth in the same year of marriage*			1.148
1916-45 * *No prenuptial birth*			1.095
1946-52 * *Birth in the same year of marriage*			0.972
1946-52 * *No prenuptial birth*			0.758
LR test chi2(4) = 3.79		p-value = 0.436	

The results show that women with no extra-marital births have a completed family size that is 13%-20% smaller than women with prenuptial births. No change of such a pattern has been detected over time (the interaction does not improve significantly the fit of the model). This finding, which contradicts what emerged at the descriptive level, would seem in line with the diffusion/innovation hypothesis that see in prenuptial births the sign of the incapacity to control fertility and consequently to use stopping behaviors to control and limit their final completed family size. Obviously, the different courtship and marriage practices across Italy along with territorial differences in the social and cultural acceptance of illegitimacy might influence our results,

especially when nothing is known about premarital pregnancies and the consequent recourse to shotgun marriages.

6. Acknowledgments

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