The Onset of Fertility Transition in Italy, 1800-1900

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1. Introduction

This paper constitutes one of the first steps of a research project on the evolution of reproductive behaviours analyzed at the individual and household level. The core of the project is a re-examination of the theory of demographic transition in Italy from the last decades of the 19th century to mid-20th century.

This paper presents the first comparative results over a period spanning from 1820 to the end of the 19th century, and it is focused on the reproductive behaviour of married women in their own families. In this period, the elements of the subsequent fertility transition can be hardly detected at a general level, however it is possible to outline a clear picture of the existing differentials in fertility outcomes in a period in which important social and economic transformations were taking place. We consider, in fact, extremely useful to better highlight the levels of fertility in many different settings of Italy before the onset of the fertility transition. This issue is of great importance to our understanding of not only fertility behaviour before the transition but also of the fertility decline as such. Such geographical differential as those related to different social groups with varying socio-economic statuses, different diffusion of urban habits and different domestic economies were the basic elements on which the demographic transition was going to take place.

There are at least three main aspects distinguishing our study: the use of a micro-analytic approach; the length of the period considered in the project (but not jet in this paper); the number and variety

of communities under study. Many previous studies have already outlined a reliable picture of the evolution of fertility behaviours for the post-transitional phase. For the pre-transitional period, on the other hand, the knowledge of the demographic dynamic is mainly limited to the northern and central Italian areas. Such framework derives from very basic methods such as aggregate reconstruction techniques, own-children method and the Henry's method of nominative family reconstitution.

We intend to re-interpret those aggregate-based results in the light of the evidences coming from our micro-level analyses. Our objectives can be briefly summarized as the following: 1) reinterpreting the analyses of demographic dynamics of a dozen of Italian communities before and during the transitional phase by using nominative datasets (in the paper we deal with five communities); 2) using micro-level data to study the reproductive behaviours of tens of thousands people from the beginning of the 19th century to the first years of the 20th century; 3) interpreting reproductive behaviours as a sequential process. In fact, we view reproduction as a process occurring over a 35-year period in which couples are constantly reconsidering their needs, resources, and strategies.

The results obtained more than 20 years ago by the Princeton Project acknowledged that many different transition models were possible (Livi Bacci 1977, Coale and Watkins, 1986). All these models have their background on a variety of situations linked to the historical period, family formation process, household structure, and household socio-economic status. All these elements mediated and drove differently the diffusion processes linked to socio-economic and cultural transformations. More recent studies (Del Panta et al. 2002) have confirmed that the paths and paces of transition in Italy were quite different from one area to the other.

Such variability included fertility patterns. At the micro-level, this means that reproductive behaviour was conditioned not only by biological factors but also by more complex decision processes involving the couple and the family. Moreover, it is expected that all these ambits interacted with the economic and social framework of each community. Consequently, our analysis focuses on the various mechanisms that caused the key passage from the episodic post-birth control towards a more conscious planning of births that involved the entire reproductive career.

Indeed, apart from well-known bio-demographic factors, some studies have argued that household structure and household SES might affect reproduction in preindustrial Italy shaping in different ways the fertility outcomes. In particular, there is evidence that reproductive behaviour was strongly influenced by household SES (Livi-Bacci and Breschi 1990). In the same way fertility seems to fluctuate according to religion (Derosas and van Poppel 2006; Livi-Bacci 1983) and in periods of severe mortality crises (Breschi 1985; Livi-Bacci 1978a).

Historical studies of marital fertility by household structure in Italy are relatively scarce, but they offer important insights on the relationship between timing of marriage, births and household composition. (Anelli, Siri, and Soliani 1982; Kertzer and Hogan 1989; Viazzo 1989).

It was observed that the co-resident domestic group could have the function of providing security for their members and this could be the case of Italian sharecropping households (Laslett, 1988). It is so conceivable that household support was not limited to the survivorship of individuals, but it involved all the aspects of family life, as childcare. Indeed, it is possible to suppose that the so called "nuclear-hardship" hypothesis could play some direct roles even in the decision process concerning childbirth. We might assume that the wives living in nuclear families did not beneficiate any kind of support in childcare, whereas the mothers living in large-scale domestic groups could rely on the solidarity of the other female co-residents.

It may also be useful to check the possible short-term relationship between annual variations in grain prices and annual fluctuations in fertility. Indeed, Bengtsson and Dribe (2006) showed that fertility was deliberately controlled also before the fertility transition by using individual longitudinal data combined with food prices. Previous macro-aggregative researches had found that fertility was significantly negatively correlated with grain prices in Northern Italy (Breschi and Malanima, 2002). However, variations in fertility resulting from fluctuations in grain prices may be caused by several determinants that can be grouped according to biological or behavioral criteria. This paper will try to address also such issue, namely the presence of a deliberate birth control before the fertility decline.

In brief, we will try to investigate the effects of household composition and SES on the reproductive process of married women by comparing some rural and semi-urban populations of northern and Central Italy. At the same time, the local economic context will also be accounted for by introducing proxies for short-term variations in prices. At the end, we consider reproduction as function of the demographic characteristics of each couple, of their reproductive history, of the structure of the household in which they lived in, as well as of individual and household responses to epidemics and short-term economic stress. In this way, we will highlight some of the most important variables playing a role in the transition from the natural fertility regime to the onset of the fertility decline.

The rest of this paper is organized as follows. The next two sections describe the communities which are part of our study and provide a short presentation of the demographic sources used to make up our data set. In section three, we provide some descriptive analyses of fertility just to give

the idea of differentials in levels and patterns of fertility across the studied populations. In section four we finally turn to a multivariate analysis of marital fertility.

2. The study areas

Our study concerns five communities located in northern and central Italy (figure 1). They include a mountain village, and four rural communities, three located in the plain and one in a hilly area. Until the Italian Unification (1861-66), these five communities belonged to four different State. We have therefore a wide array of different socioeconomic and ecological conditions to deal with.

The mountain community of Treppo Carnico is a village of about 1,100 inhabitants and 230 households on average, that in the period studied was part of the Austrian Empire, and it is located in Carnia, in north-eastern Italy (Friuli). The local economy was based on an intense seasonal emigration of adult men. In mid-nineteenth century the activities associated to such migration flows underwent a deep change, changing from peddlers and artisans into masons. During the transition between the two professional patterns – i.e. the period studied here – agriculture gained importance in seasonal migration, though it played a minor role in local economy (Fornasin 1998). Treppo Carnico displayed the demographic features typical of the Carnia region (Breschi, Gonano, and Lorenzini 1999). The growth rate was moderate (5.8 per thousand in 1834-68); life expectancy at birth was 39 years, whilst fertility was around 4.5 children per woman. Treppo Carnico was therefore characterized by a low-pressure demographic system, with late marriage and high levels of never married (see table 1).

In the other four communities, economy was exclusively rural, prevalently based on a sharecropping system. The general norms regulating sharecropping were quite similar in the four villages. The sharecropping contract lasted usually one year and it was normally made between the landowner and the head of a peasant household (Giorgetti 1974; Poni 1982). The head was usually a man, and his role and duties gave him great authority and power over the other members of the household. The landowner provided the farm, the house, and the cow barn, while the sharecropping family provided labour and agricultural tools. Agricultural works were distributed among household members according to age, sex, and individual ability. The sharecropping household was therefore a productive unit that had to supply the labour-force to cultivate the land. In this respect, the main concern of sharecroppers was to keep a balance between resources and household size, which was accomplished through the adoption of specific demographic mechanisms, such as delayed marriage and the expulsion (sometimes temporary) of family members. However, some differences existed between the four communities, both in social structure and in the environment.

Madregolo was a small parish in the territory of the Duchy of Parma (North-East) with a mean population of about 600 inhabitants per year between 1820 and 1883 (Manfredini 1997). The territory was flat and close to the Taro river so that agriculture was the main activity, producing wheat, legumes, grass and hemp as main products. According to a census of mid-nineteenth century, 72% of the household heads were peasants, 19% were artisans, and the rest was formed by unemployed poor people, some white collars, and some clergymen. Sixty per cent of the peasants were sharecroppers and tenants, and the others were labourers, either day labourers or labourers settled in a farm on yearly agreement. Madregolo is the most agricultural-oriented community among those we have studied. The backwardness of agriculture, the shortness of sharecropping contracts and the proximity to the city of Parma made turnover quite intense: almost one third of the population changed every year. As for the other demographic variables, life expectancy at birth was around 34–36 years, and the total fertility rate between 5.2 and 5.3 children per woman. In Madregolo, people married early (men around 26 and women at 23), and presented low rates of permanent celibacy, in particular among females, with only 2% of women still unmarried at 50 (see table 1).

San Nicolò di Villola and San Donnino are two rural parishes situated in the north-eastern hinterland of Bologna, a territory until to 1861 under the control of Papal State. The communities are situated in an area of Emilia-Romagna that has been already interested not only by studies on long run demographic development (Bellettini 1987; Schiaffino 1993; Del Panta and Scalone 2002), but also by micro-analytical investigations, such as Kertzer and Hogan's work on Casalecchio di Reno (1989). In 1820 there were 881 inhabitants in the two considered parishes. This figure rise up to over 1000 in 1840, and reached 1158 units in 1900. On the other hand, the number of families increased from 134 to 182 households. However the parish of San Donnino weighed more than San Nicolò of Villola in terms of population and is more close to the city of Bologna. This aspect made the turnover of population quite intense and its social structure more diversified than in the other parish.

Before the industrialization, the plain surrounding Bologna, like in Tuscany, was mostly populated by sharecroppers and farm-labourers. Nonetheless, after the national unification of 1861, the traditional sharecropping economy steadily reduced under the impact of a rapid large-scale development, which took place especially in the north-eastern plains of the town. However, important contingents of traditional sharecropping households were still present in the 20th century in the southern hilly area and in northern zoned bordering the city (Bellettini and Tassinari, 1977;

Kertzer and Hogan, 1989). Since the economy played a strong role in the household settlements, the large complex-family household was common for centuries on these lands (Barbagli 1984). In fact, under the pressure of their landowners, the sharecroppers could not abandon the multiple-family household living and they continued to have large numbers of children and to live in large complex-family households (Poni, 1977).

The demographic system of these two parishes although characterized by some minor peculiarities, presents the typical features of sharecropping societies. Late marriage for men and women and high levels of permanent celibacy, as in the other sharecropping populations here studied, TFR around 5 children per woman, and e_0 values about 40 years in both the parishes.

Casalguidi is a small country town belonging to the Grand Duchy of Tuscany and close to the city of Pistoia. Around mid-nineteenth century it had 2,500 inhabitants and 460 households, some living in the village, and some living in the surrounding countryside. Its economy was based on agriculture, which employed over 70% of the population. There were three main social groups in Casalguidi: nobility and landowners, artisans and farmers. All agricultural workers fell into the last category, but there were several degrees of differentiation and stratification in the category "farmers", though low-income and needy families accounted for the most part of the population. At the opposite end of the economic spectrum was a little group of well-off families. Most farmers were relatively rich sharecroppers. The typical farm grew grapes, olives, mulberry trees, and various kinds of grain, especially wheat. The overall trend of the population in the village is similar to that observed for Tuscany as a whole (Breschi, Derosas, and Manfredini 2004). In Casalguidi life expectancy at birth reached 35.3 years, and the fertility rate was of 5.3 children per woman. Men married at 28–29 years and women at 25, with permanent celibacy rates of, respectively, 15.1% and 10.1%.

3. Source materials

For this study, two different kinds of sources have been used: population registers on one hand, and a combination of parish registers and census-like listings called *Status Animarum*, on the other.

For the Alpine village of Treppo Carnico, we use two population registers (Breschi et al. 2008). The first was started in 1834 and kept updated until 1850, while the second register, which replaced the first one, started in 1851 and continued until 1868. The population register contains information on all the households living in Treppo Carnico, supplying individual's information such as name and family name of each household member along with dates of birth, death, marriage(s) and

movements into and/or outside the household. Nominative data recorded in the population register were supplemented with information taken from parish registers, which served mostly to correct underreporting of newborn deaths. As for the household structure, robust data are available only for those years in which the three distinct population registers were set up, namely 1834, 1851 and 1867: 59.4% of total households were simple households, while 30.5% were complex households representing 39.6% of the overall population. Regarding socio-economic status, our sources do not supply any complete and continuous information. However, the Austrian Cadastre of 1851 provides data on land and house ownership for the population of Treppo Carnico that can be taken as a proxy of household SES. The resulting picture is a community where ownership was practically universal (Breschi et al. 2008).

Documentary sources for the study of the four rural populations were the parish registers of baptisms, burials and marriages. Data drawn from parish registers were then linked to *Status animarum* (Manfredini 1996). This last source contains census-like information compiled by the parish priest before Easter. For each member of the household, name, age, sex, marital status, and relationship to the head of the household were recorded. Since these records were made on annual basis, it has been possible to reconstruct the life histories of all the individuals and families who lived in the four communities of Madregolo, San Nicolò di Villola, San Donnino, and Casalguidi in the period under study.

Unfortunately, in the case of Madregolo the sources do not provide any information about the profession or socioeconomic condition of individuals, whilst SES of the household head was sometimes recorded on the *Stati Animarum* of San Niccolò di Villola and San Donnino, and often recorded on those of Casalguidi. In order to construct a comparable SES hierarchy, a basic scheme was adopted for these three villages. First, the "laborer and daily wage earner" group includes the rural and unskilled workers that were named "braccianti" and were employed on daily bases. They were the poorest and lowest social group on account of precarious living conditions. Farmers who possessed small-size farms and sharecroppers who could rely on a stable contract composed the second category. The upper SES group was formed by the "middle class and bourgeoisie", while artisans and shopkeepers were grouped into a separated category since they were not directly involved in the agricultural sector.

For Casalguidi, we also drew additional data from the tax register (Manfredini and Breschi 2008), whose nominative information have been linked to *Stati Animarum*. All ''miserable and needy households'' were exempt from taxes, and therefore not included in the register. Data drawn from the tax registers combined with those drawn from the *Status animarum* allowed us to assess with

extreme precision and great detail the living standards and SES conditions of all the households living in the territory of the parish.

In the end, whatever the source used, the reconstruction of biographies is always based on nominative linkage. The process of data reconstruction allows us to carry out micro-level analyses that go well beyond the classical family reconstitution method. Indeed, it is possible to study the birth of a child according to factors such as parents' characteristics, household structure, mother's reproductive history, short-term variations of the economic background.

4. A glance at fertility: levels and structures

Table 2 presents the total fertility rates (TFR) and the total marital fertility rates (TMFR) in the five populations studied. Although some intrinsic limitations of these measures (De Santis 1996; De Santis and Livi Bacci 1997), they indicate moderate and comparable levels of fertility for our rural communities, with figures varying between 4.6 and 5.6 children per woman, which are consistent with findings from previous studies of fertility in preindustrial Italy (Livi-Bacci and Breschi 1990; Breschi Manfredini and Rettaroli 2000). The slight differences in fertility are largely due to the different marriage patterns. The population with the lowest fertility – Treppo Carnico – presents, as mentioned above, a very late access to marriage and high levels of permanent celibacy; on the other hand, in Madregolo, the community with the highest TFR, women got married at relatively young age. The influence of the different figures of age at first marriage reflects on the profile of age-specific fertility rates. Fertility peaked in fact at 25-29 years in the three study sites of Emilia-Romagna, at 30-34 in the Tuscan village and even later, at 35-59 years, in the alpine community because of the larger number of unmarried women in younger ages (see figure 2 panel a). In any case, the role of the biological component –the older the woman, the lower the fecundability – is always quite clear.

The picture gets different if one analyses marital fertility, which accounted for about 96% of total births. The figures for $TMFR_{20}$ and (particularly) $TMFR_{25}$, which are parameters more indicative for population with late marriage, varies, respectively, between 6.6 and 8.6, and between 4.6 and 6.2 children per couple. The alpine community shows the highest figure of $TMFR_{25}$, showing very high fertility from 35 years onwards. Overall, the level of marital fertility (TMFR) calculated for ages 20 to 49 is higher in Casalguidi than in the other sites. However, the highest levels of marital fertility 20+ years have been calculated for the two populations with the highest permanent celibacy rate and with the latest access to marriage, namely Casalguidi and Treppo Carnico. The couples

with the lowest fertility were in the parish of San Donnino. In the Emilian communities investigated, San Donnino had 6.6 children per married woman, San Nicolò 7.3 and Madregolo 7.5. However, all the observed values are consistent with typical pre-transitional fertility levels. For example, even if San Nicolò and Casalguidi experienced the same TFR (5.2), the parish of San Donnino shows lower levels of fertility. This difference could be explained by considering that San Donnino was situated at the border of the urban area, which was already characterized by a lower reproductive outcome (Schiaffino, 1993). From this point of view, the lower fertility of San Donnino could be due to the urban proximity, implying tighter connections and migrations to and from the town, like fluxes of female servants or the presence of group of families belonging to social spheres characterized by lower fertility.

As shown in figure 2 (panel b), the Emilian villages had lower marital fertility rates at all ages. The differences get more negligible after 35, probably signaling differences in the age at marriage and in the onset of the reproductive activity. When married women aged 20 to 24 are excluded, however, the TMFR maintains its higher levels in Casalguidi, while San Donnino shows the lowest values. For those areas studied over longer time spans, the differences in age-specific marital fertility rates may suggest an early stage in the process of transition to smaller families.

For the two parishes of the Bologna countryside, the only one whose data arrive at the beginning of the 20th century, we have split the whole period analyzed into two sub-periods – 1819-60 and 1861-1900 – in order to check for eventual changes in the fertility pattern. The focus is on the trend of TMFRs to check for a possible decline in fertility. Actually, total marital fertility rate shows only a slight drop passing from the late pre-unitary to the early post-unitary phase, declining from 7.1 to 6.6 children per woman. However, age-specific marital fertility rates of 1861-1900 are constantly lower than the respective figures for the period 1819-1860 (fig. 3). According with these measures, this slight reduction in fertility appears as one of the earliest in the region (Del Panta and Scalone, 2002).

This demographic process gets even clearer if one looks at figure 4, where we have decomposed net reproduction rates into the two components of gross reproduction rate and woman mortality at mean age at birth by population and period. Whilst changes in net reproductivity in Madregolo and Casalguidi are mostly determined by changes in mortality, with the dramatic effects caused by the cholera epidemic of 1854-55 in Casalguidi ($R_0 < 1$), in S.Donnino and S.Nicolò there is a small but constant decline in NRR from 1821 to 1850 that is partly linked to a real decline in fertility (GRR). After 1850, further changes in NRR are basically due to variations in mortality.

These considerations lead us to introduce the question of deliberate fertility control in the two suburban parishes. The lower levels of fertility we have assessed for the second part of the 19th

century, although not yet particularly significant, could be the sign of an early form of deliberate control of fertility. In table 3, we have reported Coale and Trussell's indices (1974; 1978). Both the rural communities of San Nicolò and San Donnino show m figures in 1819-60 that do not allow to highlight the presence of some parity-specific control of fertility. The figures, around or below 0.2, are consistent with the m values computed for all the other populations here considered, proving the natural fertility regime still existent in various areas of Italy in the first half of the 19th century.[1] In the period following Italian unification (from 1861 onwards), San Nicolò and San Donnino show higher m figures, which support the idea of the existence of a fertility pattern shaped by early signs of birth control. Marital fertility rates, in fact, appear to decline at the latest reproductive ages, involving women that had probably achieved their desired family size and that were actively prevent the birth of additional children. In fact, the deliberate stopping was the main behavioral mechanism that led to the fertility control regime and it also was the most important change in the reproductive behavior during the onset the fertility transition. In order to interpret this evidence, we must consider that those two parishes were situated in a suburban area, bordering the centre of the city of Bologna, where a precocious drop in fertility has been already documented (Schiaffino, 1993).

As for SES differentials, the main comparison concerns the dichotomy sharecroppers vs day laborers. In the Bologna countryside, the fertility differential between the two agricultural occupational category was almost of 1.5 children per married woman. In Casalguidi, such differential was even larger, around 2 children per married woman[2]. Moreover, the association between household socioeconomic status and marital fertility was especially strong among women in sharecropping households (Manfredini, Breschi 2008). The sharecropping system periodically redistributed land among tenants according to changes in the size and composition of households. Because sharecroppers' tenure on the land depended on their ability to provide labour to maintain the plot and its output, as well as producing their own subsistence, permanence and stability on the farm could be ensured by achieving a balance between these two needs (Doveri 2000). In other words, the decisive factor affecting reproduction of sharecropper couples was not the availability of the land but rather the supply of a quality labor. Since land was obtained under temporary contracts

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[1] The m figure computed for the Alpine community resulted very low and statistically not significant. This could be due to the very later access to marriage existent in this community and to the strong influence that this behavior had on the profile of the marital fertility curve.

[2] A similar pattern was also found in the Tuscan town of Prato during the eighteenth century (Della Pina 1990, 1993), in the rural suburb of Bologna around mid-nineteenth century (Angeli and Bellettini 1979; Kertzer and Hogan 1989), and in the city of Reggio Emilia at the end of the same century (Schiaffino 1993).

and access was determined by the availability of human capital, households combining a large number of working-age males with solid farming experience were in a better position to get the best and largest farms to cultivate.

To avoid an imbalance between work force and farm size, sharecropping households often used the ''preventive check'' (late marriage and higher celibacy) to control reproduction. Nevertheless, since mortality in rural Italy remained relatively high until the end of the 19th century (tab. 1), the safest way to guarantee the continuity of the household workforce was to have a large number of children per married couple, even at the expense of household consumption standards. While sharecroppers restricted reproduction by limiting marriage, there was little control over fertility after marriage. These choices, which may not have been conscious, help to explain the high marital fertility of sharecropping households in preindustrial rural Italy. Such an interpretation is confirmed by the positive relationship between household size and taxation level in Casalguidi. In a previous work (Manfredini, Breschi 2008), we found evidence that the wealthiest rural families, often the largest ones too, had the highest levels of marital fertility and the most careful marriage strategy for their members. Given this strict association between household structure and agricultural occupation in the rural populations of the Bologna countryside and Casalguidi, we will try to disentangle the relative impact and role of those two factors by estimating multivariate models based on individual-level data.

4. Individual-level analysis of fertility

It is already well-known, and proved in part by the results above described, that many factors exist contributing to make difficult the interpretation of fertility patterns and reproductive behaviours. These elements are the biological characteristics, ages at marriage, mortality levels, profession, family wealth, household structures and so on. To disentangle the respective roles and impacts of each one of these components, a multivariate statistical analysis has been carried out by using event-history techniques and estimating the risk of having a child in a given year.

We perform a micro-level analysis on legitimate births of parity 2+. Since the birth of the first child was usually linked to marriage, intervals between marriage and first birth are strongly affected by courtship traditions and prenuptial conceptions. Hence, firstborn children are excluded from our analysis. More specifically, the populations under study include only currently married women 15-49 years who had at least one birth. In our event-history analyses, we aim at determining to what extent demographic, socioeconomic, household, and community-level factors affected marital reproduction of couples in our four study sites.

Table 4 shows the full set of covariates used in our multivariate analyses. Women's current age is measured by a categorical variable consisting of six age groups with age 25-29 as reference category. Age groups 40 to 44 and 45 to 49 are grouped together. Women's age at marriage is included in the model to account for the different timing of the beginning of childbearing since late access to reproduction may imply expedite subsequent childbearing. Age difference between spouses is also included in the model, specifying it as a categorical variable consisting of three categories: wife older than husband, husband older by 0 to 4 years, and husband older by 5 years or more. Interval since last birth (current birth interval) and survival status of the previous birth are interacted to account for the effects of breast-feeding as well as couples' intention to replace a lost child. This set of covariates is aimed at estimating the role of bio-demographic factors of reproduction, and it has been estimated for all the populations.

For all the five communities, we have also introduced a variable to account for the effects of short-term variations in local economic: grain price. We have used the price of wheat of the closest urban market to each of the five sites as a proxy for local economic conditions. Vice versa, for Treppo Carnico, we used the price of corn since it was more crucial than wheat in the local economy and consumption habits. The price variable has been lagged by one year to account for the economic situation at conception. These community-level variables are included to show whether and how short-term economic stress influenced the likelihood of marital birth of married women.

In addition to short-term economic stress caused by fluctuations in local harvests, we have controlled the effects of epidemics, especially cholera, that devastated, with the exception of Treppo Carnico, the areas in which our populations were located.[3] In such hard times, normal demographic processes were severely compromised by high mortality.

Finally, we have introduced two covariates to capture and disentangle the effects on fertility associated with household structure and household SES. Unfortunately, these information were not available for all the communities: SES was not reported for Madregolo and Treppo Carnico, and household structure was not available again for Treppo Carnico.[4]

The results are shown in table 4. To sum up:

Biodemographic factors go in the expected direction in all the populations studied. The risk of having a child tends in fact to decrease as woman's age increases, and in case the previous birth has

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[3] Statistical control for epidemic years is also needed to avoid possible misinterpretation of the effects of variations in local grain prices. In preindustrial societies, epidemic outbreaks were usually accompanied (and even preceded) by rising grain prices (Manfredini 2003).

[4] It is to say, however, that social stratification was not so marked in the Alpine village as it was in the other rural communities of the plain.

died in infancy, the risk of birth largely increases for shorter birth intervals. The results relative to age at marriage and age difference between spouses are less clear and never statistically significant. Short-term variations in grain prices appear to have negative effects on fertility whose extent differ from population to population. It has a non-significant effect in Madregolo, whose almost exclusively rural economy made it less dependent on market prices, whereas in the other populations the risk is statistically significant. For Treppo Carnico, this result is in line with previous findings both at the aggregate (Breschi, Fornasin, and Gonano 2002; Fornasin 2005) and individual level (Breschi et al. 2009a). It has been argued that in hard times seasonal migrants tended to move up their departure from the village (from fall to early summer). The result of this change was twofold: on the one hand, there were less people to feed at home, on the other hand, they could supplement their meagre income. In any case, the longer period of wife-husband separation reduced fertility.

The same significant relationship between price increase and drop in fertility has emerged also for Casalguidi and for the two Bologna suburban parishes. In the case of the populations of the plain, however, the fertility response to price fluctuations is complicated by the presence of some epidemics that hit the communities throughout the 19th century, especially the typhus of 1816-17 (years covered only for Madregolo) and the cholera of 1855 (all the rural populations). The well-known relationship between mortality crisis and price increase may somehow alter the interpretation of the results. This is particularly true for Casalguidi, whose only one significant increase in market prices occurred exactly on the occasion of the cholera epidemic of 1854-55. According to some other preliminary proofs on the data not yet inserted here, the introduction of a covariate concerning epidemics makes the price coefficient of Casalguidi non-significant from a statistical point of view. Conversely, the longer trend of price fluctuations analyzed for S.Donnino and S.Nicolò makes such an effect less pronounced and persistent.

A close relationship between SES and household structure on the one hand, and fertility, on the other hand, is confirmed also at the individual level. In some populations, head's profession is dominant over household complexity (suburban parishes of Bologna) whilst in others the opposite case prevails (Casalguidi). Nevertheless, in both cases, the relation underlines the higher fertility of sharecroppers in comparison to that of day-laborers. More specifically, women living in sharecropping households had for 16% to 40% higher risk of having a baby compared to women in households whose head was a day-laborer. The same advantage in terms of fertility, when not even higher, has been observed for women living in complex households with respect to women in nuclear households. This is consistent with the findings from studies on other pre-transitional Italian rural communities (Anelli, Siri, and Soliani 1982; Kertzer and Hogan 1989) and with the results of

analyses on rural households in early twentieth-century Italy (Gini 1934; Livi 1927). In 1927, Livi had already argued that household socioeconomic status, landholding, and household size were all elements positively associated with the number of children in agricultural communities of preindustrial Italy[5]. The sharecropping household had a multiple or extended structure and was definitely less economically fragile than that headed by a day-laborer. Mothers could take advantage of the presence of other women in rearing children and doing house-works. Likewise, complex households were less exposed to the consequences of sudden household head's death.

In the models we present here, household head's profession can be assumed as a proxy of wealth and living standards. Thus, we could conclude that the richer the household in which a woman lived, the higher was her fertility. However, for Casalguidi we had the opportunity to measure wealth and living standards in more and very precise way. In fact, we have retrieved information on the Family Tax each household had to pay on annual basis. It is an important piece of information whose effect has been analyzed in detail in two previous studies, and whose results can be somehow extended to the other sharecropping communities here investigated (Manfredini, Breschi 2008; Breschi et al. 2009b). We have proved that in Casalguidi, at the beginning of demographic transition, demographic behaviours of household members, especially fertility and mortality, were shaped by the general level of living standards within the family, rather than by individual occupation or profession. Hence, even within the various occupational categories, women presented different levels of fertility according to the wealth of the household in which they lived, generally higher in richer families.

5. Few and provisional concluding notes

These preliminary results give us the opportunity to point out our future research lines when approaching the fertility decline of the first half of the 20th century.

The paper testifies once more that before the onset of the demographic transition Italian fertility varies according to a lot of elements different from the pure bio-demographic variables: by area, period, SES, household typology, bad and good times and so on. These variations are probably linked to the reproductive behaviours that seldom differ inside the same population, depending on its social and economic composition. Indeed, the general level of fertility in a specific period is the average of plural strategies of reproduction. We think that understanding the mechanisms that drive

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[5] Livi (1927) claimed that where holdings were divided in passing from one generation to the next, the creation of smaller farms might have several different results: family limitation, emigration, or a combination of the two.

these different reproductive behaviour is very important to identify the onset of the demographic and the fertility transitions. As a matter of the fact the transition paths have their prerequisites in those differentiations whose link with the household/family lives is very strong.

In the next development of our study, we will investigate more in depth the hypothesis linking SES and fertility. Our results demonstrate that fertility is higher among the wealthier and more complex families, that are usually less reactive to the economic stresses. These families seldom belong to the more representative and richest social groups of the different communities. How can we link these pre-transitional picture to the theory that sees the wealthiest and most fertile social groups as forerunners of the fertility control, which is indeed not new (Salvini, 1990)? As a matter of the fact, it will be quite interesting to get much more in depth in the comprehension of what role the gradual proletarianization of the high-fertility social category of sharecroppers and the disappearing of their system of complex households might have played in the drop of fertility in the 20th century.

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Figure 1: Italy. Geographical location of the area and the studied communities
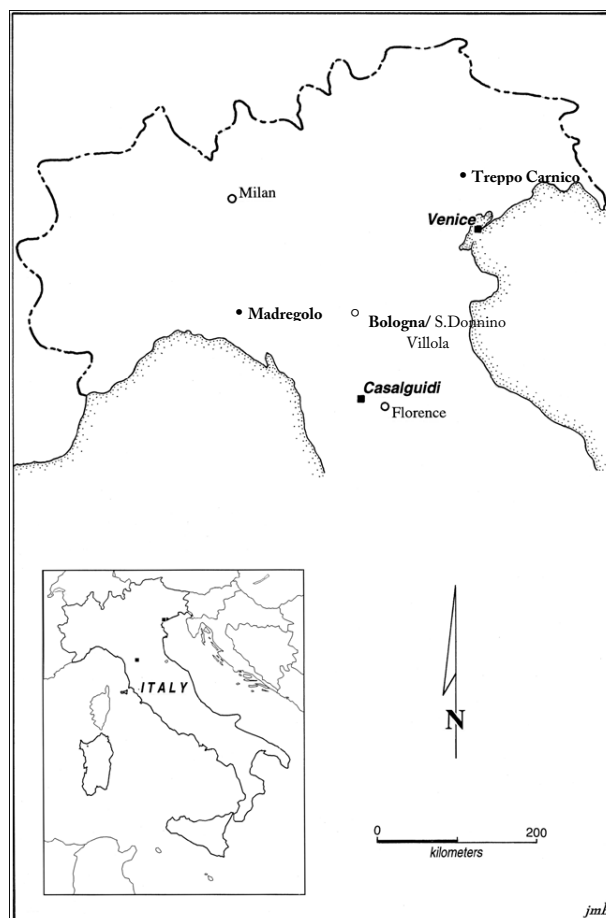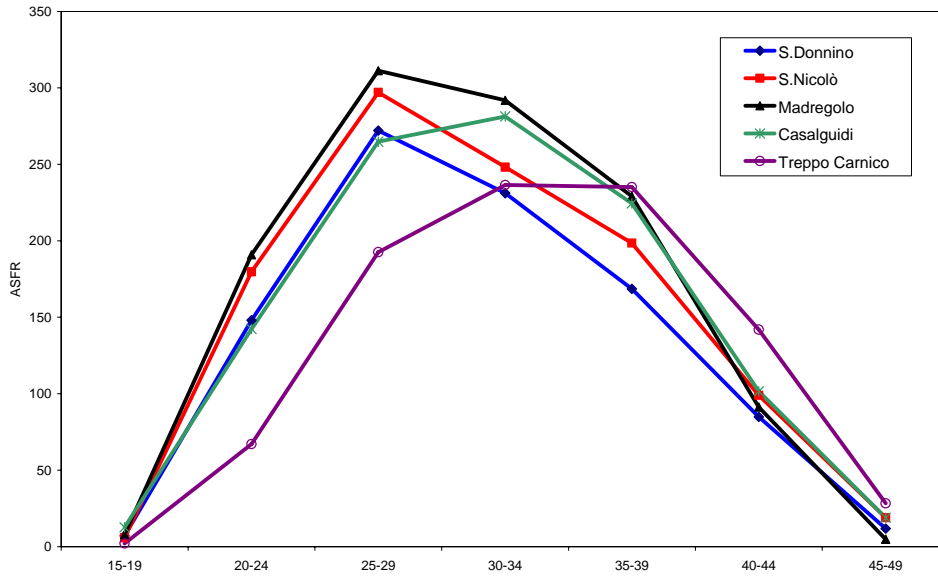
Figure 2. Age-specific fertility rates (a) and age-specific marital fertility rates (b) in the studied communities.
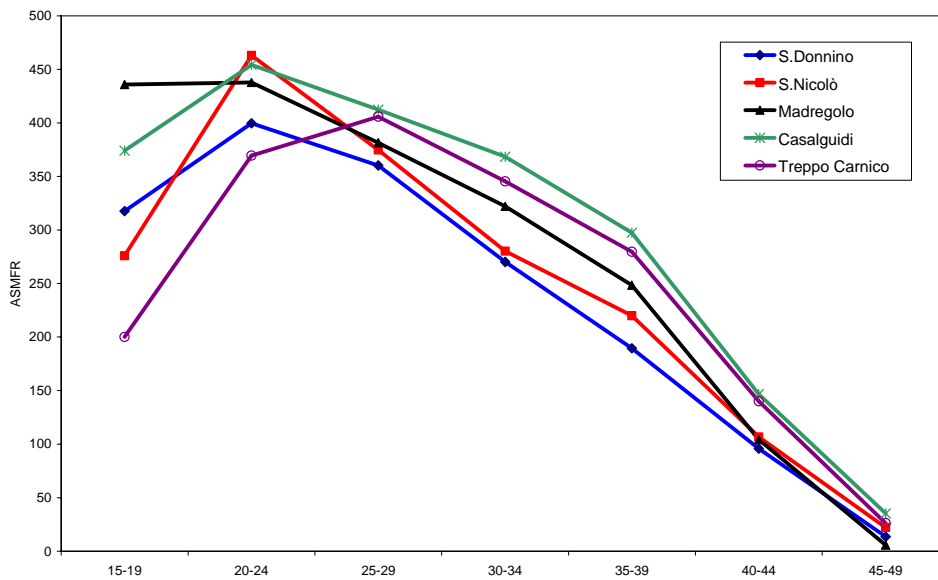
a)

b)

Figure 3. Age-specific marital fertility rates in Bologna suburb in 1819-1860 and 1861-1900.
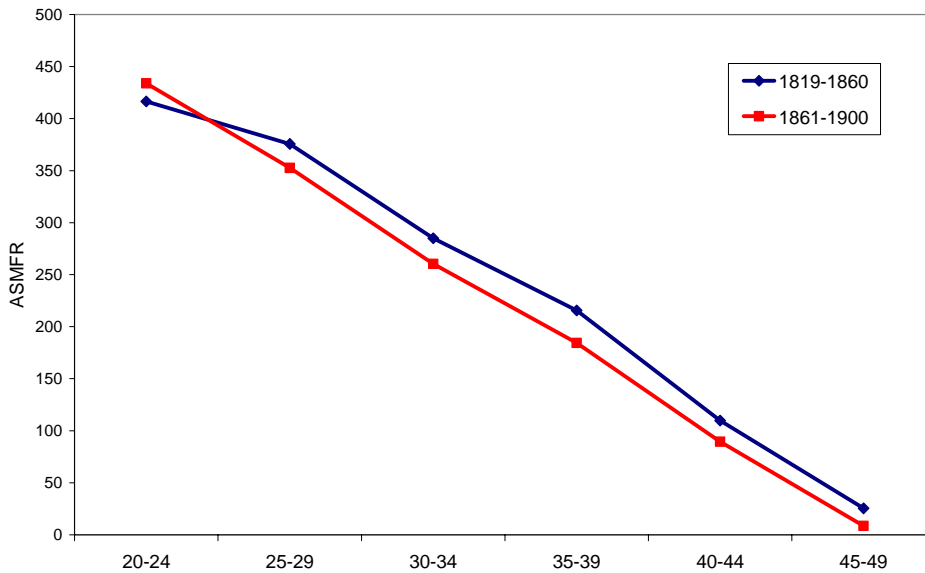

Table 1. Selected demographic indicators in the studied populations.

ulation	Mean age at 1st marriage		Percentage unmarried 45-49		Life expectancy at birth	TFR
	M		M			
Treppo Carnico 1834-67	30.2	27.0	18.1	17.2	39.2	4.5
Madregolo 1800-1883	26.8	23.5	9.7	2.1	35.6	5.6
Niccolò di Villola 1819-1900	27.3	23.1	10.0	13.3	39.5	5.2
San Donnino 1819-1900	27.2	23.3	12.4	12.1	40.2	4.6
Casalguidi 1819-59	28.8	24.7	14.8	10.1	35.3	5.2

Table 2. TFR and TMFR in the studied populations

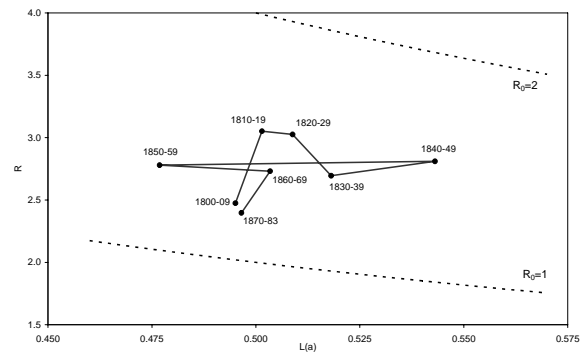|	Treppo Carnico	Madregolo	San Niccolò di Villola	San Donnino	Casalguidi
TFR	4.5	5.6	5.2	4.6	5.2
TMFR	8.8	9.7	8.7	8.2	10.5
$TMFR_{20}$	7.8	7.5	7.3	6.6	8.6
$TMFR_{25}$	6.1	5.3	5.1	4.6	6.2

Note: $TMFR_{20}$ refers to the sum of marital fertility rates for ages 20 to 49; $TMFR_{25}$ refers to the sum of marital fertility rates for ages 25 to 49.

Figure 4. Components of reproductivity by population and period. Casalguidi (a), Madregolo (b), and Bologna suburban parishes (c).

a)
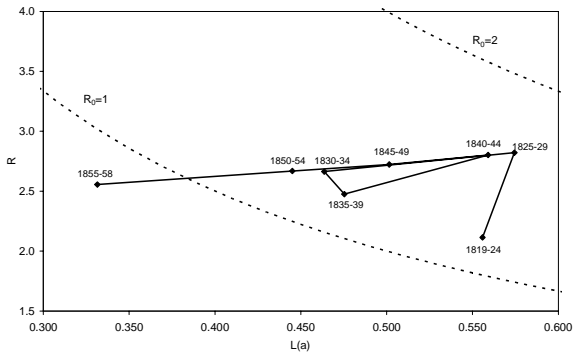
b)

c)
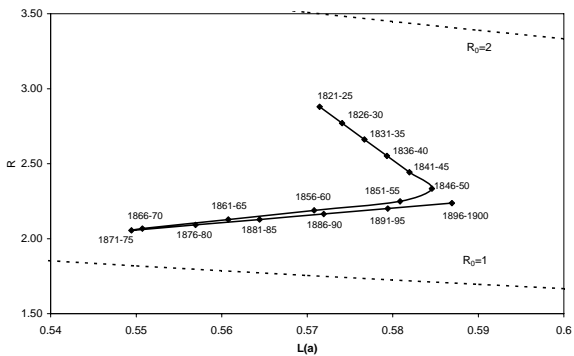
Table 3. Coale-Trussell indices of marital fertility

Villages	Period	M	m
Treppo Carnico	1834-1867	0.884	0.009
Madregolo	1800-1883	0.967	**0.273**
San Niccolò	1819-1860	**0.937**	**0.260**
	1861-1900	**0.955**	**0.309**
San Donnino	1819-1860	**0.864**	**0.163**
	1861-1900	**0.878**	**0.445**
Casalguidi	1819-1859	0.969	**0.132**

Note: In bold parameters statistically significant at p<0.05

Table 4. Logistic regression. Risk of having another child

Madregolo 1800-83, Casalguidi 1819-59, S.Donnino & S.Nicolò 1819-1900 ,Treppo Carnico, 1834-67

Variables	Madregolo		Casalguidi		S.Donnino & S.Nicolò		Treppo Carnico	
Age (ref. 25-29 yrs)	1.000		1.000		1.000		1.000	
< 20	-		1.089		0.232	**	6.500	
20-24	0.853		1.086		1.113		0.661	*
30-34	0.731	**	0.846	*	0.775	**	1.010	
35-39	0.591	**	0.595	**	0.602	**	1.026	
40+	0.152	**	0.153	**	0.216	**	0.540	**
Age at marriage (ref. 20-29 yrs)	1.000		1.000		1.000		1.000	
< 20	1.193		0.859		0.874		1.084	
30 +	1.177		1.209		0.837		0.901	
Unknown	0.856		0.825	**	0.782	**	-	
Age difference between spouses (ref. 0-3 yrs)	1.000		1.000		1.000		1.000	
Woman older than man	1.152		0.904		1.197	*	1.013	
Man older than woman by 4+ yrs	0.971		1.005		0.972		0.994	
Unknown	-		-		1.225		-	
Birth interval (ref. 2-3 yrs)	1.000		1.000		1.000		1.000	
< 2 yrs	0.236	**	0.190	**	0.389	**	1.198	**
4+ yrs	0.180	**	0.128	**	0.194	**	0.603	**
Survival of the last child (ref. Still alive)	1.000		1.000		1.000		1.000	
Dead	0.870		1.028		1.933	**	3.320	**
*Interaction birth interval*survival last child*								
< 2 yrs x dead	1.365	**	1.363	**	1.556	**	0.904	
4+ yrs x dead	0.799		-		0.591	*	0.528	
Household structure (ref. Nuclear)					1.000			
Extended	5.055	**	2.419	**	1.172	*		
Multiple	0.853		1.618	*	1.163	*		
No structure / Structure unknown	1.000		1.000		-			
Migrant in the previous 3 yrs (ref. Non migrant)	1.000		1.000		1.000			
Migrant	0.524	**	0.272	**	0.987			
Uncertain	-		0.903		-			
Household head's occupation (ref. Day laborer)			1.000		1.000			
Farmer / sharecropper			1.158		1.411	**		
Artisan			1.203	*	1.276			
Well-off			1.136		1.204	*		
Unknown			-		1.228	*		
Grain price lagged by 1 yr (lag)	0.875		0.721	*	0.492	*	0.746	*
*Period (various reference categories)**	1.000		1.000		1.000			
Period 1	0.944		0.853	*	0.905			
Period 2	0.983		0.900		0.919			
Period 3	0.975		0.670	**	0.897			
Parish (ref. S.Nicolò)					1.000			
S.Donnino					0.867	*		
Person-years	4387		9755		9,135		3,926	
Births	1058		2545		2,115		1,012	

* Period is categorized as follows: Madregolo 1800-29 (ref.), 1830-49, 1850-69, 1870-83; Casalguidi 1819-29 (ref.), 1830-39, 1840-49, 1850-59, S.Donnino & S.Nicolò 1819-40 (ref.), 1841-60, 1861-80, 1881-1900.

Note: * p < 0.05; ** p < 0.01.