Regional Context and Fertility in Contemporary Italy[1]

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Abstract. Our motivation in this paper comes from a growing concern in demography for a better understanding of context in reproductive behavior outcomes. This takes on particular importance in Italy, a country still characterized by very low fertility. We exploit detailed life history calendar data for a large, nationally representative sample of Italian women, and we conduct a more refined analysis of the relationship between personal traits, regional context and fertility. After introducing the Italian setting, the descriptive analysis verifies the persistence of significant differences in the reproductive behavior of women according to region of origin. Our multivariate analysis tests for the influence of women's employment, union status, region of origin, and other standard traits on the annual probability of first and second birth. Our results point to very strong effects of a woman's own employment (and weaker effects of her regional context) on first and second birth. We also find that more secular unions are associated with lower rates of first birth, and that more secular regional contexts are associated with lower rates of transition to first birth. Advocates of several competing explanations of very low fertility will find items of support in these results.

Introduction

Many high-income countries have moved into a demographic regime of low fertility, and several have experienced persistent very low fertility. The case of Italy has attracted disproportionate attention because conditions thought to promote decline (female labor force participation; religious secularism; weakening of kin networks) have been less in evidence in Italy than its European neighbors. Nevertheless, Italy has continued to experience fertility rates well below replacement, dipping to a TFR as low as 1.2. What may be less well appreciated is that internal Italian regional differentials – both in levels and changes in childbearing rates -- have also been manifest throughout this time.

In this paper we examine sources of variation in Italy's recent childbearing behavior. In so doing we evaluate hypotheses that emphasize structural socioeconomic factors as well as cultural factors. We estimate a multilevel contextual event history model, regressing transition to first birth and second birth on an array of personal characteristics, family background, and selected socioeconomic characteristics of the province or region. While the arrival and persistence among nations with "very low" or "lowest low" fertility have often been noted (Kohler et al., 2002; UN, 2006), less often scrutinized is the persistence of regional differentials in the level of fertility and the pace of change. Our motivation in this paper comes from a growing concern in demography for a better understanding of context in fertility outcomes. In this paper we examine the relationship between location and fertility, and we allow for characteristics of current region and province to influence childbearing.

A related perspective on the importance of geography in fertility is offered by Lesthaeghe and Neels (2006). In their synthetic piece, they argue that spatial pattern can yield insights for theory, particularly theories that invoke processes of diffusion or collective behavior. They offer multiple hypotheses, ranging from the microeconomics of household behavior to the legitimatization of more secular behaviors, as providing the impetus for shifts in nuptiality and fertility. Perhaps most noteworthy for our purposes here is that Lesthaeghe and Neels elect fertility behavior itself for the empirical examination of these ideas, and furthermore map multi-decade regional patterns of fertility in Belgium and France. At the outset Lesthaeghe and Neels point out the pitfall of the ecological fallacy -- correlations among aggregate units do not necessarily establish correlation (causation!) at the

micro level – a concern relevant to our approach here. All told, however, the socialization and diffusion processes implicit in geographic pattern and the systematic temporal shift provide the impetus for our attempt to model fertility transition across cohorts, both as a function of individual behavior and of the (geographic) context of social life.

As we will show, our results provide some support for both socioeconomic and cultural explanations, and at the same time they continue to call into question the relative importance of these competing theories of fertility transition. We do find, for instance (and varying by model specification), that women's labor force participation carries predictive power. Furthermore, being in a civil (vs. religious) union markedly lowers expected fertility. The effect of cohabitation is even stronger. Trends by birth cohort, a marker of ongoing secular change, are partly explained by the inclusion of other socioeconomic traits.

Context appears to matter, as well. Regional measures of female labor force participation do sometimes predict fertility rates beyond personal traits. Women living in regions where many women work (and net of their own labor force attachment) are much less likely to have a first or second birth. We find that even after controlling for a host of contemporary personal traits, background characteristics, and community variables, women in the same geographic area have similar childbearing rates that are different from other areas. These persistent effects of geography (and cohort) continue to beg the question of the additional forces driving Italian family building behavior.

This paper is part of a much more extensive project: "Explaining Low Fertility in Italy" (ELFI). The ELFI project combines several strategies – some qualitative, some quantitative – to attempt to decipher the Italian childbearing experience. We also point to strategies for examining and understanding European cross-country variation in contemporary family-building regimes.

The contemporary European fertility experience remains a puzzle for classic demographic transition theory. While the transition paradigm assumed that fertility would stabilize at replacement levels, lower levels of fertility first emerged and now have persisted in some of the most advanced industrialized states. This persistent low fertility has prompted Kohler et al. (2002:641) to distinguish a distinct category of populations having "lowest low fertility", defined as having a TFR at or below 1.3. By 2002, 17 countries in

Europe had such lowest low fertility (Kohler, Billari and Ortega 2002; Billari and Kohler 2004). Persistent very low fertility has attracted wide attention, focusing on its implications for long-run population dynamics and the possibility of a low-fertility spiral, for labor force aging and public finance constraints, and on the perplexing nature of the phenomenon itself (Balter, 2006).

The case of Italy (along with Spain and Portugal) remains particularly surprising and perplexing. Pertinent is the observation of Chesnais (1998:91): "No official population forecast, either national or international, had anticipated a total fertility rate of 1.2 for any country, [much] less for Mediterranean countries, which are still commonly viewed as "laggards" and…family-oriented. This outcome is probably the biggest surprise of European demographics at the end of the present century." The longstanding fertility differential between northern and southern Europe was unexpectedly reversed. Countries viewed as traditional, Catholic, and family-oriented inexplicably had markedly lower fertility than those that were Protestant, more secular, and had weaker family ties (Chesnais 1996:729). Italy, Spain, and Greece, having among the lowest female labor force participation (FLFP) rates in Europe, also had virtually the lowest fertility rates (Del Boca 2002:11).

The feature of individual microeconomic behavior that has most attracted attention has been female labor force participation (FLFP). The substitution of activity away from childbearing with growing female wage opportunity seems to make sense at the household level, yet at the macro level the puzzle remains: the country-level correlation between FLFP rates and TFR reversed sign between the 1960s and 1990s (Morgan, 2003) . As recently as the early 1980s the relationship was negative, and, in the words of Lesthaeghe and Willems (1999:221; Ahn & Mira 1999:2), it "was seen as one of the most stable relationships in economic demography." The nature of the link between household level empirical regularity and population-level manifestation of the (reversed) relationship remains to be seen. Bernhardt (1993:32) argues that in Europe "the inhibiting effect of work on fertility has been at least partially removed with the help of social and institutional arrangements." citing in particular the provision of publicly funded childcare, maternity leave, and tax benefits. More generous maternity benefits, tax provisions favoring childbearing and childrearing, direct public services to assist working mothers, such as child care and health benefits, all have been considered or implemented (Gauthier 1996).

Role incompatibility should be pertinent, so that public provision for childcare, or kin-availability should facilitate the transition to parenthood and additional childbearing (Rindfuss et al. 2003:10). Yet, Engelhardt and Prskawetz (2004:55), looking at the OECD countries over time, conclude: "Trends in the variables that would be representative for the role incompatibility hypothesis and the ease in combining work and child-rearing…cannot be related to the trends in fertility." The childcare link is particularly problematic. There is significant European cross-national variation in the use of public and private child care, but little evident correlation with fertility. Furthermore, Del Boca argues that the Italian public child care system inherited an institutional structure that fails to make work more manageable for mothers with children (Del Boca 2002),

In a very different vein, a number of scholars have argued that no adequate theory of fertility can be developed that does not incorporate an understanding of culture (Kertzer 1995, 1997). Consonant with this view is the claim of Lesthaeghe & Surkyn (1998:8), "The two most salient features of Western ideational change have been the processes of secularization and individuation." Van de Kaa (1987:6), one of the originators of the theory of the Second Demographic Transition (SDT), indicated by a further fall to below-replacement fertility, also places emphasis on individualism. Yet the countries in Europe that currently have the lowest fertility are not those with the most secularization or individualization, but, on the contrary, those, like Italy, showing more familism, with lower rates of divorce, non-marital cohabitation, and births out of wedlock (McDonald (2001).

All this inconclusive empirical work suggests that an analytical approach incorporating micro and macro factors jointly might be instructive. To gain better insight into the persuasiveness of various mechanisms and their underlying theory – secular change and second demographic transition, female labor force, public sector family-friendly provision, housing costs, culture -- it is valuable to go beyond inter-country comparisons and to look more carefully at changing fertility behavior within Italy.

The Italian Situation – An Overview

Italy's well-know position in national-level comparisons of fertility trends masks much internal variation both in level and in trend. While all regions participated in the pronounced decline in average childbearing the onset of the transition to very low fertility differed, and significant regional differentials – unsurprisingly manifest 50 years ago, are still apparent in the early 21st century.[2]

Figure 1 presents overall trends in fertility for each of the 20 recognized regions. Replacement levels of fertility were reached in parts of the North beginning with the 1910 birth cohort, while as late as the early 1980s the TFR in a number of southern regions still stood above replacement. (In this discussion and below we will often make use of broader "macro-regions": Northwest, Northeast, Center, and South; The Northwest and Northeast together comprise the North.[3]) Over the last two decades of the 20th century, fertility in northern and central Italy remained stable, while southern regions experienced continuing sharp fertility decline. By century's end, Campania, although still having the highest fertility in the country, had a TFR of only 1.5, and, Sardinia, known for its economic underdevelopment, had Italy's lowest regional fertility (1.04) (Dalla Zuanna & Crisafulli 2002:tab. 2). On the whole there has been a national convergence to a moderate range of low fertility values. In the five years 1955-59 the difference among the maximum TFR value (3.56 in Sardegna) and the minimum (1.47 in Liguria) was about 2 children per woman; today this difference is 0.4.

[FIGURE 1 HERE]

Female labor force participation exhibits similarly wide variation across regions. Women in the North are much more likely to be in the paid labor force. In the mid-1990s, 64% of women aged 20-49 in the northwest, but only 36% in the South did paid work. Even more strikingly, 41% of the southern women had *never* been in the labor force, compared to only 7% of those in the Northwest (F. Bernardi 1999:753). Indeed, the increase in FLFP has been quite modest in the South, with the proportion of women who had *ever* entered the labor force rising only from 41% among those born before 1929 to

[2] The very recent period is characterized by a slight increase of births shown by a national TFR that changes from 1.22 recorded between 1990 and 1995 to 1.28 in the five years 2000-04 (reaching up to 1.33 children per woman in the single year 2004).

[3] Northwestern macro region consistrs of Valle D'Aosta, Piemonte, and Liguria. The Northeast region is Veneto, Friuli, Trentino, and Lombardia. The Central region is Emilia Romagna, Toscana, Marche, Umbria, Lazio, Abruzzo, and Sardegna. The South consists of Molise, Puglia, Basilicata, Campania, Calabria, Sicilia.

51% in the 1944-58 birth cohort (compared to 84% in the North) and little sign of any increase since then (Barbagli et al. 2003:tab.1.8). Among women with children under age six in the mid-1990s, 62% of the northerners and only 31% of the southerners were employed (Sabbadini 1999:tab. 3.5). A 1998 national sample survey (Famiglia e Soggetti Sociali, FSS) asked all individuals if they had ever been in the paid labor force. The persistence of strong regional differences, particularly a North-South contrast, is clear. In the South, 50% of the 1941-50 birth cohort had never entered the labor force, while in the North only 20% had never worked. By the 1961-70 cohort the figure had increased to 54% in the South, while it had decreased to around 10% in the northern regions. The center of the country remained intermediate.

A final indicator is that of gender norms. In the North both premarital cohabitation rates and divorce rates are notably higher (Sabbadini 1999: tab. 6.3; Barbagli 1990). Data as recent as the 1998 Family and Social Subjects survey (ISTAT) point to strong regional differences in various norms, such as spousal (female) autonomy, with a range extending from the most "modern" area, the Northwest, to the traditional South.

Given Italy's strong pattern of regional differences--a product of the fragmentation of the Italian peninsula into several separate states, speaking different languages, until Italian unification in 1861—it is instructive to examine the extent to which economic and demographic factors account for—or at least correlate with-- regional variations in fertility, either cross-sectionally or over time.

Still the case is not obvious. Consider fertility and religiosity. The SDT theory places special emphasis on secularization and a movement away from religious values and religious identities. A plot of regional TFR against percentage of religious marriages in 2003 offers little evidence of any link between secularization and low fertility (figure not shown). For example Italy's least secularized region using this measure, and certainly one of its most traditional, was the deep southern region of Basilicata, where only 9% of marriages were celebrated outside a church (vs. 27% nationally), yet in 2003 Basilicata's TFR was 1.20, actually below the national average. Basilicata also had among the lowest FLFP rates in Italy, with only 46% of women aged 25-34 in the labor force.

Substantial regional fertility differentials have not altogether disappeared in the face of convergence in national fertility to a low level. We argue that considering regional

characteristics in more elaborate multivariate models might help shed light on the overall determinants of Italy's path to low fertility.

Data and Methods

We use data from *Indagine Longitudinale sulle Famiglie Italiane* (ILFI) or *Italian Households Panel*. ILFI is currently the only ongoing prospective social survey in Italy. It includes detailed fertility histories, making it especially valuable for our analysis. ILFI is based on an original sample of 4,404 households within which all members are interviewed (9,770 individuals at 18+ years old). The first wave of the panel took place in 1997 and we here analyze data through the first 4 waves (1997, 1999, 2001, 2003). Men and women aged 18-49 constitute about 60% of the initial sample. ILFI is representative of the Italian population nationally.[4]

The dynamic nature of the sample means that at every wave it loses all individuals who a) died; b) migrated abroad; or c) became severely impaired; and it gains individuals who a) reach age 18 and belong to the originally sampled households; and b) enter via union or cohabitation. Notable for its life history detail, the ILFI collects complete information - from the moment of birth to the end of the most recent survey wave – on geographical or residential history, education and vocational training, work, social origins, family and fertility.

Our universe for analysis is women in a union. We exclude women who are not in a union for the person-year of interest. While such unpartnered women are at risk of a birth, the events are so infrequent in Italy (unlike some other parts of Europe) that we elect to exclude such women from the risk set. We did estimate some companion models including such women and a covariate for not-in-union; the covariate was of course highly significant, and little else changed.

Our estimation approach is a discrete time event-history analysis. From the ILFI data we have annual information on fertility (birth of a child in that year) as well as annual

[4] ILFI, under the direction of Antonio Schizzerotto, samples a nationally representative fraction of households with a multi-stage design. Sampling fractions are identical across regions, except that Trentino is oversampled. This adds approximately 319 households from this region. We use the data with the filter that includes only the nationally representative portion. Results with the augmented sample show little difference. This also makes it unnecessary to weight descriptive statistics. For further information on ILFI see www.sociologiadip.unimib.it/ilfi/.

information on region of residence. We fit the model with random effects. In the results we present in tables below, we have fit these models for clustering effects at the province level, generally about 100 groups, fewer for models with more limited availability of covariates.[5] The random-effect approach offers several advantages as a multi-level strategy in our case. It is relatively parsimonious, and it offers a direct test (via *sigma* and *rho* statistics) of the common remaining variance in the cluster, net of covariates. The random effects approach readily accommodates both time-fixed and time varying covariates and it uses all information on all individuals included in the estimation (Pederson, 2004: 340-341). We have estimated a variety of models and more information on these is available from the authors.

We have annual information on a number of other key traits of the woman, as well: labor force status, employment, and marital status. Collectively these constitute time-varying covariates. We model birth in the given year as a function of values of these traits lagged one year. In addition, we include the time-fixed covariates of birth cohort and education. We operationalize region to be one of four major "macro-regions" in the country overall; these are an aggregation of the 20 administrative regions in Italy. Macro-region (hereafter simply region) is a basic indicator of exposure to a social setting.

Age. We control for age and its square. The value of age is that of the women in the person-year of exposure to the risk of a birth. Onset of risk is age 15, and women are in the risk set until the time they experience a birth or they are censored. Censoring occurs by the survey itself or reaching age 50 and exiting the childbearing years. The use of quadratic form in age simply allows us to capture the inverted U-shaped pattern of the fertility profile.[6]

We include a dummy variable set for *cohort*. We identify broad birth cohorts of 1941-50, 1951-60, and 1961-85. (The 1951-60 cohort serves as the reference group). Consistent with the sharp fall in current and completed fertility over the past decades, there are, at first pass, strong cohort effects in childbearing propensity. An examination of the duration from age 15 to first or second birth (ignoring union) confirms the slowdown in net childbearing transition over the latter portion of the 20th century. What remains to be seen is how much

[5] We use STATA9 and its xtlogit procedure.

[6] In preliminary models we included age at union and its square as covariates. These presented some problems with multicollinearity in our first-birth models, so we have elimintated them.

additional impact cohort might have on the pace of childbearing within unions, our subject. Technically, age is a time-varying covariate; its value is of course predetermined at each year.

For our models of second birth, we include a series of dummy variables for the *age of the women at birth of the first child*: age 15-19; 20-24; 25-29; 30-34 (reference) and 35-49. We aggregated the last category due to the sparseness of the data and the relatively low rates at that age. *Education* is the chief personal socioeconomic covariate for which we control. We formulate this as a dummy variable (low [< 8 years], high[>13 years] versus reference of middle level).

Key in our analysis of personal traits related to the fertility transition is indication of women's own *employment*. This is a time-varying covariate, lagged by a year. This indicator gives us appropriate purchase on the extra-household labor market activity and influence on childbearing. We also include dummy variables for the *type of union* a women has entered: religious (reference category); civil, and cohabiting. This formulation allows a more direct test of secularization. To the extent that marriage in a civil rather than religious ceremony points to secularization, we would expect women in such unions to have lower rates of transition to first and second birth. Cohabitation – vs. other union type – would be a move toward even greater secularization and less commitment to family-building and if so, should be associated with even lower levels of childbearing.

We pay particular attention to *region*. Among our covariates we include a four category variable for macro-region. There are aggregates of 20 administrative regions in Italy, which themselves collectively contain over 100 provinces. In our models we enter dummy variables for Northwest, Center and South macro-regions, with Northeast serving as the reference category. This macro region categorization captures some major historical (and cultural) differences in Italy, while not fitting too many parameters. One of the tests of our models will be to see whether they reduce the predictive power of region. The ability to "explain away" regional effects would support a story of Italian fertility that attributes regional differences to compositional influences. Conversely the persistence of regional effects begs the question of underlying differences in attitudes or culture.

Context is quite often cited as influential on behavior. In cross-national comparisons of fertility policy or labor market context is frequently mentioned in differences one observes across national populations. We test for contextual effects within Italy, emphasizing measures available at the regional level. (We have encountered severe data

limitations in trying to locate provincial level data that are available for a sufficient length of time to serve as a suitable time-varying covariate.) A host of indicators of context that might influence family formation have been nominated in the literature. Labor market conditions, especially the degree to which women are already in the workplace, are mentioned quite frequently, so we include *regional female labor force participation rate*. In models we report below we also include regional time-varying covariates for *overall marriage ratio* (ratio of marriages to 1000 adult persons) and the *civil marriage ratio* (fraction of marriages that are civil status). We would anticipate that higher rates of marriage in the reference region (a peer influence indicator) would serve as an indicator of familism and predict higher rates of childbearing. And conversely, higher rates of civil marriage in the region (net of overall marriage rates) would indicate greater secularism and hence predict low rates of transition to first and second child among women in a union.

We examine several other contextual covariates. These vary in the degree to which they tap an underlying trait of interest to us, and the degree to which they offer a complete time series to accompany the person-year of exposure in our data. In some models we examined *province population density*. Population density may be the best measure available of differential costs of family size across space absent a time series of housing price data. Couples living in more dense provinces would likely face greater household financial outlays for space (rooms in the home, space outside the home) and some additional congestion costs. On the other had, population density may tap location in which there are certain public and private service provisions (employment availability for a spouse child care) that could be available to the couple. We did examine models that included a measure of *child care availability* for children 3-5, but although a key potential indicator (indicative of variation in public seats availability) the data were too sparse to be included here.

We analyze these two birth transitions with a multilevel logit model for the probability of birth (first or second), including a level parameter for grouping by province (N>100 groups). Our covariates described above capture both fixed and time-varying aspects of the process. Since most childbearing in Italy is within a union (religious, civil, or cohabiting), the models we present are limited to women in a union (at time of conception). We have examined models with all women included and with "not-in-union" as a covariate; the covariate, not surprisingly, is very powerful, but little else changes in the model. Of course, it is only women who experience a first birth who join the population of women at

risk of experiencing a second birth. Our approach suggests we pay particular attention to a few variables, beyond the ones (age, age-squared) known so clearly to influence the probability of a birth. The event history approach allows us to examine, for every year of exposure to the risk of childbearing (union to the year of the current wave of the survey), the influence of these covariates in their correct temporal order.

Women in birth cohorts 1941 to 1985 were approximately 20 to 62 years old at the time of the ILFI survey. For the youngest cohorts, we cannot observe all of their childbearing exposure, although our models adjust for censoring. Premature mortality of selectively differential women could affect our results, although given limited female mortality at these ages it is likely that any such effect is slight. In the pages to follow, we first present some descriptive information and then we present our multivariate results successively for first birth and second birth.

Table 1 presents descriptive statistics for all covariates in the analysis. Figures 2 to 4 present Kaplan-Meier survival curves for the rate of transition to union, first birth and second birth. (We include a curve for union as background to this analysis; we limit our multivariate analysis to women already in unions.) Data in Table 1 are in person-year units rather than per-woman unit. The age and exposure of the women influence these values. Older women and women who have longer transitions to first or second birth contribute more observations. Only women who have had a first birth contribute person-years to the descriptive statistics for the second birth.

[TABLE 1 HERE]

Figure 2 presents the survival curves for the duration to first union, drawn separately by region. (These are from companion data that include larger original samples, since we do not have to exclude cases with missing data.) We observe only modest regional differences for the rate of entry into first union. This lack of regional difference in marriage rates is itself noteworthy, in that, as we shall show below, our geographic depictions of fertility rates point to significant differences across the four macro regions of Italy.

Figure 3 presents K-M curves for the transition from first union to first birth. This transition shows clear regional differences across all cohorts. Women in the South proceeded more quickly to a first birth after marriage than did women elsewhere. Some 92% of women in the South had a child within five years of marriage compared to 83% of women in the Northwest. Of course, these comparisons are made before the introduction

of any other controls. Figure 4 shows that the divergence of the South from the other macro-regions is even more pronounced for the transition from first to second birth. Cohort differences in the second birth transition (not depicted) show a crossover. The youngest cohort is slow to make the transition for about 4 years following first birth, but after that point makes the transition more rapidly so that it reaches a crossover with the other two cohorts within a decade of exposure.

[FIGURES 2-4 HERE]

Results

Table 2 presents our discrete time multi-level results for first birth. We present two models: the first includes personal characteristics only; the second adds regional contextual variables. Both models are estimated with a hierarchical clustering parameter. We estimated a number of other versions of these models, which we discuss in passing. As backdrop we note that a simple model of age (and its square), cohort (4 categories), and region (4 categories) confirms and extends our descriptive figures above. Such a model for first birth indicates that both cohort and regional effects are strongly in evidence. For instance the predicted probability of first birth (in any person year of exposure) declines steadily across cohorts., such that the odds of giving birth in the youngest cohort (born since 1970) are only about 60% of those of the older (pre 1950) cohort [exp(-.326-.188)]. For region, the Northeast, Northwest, and Center do not differ significantly from one another, but women living in the South exhibit appreciably higher fertility. Odds of making the transition to first birth for women in the South are about 1.34 those of women in the Northeast [exp(.293)].

[TABLE 2 HERE]

Model 1 of Table 2 includes personal traits, both fixed and time-varying, but excludes contextual measures. The effects of age (age-squared), region, and cohort are still present. Women from the South are predicted to have odds of making the transition to first child about 1.17 that of women in the Northeast, and this is statistically significant at $p < 0.05$. Women with relatively low and high educational attainment are predicted to have higher fertility, yet only the former differential is statistically significant.

Women who are working are much less likely to have a birth in the subsequent year. The estimated coefficient of -0.356 in Model 1 corresponds to a 30% reduced odds of bearing a child in the succeeding year, compared to an otherwise equivalent woman who is

not working. At the level of individual behavior such a strong result ($p<0.001$) offers clear strong support for the female labor force participation hypothesis.

In Model 1 we find further support for the secularization hypothesis, as indicated by the measure of union type that we include. Women who are in a secular union (married, but not in the church) are significantly less (about 20% less in odds) likely to make the transition to first birth, all else equal. The effect is even stronger for women who are in a cohabiting union; for these women the odds of making transition to first birth are only about half [0.503=exp(-.686)] of comparable women who are in religious unions.

Model 2 retains the set of individual covariates of Model 1, and it introduces three time-varying contextual measures. These are regional values (by year) for female labor force participation rate; the overall regional marriage rate; and the regional civil marriage rate. The labor force measure is designed to capture the extent to which there is expectation, opportunity, and peer pressure (support) for labor force entry and continuation for women in the region. While we cannot identify the exact mechanisms here, the notion is that in regions with higher levels of female labor force participation, conditions are shifted such that women (themselves considering whether to work or not) are more likely to enter the workforce. In the case of marriage, our contextual measures capture the local (regional) conditions that may, first, support or encourage entry to marriage itself, and secondly, a more secular stance with regard to union formation. While both from the standpoint of geographic (community) refinement and from the standpoint of the technical measures themselves, these indicators could be better, they reflect relative conditions in the region of residence during the time women are contemplating family-building.

We find that inclusion of these contextual effects significantly improves the fit of our model. (Log-Likelihood is improved from -5140 to -4208 upon the addition of three estimated coefficients). The overall picture offered by model 1 and its estimated coefficients is altered somewhat. Most coefficients remain of the same sign and magnitude, although several now shift toward zero and lose there statistical significance. Most notably, cohort effects move appreciable toward zero (all now non-significant and examination of standard errors indicates no identifiable distinction of the 1971-85 cohort from other cohorts.) In the same vein, the three dummy variable markers of regional effects are all now non-significant. Where in model 1, southern women exhibited higher childbearing propensity, this differential is less than half its former size and non-significant. Taken

together these comparisons of model 2 versus model 1 provide strong indication that the cohort and regional effects apparent are associated with the time trends and regional differentials that are themselves linked to female labor force participation and to union formation.

The coefficient on regional female labor force participation rate is not statistically significant, but does indicate that women residing in high FLFP area are somewhat less likely to progress to first child than other women. The coefficient on individual FLFP is actually slightly larger in magnitude in Model 2 than Model 1, and it retains its statistical significance.

Contextual effects for regional union formation are statistically significant and instructive. Women living in regions where overall marriage rates are higher are more likely to themselves make the transition to first birth. Women in the regions where the civil marriage rate is high (net of the overall marriage rate) are less likely to make this first-brith transition. (We confirmed this effect with a model that replaced this two covariates with a single covariate – the share of marriages that are civil status– and the coefficient on that regressor was significant.

Not only does the overall model fit improve (18% improvement in the log-likelihood), but the residual place-specific correlation is reduced. The value of the *rho* parameter, at 0.003 in Model 1, is reduced to 0.001 in Model 3, pointing to a reduction in residual correlated behavior of women from the same province that is not otherwise accounted for by covariates in the models.

Table 3 extends the analysis to the second birth. The covariate structure is much the same as in the analysis of first birth. We add here a covariate (expressed by a series of dummy categories) for age of the women at the birth of the first child, a control for potential shifts in timing during family building strategy. This model, of course, includes in its risk set only those women (N=1236) who have experienced a first birth. This approximately halves our sample, and as a consequence our ability to detect effects statistically deteriorates from Model 1. As in Table 1, Model 1 includes all of the individual covariates, both fixed and time-varying. Model 2 adds the three regional contextual measures.

[TABLE 3 HERE]

We find a strong age profile of second birth, as expected, increasing in age but at a decreasing rate. Effects of age a first birth are not all significant. They appear to point to a hastening of progression to second birth with age of the women. Age 30-34 is the reference

category; younger ages have negative coefficients, the older category positive.) In Model 1 women in the oldest cohort (born 1941-50) are appreciably and significantly more likely to make the transition to second birth than subsequent cohorts. The youngest cohort in our data (born 1971-85) seems to show a slight elevation in the odds of second birth, *ceteris paribus*, but the small numbers in this group question any firm inferences that might be made. Effects of education are not visible in these models.

As in model 1 we detect very strong and statistically significant effects of a woman's employment on her propensity to progress to a second child. A women who has one child and is working exhibits an odds about 25% less than an otherwise equivalent mother who is not working. Women in a civil union are less likely to have a second birth in any given year, although the associated coefficient is not statistically significant. Women in cohabiting unions are much less likely to bear a second child (odds 0.39), although this is a small and select group: both currently cohabiting and having borne a first child.

Regional effects are pronounced in the transition to second birth. Women in the Northwest are much less likely ($p < .001$) to make this transition that women in the Northeast. By contrast women in the South are much more likely to make the transition than women in the Northeast. The relative odds ratio comparing a second-birth transition between the South and the Northwest, the two most disparate regions, is 2.7.

Model 2 of Table 3 adds the regional contextual effects. Unlike the case of first-birth transition, these three contextual indicators do not reach statistical significance. The signs of the coefficients do point to consistency with the effects we observed in Table 2 for first birth. We would predict for second birth that women living in regions with greater labor force participation and a greater relative incidence of civil unions would be less likely to have a second birth net of their own characteristics.

Other covariates (those also in Model 1) change little and do not necessarily move toward zero. Most notably, cohort differences are driven to non-significance, while age effects (age and age-at-first-birth) retain their importance. The women's own union status and education do not achieve statistical significance.

Notably a woman's own labor force participation and her region of residence remain important predictiors of this transition, even after the inclusion of contextual covariates. The odds ratio for the South-Northwest comparison is still large: 2.4. What may be most striking, however, is the persistence of such a huge regional differential even after adjusting

for a number of other personal and regional characteristics. The deviation of the South seen in Figure 4 (Kaplan-Meier graphs) is, thus, not explained away by other compositional or contextual effects, at least by those we have been able to examine.

Both Model 1 and Model 2 carries small and non-significant *sigma* and *rho* statistics. Thus , there is no discernable clustering. Both model 1 and model 2 of table 3 (for second birth) have *rho* and *sigma* statistics about one tenth the size of those in Table 2 for first birth.

Other models: We explored and estimated several other models. Women living in low density (suburban, rural) communities are more likely to bear a child; notably this effect is stronger for first birth than for second birth, suggesting that changing residence is a likely part of a prospective family-building strategy. Women who reported themselves to be students (a year prior) were less likely to make the transition to first birth. Those who had left the parental household were more likely to have a first child. Not surprisingly, these two variables were of no predictive value for second birth. Some might be concerned that such measures of residence and student status (especially this last in Italy) might be endogenous. The potential effect of child care is of particular in interest, since for some it represents the ability of the public sector to deliver services that are more family-friendly, or in other words, lower the cost for the couple in expanding family size. While we did develop a regional time series of children 3-5 in child care, our time series was not long. The resulting sparseness of the data meant that we never observed a statistically significant effect, and we have omitted that covariate from models we report here.

Conclusion

Italy has remained a puzzle for its persistent low fertility. Our approach has been to look inside Italy, examining regional differences, to shed some light on the trends in Italian fertility and the broader issue of "lowest-low" fertility in contemporary high-income settings.

Our results first confirm that the national pattern of reduction in childbearing to sub-replacement levels has been replicated within Italian regions. This drop has occurred in all Italian regions. Moreover, mirroring the puzzle of international comparisons, some of the Italian regions with the largest declines in fertility are those where such changes would have been least expected, a priori. Sardinia's decline from total fertility of 3.6 in the 1950s to 1.0 by 2000 is the exemplar.

A number of competing, yet intersecting, ideas have been offered to explain the decline to lowest-low fertility. These include entry of women in the labor force, differential in family-friendly public sectors support (such as child care provision), cost-of-living differentials, secularization, and others. We examine these hypothesized effects with multivariate contextual models estimated from event histories constructed from panel and retrospective data representative of the Italian population. Our models examine the process for women already in a union, recognizing that significant variation across several dimensions is manifest in the pattern of entry into union.

Our models give credence to several of these notions, identifying the empirical manifestations of the dynamic pattern of movement into childbearing and family formation. Our results unquestionably point to the effect of a woman's own employment on slowing down the rate of transition to first and second birth. The effect is large enough to reduce the odds of a birth in any given year by over 20% with the effect slightly larger for second birth than first.

For those who emphasize explanations more consonant with notions of cultural differences or secularization processes, our results also offer some support. For first birth of women in a union (but not second birth), those women in civil unions and particularly those in cohabiting relationships exhibits much lower childbearing rates than women who share all other characteristics. Women who married in a civil ceremony rather than a religious ceremony exhibit about 20% lower odds of making the transition to first birth.

Contextual conditions, here predominantly social characteristics of the region of residence lagged one year, are informative. There is the suggestion (thought not a statistically significant coefficient) that women residing in regions in which more of their peers work are less quick to move to first or second child. What is more, we have clear evidence that women who live in regions with a high ratio of civil unions to overall unions proceed more slowly to their first child, again a potential indicator of a more secular context, even after adjustment for the woman's own traits. Regional effects are visible in simpler models, but we cannot explain away the predictive power of region on second birth rates (much higher in the South) even after introducing many individual and contextual controls. Further compositional influences not yet controlled, selection processes, and culture itself continue to await introduction into more sophisticated models.

All told, our results point to the importance of structural and contextual conditions associated with the transition to very low fertility. At the same time our results push analysts to explain how contextual mechanisms might operate and why certain effects – such as a Southern regional difference – cannot be adequately explained away by technically superior models estimated with contextual data.

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Table 1
Descriptive Statistics, Person-Year Data for First and Second Birth
2003 ILFI Survey

Variable	Estimate	Standard Dev.	Mean	Standard Dev.
Individual Traits (Fixed)				
Age	27.099	6.851	32.406	7.891
Age Squared	781.307	428.060	1112.388	541.612
Cohort (vs. 1951-60)				
Cohort 1941-50	0.306	0.461	0.418	0.493
Cohort 1961-70	0.295	0.456	0.169	0.375
Cohort 1971-85	0.049	0.217	0.012	0.109
Respondent's Education (vs. diplome)				
Education of Respondent low	0.546	0.498	0.609	0.488
Education of Respondent high	0.096	0.295	0.093	0.291
First Birth Timing vs. Age 30-34				
Age at First Birth, 15-19			0.092	0.290
Age at First Birth, 20-24			0.428	0.495
Age at First Birth, 25-29			0.321	0.467
Age at First Birth, 35-49			0.046	0.210
Individual Traits (Time-varying)				
Employed	0.603	0.489	0.598	0.490
Union Type (vs. religious)				
In a Civil Union	0.065	0.247	0.064	0.245
In an Cohabiting Union	0.052	0.221	0.026	0.160

Table 2
Random Effects Logit Regression Models for First Birth
2003 ILFI Survey (Women in Union, 1941 and subsequent cohorts)

Variable	First Birth			
	Model 1		Model 2	
	Estimate	Standard Error	Estimate	Standard Error
Individual Traits (Fixed)				
Age	0.408 ***	0.408	0.377 ***	0.045
Age Squared	-0.008 ***	-0.008	-0.007 ***	0.001
Cohort (vs. 1951-60)				
Cohort 1941-50	0.142 **	0.062	0.073	0.087
Cohort 1961-70	-0.199 ***	0.065	-0.019	0.079
Cohort 1971-85	-0.257	0.121	-0.042	0.137
Respondent's Education (vs. diplome)				
Education of Respondent low	0.115 *	0.057	0.069	0.061
Education of Respondent high	0.156	0.096	0.150	0.100
Individual Traits (Time-varying)				
Employed	-0.356 ***	0.054	-0.366 ***	0.060
Own Union Type (vs. religious)				
In a Civil Union	-0.233 ***	0.112	-0.200 #	0.115
In an Cohabiting Union	-0.686 ***	0.160	-0.672 ***	0.165
Region of Residence (Time-varying)				
Northwest	-0.134	0.090	-0.013	0.100
Center	0.006	0.073	0.095	0.079
South	0.157 *	0.074	0.065	0.096
Contextual Measures (Time-Varying)				
Regional Female LFP rate			-0.073	0.239
Regional Marriage Rate (Overall)			0.108 **	0.037
Regional Marriage Rate (Civil)			-0.009 #	0.005
Constant	-6.127 ***	0.552	-6.183 ***	1.070
N Women	2403		2403	
N Observations	11034		11034	
N Groups	102		102	
Sigma	0.1015		0.0605	
Rho	0.0031		0.0011	
Log-likelihood	-5140.633		-4208.327	

*** = p < 0.001, ** = p < 0.01, * = p < 0.05, # = p < 0.10

Table 3
Random Effects Logit Regression Models for Second Birth
2003 ILFI Survey (Women in Union, 1941 and subsequent cohorts)

	Second Birth			
	Model 1		Model 2	
Variable	Estimate	Standard Error	Estimate	Standard Error
Individual Traits (Fixed)				
Age	0.820 ***	0.082	0.792 ***	0.091
Age Squared	-0.015 ***	0.001	-0.014 ***	0.001
Cohort (vs. 1951-60)				
Cohort 1941-50	0.261 ***	0.087	0.085	0.117
Cohort 1961-70	0.070	0.103	0.160	0.118
Cohort 1971-85	0.257	0.271	0.436	0.284
Respondent's Education (vs. diplome)				
Education of Respondent low	-0.008	0.086	-0.076	0.092
Education of Respondent high	0.093	0.147	0.087	0.151
First Birth Timing vs. Age 30-34				
Age at First Birth, 15-19	-0.220	0.202	-0.329 *	0.220
Age at First Birth, 20-24	-0.369 **	0.151	-0.348 **	0.158
Age at First Birth, 25-29	-0.436	0.141	-0.406 *	0.146
Age at First Birth, 35-49	0.500 **	0.294	0.507 #	0.303
Individual Traits (Time-varying)				
Employed	-0.294 ***	0.078	-0.279 ***	0.085
Union Type (vs. religious)				
In a Civil Union	-0.257	0.193	-0.244	0.198
In an Cohabiting Union	-0.950 **	0.347	-1.007 **	0.368
Region of Residence (Time-varying)				
Northwest	-0.395 ***	0.126	-0.412 ***	0.141
Center	-0.111	0.099	-0.108	0.106
South	0.600 ***	0.100	0.458 ***	0.137
Regional Characteristics				
Regional Female LFP rate			-0.264	0.356
Regional Marriage Rate (Overall)			0.067	0.051
Regional Marriage Rate (Civil)			-0.005	0.007
Constant	-12.845	1.241	-12.025 ***	1.881
N Women	1236		1236	
N Observations	10396		10396	
N Groups	101		101	
Sigma	0.051	0.051 ns	0.034	0.283 ns
Rho	0.001	0.001 ns	0.000	0.006 ns

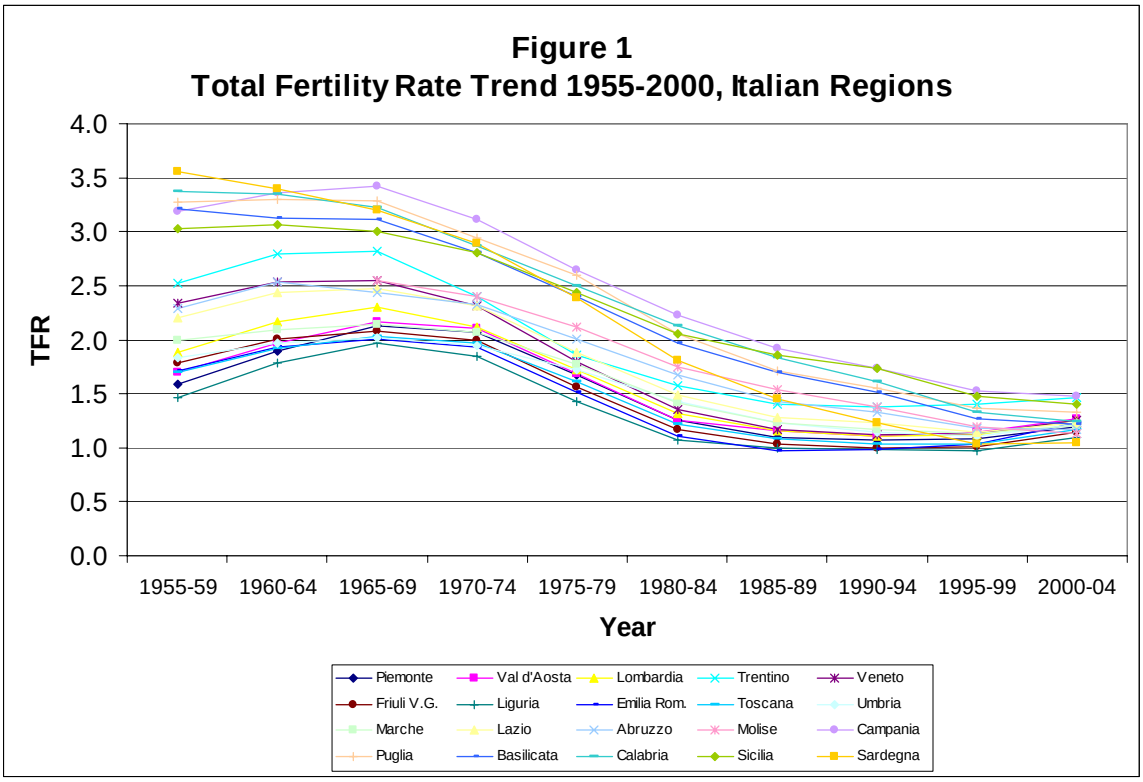
Figure 1
Total Fertility Rate Trend 1955-2000, Italian Regions
TFR
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1955-59
1960-64
1965-69
1970-74
1975-79
1980-84
1985-89
1990-94
1995-99
2000-04
Year
Piemonte
Val d'Aosta
Lombardia
Trentino
Veneto
Friuli V.G.
Liguria
Emilia Rom.
Toscana
Umbria
Marche
Lazio
Abruzzo
Molise
Campania
Puglia
Basilicata
Calabria
Sicilia
Sardegna

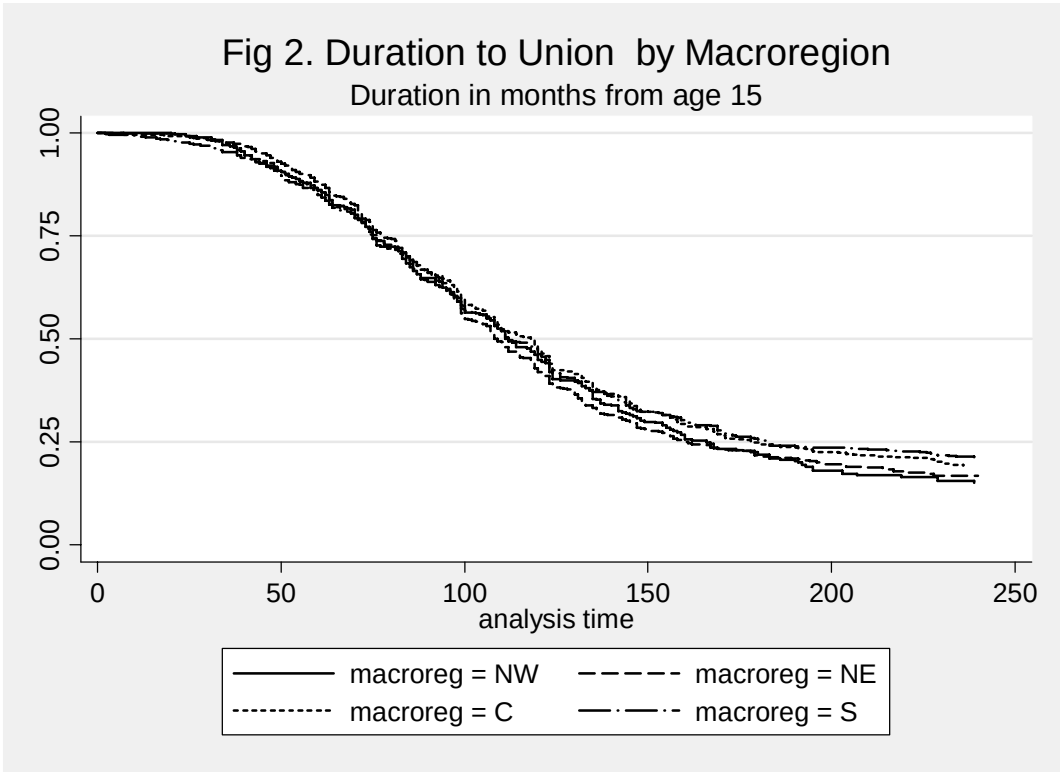
Fig 2. Duration to Union by Macroregion
Duration in months from age 15
0.00
0.25
0.50
0.75
1.00
0
50
100
150
200
250
analysis time
macroreg = NW
macroreg = NE
macroreg = C
macroreg = S

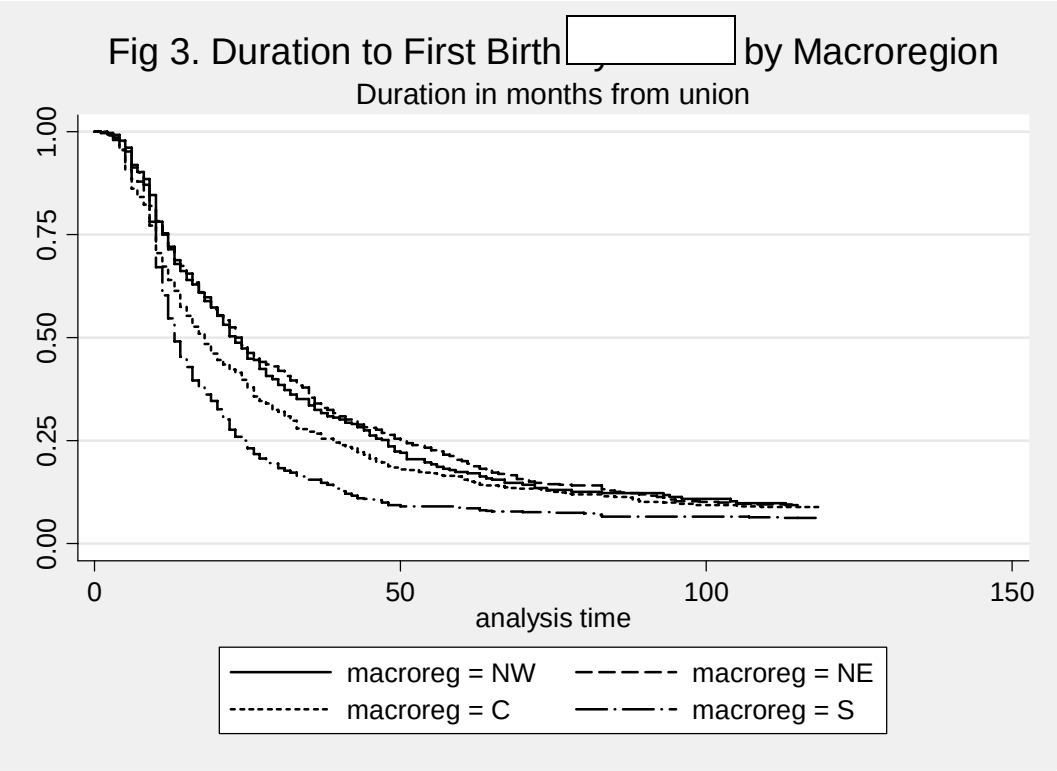
Fig 3. Duration to First Birth by Macroregion
Duration in months from union
1.00
0.75
0.50
0.25
0.00
0
50
100
150
analysis time
macroreg = NW
macroreg = NE
macroreg = C
macroreg = S

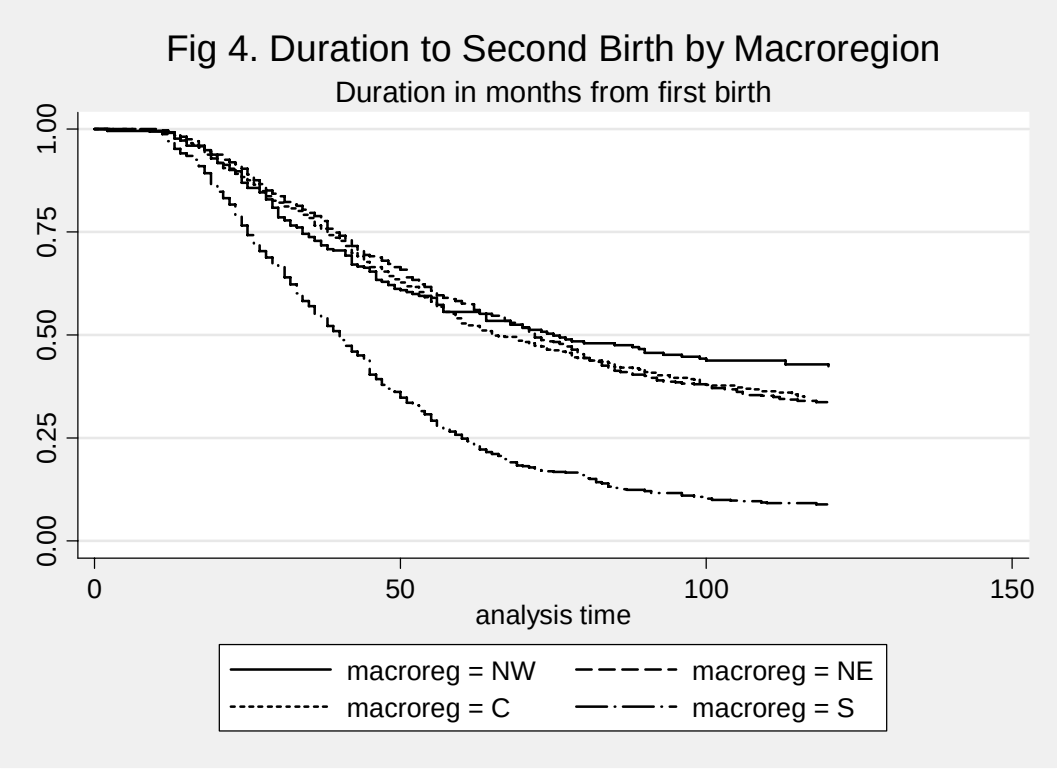
Fig 4. Duration to Second Birth by Macroregion
Duration in months from first birth
1.00
0.75
0.50
0.25
0.00
0
50
100
150
analysis time
macroreg = NW
macroreg = NE
macroreg = C
macroreg = S