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Does the Field of Study Affect Entry into Motherhood? Evidence from Italy

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Abstract

Differences in the transition to first motherhood in Italy have usually been explained using women's educational attainment, income, or employment instability. Our aim is to analyse whether, and how, entries into motherhood also vary by field of study. Drawing on the Indagine Longitudinale delle Famiglie Italiane (ILFI) up to 2005, we ran discrete-time hazard rate models. The results show that in Italy highly educated women trained in science and technology are not the least prone to enter into motherhood. Rather, three distinct groups of women emerge: a) those with a general upper secondary diploma and with a degree in medicine, who are the least likely to become first-time mothers; b) those with a degree in teaching and psychology, who are the most likely to become mothers; c) those trained in all other fields, who show no difference in timing to first birth. Thus, the woman's level and type of education seem to matter much less than what has been found in other countries. In a context with still relatively traditional gender roles and family formation processes, and with relatively weak returns to education, education appears to matter most in the transition to first union.

Keywords

Fertility, first-birth, education, field of study, Italy

* The authors have contributed equally to this study.

Introduction

In recent decades, women's levels of educational attainment have markedly increased throughout Europe, to the extent that women now form the majority of those enrolled for university degrees (Van Bavel 2012). Yet, gender segregation is still high (Alon and DiPetre 2015). Women are still underrepresented in the more lucrative and competitive jobs, being concentrated in ones that are poorly paid but easily combinable with family responsibilities, such as those in public administration, nursing or teaching. This concentration corresponds to a large extent with the concentration of women within specific fields of study: women have a higher tendency than men to seek diplomas or degrees in health or personal care, in teaching or in humanities, whereas they have a lower tendency to study science, technology, engineering or mathematics (STEM). As already well-established in the literature, these selected educational choices have important consequences for family formation.

In fact, a growing body of research shows that the field of education is just as important for entry into union and parenthood as the level of education: women trained in traditional female-dominated fields of study, such as teaching or health care, have lower probabilities of postponing family formation than women in science and technology. This association has been found in Norway (Lappegård and Rønsen 2005), Sweden (Hoem, Neyer, and Andersson 2006a, 2006b; Tesching 2012), Spain (Martín-García and Baizán 2006), Austria (Neyer and Hoem 2008; Neyer, Hoem and Andersson 2017), Greece (Bagavos 2010), Western Germany (Oppermann 2014), the Netherlands (Begall and Mills 2013) and in the USA (Michelmore and Musick 2014; Han, Tumin and Qian 2016). To our knowledge, no systematic investigation of the link between field of study and motherhood has so far been undertaken in Italy, where studies on first-birth decisions have primarily explored the impact of women's educational attainment (Caltabiano, Castiglioni and Rosina 2009; Impicciatore and Dalla Zuanna 2016; Cantalini 2017), of employment instability (Bernardi and Nazio 2005; Kertzer et al. 2009; Santarelli 2011; Barbieri et al. 2015) or of the field of study only for men (Guetto and Panichella 2011).

By drawing on the Longitudinal Survey on Italian Households (Indagine Longitudinale delle Famiglie Italiane- ILFI) up to 2005, we attempted to fill this gap by analysing whether, and how, different fields of study are associated with different timings and probabilities of transition to motherhood for Italian women born between 1945 and 1974. Italy is an interesting case on which to focus: it records one of the lowest female participation rates (52.5) together with one of the lowest total fertility rates in Europe (1.34), and one of the highest mean ages of women at first marriage (31.9) and first childbirth (31.0) (Eurostat 2018). Italy is also a country in Europe with one of the widest gaps in gender role attitudes, not only by level, already documented in the literature (Naldini and Jurado 2013; Matysiak and Vignoli 2013), but also by field of study.[1] In trying to explain the Italian delay in these major demographic events, it is of crucial importance to extend the analyses to factors, such as field of study, that might capture not only differences in labour market positions and prospects, but also in family and career orientations.

[1] Own calculations on the European Social Survey (ESS) data.

The relation between education and first birth: theoretical background

Three dimensions of education have been shown to be related to fertility and fertility postponement (Lappegard and Rønsen 2005): the duration of educational enrolment, the level of educational attainment, and educational field. Longer periods spent in education have been widely viewed as one of the main determinants of the postponement of family formation because there are normative expectations in society according to which individuals still enrolled in education are not yet prepared to embark on a long-term commitment, such as parenthood. Indeed, being a student and a mother at the same time is too demanding in terms of both time and money (Blossfeld and Huinink 1991; Lappegard and Rønsen 2005).

As pointed out by the economic theory of the family, not only a prolonged permanence in the educational system but also a higher educational attainment inhibits family formation. Higher levels of education entail a growth in the earning potential of women that raises the (opportunity) cost of eventual employment interruptions for children, thus reducing the demand for children (Becker 1981) or postponing them to later stages when women are more established in their jobs and taking a break is perceived as less damaging to their careers (Gustafsson 2001). According to culture-based theories, such as the second demographic transition, higher levels of education are also associated with female emancipation, value change and individualistic preferences entailing different gender and motherhood-fatherhood ideals and offering women more lifestyle paths and new alternatives to their mere role of wife and mother that inhibit family formation (Lesthaeghe 2002).

As a new line of research has recently pointed out, not only the educational enrolment and attainment, but also the field of study is important in shaping men's and women's family and work choices and outcomes. According to these studies, education is not just a means to accumulate human capital that can be later sold in the labour market and hence a mere indicator of the opportunity costs of childbearing. Education may also be a proxy for the rewards of childbearing, given that people do not value children and careers equally (Hoem and Hoem 1989; Lappegård and Rønsen 2005). The association between field of study and fertility decisions may be guided by four different mechanisms (Hoem, Neyer and Andersson 2006a; Martín-García and Baizán 2006; Tesching 2012). The first mechanism concerns the role of primary socialisation. Because of gender socialisation, women tend to go into educational fields that provide broader cultural knowledge and relational resources, while men enter competitive fields with more quantitative skills and material returns. However, women (like men) are not a unique homogenous universe: they differ in how they value and desire to invest in different life domains and roles (Lappegård and Rønsen 2005), and this difference affects both the choice of study discipline and the rate and speed of entry into parenthood (van Bavel 2010). More precisely, women with favourable values and attitudes toward family life and fertility tend to enter specific fields and later take up nurturing occupations – such as teaching, social work or health care – which are seen as extensions of the traditional gender roles (Lesthaeghe 2002).

The second possible mechanism is also a socialisation type of mechanism, but it operates not before but during the formative years. Young women (and men), through the content of the curricula and the degree of sex segregation in the chosen educational pathway, construct normative beliefs about what is appropriate to be and do, which impact on future family/fertility decisions. For instance, pursuing a particular education that highlights stereotypical female qualities, such as teaching and health care, and that enrols mostly women may foster women's

preferences for early family formation and high fertility (Hoem, Neyer and Andersson 2006a; van Bavel 2010).

The third mechanism centres on the role of perceived labour market conditions and prospects. Different fields of study convey differences in the chances of finding a job, in the (mis)match with available occupations, or in the time that it takes a woman to become established in the labour market. Additionally, different fields of study vary regarding the type of job to which they lead, in terms of job content, employment security, wages, or family friendly working conditions. For instance, jobs in the public sector tend to have lower penalties for career breaks and slowly changing skills (Blau, Ferber and Winkler 1992). Female-dominated sectors often offer more part-time employment, higher flexibility, and more exit and (re-)entry options (Hoem, Neyer and Andersson 2006a). Moreover, because they are closely associated with notions of femininity and motherliness, they typically offer flat careers and lower wages (Ochsenfeld 2014). This reduces the opportunity cost of marriage and motherhood in terms of forgone wages and skill depreciation, provoking an earlier and higher fertility. As recently shown by Barone et al. (2017), different perceptions of own skills and of economic returns to field of study importantly contribute to explaining between- and within-gender differences in educational choices.

Finally, the field of study may affect timing to first birth through differential marriage markets. In Sweden, previous research has shown that educational field is a better predictor of whether a woman has ever been married than educational attainment (Neyer and Hoem 2008). Women educated in female-dominated fields may be more inclined to more traditional union formation behaviours due to the three above-mentioned mechanisms (self-selection, socialization and less anticipated work-family conflict). Male-type and male-dominated fields (e.g. STEM disciplines) often lead to jobs with higher wages and prestige, also for women, but are associated with longer working hours, more demanding and less family friendly work environments, which may provoke later and lower rates of union formation. However, such fields may increase union formation prospects for women via the expanded availability of prospective partners (Michelmore and Musick 2014). That is, women in male-dominated fields may be less centred on family and more centred on work, but may have more chances of finding a partner among their colleagues and, consequently, may enter into a union and motherhood earlier.

The "field of study effect" in context: research hypotheses on Italy

As many scholars have argued, the effect of education on family formation and on the gender division of paid and unpaid work is institutionally and culturally embedded (Geist 2005; Steiber, Berghammer and Haas 2016). In particular, there is evidence that education polarizes behaviours to a greater extent where a general cultural shift in favour of non-traditional gender roles has not (fully) occurred (Lück 2006). In such relatively traditional contexts, such as Italy, education allows entry into good labour market positions – including good earnings with which to buy childcare (particularly important if reconciliation policies are poor) – and strongly differentiates attitudes (Künzler 2002; Lück 2006; Lomazzi 2017). Only highly educated women, especially those in remunerative fields, may receive the kind of legitimacy to work that they need in order to overcome traditional gender norms and practices, including becoming mothers with the sacrifice of their careers (Solera and Bettio 2013).

Although never explored in the Italian literature, the same wide gap in attitudes can be expected according to field of study, and this should lead to high fertility differentials across fields. According to this pattern, (the many) women choosing female-dominated fields that require qualities and skills typically defined as feminine, such as teaching and nurturing, tend to have orientations markedly different from those of (the few) women choosing low feminized fields associated with qualities and job positions considered masculine.[2]

High fertility differentials across fields can be expected also on the basis of high returns differentials by field of study, particularly important if the public support to the cost of children is low. Data indeed show that the graduates most in demand are those in the socio-economic field (31% of total hiring needs in 2013), followed by engineering and architecture (28%) (Montanari, Pinelli and Torre 2015). Although time to find a job and initial wages are not so different, these types of graduates, as well as those in medicine and other health-related fields, enjoy strong labour market prospects, leading to a steeper earning rise along their careers (Almalaurea 2015; Abbiati and Barone 2017). Data also show that the availability of childcare services in Italy is still very low, which makes own (or family) earnings important to be able to reconcile work with family responsibilities (Bettio and Plantenga 2004; Naldini and Saraceno 2011). Moreover, until the late 1990s to early 2000s, before deregulation reforms and welfare state retrenchment took place, protection in the public sector was used as a surrogate measure for universal work-family reconciliation policies, offering very attractive conditions in some sectors such as teaching, while further segmenting the labour force (Barbieri and Scherer 2009). On this reasoning, we test in this study whether there is a strong effect of field of study:

> *H1- Strong effect of field of study*: in traditional gender contexts like Italy, women in male-typed and male-dominated fields such as STEM are few and highly selected in terms of work-centred orientations, which induce them to postpone motherhood compared to women in other fields of study, especially those in teaching and health care (fields that not only select and produce care-centred preferences, but also lead to jobs more compatible with family responsibilities).

Yet, as underlined by Kotsadam (2011), in coercive contexts with strong gendered norms and scant support for care and reconciliation, women and men may be less free to follow their heterogeneous preferences. Italy is one such constraining setting. In Italy the share of people approving new gender roles has increased, yet it is still one of the lowest in Europe. For instance, the European Values Study (EVS) shows that in Italy the view that female employment is harmful for children still predominates (Naldini and Jurado 2013).[3] Italy is also a country with one of the lowest amounts of welfare support for the cost of children, in terms of both income transfers and availability of care services, and one of the countries with the highest gender asymmetry in the distribution of domestic and care work within couples, also when both are employed (Carriero and Todesco 2016; Eydal and Rostgaard 2018).

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[2] Eurostat data from 2005 (when the data used for our empirical analyses stop) show that the degree of feminization of different fields of graduation ranges from more than 75% in Humanities and Arts or in Education and Training; between 55 and 65% in Health and Welfare, in Social Science, Business and Law and in Science and Mathematics; around 45% in Agriculture, Veterinary or in Service fields; only 30% in Engineering, Manufacturing and Construction.

[3] In fact, more than 2/3 of Italians both in wave 1999 and wave 2008/2009 of the EVS agree that *"*A pre-school child is likely to suffer if his or her mother works*"*, with nearly no difference between the 50-74 and the 25-49 age groups.

Moreover, in Italy, labour demand and labour market returns to education are quite weak compared to other countries. The female activity rate in Italy has certainly increased since the 1970s, rising, according to OECD historical statistics, from 33% in 1970 to 51% in 2005 and 56% in 2017. Yet, it is still one of the lowest among advanced countries and with a strong weight of unemployment. Educational attainment has also expanded, especially among women: in 1989 only 6% of women and 7% of men aged 25-34 were graduates, against 19% of women and 13% of men in 2005, and 33% of women and 20% of men in 2017. Nevertheless, compared to most other advanced countries, in Italy university graduates are still few and struggle to secure good jobs: earnings differentials with less educated people, as well as earnings differences among various fields are smaller than elsewhere in the European Union.[4]

> *H2- Weak effect of field of study-* Low returns to education coupled with low public childcare supports and high gendered norms should reduce differentials in transition to first birth among women trained in different fields.

Data, method and variables

The analysis was based on the Longitudinal Survey on Italian Households (ILFI), a five-wave survey first carried out in 1997 on a national representative sample of 9,770 individuals belonging to 4,714 households throughout Italy. We used the entire history of the ILFI as collected in the first wave in 1997 and updated until the last wave dated 2005. Although relatively old, the ILFI is a dataset with a longitudinal design in a number of different areas (such as family, work and education, including the field) and thus makes it possible to reconstruct complete life histories for different female cohorts. In order to study transition into first motherhood, we used discrete-time hazard rate models by fitting simple logit regressions to the data. Thus, the dependent variable was the log-odds of the monthly conditional probability of becoming a mother within a particular month, given that the person had not had a child until that time. Following previous studies (e.g. Begall and Mills 2012; Tesching 2012), the dependent variable was equal to 1 nine months before first childbirth to capture the decision to have children more than the actual birth, which might also not occur because of spontaneous abortion. Moreover, in line with many studies (van Bavel 2010; Michelmore and Musick 2014), we modelled how field of study relates to fertility postponement, which includes both delay and childlessness. Yet, in the descriptive analyses, we show differences by field of study both of average age at first child and of share of childlessness at age 35.

As crucial independent variables, we included three measures of women's education. Educational enrolment was a dummy capturing whether the woman was still in education. Following the international standard classification (ISCED 1997), educational attainment consisted of three levels: up to lower-secondary education (ISCED 0-2), upper-secondary education (ISCED 3-4) and tertiary education (ISCED 5-6). We also incorporated the variable 'field of study', which referred to the main subject matter of these studies. In low education, field was not applicable. In

[4] Italy has the second lowest attainment rate for tertiary education in the European Union (22.4% in 2013 for the 30-34 age group), coupled with a very high dropout rate (45%). Once education has been concluded, the employment rate of tertiary graduates after 3 years is 16 percentage points higher than that of upper secondary graduates; yet, it is still 24 percentage points lower than the EU average. Moreover, in Italy the relative earnings of tertiary graduates (aged 25-34 years old) correspond to 122% of the income of peers with only upper secondary education. This proportion is 140% for the OECD average (Montanari, Pinelli and Torre 2015).

medium-level education, some fields had small Ns; consequently, we grouped the original categories into three groups. The first group included unspecified basic programmes: called "general" (corresponding, in the Italian system, to "licei"). Following previous research, in the second group of medium-level education we merged health care with education and humanities and arts in the category called "care and social skills" (which includes, in the Italian system, "magistrali and istituti d'arte") (Martín-García and Baizán 2006). This category – used as the reference – has traditionally been female-dominated and associated with lesser professional aspirations; hence it is expected to be the most inclined to early motherhood. The third group (called "others") included the remaining list of studies within the upper-secondary level of education ("istituti tecnici industriali, istituti tecnici commerciali, geometri, istituti professionali") (Guetto and Panichella 2013).

With regard to university level education, we first distinguished five fields: humanities and arts ("lettere"); social sciences, business and law ("economia e statistica, scienze politiche e sociologia, giurisprudenza"*)*; science, architecture, engineering, manufacturing and construction; health care ("medicina") and teaching/psychology ("magistrali e psicologia").[5] The use of a more disaggregated version would have certainly been more informative (e.g. Hoem, Neyer and Andersson 2006a, 2006b; Tesching 2012), but this option was blocked by too small cells sizes.[6] Yet, in a second step, we also ran models without distinguishing the field at the secondary level of education but only at the tertiary level so as to be able to capture more distinctions among graduates. For example, we put in a separate category those with only 3- year programmes, which include those studying as nurses, physiotherapists, social workers (in "softer", female-dominated and possibly more nurture-oriented educational fields); or we separated women studying engineering from those studying science (the latter , unlike the former, often becoming teachers). To be more precise, in this second step we distinguished nine tertiary fields as follows: three-year degree programmes ("diploma universitario"); social sciences and business; law; humanities and arts; architecture, engineering, manufacturing and construction; science; health; and others. We believed that using a separate category for three-year degree programmes is important in order to disentangle the heterogeneous world of health care.

Previous research on the effect of field of study on family formation in other countries shows that women trained in teaching and health care have much higher first-birth risks than any other major grouping at each educational level. What it means to be in the health care field is clear in most of these countries, where data make it possible to distinguish "midwifes, nurses and/or medical assistants" from individuals who will go on to become "doctors". Women majoring in personal or social care (i.e., those in tertiary low: vocational college on midwife, nursing) indeed achieve early transitions to union and parenthood in Norway, Sweden, Austria, Greece, the Netherlands, West Germany and the USA. However, women majoring in pre-med (tertiary high: upper tertiary

[5] For university-level education, cases with missing information on the field (3% of women, i.e. 91 cases) or with 3 years "diploma universitario" (2,6%, i.e. 82 women) were included in the analysis, assigning to them the corresponding field obtained by these women while enrolled in upper-secondary education.

[6] In Eurostat statistics and in other studies, teaching and psychology are separated as well as science, mathematics computing from engineering or veterinary agriculture (Hoem, Neyer and Andersson 2006a, 2006b; Tesching 2012). Yet, here this is not possible either because they are merged in the original ILFI categorization or because of too small cells. Indeed, in our cohorts the share of women with a tertiary education amounted to 13% (see table 1), ranging from 12% in the first and second cohort to 20% in the youngest. This share of graduates corresponds, in ILFI, to a sample of only 400 women, who distributed among the various fields as follows: 20% (corresponding to 85 women) in 3-year degrees, another 20% in arts and humanities, 10% in economics, law, education and psychology, or science (roughly 35 women in each group), 5% in social science or in medicine or in architecture (roughly 20 women in each), and only 2% in engineering (6 women).

education and research degree in medicine) show no significant advantage and delay marriage and childbearing in all these countries, with the sole exception of Norway. Physicians are shown to be positioned somewhere in between. The explanation given is that midwifes and nurses study for a relatively short time and qualify for occupations that involve care for other people, so that they are most prone to childbearing. For medical doctors, the mean age on completion of education (medicine is quite different in terms of the duration of study) and preference heterogeneity (women educated in the (para)medical field aim at occupations that generally are related to strong work-orientations and to high costs of withdrawal from the labor market) certainly plays a role in producing no clear-cut relationship with motherhood. Guetto and Panichella (2013) using our same dataset but for Italian men do not distinguish midwifes, nurses and/or medical assistants from doctors. With some caution due to data limitations, such as no type distinction within "diploma universitario" and small sample sizes, we have tried to go further in our analysis for Italian women.

The impact of these four education-linked variables was controlled by a number of variables. We included birth cohort and region of residence to capture socialisation to different gender/family models and exposure to different sets of opportunities and constraints. More precisely, our analysis concerned women born between 1945 and 1974, a period in which Italian education expanded rapidly (Shavit and Westerbeek 1998). Because the last interview dated to 2005, only those born between 1945-1954 and 1955-1964 could be entirely observed for a quite large span of their life courses, until their forties. For the last cohort (1965-1974), we captured the life course as much as possible – not less than 31 years – to observe the transition to motherhood. Nevertheless, it should be borne in mind that for this latter cohort we estimated childlessness by age 35, which cannot be considered as permanent childlessness. In fact, this is the reason why we excluded the youngest cohorts (those born after 1974), for which we could not at all capture the phase of starting up a family. Oldest cohorts were excluded because of too low educational attainment (e.g. only 5% of women born between 1935 and 1944 were graduates).

Moreover, as already said, numerous studies show that family formation – in particular transition to first child – is encouraged by employment and economic security and by family friendly jobs like those in the public sector. In order to check whether the impact of level and field of study remains after controlling for position in the labour market, we introduced the woman's activity status and, if employed, her occupational position (captured by occupational prestige score), sector (public vs. private sector) and contract (self-employed or temporary, permanent and without contract employees). In the absence of information on wages, these variables are also meant to capture monetary returns to education, although we are aware that they do so in a very rough way.[7] ILFI, like most retrospective panels, does not contain information on attitudes and intentions, so it is not possible to detect which causal mechanism works behind the observed association between field of study and entry into motherhood. However, by means of event-history regression models, ILFI can show whether this association exists and still remains after controlling for duration and level of education and for the woman's current labour market

[7] Also occupational class, in a detailed extended version like the 11-EGP class schema, could be used as a proxy for earnings. Yet small cell numbers for tertiary educated women of different fields prevented us from using the extended version of class. Hence, following those who argue in favour of using occupational status as an alternative to class in order to proxy earnings (Schooler and Schoenbach 1994; Goldthorpe and McKnight 2005), we ran models with prestige score of the current occupation, assigning 0 to those periods where the woman did not work. The ILFI occupational score ranks occupations according to their 'desirability' expressed by a representative sample of (Italian) individuals: desirability concerns monetary, in kind, and immaterial rewards, and it is measured along a 93-grade scale, as proposed by de Lillo and Schizzerotto (1985).

position, suggesting that not only strict instrumental human capital returns may be at play.

Some effects of field of study on fertility may be indirect, working through variation in age at and rate of marriage (Michelmore and Musick 2014). We therefore distinguished whether the woman was in a union or not.[8] Since fertility decisions are mostly taken within a partnership, and because the male partner's characteristics, his attitudes and his current or potential resources, are crucial in pushing couples towards long-term commitments, especially in still relatively male-breadwinner contexts like Italy (Blossfeld et al. 2005), as a robustness check we also ran models controlling for the male partner's educational attainment. Finally, as necessary in discrete time models, we included a variable indicating duration in origin state – that is, the time elapsing since the opening of our observational window at age 15 (plus duration squared, to capture curvilinear chances of becoming a mother as age increases). With the exception of birth cohort, all these factors change over a person's life course, so they were introduced as time-varying covariates. Table 1 (see Appendix to the present document) provides an overview of all the variables used in the event-history models and their distribution.[9]

The next sections, by analysing the data, will show whether in Italy women born between 1945 and 1974 trained in male-typed and male-dominated fields are more, less, or equally likely to become mothers compared to differently educated women, suggesting which of the possible above-mentioned opposite mechanisms is at play.

Results: Does the field of education matter in Italy?

Descriptive evidence

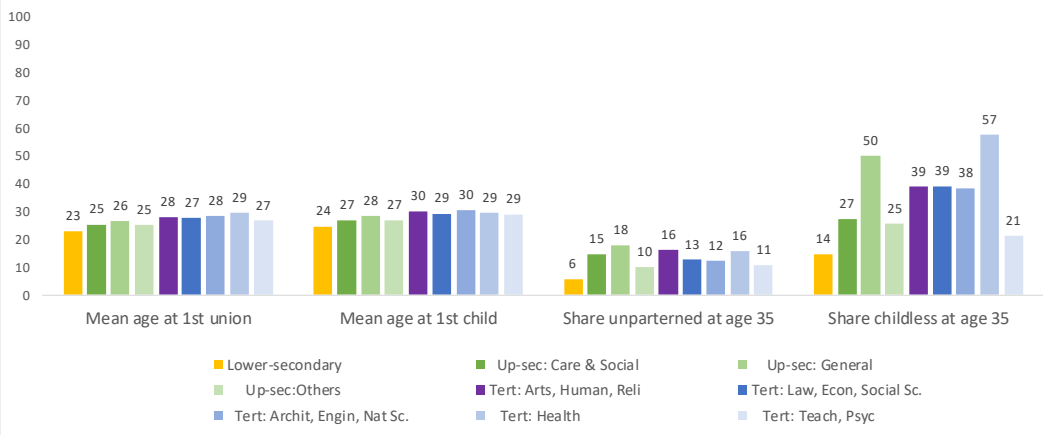
Figure 1 shows whether and how, in Italy, the timing and probability of entering motherhood vary by level and field of education. Although single motherhood exists as the outcome of out-of-partnership pregnancies or access to technology-assisted reproduction, in Italy women's transition to motherhood still occurs within stable partnerships and especially within marriage, especially in the cohorts considered here (women born between 1945 and 1974): this is evidenced by the close correspondence between mean age at first marriage and mean age at first child, the former occurring on average two years before and without large differences across fields of education at each level. Yet, if one looks at the probability of being still childless at age 35 rather than average age when becoming a mother, field of study seems to matter: within upper-secondary education, 49.7% of women in general tracks are still childless versus around 25% for the others; within tertiary education, 57.1% of female graduates in health care are still childless at age 35, versus 38.2% in architecture, engineering, natural science; 38.7% in arts and humanities and 39% in law, economics and social science, and versus only 21% in teaching and psychology. Shares of women who are not married/cohabiting at age 35 diminish for all women, but female graduates in teaching and psychology are also those more prone towards union formation at the same level of education. Since education has expanded across cohorts, these shares largely correspond to the behaviour of

[8] In our cohorts, cohabitation was rare, so we merged episodes of marriage with cohabitation.

[9] Since almost all covariates are time-varying, their distribution changes over time. Here we decided to show distribution at age 35, an age when most of our women had completed both education and transition to first child (reference file: person file) and distribution across all observational periods, that is, across all months for all women born between 1945 and 1974 starting from age 15 to first childbirth or to age 40 (35 for last cohort) if remaining childless (reference file: month-person file).

the youngest cohorts: indeed for women born between 1945-54 only 11% are childless at age 35 among the graduates and 10% among the not-graduates, whereas for women born between 1955 and 1970 39% are childless among those with tertiary education and 21% among those with middle and low levels of education.

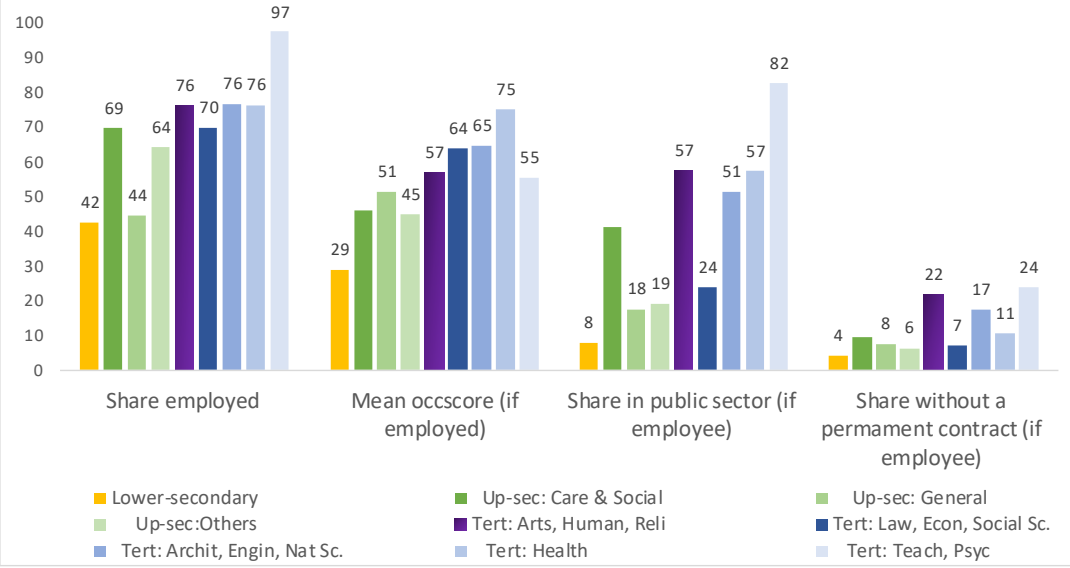
Figure 1 – Timing and probability of becoming first-time mothers in Italy, by field of education



Source: ILFI all waves (1997, 1999, 2001, 2003, 2005).

Figure 2 describes the position of women in the labour market by field of education at age 35 when, in our cohorts, family formation is typically concluded and labour market careers are often

Figure 2 – Labour market position of women at age 35 in Italy, by field of education



Source: ILFI all waves (1997, 1999, 2001, 2003, 2005).

stable. The position is captured by employment status, occupational position (mean occupational score), sector and contract, that is, by the same covariates used later in the regression models. This picture at age 35 signals what is the normal employment and occupational destiny of women within each field, a normality of which young women have a certain knowledge/perception when they choose what to study, and later whether to have children.

Women trained as teachers and psychologists are the most likely to be employed at age 35 (97.4% are employed). They indeed typically reach professions and jobs which are not the most prestigious (mean occupational score of 55) but which have working schedules or public sector conditions compatible with family responsibilities, which reduce the cost of children because they prevent labour-market interruptions around childbirths, especially in Italy. Within tertiary degrees, women trained in health care, architecture, engineering, natural science or in arts and humanities (around 76%) are the second most likely to be employed at age 35. Women trained in law, economics or social science have the same employment rate as women with an upper-secondary diploma in care and social skills (69%), although the latter have a lower occupational position in terms of prestige compared to the former (mean occupational score of 46 vs 63). Italian women with tertiary degrees in health care or teaching-psychology are those working in the highest occupational positions or in most family friendly jobs respectively. Differences in terms of contract are less marked.

By means of event-history regression models, the next section sheds light on the association between field of study and first motherhood net of level and duration of education and its labour market returns.

Event-history models' evidence

Our evidence on the link between field of education and transition to first child in Italy is summarised in Table 2 (see Appendix to the present document), where six discrete event-history models are reported. Models 1a and 1b estimate, *ceteris paribus* (birth cohort, region, duration, marital status), the effect of educational enrolment and educational attainment without controlling for the woman's current labour market position (a) or after controlling for activity status, sector, contract and occupational position. Models 2a and 2b add field of study at each education level, again without (a) and with (b) controls for labour market position. Models 3a and 3b use a different categorisation of fields of study, distinguishing them only among graduates. Although education and occupational position are obviously associated, a preliminary check has shown that, in Italy in our cohorts, this association is never too high to encounter problems of multicollinearity when introducing them in the same model.

The data confirm that women still in education are less likely to become mothers than women who have completed education. The effect is similar to that previously found in other settings, for example in social-democratic Norway (Lappegård and Rønsen 2005).[10] As in most Western countries, finishing full-time education counts as one of the key prerequisites for motherhood in Italy. However, in contrast with the expected negative effect of educational attainment, women with a middle or low education have the same first childbirth rate as tertiary-educated women

[10] If we translate B coefficients of Table 2 into odds ratios, the odds ratio of being enrolled in education versus not being enrolled is equal to 0.32, very similar to the 0.36 of Table 2 in the Norwegian study, which controls for a very similar set of variables.

(Model 1a 1b). The postponement effect of high education appears only when the control for being in a partnership or not are removed. This suggests that, in Italy, destandardisation of the life course is not common and that cohabitation, but especially marriage, is still the precondition of having children. In other words, our results reinforce previous findings that the opportunity cost of motherhood for highly educated women may be revealed more in the timing of union formation than in that of motherhood (Cantalini 2017) and in the rate of labour-market interruptions around childbirth (Solera 2009). This is also in line with the finding of Kertzer et al. (2009), who show that women with low or high education experience marriage more rapidly than middle-educated women – the U-shaped effect – while a woman's level of education does not matter in predicting the first birth transition. The absence of a postponement effect in fertility for tertiary-educated women may also be explained by changes across cohorts. Models separated by cohort show, in fact, that, for the 1945-1954 cohort, there was a significant positive effect of middle and high education on the transition to first child, which disappears for the second cohort (1955-1964) to become negative in the last cohort (1965-1974).

What about the effect of field of study? In line with hypotheses 2, we find that, in our Italian cohorts, women's educational field is not strongly linked with female reproductive behaviour. Given the relatively bad position of Italy in terms of employment level, economic returns to education and social welfare, and in terms of diffusion of traditional gender and family norms, the association between field of study and entry into motherhood is less strong than previously reported for other countries where fertility decisions are more value-driven because, as argued by Kotsadam (2011), they are less constrained by employment and economic uncertainty or by a mother-centred emphasis on care responsibilities (shared neither by the state nor the man). Indeed, on the one hand, model 2a shows that higher first-birth risks are not found among women trained in fields associated with stereotypical female qualities and relational skills, such as teaching and health care. Upper-secondary women instructed in the category of general subjects ("licei") are those who have the lowest probability of having the first birth (perhaps due to their reduced employability prospects and to a high self-selection, since the vast majority of young women enrolled in "licei" continue studying by entering tertiary tracks) while, in line with the above-mentioned Figure 1, women with a university degree in teaching and psychology are the first to become mothers, together with women with only up to lower-secondary education. Other types of diploma in medium-level education show the same likelihood of motherhood as the reference category (diploma in care and social skills). Nor are college-educated women trained in STEM fields significantly less prone to enter into motherhood.

On the other hand, inspection of fields of study adds some interesting insights into the picture of the transition to first childbirth in Italy. It emerges that not all highly educated women display a lower propensity to motherhood. In fact, compared with upper-secondary educated women in caring and social skills, highly educated women trained in teaching and psychology are more likely to become mothers. By contrast, highly educated women trained in health care do not display a positive tendency to become mothers but rather a negative (although insignificant) one; and this probably reflects the long duration of health care studies[11] and of settling down in the Italian labour market once completing them and the difficulty of combining family duties with such professions with high responsibilities and irregular and long working hours (Gaiaschi 2019). However, some caution is necessary due to the small sample size, which may preclude the

[11] On running models without the covariate "education enrolment", the coefficients of "tertiary, Health" (models 2a 2b), as well as of "level of education" (models 1a and 1b) become significant.

detection of statistically significant effects in the health care category, as instead emerging in the descriptive figures (see Figure 1). A calculation of predicted probabilities, indeed, shows that, albeit with large interval confidences, women graduated in health have 0.0040 probability of becoming mothers, the same as "licei", against 0.0067 of women graduated in teaching and psychology. The other types of education have a probability of around 0.005.

In models 3a and 3b, we distinguish further within tertiary education. In order to separate women trained as midwifes, nurses, physiotherapists from those who go on to become doctors, distinct categories for three-year degree programmes and five-year degrees and/or masters/PhDs are used. The results confirm that not all highly educated women display a lower likelihood to motherhood in Italy. Once again, entry into motherhood appears more common for tertiary-educated women in teaching and psychology than for women with no tertiary education. Once the former category "law, economics and social sciences" is disaggregated into two subcategories – "law" on the one hand and "economics and social sciences" on the other – we find that women with a degree in teaching and psychology, economics and social sciences, arts and humanities are the most likely to become first-time mothers. Women with university degrees in technical studies are less prone to have the first child, as are women without tertiary education and women graduates in law, in science and in health (medicine). In Italy, as happens with women in male-typed and male-dominated fields such as STEM, those who go on to become doctors are few and seem to be highly selected in terms of work-centred orientations, which, together with long times to get established in the labour market, induce them to postpone motherhood compared to those trained in teaching and psychology, who seem to be more care-centred and hold jobs more compatible with family responsibilities.

The comparison between model 2b and 3b with 2a and 3a shows that the type of education discourse changes little when we add variables concerning the woman's labour market position (activity status, sector, contract or occupational score). This suggests that variation according to field of study is not entirely instrumental and implies a possible relation between the choice of a softer, more female-dominated (and family oriented) educational field and a more traditional fertility behaviour. Besides having jobs with more flexible family friendly schedules and conditions, women in the teaching and psychology fields may give high value to having children and to social skills activities, so that they more quickly form a family compared to differently trained women working in similar sectors, contract and occupational positions.

These models also show that occupational score and sector do not really matter for those women who are employed, while type of contract seems to matter in the direction opposite to what theories of the effect of deregulation on family formation predict: Italian women with fixed-term contracts both in the private and public sector accelerate transition to motherhood. This is probably due to the time span of our data and analyses, which focused on women born between 1945 and 1974, and therefore on women building their families and careers from the 1970s to the mid-late 1990s, when the process of labour market deregulation was in its early stage, temporary contracts were rare in specific sectors and positions, and traditional male breadwinner norms were still powerful. Previous studies on the same time span indeed confirm that work uncertainty affects only men's transition to parenthood (Bernardi and Nazio 2005), whereas among women the only distinction is employment status, as we also find: women with a job are less likely to become mothers than jobless women. Other studies focusing on more recent cohorts or periods (Vignoli, Drefahl and De Santis 2012; Barbieri et al. 2015) instead find that the first pillar (i.e. a male partner with a stable and well-paid job) is still crucial in directing fertility decisions, but in

dual-earner couples both his and her permanent position encourages childbirths, especially if she is highly educated.

Robustness checks

As shown in Table 2, in Italy union formation is the strongest driver of transition to first birth. Hence the reason why we find a weak effect of field of education (but also of level) may be the fact that education especially matters in shaping whether and when women enter a stable union. Once they have entered, having children is "normal", so that there may not be differences across women and couples. To furnish a more nuanced and fine-grained picture of the multifaceted influence of education on family behavior in Italy, we thus also analyse whether there are differences among fields in regard to entry into first marriage/cohabitation. To the best of our knowledge, no study has been undertaken to examine this issue in Italy.

Table 3 (see Appendix to the present document) displays the estimates of discrete time models for entry into first union in Italy. First, as expected, the effect of full-time educational enrolment is substantial. It appears to strongly deter union formation, which reflects that the incompatibility norms between student and family roles are particularly pervasive for union entry. This negative impact is larger for entry into union than into motherhood. Second, the impact of level of education confirms a negative association between educational attainment and union formation for women in Italy. Middle and high educated women are less prone to enter into first union than are those with a low level of education. Third, once we distinguish various fields of study within medium and high educational levels, it again emerges that those with an upper general secondary diploma ("licei") are the least likely to enter into first union, while those with a tertiary degree in teaching and psychology are the most likely to do so, this time together with the low educated.

If we distinguish only among graduates, entry into union appears more common for tertiary-educated women in teaching and psychology, in the same way as women graduates in economics and social sciences, arts and humanities, and, unlike for first child, in science and in engineering-architecture and without tertiary education. It is only women in medicine and in law that are the most likely to postpone entry into first union, together with women with a "diploma universitario". In the latter case, it may be due to the lower employability when compared to those with five-year degree programmes; in the former case to high professional aspirations and to long periods of training before obtaining stable and remunerative positions.[12] As for the transition to first child, this effect of field of study on the transition to first union does not change when we control for the labour market characteristics.

Moreover, in Italy, at least until 2005, the male breadwinner norm was still very influential. This means that once a woman is in a relationship, it may be the labour market conditions and career prospects of the male partner which mainly drive the timing and realisation of her fertility expectations. In this sense, as a robustness check, we also ran models of Table 2 controlling for partner's educational attainment as a proxy for his attitudes and his employment and economic prospects.[13] Interestingly, in models 1a and 1b with educational level, the woman's university

[12] Again, as it was for the transition to first child (see table 2 and note 11), by running models without the covariate "education enrolment", the coefficients of "tertiary, Health" (models 2a and 2b) become significant, suggesting that much of the effect of medicine on family formation operates through increased time in school.
[13] Results not shown here but available upon request.

degree becomes significant by adding the partner: college-educated women have children before/faster than those with low- or medium educations. In models with field of study, the tertiary field category "teaching and psychology" loses significance.

Conclusions

Differences in the transition to first motherhood in Italy have been traditionally explained by using women's educational attainment, income or employment instability. No attention has been paid to the role of the field of study. Using data from the ILFI and focusing, by means of event history models, on the effect of three dimensions of education – enrolment, level and field – on first transition to motherhood, this study has started to fill this research gap. In a cultural, structural and institutional women-unfriendly setting like Italy, education pays off not only with better chances of entering the (good) labour market but also with greater legitimacy to work even in the presence of children and even in the absence of generous family policies, so that one can expect a strong effect of level of education on first-birth postponement. Moreover, in a context like Italy where tertiary education attainment is low, labour market opportunities, earnings and career prospects are quite segmented, where universal support for the cost of children is weak, field of study may also matter to a great extent. Indeed, women who break with prevailing norms and reach quite rare remunerative and prestigious positions may self-select into male-typical fields like STEM and postpone fertility; women with care oriented and family oriented preferences may choose fields such as teaching, psychology and health care which imply and reinforce stereotypical female qualities and/or which lead to jobs and sectors facilitating the combination between work and family responsibilities, so as to anticipate fertility.

By contrast, our results show that in Italy, in the cohorts of women born between 1945 and 1974, high levels of education do not entail lower transitions to first child and that the classic distinctions among fields of education found in other countries matter less, supporting the *weak effect of field of study* hypothesis (H_2). Low employment opportunities and returns to education together with still widespread traditional gender and family norms seem to reduce in Italy differentials in the transition to first birth among women trained in different fields. College-educated women trained in STEM fields are not the least prone to enter into motherhood. Rather, three distinct groups of women appear: a) those with a general upper secondary diploma and with a degree in medicine, who are the least likely to become first-time mothers; b) those with a degree in teaching and psychology, who are the most likely to become mothers; c) those trained in all other fields, who show no difference in timing to first birth. This effect of field of study does not change when we add variables concerning the woman's labour market position. Moreover, when controlling for partnership status, the woman's labour market position does not matter: the only divide is between working or non-working women, the latter being more likely to become mothers.

Four mechanisms behind the possible association between field of study and fertility decisions have been pointed out in the literature. Women who have acquired different types of education may have different entry rates into motherhood because of differences in already-existing individual attitudes and values; in more or less family oriented socialization during the formative years; in cost-benefit calculations concerning their prospective occupations and career paths; in marriage markets. Due to our dataset characteristics with an absence of retrospective information either on attitudes, intentions and negotiations within couples, or on income and wages, in this study we have not been able to separate out causal from selection effects, and thereby test which

of the mechanisms are at work. Not being part of a comparative harmonized cross-country dataset, it is also impossible with ILFI data to test the specificity of the Italian findings to see whether and why Italy is different from other countries in its interplay between education and fertility. However, by running event-history models on the effect of field of study on transition to first motherhood net of level and duration of education and net of its labour market returns (measured through occupational score, sector and contract), some interesting insights can be drawn.

First, the educational field is an important dimension to consider when studying the relation between education and fertility, since the actual effect of education level does not surface until we control for fields of study. Not always do tertiary educated women delay or forgo fertility compared to the less educated: highly educated women trained in teaching or psychology are more likely to become mothers compared with low and most middle educated women (apart from those attending "liceo" and not going on to university). In addition, field of study remains significant after controlling for women's position in the labour market. This suggests that something more than wage and employment conditions – i.e. more than strict instrumental human capital returns – are involved: women are a heterogeneous group with different family and career orientations, and the field of study may contribute to capturing this variation.

At the same time, the fact that women graduated in STEM do not behave differently, while women graduated in health care fields tend to postpone first childbirth as much as women with a "liceo" diploma, suggests a complex interplay among material, cultural and institutional factors. Structural and institutional constraints, such as the long time necessary in Italy to settle down and achieve high earnings for those going on to become doctors, or such as the low labour market match for the few that attend "licei" and do not go on to university, in a context of weak family policies, certainly matter in explaining their negative effect on fertility. Cultural constraints, such as a strong emphasis on motherhood as central to women's identities and roles, combined with good labour market prospects, may cancel out the self-selection of the few women choosing very male-dominated and career-oriented fields like STEM, so that these women do no show a lower and slower propensity to become mothers. Nevertheless, the limitations of ILFI data must be borne in mind. Childlessness can only be estimated by age 35 for the youngest cohort (1965-1974), which is not permanent childlessness, and this limitation makes it difficult to determine clear-cut associations. Moreover, relatively small amounts of graduated women in our cohorts may have precluded the detection of statistically significant effects. Indeed, when we only distinguish the field of study at the tertiary level, the coefficients for women with university degrees in technical studies and in medicine become significant: these women are among those with the lowest probability of having the first child likewise women with a tertiary degree in law and in natural science. Consequently, our results should be seen as preliminary.

The second insight, connected to the importance of prevailing cultural models, is that in Italy the role of both level and type of education in driving transition to motherhood may increase as de-traditionalization in family and gender patterns increases and tertiary education attainment and gender de-segregation in education expands. The fact that women with an upper-secondary education appear to have the same first-childbirth risks as some tertiary-educated women, and that the effect of the woman's education and sector disappears when controlling for partnership status suggest that in Italy marriage, at least until 2005, was still the precondition for having children and that the male breadwinner norm was still very influential. Our robustness analyses confirm that education matters more in the decision whether and when to enter first union than first child. This suggests that, in the Italian context, women with specific values attached to family

life choose fields such as teaching and psychology that lead to more female occupations, either for contents or for family friendly working conditions, and they more rapidly enter a stable partnership with fertility plans. Yet, once they are in a union, it is mainly the economic and career condition of the male partner that drives the timing and realisation of such fertility plans. ILFI stops in 2005. Whether this is true also for younger cohorts and more recent years remains an open question. It is also still an open question whether the choice of educational field is reflected in women's (but also men's) fertility over the life course, i.e. second/third births. Future research, with the availability of data including longitudinal information on both behaviours and attitudes and for both partners, should address these issues.

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References

Abbiati, G. and Carlo Barone (2017). "Is University Education Worth the Investment? The Expectations of Upper Secondary School Seniors and the Role of Family Background." *Rationality and Society* 29(2): 113-159.

Almalaurea (2015). *XVII Indagine sulla Condizione Occupazionale dei Laureati*. Bologna.

Alon, S. and Thomas A. DiPetre (2015). "Gender Differences in the Formation of a Field of Study Choice Set." *Sociological Science* 2: 50-81.

Bagavos, Christos (2010) "Education and Childlessness: the Relationship between Educational Field, Educational Level, Employment and Childlessness among Greek Women Born in 1955-1959." *Vienna Yearbook of Population Research* 8: 51-75.

Barbieri, P. and Stefani Scherer (2009). "Labor Market Flexibilisation and its Consequences in Italy." *European Sociological Review* 25(6): 677-692.

Barbieri, P., Bozzoni, R., Scherer, S., Grotti, R. and Michele Lugo (2015). "The Rise of a Latin Model? Family and Fertility Consequences of Employment Instability in Italy and Spain." *European Societies* 17(4): 423-446.

Barone, C., Schizzerotto, A., Abbiati, G.M. and Giulia Assirelli (2017). "Gender, Information Barriers and Fields of Study Choice: a Field Experiment." SciencePo: Laboratoire interdisciplinaire d'evaluation des politiques publiques (LIEPP Working paper n.63).

Becker, Gary S. (1991). *A Treatise on the Family.* Cambridge, MA: Harvad University Press.

Begall, K. and Melinda C. Mills (2012). "The Influence of Educational Field, Occupation, and Occupational Sex Segregation on Fertility in the Netherlands." *European Sociological Review* 29: 720-742.

Bernardi, F. and Nazio, T. (2005). "Globalisation and Transition to Adulthood in Italy," (347-372) in *Globalization, Uncertainty and Youth in Society,* edited by Blossfeld, H.-P. et al. London: Routledge.

Bettio, F. and Janneke Plantenga. (2004). "Comparing Care Regimes in Europe." *Feminist Economics* 10(1): 85-113.

Blau, F. D., Ferber, M. A. and Anne E. Winkler (1992). *The Economics of Women, Men, and Work.* Upper Saddle River: Prentice Hall.

Blossfeld, H.-P. and Johannes Huinink (1991). "Human Capital Investments or Norms of Role Transition? How Women's Schooling and Career Affect the Process of Family Formation." *American Journal of Sociology* 97: 143-168.

Blossfeld, H.P., Klijzing, E., Mills, M.C. and Karin Kurz (Eds.) (2005). *Globalization, Uncertainty and Youth in Society.* London, New York: Routledge.

Cantalini, Stefano. (2017). "Does Education Affect the Timing or Probability of Family Formation? An Analysis of Educational Attainment and First Union in Italy." *Research in Social Stratification and Mobility* 49: 1-10.

Caltabiano, M., Castiglioni, M. and Alessandro Rosina (2009). "Lowest-Low Fertility: Signs of a Recovery in Italy?" *Demographic Research* 21(23): 681-718.

Carriero, R. and Lorenzo Todesco (2016). *Indaffarate e soddisfatte. Donne, uomini e lavoro familiare in Italia*. Roma: Carocci.

De Lillo, A. and Antonio Schizzerotto. (1985) *La valutazione sociale delle occupazioni.* Bologna: Il Mulino.

Eurostat (2018). *Population and Social Conditions Database.* [http://ec.europa.eu/eurostat/data/database, accessed July, 2018]

Eydal, G. B. and Tina Rostgaard (2018). *Handbook of Family Policy.* Cheltenham, UK: Edward Elgar Publishing.

Gaiaschi, Camilla (2019, forthcoming). "Women's Advancement in Medical Careers: Walking the Tightrope between Equality and Difference." *Work and Occupations.*

Geist, Claudia (2005). "The Welfare State and the Home: Regime Differences in the Domestic Division of Labor." *European Sociological Review* 21: 23–41.

Goldthorpe, J. and McKnight, A. (2005). "The Economic Basis of Social Class," (pp. 109-136) in *Mobility and Inequality: Frontiers of Research in Sociology and Economics*, edited by S.L. Morgan, D.B. Grusky and G.S. Fields. Stanford: Stanford University Press.

Guetto, R. and Nazareno Panichella (2013). "Geographical Mobility and Reproductive Choices of Italian Men." *European Sociological Review* 29(2): 302-315.

Gustafsson, Siv S. (2001). "Optimal Age at Motherhood. Theoretical and Empirical Considerations on Postponement of Maternity in Europe." *Journal of Population Economics* 14: 225-47.

Han, S., Tumin, D. and Zhenchao Qian (2016). "Gendered Transitions to Adulthood by College Field of Study in the United States." *Demographic Research* 35(31): 929–960.

Hoem, B. and Jan H. Hoem (1989). "The Impact of Women's Employment on Second and Third Births in Modern Sweden." *Population Studies* 43: 47-67.

Hoem, J.M., Neyer, G. and Gunnar Andersson (2006a). "Education and Childlessness. The Relationship between Educational Field, Educational Level and Childlessness among Swedish Women Born in 1955-59." *Demographic Research* 14(15): 331-380.

Hoem, J.M., Neyer, G. and Gunnar Andersson (2006b). "Educational Attainment and Ultimate Fertility among Swedish Women Born in 1955-59." Rostock: Max Planck Institute for Demographic Research (MPIDR Working paper WP 2006-004).

Impacciatore, R. and Gian Piero Dalla Zuanna (2016). "The Impact of Education on Fertility in Italy. Changes across Cohorts and South–North Differences." *Quality & Quantity* 51(5): 2293-2317.

Kertzer, D.I., White, M.J., Bernardi, L. and Giuseppe Gabrielli (2009). "Italy's Path to Very Low Fertility: the Adequacy of Economic and Second Demographic Transition Theories." *European Journal of Population* 25: 89-115.

Kotsadam, Andreas (2011). "Does Informal Eldercare Impede Women's Employment? The Case of European Welfare States." *Feminist Economics* 17(2): 121-144.

Künzler, J. (2002). "Paths Towards a Modernization of Gender Relations, Policies, and Family Building," (252-298) in *Family Life and Family Policies in Europe* vol. 2, edited by F-X., Kaufmann, A. Kuijsten, H-J. Schulze, and K.P. Strohmeier. Oxford: Oxford University Press.

Lappegård, T. and Marit Rønsen (2005). "The Multifaceted Impact of Education on Entry into Motherhood." *European Journal of Population* 21: 31-49.

Lesthaeghe, R. (2002). "Life Course Transitions and Value Orientations: Selection and Adaptation," in *Population Issues. An Interdisciplinary Focus,* edited by R. Lesthaeghe. New York: Kluwer Academic/Plenum Publishers.

Lomazzi, Vera (2017). "Gender Role Attitudes in Italy: 1988–2008. A Path-Dependency Story of Traditionalism." *European Societies* 19(4): 370-395.

Lück, D. (2006). "The Impact of Gender Role Attitudes on Women's Life Courses," (405-432) in *Globalization, Uncertainty and Women's Careers: an International Comparison*, edited by H-P. Blossfeld and H. Hofmeister. Northampton: Edward Elgar.

Martín-García, T. and Pau Baizán (2006). "The Impact of the Type of Education and of Educational Enrolment on First Births." *European Sociological Review* 22(3): 259-275.

Matysiak, A. and Daniele Vignoli (2013). "Diverse Effects of Women's Employment on Fertility: Insights from Italy and Poland." *European Journal of Population* 29: 273-302.

Michelmore, K. and Kelly Musick (2014). "Fertility Patterns of College Graduates by Field of Study, U.S. Women Born 1960-79." *Population Studies* 68(3): 359-374.

Montanari, M., Pinelli, D. and Roberta Torre (2015). "From Tertiary Education to Work in Italy: a Difficult Transition." *ECFIN Country Focus 12 (5).*

Naldini, M. and Teresa Jurado (2013). "Family and Welfare State Reorientation in Spain and Inertia in Italy from a European Perspective." *Population Review* 54(1), Special Collection 4: 43-61.

Naldini M. and Chiara Saraceno (2011). *Conciliare famiglia e lavoro: vecchi e nuovi patti tra sessi e generazioni*. Bologna: Il Mulino.

Neyer, G. and Jan H. Hoem (2008). "Education and Permanent Childlessness: Austria vs. Sweden; a Research Note." Rostock: Max Planck Institute for Demographic Research (MPIDR Working Paper WP 2008-007).

Neyer, G., Hoem, J.M and Andersson, G. (2017). "Education and Childlessness: The Influence of Educational Field and Educational Level among Swedish and Austrian Women," (183-2017) in *Childlessness in Europe: Contexts, Causes, and Consequences,* edited by M. Kreyenfeld and D. Konietzka. Demographic Research Monographs, Springer.

Ochsenfeld, Fabian (2014). "Why Do Women's Fields of Study Pay Less? A Test of Devaluation, Human Capital, and Gender Role Theory." *European Sociological Review* 30(4): 536–548.

Oppermann, Anja (2014). "Exploring the Relationship between Educational Field and Transition to Parenthood –An Analysis of Women and Men in Western Germany." *European Sociological Review* 30(5): 728-749.

Santarelli, Elisabetta (2011). "Economic Resources and the First Child in Italy: A Focus on Income and Job Stability." *Demographic Research* 25(9): 311-336.

Shavit, Y. and Karin Westerbeek (1998) "Educational Stratification in Italy: Reforms, Expansion, and Equality of Opportunity." European Sociological Review 14(1): 33-47.

Schooler, C. and Carrie Schoenbach. (1994). "Social Class, Occupational Status, Occupational Self-Direction and Job Income: A Cross-National Examination." *Sociological Forum* 9(3): 431-458.

Solera, Cristina (2009). *Women in and out of Paid Work: Changes across Generations in Italy and Britain.* Bristol: The Policy Press.

Solera, C. and Francesca Bettio (2013). "Women's Continuous Careers in Italy: the Education and Public Sector Divide." *Population Review* 52(1): 129-148.

Steiber, N., Berghammer, C., and Barbara Haas (2016). "Contextualizing the Education Effect on Women's Employment: A Cross-National Comparative Analysis." *Journal of Marriage and Family* 78(1): 246-261.

Tesching, Karin (2012). *Education and Fertility. Dynamic Interrelations between Women's Educational Level, Educational Field and Fertility in Sweden*. Stockholm University Demography Unit – Dissertation Series 6.

Van Bavel, Jan (2010). "Choice of Study Discipline and the Postponement of Motherhood in Europe: the Impact of Expected Earnings, Gender Composition, and Family Attitudes." *Demography* 47(2): 439-458.

Van Bavel, Jan (2012). "The Reversal of Gender Inequality in Education, Union Formation and Fertility in Europe." *Vienna Yearbook of Population Research* 10: 127-154.

Vignoli, D., Drefahl, S., and Gustavo De Santis (2012). "Whose Job Instability affects the Likelihood of Becoming a Parent in Italy? A Tale of Two Partners." *Demographic Research* 26(2): 41-62.

Appendix

Table 1 – Becoming first-time mothers in Italy: definitions and descriptive statistics for dependent and independent variables

	Label variable	*Description*	*% across all observation window (month-person file)*	*% at age 35 (person file)*
Observation Window	From age 15 to first childbirth or to age 40 (35 for last cohort) if remaining childless			
Dependent variable(s)	Time to first pregnancy	Measured in months, Dummy=1 if pregnant (9 months before childbirth), 0 if not pregnant	0.5%=1 99.5%=0	22.8% still childless
		Mean months or age at first birth	132.9 months (sd: 55.5)	25.8 age (sd:4.8)
	Time to first union	Measured in months, Dummy=1 if married/cohabiting, 0 if never married/cohabiting	0.6%=1 99.4%=0 122.5 (sd: 51.5)	8.9% still unpartnered 24.1 age (sd:4.5)
		Mean months or age at first union		
Time-constant Independent variables	Birth cohort	3 groups:		
		1945-1954	34.9%	39.6%
		1955-1964	34.4%	38.5%
		1965-1974	30.7%	21.9%
Time-varying Independent variables	*Education enrolment*	2 groups:		
		Still in education	81.0%	3.0%
		Not in education	19.0%	97.0%
	Level of education	*3 groups:*		
		Lower-secondary	49.0%	51.0%
		Upper-secondary	36.8%	35.5%
		Tertiary education	14.2%	13.5%
	Type of education at each level	*9 groups:*		
		Lower-secondary	48.6%	50.8%
		Upper-secondary		
		Care & Social Skills	9.7%	9.9%
		General	7.6%	6.7%
		Others	22.4%	21.3%
		Tertiary		
		Arts, Human, Religion	3.1%	3.1%

	Law, Econ, Social Sc.	2.8%	2.5%
	Archit., Engin., Nat. Sc.	3.4%	3.2%
	Health Professions	0.9%	0.9%
	Teaching, Psychology	1.5%	1.6%
Type of education among graduates	*9 groups:*		
	3-year degree programs	18.6%	19.2%
	Tertiary, Econ, Social Sc.	12.0%	13.1%
	Tertiary, Law	7.6%	7.5%
	Tert., Arts, Human, Relig	21.2%	20.6%
	Tertiary, Archit, Engin.	5.5%	5.8%
	Tertiary, Natural Sc.	8.4%	7.9%
	Tertiary, Health	5.9%	5.6%
	Tertiary, Teaching, Psych	10.8%	10.3%
	Tertiary, Others	10.1%	9.8%
Region of residence	3 groups:		
	North	44.5%	43.8%
	Centre	19.8%	19.5%
	South	35.7%	36.7%
Duration since 15 ys.	Cumulative months passed since 15 years old	154.2 (sd: 84.6)	253
Duration squared			
In union	2 groups:		
	Not married or cohab.	49.8%	15.1%
	Married or cohabiting	50.2%	84.9%
Activity status	2 groups:		
	Not employed	55.1%	46.1%
	Employed	44.9%	53.9%
Sector and Contract (among the employees)	5 groups:		
	Private employees		
	Permanent	18.9%	19.5%
	Temporary	2.9%	3.1%
	Without contract	2.9%	1.6%
	Public employees		
	Permanent	8.9%	14.7%
	Temporary	3.4%	4.4%
Occupational prestige score (among the employed)	DeLillo-Schizzerotto occupational score	37.8 (sd: 18.7)	41.8 (sd: 19.2)
NUMBER OF MONTHS-PERSONS	421475		
NUMBER OF WOMEN	2958		

Source: ILFI all waves (1997, 1999, 2001, 2003, 2005).

Table 2- Estimates of discrete time models for becoming first-time mothers in Italy

	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b
Birth cohort: 1945-1954						
- 1955-1964	-0.20**	-0.19**	-0.18**	-0.17**	-0.20**	-0.19**
- 1965-1974	-0.49***	-0.53***	-0.47***	-0.51***	-0.51***	-0.55***
Region of residence: North						
- Centre	0.15**	0.13*	0.16**	0.13*	0.15*	0.12†
- South	0.49***	0.44***	0.50***	0.45***	0.49***	0.44***
Duration since 15 years	0.01***	0.01***	0.01***	0.01***	0.01**	0.01**
Duration squared	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***
Married or cohabiting	3.43***	3.46***	3.44***	3.46***	3.43***	3.47***
Enrolled in education	-0.74***	-0.76***	-0.74***	-0.76***	-0.79***	-0.80***
Level education: up to lower-sec						
- upper-secondary	-0.07	-0.06				
- tertiary	0.07	0.05				
Type education at each level: upper-secondary, care & social						
- up to lower-secondary			0.01	0.01		
- upper-secondary, General			-0.21†	-0.24*		
- upper-secondary, Others			-0.04	-0.02		
- tertiary, Arts, Human, Religion			0.11	0.06		
- tertiary, Law, Econ, Social Sc.			0.15	0.16		
- tertiary, Archit, Engin, Nat. Sc.			0.01	0.00		
- tertiary, Health			-0.20	-0.20		
- tertiary, Teaching & Psych.			0.33†	0.31†		
Type education among graduates: Teaching & Psych						
- not tertiary					-0.35**	-0.33†
- three-year degree programme					-0.30	-0.34†
- tertiary, Econ, Social Sc.					0.01	0.01
- tertiary, Law					-0.49†	-0.40
- tertiary, Arts, Human, Religion					-0.21	-0.25
- tertiary, Archit, Engin					-0.71**	-0.66**
- tertiary, Natural Sciences					-0.42†	-0.45†
- tertiary, Health					-0.52†	-0.50†
- tertiary, Others					0.04	0.06
Activity status: not employed						
- employed		-0.14		-0.16†		-0.14†
Occupational score		-0.00		-0.00		-0.00
Sector and contract: private, permanent						
- private, temporary		0.34**		0.37*		0.35*
- private, without contract		0.05		0.03		0.06
- public, permanent		0.10		0.11		0.09
- public, temporary		0.34**		0.33**		0.33**
- self-employed		-0.01		0.01		0.01
Constant	-6.66***	-6.62***	-6.73***	-6.67***	-6.29***	-6.27***
LOG-LIKELIHOOD	-10935.27	-10271.31	-10799.49	-10196.51	-10931.08	-10267.09
N. OF MONTHS-PERSONS	421475	421475	421475	421475	421475	421475
N. OF WOMEN	2958	2958	2958	2958	2958	2958
N. OF TRANSITIONS	2182	2182	2182	2182	2182	2182

Notes: estimates using option « cluster » ***p<0.01, **p<0.05, *p<0.10, † p<.20

Source: ILFI all waves (1997, 1999, 2001, 2003, 2005).

Table 3- Estimates of discrete time models for entry into first union in Italy

	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b
Birth cohort: 1945-1954						
- 1955-1964	-0.07†	-0.09*	-0.06	-0.09†	-0.11**	-0.15**
- 1965-1974	-0.71***	-0.74***	-0.69***	-0.72***	-0.77***	-0.83***
Region of residence: North						
- Centre	0.01	-0.00	0.02	0.00	-0.00	-0.04
- South	0.02	-0.02	0.03	-0.00	0.04	0.00
Duration since 15 years	0.04***	0.04***	0.04***	0.04***	0.04***	0.04***
Duration squared	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***
Education enrolment: out of education						
- in education	-1.12***	-1.11***	-1.12***	-1.12***	-1.24***	-1.32***
Level education: up to lower-sec						
- upper-secondary	-0.30***	-0.48***				
- tertiary	-0.25***	-0.53***				
Type education at each level: upper-secondary, care & social						
- up to lower-secondary			0.34***	0.55***		
- upper-secondary, General			-0.28**	-0.31**		
- upper-secondary, Others			0.12†	0.17*		
- tertiary, Arts, Human, Religion			0.09	0.00		
- tertiary, Law, Econ, Social Sc.			0.16	0.10		
- tertiary, Archit, Engin, Nat. Sc.			0.11	0.09		
- tertiary, Health			-0.08	-0.14		
- tertiary, Teaching & Psych.			0.30*	0.25†		
Type education among graduates: Teaching & Psych						
- not tertiary					-0.15	-0.08
- three-year degree program					-0.46**	-0.55**
- tertiary, Econ, Social Sc.					0.09	0.09
- tertiary, Law					-0.40*	-0.43*
- tertiary, Arts, Human, Religion					-0.21	-0.25
- tertiary, Archit, Engin					-0.04	0.07
- tertiary, Natural Sciences					-0.22	-0.22
- tertiary, Health					-0.36†	-0.38†
- tertiary, Others					-0.21	-0.17
Activity status: not employed						
- employed		-0.48***		-0.49***		-0.29***
Occupational score		0.01***		0.01***		0.01**
Sector and contract: private, permanent						
- private, temporary		-0.12		0.12		-0.12
- private, without contract		-0.53***		-0.55***		-0.50***
- public, permanent		0.11†		0.13†		0.08
- public, temporary		-0.07		-0.05		-0.11
- self-employed		-0.24**		-0.21*		-0.10
Constant	-7.12***	-6.89***	-7.49***	-7.47***	-6.94***	-6.80***
LOG-LIKELIHOOD	-13461.79	-12950.45	-13355.10	-12860.67	-13476.37	-12986.89

N. OF MONTHS-PERSONS	379709	379709	379709	379709	379709	379709
N. OF WOMEN	2958	2958	2958	2958	2958	2958
N. OF TRANSITIONS	2467	2467	2467	2467	2467	2467

Notes: estimates using option « cluster » ***p<0.01, **p<0.05, *p<0.10, † p<.20
Source: ILFI all waves (1997, 1999, 2001, 2003, 2005).