FERTILITY OF IMMIGRANT WOMEN IN ITALY: OUTCOMES FROM UNCONVENTIONAL DATA[1]

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1. Introduction

In the first decade of the twenty-first century, immigration has reached unexpected and exceptional levels that transformed Italy in one of the main European host countries (Sobotka, 2009; Strozza, 2010). Moreover, the aspect of immigration in Italy has changed its characteristics: workers alone, both men and women, were prevalent in the past, while in recent years immigrant families and family reunification have become particularly relevant, reflecting a continuous process of settlement (Dalla Zuanna et al., 2009).

Regular immigrant women have increased in Italy during the inter-census period 2002-2011 respectively from 676 thousands to 2 million and 61 thousands. Moreover, an increasing female participation was observed in the composition by sex of migration flows to Italy (Impicciatore, Strozza, 2015). Looking at the residence permits, in 2013 over the 53% of women arrived in Italy for family reasons, while only 23% for work reasons. Another important phenomenon is the increasing number of births with both foreign parents that constantly increased up to 14.5 every 100 live births in 2011.

Among these aspects, this paper focuses on the immigrant population's reproductive behaviors, which appear remarkable when considering the Italian model of fertility, where immigrant women provide significant contribution. It is generally known that Italian fertility is one of the lowest in the world (Billari, 2008) and that the slight increase recorded in the last few years is in part due to the presence of foreign women (Sobotka, 2008; Ferrara et al., 2009).

In Italy recent studies have tried to understand the characteristics and the determinants of foreigners' fertility (Mussino, Strozza, 2012; Ortensi, 2015), mainly founding strong differences by citizenship and migratory strategies. However, an in-depth exploration of individual factors affecting childbearing was not possible to date, because of the paucity on micro data at national level.

[1]This work is the result of a close collaboration between the authors. As for this version, sections 3, 5 and 6 by P. Giannantoni; sections 1, 2 and 4 by G. Gabrielli.

This study will try to contribute to the debate using an unconventional survey not designed to study fertility patterns. Data used come from the 2009 "*Reddito e condizioni di vita delle famiglie con stranieri*" (Income and Living Conditions of Households with Foreigners) survey. The aim is to individuate the main individual determinants of fertility for immigrant women in Italy, particularly looking at women characteristics and migratory differentials.

The article is structured as follow: the next section contains the theoretical framework; in the third section, the data and the method of analysis are described; in the fourth and fifth sections, the descriptive data and the results of multidimensional analysis are showed; in the final section, the main outcomes and some conclusions are discussed.

2. Theoretical background

Fertility and family formation of migrants has been marginalized theoretically, methodologically, and empirically until the late 1980s. The main reasons for the scarcity of studies on this issue were the absence of data, the emphasis on the individual as economic actor, and the predominance of a view based on the "dichotomy of male producer and female reproducer" (Kofman, 2004: p. 243). In the last threedecades this topic has attracted the growing interest of researchers first in North American and Asian Pacific countries, and subsequently in Europe, with the increasing recognition of the connection existing between the migratory strategies and the family projects. Within the mainstream hypotheses about migration and fertility, the importance of the role played by women's migratory patterns and its effect on fertility after migration has been considered in different ways at individual level. In particular, scholars showed that the heterogeneity of the fertility behaviors depends on the demographic and social characteristics of the immigrants, their geographical origin, and migration strategies (Carlson, 1985).

Among the immigrants' characteristics influencing fertility, emphasis was given to their countries of origin that is often considered a proxy of their values and cultural heritage, which can be maintained after migration (Coleman, 1994; Gabrielli et al., 2007). Therefore, persons from different geographical origins may show differences in reproductive behaviors in the same country of destination (Andersson, Scott, 2007; Bijwaard, 2010). This is particularly true for the Italian context, where previous studies have described the wide variety of origins characterizing migrant flows (Mussino et al., 2015). In adding, both the age at arrival and the fertile period after migration may affect the childbearing of immigrant women in the destination country (Wolf, 2014). Adserà and Ferrer (2011) noted how childbearing increases smoothly with increasing age at migration

because of a reducing assimilation to low fertility of natives. The authors describe how "there are different mechanisms through which age at arrival may be relevant to immigrant outcomes ... moreover if there are critical ages at which individuals learn a particular behavior or skill" (p.16). We need to control the exposure time of fertility and the length of stay in the destination country in order to edge against compositional effect.

Gender relations strongly affect the migration and fertility behaviors of women (Carling, 2005; Hiller, McCaig, 2007). Gender roles and norms in the home country determine women's social, occupational and economic positions, women's participation in international migration and in turndifferent outcomes in the new country of settlement. An egalitarian gender system incentives women to migrate as forerunners, independently from a partner. These women can be either single or in union, leaving the family behind. Scholars have underlined how the experience of migration changes dramatically between forerunners and followers (Nedoluzhko, Andersson, 2007; Ortensi, 2015). First migrant women, in most cases, migrate with a project related to work and childbearingcan be considered as secondary goal. Family migrants are, conversely, less or not subjected to the trade-off between work and family. Women who migrate for family reasons choose often not to enter into the labour market, as the commitment to family life is the main aim after migration.

Women's educational attainment and participation in the labor market are also individual characteristics reflecting the socioeconomic conditions. They both constitute important elements in shaping fertility after migration. Educational attainment, generally speaking, depresses fertility (Skirbekk, 2008), however this link is morecomplex when it concerns immigrant women (Adserà and Ferrer, 2011). Work conditions in the country of destination need also to be taken into account, independently from educational attainment, as under qualified employment is extremely frequent among immigrants. Immigrate women are often employed in time-consuming low-skilled jobs, that are not easily compatible with childbearing (Andersson, Scott, 2007). The interplay and the complexity of these individual and migratory characteristics call for further investigation in their relationship with fertility.

3. Data and methods

The survey on *"Reddito e condizioni di vita delle famiglie con stranieri"* (Income and Living Conditions of Households with Foreigners) has been conducted by Istat in 2009. This survey 'replicates' the EU-SILC one in terms of questionnaires, techniques, imputation and integration of data, but it focuses merely on foreign population. It collects data on about 9,000 foreign individuals aged 15 and

older. The great advantage of this source is that the selected sample is representative of the foreignersresiding in Italy (weighted data) and the sample size allows us to analyze the data distinguished by citizenships. However, the main disadvantage is that the survey is focused on income, poverty and living conditions; thus it is not targeted to study fertility and it does not provide any direct information on the number of children ever born to women and women's childbearing histories.

Nevertheless, it is possible to reconstruct information on fertility behaviors with the application of the own-children method (Cho, Retherford, Choe, 1986). It employs numbers and ages (or birthdates) of young co-residing children, who are unlikely to have left home, to provide estimates of the numbers and/or timing of births to women in the same household. Born for fertility reconstruction in historical populations, in recent years such method has been applied to surveys in several European countries for the study of fertility both at macro level with the estimation of TFR (Bordone et al., 2009) and at micro level for investigating determinants of fertility decisions (Klesment et al., 2014).

The used data provide the identification number of the mother for each child in the household, allowing the right mother-child match. Moreover, to control the permanence of children in the mother's household at the time of interview, according to the literature (Rondinelli et al., 2006) we limit the age at interview of mothers to 40 years oldin order to have the majority of children relatively young and therefore less likely to have left parental house.

What is important to underline is that, as far as we are concern, this method is still rarely applied to immigrant population above all in the Italian context. This kind of application brings at least another additional issue to the methodology: migrant women can have children left abroad. These children obviously do not co-reside in the household at destination and their omission would bias downwards fertility estimations. In our data we have a dummy about the presence/absence of children born abroad, thus we were able to control at least partially such issue.

We decided to select only foreign women (according to their citizenship) arrived in Italy after the age of 14 years. We excluded from our analysis also women married to an Italian partner, as they would constitute a very specific subgroup whose reproductive behaviors are expected to be significantly influenced by the presence of the native partner. The final sample is constitute of 2.388 women that are weighted in all our analysis to represent the foreigners residing in Italy. This research aims at investigating fertility of immigrant women in Italy, analyzing the number of children born after migration (since now on only "children"). We identified children born after migration on the base of their birth date, which must be subsequent to the date of the mother's arrival in Italy. Co-resident children born before their mother arrived in Italy are therefore excluded from our analysis.

In the multivariate analysis, we applied Poisson regression models, as the target variable is a count data. This is a form of regression analysis which assumes the response variable Y to have a Poisson distribution, and the logarithm of its expected value can be modeled by a linear combination of unknown parameters. The basic formulation of a Poisson model is the following:

$$\ln(Y_i) = \ln(exposure) + \beta_0 + \beta_1 X_1 + \ ... + \ \beta_n X_n + \varepsilon_i \quad (1)$$

Immigrant women are exposed to the risk of the events, i.e. having children after migration, for a different amount of time, depending on their age at arrival and their age at the interview. We adjusted the Poisson model with the length of fertility period spent in Italy, considered as the "exposure", i.e. a predictor with a coefficient constrained to 1. We illustrate the effects of independent variables on fertility expressed by means of Incidence Rate Ratios (IRR).

A first group of variables is related to migration patterns and the context of origin, namely: citizenship, age at arrival, typology of migration. Typology of migration is a dummy variable defined according to two characteristics: union status of the woman at arrival (in union or single) and order of arrival with the partner (woman or man forerunner). An independent migrant is either a woman who arrives in Italy as a single, or a married woman who arrives before her partner (Ortensi, 2015). Conversely, a family migrant is a married woman who arrives together or rejoins her partner at destination. We included in the "family migrant" also women who marry in the immediate period after their arrival (<2 years after the arrival) as we expect these women to be "marriage migrant".

A second group of variables is related to women's individual characteristics, namely: educational attainment and occupational status. We reconstructed educational attainment at arrival (primary or less, lower secondary, upper secondary, tertiary or higher), according to the hypothesis that the educational attainment at arrival influences the opportunities for the woman at destination as well as her fertility behaviors. Differently we considered occupational status at the time of the interview due to lack of further information at arrival. Given the rigidity of the labor market and the barriers to occupation of immigrants face, we expect occupational status to be consistent during the whole length of stay in Italy. Categories for this variable are: housewife, unemployed/inactive, employed in high (managers and professionals), medium (service workers) and low level work (agricultural, craft, machine operators and other unskilled workers), according to the International Standard Classification of Occupations (ISCO-88).

Finally, we included the resident macro-area (NUTS-1) to consider the territorial differences to detect whether a contextual effect of place of living at destination

exists. In all the models, we control for children born abroad, regardless if they live in cohabitation or abroad.

4. Descriptive results

Looking at the characteristics of immigrant women, the distribution by citizenship shows a net prevalence of the Romanians (29.3%), followed by the Albanians (11.2%) and the Moroccans (9.4%). The Ukrainians/Moldovans represent 6.4% of the immigrant women, whereas the Chinese and the Poles are respectively 4.6% and 3.9%. The rest of women come in equal proportion from the rest of the countries of Asia, Africa, Latin America and East Europe areas (the percentage of each area varies from 7% to 10%). The only exception is represented by immigrants originating from Europe-15 (EU15) and other developed countries (MDCs including the ones of North America, Oceania, Israel and Japan) who represent only 2.0% of immigrant women.

The majority of women arrived in Italy as independent migrant (66.5%) and before starting their reproductive life, i.e. without children born before migration (70.7%). However, these proportions are extremely heterogeneous according to the different citizenship: the Moroccans, the Albanians and the Poles assume the highest quota of women without children born before migration (respectively 83.8%, 81.4% and 78.2%), while the Ukrainians/Moldavians, the Romanians and the Chinese assume the lowest quota (respectively 56.4%, 65.4% and 66.2%).

Regardless the country of origin, the sampled women have on average 31 years old at interview and arrived in Italy at the mean age of 24.5 years old (the age range is in both cases 15-40) and spent in Italy a period of 6.6 fertile years during which they gave birth to less thanone child per woman on average (0.6). However, the number of children born to these women after migration shows a marked variability ranging from zero to six. In particular, 60.2% of women has no children on average, 23.3% one child and 16.5% more than one child (see table 1).

Table 1 depicts also migratory characteristics described above in association with the fertility outcomes. Obviously, the higher is the age at arrival the lower is the number of children born after migration but this effect depends directly on the reduction of the exposure period, when a woman arrives at older ages. We will able to control such issue in the multivariate analysis (see section 3).

Similarly, women, who express yet their reproductive behavior before migration in Italy, assume the lowest fertility level. Among them, 78.0% had not children in Italy and only 0.6% had three or more children. Immigrant women with no children born abroad assume very different quota in the two considered categories (respectively 52.6% and 4.2%).

The same pattern occurs considering the typology of migration: women who arrived in Italy as independent assume significant low fertility than women arrived together or after her partner: 87.9% of the former group had less than two children, while 25.2% of the latter group had at least two children.

According to country of citizenship and not considering the EU15 and the other MDC countries group, the Ukrainians/Moldavians assume the lowest fertility levels (84.0% have no children) while the Moroccans the opposite (12.4% have three or more children). The Poles and the Romanians (which is the most numerous group) assume also low child percentages together with the Latin Americans. Conversely, the Chinese have high number of children (43.7% have more than one child) together with Africans.

Table 1 - *Number of children after migration by selected women'migratory characteristics.*

Women characteristics	Number of children after migration (%)				
	0	1	2	3 and plus	Total
Age at arrival					
15-20	52.5	25.4	16.7	5.4	100.0
21-25	52.0	28.5	15.7	3.8	100.0
26-30	63.8	21.6	13.1	1.5	100.0
31-40	82.8	13.1	4.1	0.0	100.0
Children born before migration					
No	52.6	25.4	17.8	4.2	100.0
Yes	78.0	18.6	2.8	0.6	100.0
Typology of migration					
Independent	67.7	20.2	9.8	2.3	100.0
Family	45.0	29.8	20.5	4.7	100.0
Country/Area of citizenship					
Romania	77.6	18.0	3.9	0.5	100.0
Albania	42.9	32.2	22.1	2.8	100.0
Poland	75.3	11.9	10.7	2.1	100.0
Ukraine and Moldova	84.0	14.1	1.9	0.0	100.0
EU15 and other MDCs	87.1	4.3	8.6	0.0	100.0
Other Europe	58.7	22.6	14.4	4.3	100.0
Morocco	36.5	25.5	25.6	12.4	100.0
Other Africa	36.3	32.2	24.0	7.5	100.0
China	30.8	25.5	36.5	7.2	100.0
Other Asia	46.1	36.8	16.1	1.0	100.0
Latin America	74.0	19.5	5.8	0.7	100.0
Total	*60.2*	*23.3*	*13.3*	*3.2*	*100.0*

Source: our elaborations on "Reddito e condizioni di vita delle famiglie con stranieri" data, 2009.

5. Multivariate approach: the Poisson model

We modeled our data through Poisson regressions using a stepwise procedure. We introduced the migratory characteristics included in descriptive analysis (i.e. age at arrival, children born before migration, typology of migration, area of citizenship) as first, followed by individual covariates (educational attainment and occupational status) and completed with macro-area of residence in the last step. All the models have been controlled by the length of the fertile period the woman had spent in Italy, included in the model as the offset. The likelihood estimations show in table 2 an increasing significance of the nested models. In all the models the age at arrival shows a slight ∩-shape of the IRR ones controlling for the exposure time, increasing its significance as the model grows in its completeness. As in the descriptive analysis, having children before migration reduces the probability of having an additional child in the host country of almost 60% (IRR 0.40). At the same time the migratory pattern has a predominant role in explaining fertility at destination, as family migrant has almost a double risk of having an additional child than women who arrived as independent migrant (IRR 1.92).

Even controlling for different characteristics of women, citizenship maintains a significant role in predicting different levels of fertility. Considering the Romanian women as the reference group, the Chinese, the Moroccans and other Africans assume more than double levels of fertility. However, the Moroccans have not the highest IRR as can be expected according to descriptive analysis: this result occurs ones controlling for the typology of migration that depict significantly the IRR of the Moroccans from 2.41 (not shown) to 2.06. Other Asian countries, the Albanians and other Eastern European countries assume as well incidence rate ratios (IRR) greater than 1. While the Polish, the Ukrainians/Moldavians and the Latin Americans do not show values significantly different with respect to the reference group. In the model 2 and 3 the IRRs by citizenship remain significant even if the reduce their values, with the exception of the Chinese case. Such result shows how, after controlling for socioeconomic characteristics and geographical macro-areas of residence, the cultural disparities still persist and in the Chinese case are not affected by other predictors. Characteristics of the women in the social and economic context at destination, analyzed by means of educational attainment and occupational level, play a role in modeling fertility. However, occupation seems to have a much stronger impact on fertility that her education at arrival. Particularly being a home-maker (reference category) is the condition with the highest fertility level. The levels of occupation (low, medium or high) do not appear significantly different from each other, while unemployed/inactive positions almost halves the fertility level (IRR 0.49) with respect to the reference group.

Table 2 − *Determinants of number of children after migration. Poisson model.*

Women characteristics	Model 1		Model 2		Model 3	
	IRR	Sig.	IRR	Sig.	IRR	Sig.
Age at arrival	1.12		1.15	*	1.15	*
Age at arrival (squared)	0.99		0.99	*	0.99	*
Child born before migration						
No	*ref.*		*ref.*		*ref.*	
Yes	0.40	***	0.41	***	0.41	***
Typology of migration						
Independent	*ref.*		*ref.*		*ref.*	
Family	1.92	***	1.83	***	1.84	***
Country/Area of citizenship						
Romania	*ref.*		*ref.*		*ref.*	
Albania	1.57	***	1.40	***	1.39	**
Poland	1.08		1.13		1.19	
Ukraine and Moldavia	0.63		0.67		0.69	
EU15 andother MDCs	0.52		0.59		0.59	
Other Europe	1.50	**	1.29	*	1.31	*
Morocco	2.06	***	1.57	***	1.54	***
Other Africa	2.02	***	1.84	***	1.83	***
China	2.39	***	2.44	***	2.47	***
Other Asia	1.44	***	1.26	*	1.24	*
Latin America	0.96		0.98		0.95	
Educational attainment						
primary or less			*ref.*		*ref.*	
lower secondary			0.90		0.89	
upper secondary			0.82	*	0.81	*
tertiary or higher			0.79		0.77	*
Occupational level						
Housewife			*ref.*		*ref.*	
Unemployed/inactive			0.49	***	0.48	***
Low level			0.59	***	0.60	***
Medium level			0.53	***	0.52	***
High level			0.60	***	0.60	***
Resident macro-area						
North West					*ref.*	
North East					0.90	
Centre					0.89	
South					0.79	*
Islands					0.81	*
Constant	0.01	***	0.01	***	0.02	***
Log likelihood	*-595,003*		*-574,184*		*-573,190*	

*Note: IRR: Incidence Rate Ratio; ref.: reference category; *: p <0.1; **: p <0.05; ***: p <0.01;*
all the estimates are adjusted according to the number of fertile years spent in Italy (individual exposure).
Source: our elaborations on "Reddito e condizioni di vita delle famiglie con stranieri" data, 2009.

In model 3, Southern and Island regions significantly depress the fertility level of immigrant women in respect to North-Western ones (IRR respectively equal to 0.79 and 0.81). Such result, although interesting, need further analyses to be correctly evaluated.

6. Discussion

This paper aims at investigating the quantum dimension of fertility behavior of immigrant women by analyzing the number of children born after migration. Our results show how unconventional data and methods can provide useful research elements on fertility debates of migrants in a context characterized by paucity of information. This study confirms the importance of the interrelationship between migratory and reproductive behaviors. The experience of migration can shape fertility behaviors in different ways. According to the literature, among immigrant women the country/area of origin (Mussino et al., 2015), the migratory patterns and the gender roles (Ortensi, 2015) represent important determinants of migrants' fertility outcomes after migration, while the individual characteristics and destination contexts seem less important. In particular, citizenship maintains a significant role in predicting different levels of fertility even controlling for different characteristics of women: the Africans together with the Chinese assume the highest fertility level while the East-Europeans show the opposite.

Moreover, there are important intersections among gender role, migration strategy and labor participation in defining reproductive behaviors of immigrant women. Migratory strategies related to gender roles show how family migrant have a higher risk of having a child than women who arrived as independent migrant. In addition, controlling for the migratory pattern, education does not appear to play a determinant role while female workers have a lower risk of having a child than home-workers do. However, in order to complete the shape of fertility behavior, further analysis will consider, using both the same data and approach, the tempo dimension of fertility behavior (i.e. timing to first birth).

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SUMMARY

Fertility of immigrant women in Italy: outcomes from unconventional data

This paper contributes to the debate on the immigrant population's reproductive behaviors using an unconventional survey not designed for demographic analysis. Applying the own-child method of young co-residing children, who are unlikely to have left home, we describe the patterns of the numbers of births realized after migration to women aged 15-40 years old and we look at the maindeterminants of fertility fitting a Poisson model. According to the literature, among immigrant women the migratory patterns, the gender roles and the country/area of origin represent important determinants of migrants' fertility after migration, while the individual characteristics and destination contexts seem less important.

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