

Sex imbalances at birth in migratory context in Western Europe: evidence from Italy

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Abstract This paper aims to explore SRB of migrants in Italy in order to shed light on the phenomenon of sex selection at birth and to help to address policies against that practice. Our objective is to analyze births from mothers with a foreign background from countries where sex selection at birth is widespread and that are among the largest immigrant communities in Italy. The paper aims at assessing if a skewed sex ratio at birth is observed also among overseas communities and what are the possible factors affecting skewed SRB in migratory context. Data stems from the Survey on births from the Resident Population Registers, from Survey on Income and living conditions of families with migrants held by ISTAT in 2009 and from the First Regional Survey on Sexual and Reproductive Health of Migrant Women held in Lombardy in 2010.

Key words: sex selection, sex ratio, fertility, migration, Italy

1 Introduction and previous findings

In the Program of Action of the 1994 International Conference on Population and Development (ICPD) held in Cairo, was recommended to eliminate all forms of discrimination against the girl child commonly known as “son preferences”; among those, there is prenatal sex selection. The phenomenon of prenatal sex selection is particularly widespread in East and Southeast Asia. Recent studies (Guilmoto 2009; 2012) show that sex ration at birth (SRB) has risen in a few Asian countries since the '80s. The trend was opposite to observed SRB worldwide that has been stable at 104-106 in the period 1950-2000 and will have the same pattern in the future (Guilmoto 2009). In a few Asian countries, such as India and China, the SRB is

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abnormally higher than expected. According to Guilmoto (2012), the causes of the rising trend of SRB in certain countries of the world are to be ascribed to son preference, to the availability since the '80s of prenatal diagnosis technology that allows couple to know the sex of the future born and that could lead to an (legal or illegal) abortion (Chen et al., 2013), and finally to the fertility transition that lead many countries to lower level of fertility that could have exacerbate the need for sex selectivity. Sex selection at birth has important consequences from the demographic point of view because it leads to the well-known phenomenon of "missing women": in 2010 there were about 117 missing women worldwide, i.e. girls that didn't born or that didn't reach the age of 5 because of sex selection at birth or immediately after birth. Major contributors to the bulge of missing women were India and China (Guilmoto 2012). However, sex selection at birth is also diffused in other countries of the world, in particular, after the end of the iron curtain, it has been recorded and unusual SRB in few countries in West Asia: Azerbaijan, Armenia and Georgia and in two countries in Southeast Europe: Albania and Montenegro. Only South Korea has managed to achieve a decrease from the elevated levels of the 1980s and now has a normal sex ratio at birth (WHO, 2011). Finally the increasing number of international migrant worldwide, in particular from Southeast and East Asia could have exported the SRB imbalances in destination countries in the Western World. So far, few studies have found evidence of SRB from migrants of South East or Eastern Asia, slightly higher than expected in countries such US, UK, Canada and Italy (Almond and Edlund 2008; Almond et al. 2009; Dubuc and Coleman 2007; Meldolesi 2012; Blangiardo and Rimoldi 2012).

2 Research aim and questions

This paper aims to explore SRB of migrants in Italy in order to shed light on the possible phenomenon of sex selection at birth and to help to address policies against that practice. Recent studies addressed the same issue for migrants of Indian and Chinese origin living in Italy (Meldolesi 2012; Blangiardo and Rimoldi 2012). The first study was limited at the period 2006-2009 and used data on birth records, the second study uses data from a survey of 700 women of Chinese and Indian origin realized in 2011 in the Lombardy region. Our objective is to go beyond these studies, analyzing births from mothers with a foreign background from countries where sex selection at birth is widespread and that are among the largest immigrant communities in Italy, including Albania, China, India, Pakistan, Sri Lanka and Bangladesh. The ratio of male to female births exceeds the biological norm (1.05/1.06) in certain countries of the world e.g Albania, China, India and Pakistan. Knowing that those citizenships are among the most represented in Italy, the paper aims at assessing if a skewed sex ratio at birth is observed also among overseas communities and what are the possible factors affecting skewed SRB in migratory context..

3 Data and Methods

Data of descriptive statistics stems from the Survey on births from the Resident Population Registers. Among the vital statistics sources, an individual and continuative Survey on births from the Resident Population Registers was set up by the Italian National Institute of Statistics (Istat) since January 1999 and it ensures the knowledge of the main characteristics of births and parents at the municipality level. The individual sheets currently retrieve information on births (sex, date and place of birth, nationality), parents (place and date of birth, nationality, and marital status) and the main details of the head of the household. Thus live births registered in the Population Register will provide descriptive analysis of the phenomenon. The last data available are referred to 2012. Average SRB will be calculated for the period 2005-2012 by citizenship of each parent and for same citizenship couples.

A second analysis, a logistic regression with robust standard error for clustered data, will be performed on data from the Survey on Income and living conditions of families with migrants held by ISTAT in 2009 and financed by the Italian Minister of Labour and Social Policy. It follows, for both contents and methodology, EU-SILC, the European Statistics on Income and Living Conditions, which started in 2004 with the European Union Regulation n. 1177/2003. This survey collected information on a total sample of 15,036 individuals aged 0-80, among 135 different countries of birth, with different migration histories, in terms of period of arrival in Italy, socio-economic integration, links with the origin country and future plans.

A third analysis, a logistic regression with robust standard error for clustered data, is performed through the First Regional Survey on Sexual and Reproductive Health of Migrant Women held in Lombardy in 2010, the first Italian region for number of migrants that accounts for nearly a quarter of the whole national number of migrants. This data contain information at personal level on women's experience of abortion (in Italy or abroad) as well as data on the gender of children ever born.

Results of both descriptive and multivariate analysis are presented in the following section.

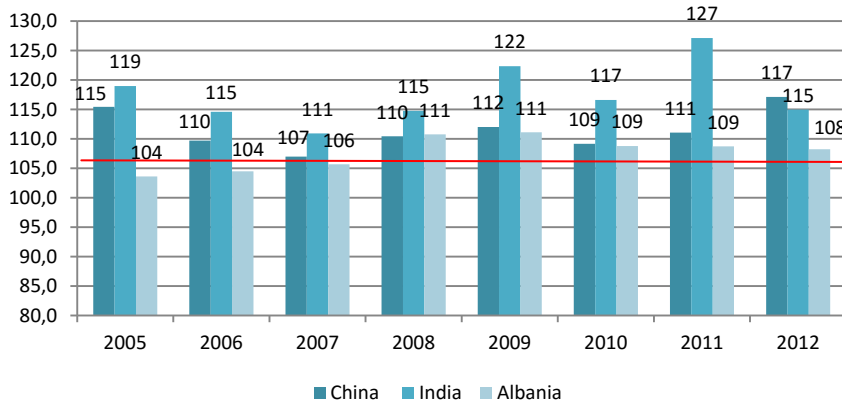
4 Results

4.1 Descriptive Statistics

Descriptive results about births in Italy by same citizenship parents originating from a country with skewed sex ratio at birth (figures 1 and 2) show significant bias in SRB at birth in particular for Indian and Chinese origin migrants.

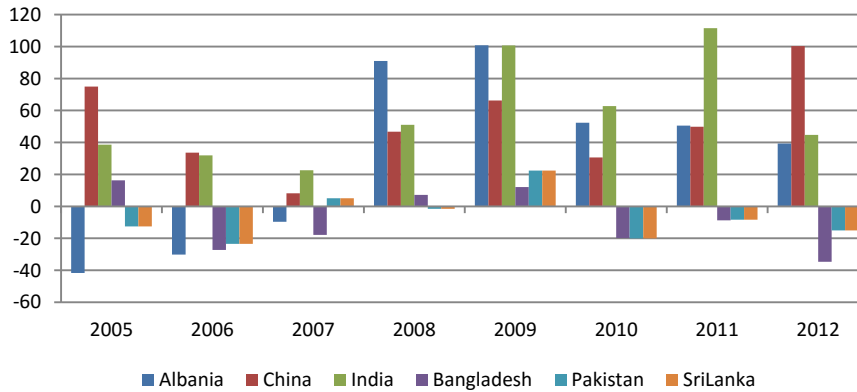
Couples from India and China also show a systematic excess in the expected number of male births. Skewed sex ratios are also observed for births by Albanian couples starting from 2008.

Figure 1: SRB for same citizenship couples from China, India and Albania. Years 2005 to 2012.



Source: Authors' elaborations on Istat data

Figure 2: Differences between observed number and expected* number of males 2005-2012. Selected citizenships.



* As $(\text{Total birth}) \cdot (1 - 0,485)$

Source: Authors' elaborations on Istat data

The observed SBR are less skewed for couples where only one parent is from countries with unbalanced sex ratio at birth. This is quite evident for couples where only one parent is from either Albania or China while for couples with one Indian parent the small number of annual births suggests some caution in the analysis of results.

Table 1: SRB for births by parents from China, India and Albania according to partner's citizenship. Years 2005 to 2012.

	Albania		China		India	
	same citizenship couples	mixed couples *	same citizenship couples	mixed couples	same citizenship couples	mixed couples
2005	104	105	115	104	119	109
2006	104	111	110	100	115	140
2007	106	106	107	102	111	136
2008	111	100	110	96	115	95
2009	111	101	112	119	122	111
2010	109	112	109	109	117	129
2011	109	109	111	98	127	104
2012	108	106	117	106	115	93
Total 2005-2012	108	106	111	104	118	110
Total births	65,244	16,706	34,828	5,779	18,022	1,443

*only one parent is from the citizenship under analysis

No systematic excess in the number of male births in Italy is observed for couples from Pakistan, Bangladesh and Sri Lanka.

Data from the First Regional Survey on Sexual and Reproductive Health of Migrant Women which include also information on births before migration or abroad (table 2) also show important bias in SRB at for mothers from China, India and Albania. Despite the relatively small number of births observed, results from this data are consistent with the overall data on births in Italy.

Table 2: SRB by mother's citizenship in Lombardy Region, 2010

Mother Citizenship	SRB	N.Births	% births in Italy
Albania	125	109	42.2
China	114	92	53.3
India	127	129	31.0
Pakistan	104	50	30.0

Source: Farina P.(2010).

4.2 *Multivariate analysis*

The first multivariate analysis is based on a subsample of the EU-SILC survey on immigrants performed in Italy in 2009. The subsample is composed of 3,761 children from 2,159 couples. Children with parents both originating from Albania, Macedonia, Montenegro, Kosovo, China and India (24.5 percent of total sample) are considered as children from a country with imbalanced SBR. Other countries where the phenomenon is observed in literature as Georgia or Armenia are not included in the survey as they are minor countries of immigration to Italy. Following the model proposed by Basten and Verropoulou (2013) we control for the year of birth of each parent and of each child, the educational level of each parent, the occupation (ISCO) of each parent and the child's parity. We have also inserted a covariate indicating a country of origin with imbalanced SBR, a dummy for having a parent native Italian, a dummy for married parents at the child's birth and a dummy for being the youngest child in the family - in the hypothesis that the last birth in a family could be more subjected to sex selection a low fertility regime. Interactions are also included.

This model that, as already underlined, is fitted only on cohabitant children, shows a higher incidence of male births for children born abroad, while the same tendency is not observed for all births. We observe also an association of male births with low education of the mother and low-status job position of the father for parents from countries with imbalanced SBR. The interaction between the dummy indicating the youngest child of the family and the dummy for SBR countries is significant. To sum up the model suggest an excess of male births for children born abroad and youngest offspring of parents from countries with imbalanced SBR. This can be interpreted either as the existence of a sex selection before emigration or as the existence of gender preference in the process of family reunion. The data also suggest that this selection is more evident on the youngest child: when families reach the desired number of children may opt for gender selection in order to have at least a male child.

Table 3: Odds ratios, standard error and 95% confidence intervals from logistic regression with robust standard error for clustered data assessing associations between selected characteristics and male births

Y= sex	OR	Robust S.E.	p	[95% Conf. Interval]
Country of origin with Sex imbalances at birth: Yes (ref. No)	0.645	0.113	0.016	(0.452;0.921)
Child 's year of birth	0.988	0.003	0.000	(0.981;0.995)
Mother's age at child's birth	0.999	0.005	0.869	(0.990;1.017)
Father's age at child's birth	1.000	0.008	0.946	(0.984;1.017)
Parents were married at birth: Yes (ref. No)	0.992	0.073	0.911	(0.858;1.145)
Child was born abroad: Yes (ref. No)	0.806	0.087	0.048	(0.653;0.997)
Child was born in abroad*	1.653	0.249	0.001	(1.230;2.222)
Country of origin with Sex imbalances at birth				
Parity	0.946	0.032	0.109	(0.885;1.012)

Older sibling: Yes (ref. No)	1.043	0.098	0.652	(0.867;1.254)
Older sibling *Country of origin with Sex imbalances at birth	1.609	0.254	0.003	(1.180;2.195)
Mother's Highest ISCED education level attained at child's birth: lower secondary education or upper secondary education (Ref: post-secondary non tertiary education, tertiary education)	0.952	0.073	0.529	(0.818;1.108)
Mother's Highest ISCED education level attained at child's birth: No education, pre-primary education, primary education (Ref: post-secondary non tertiary education, tertiary education)	1.302	0.102	0.001	(1.117;1.518)
Father's Highest ISCED education level attained at child's birth: lower secondary education or upper secondary education (Ref: post-secondary non tertiary education, tertiary education)	0.847	0.107	0.161	(0.671;1.069)
Father's Highest ISCED education level attained at child's birth: No education, pre-primary education, primary education (Ref: post-secondary non tertiary education, tertiary education)	0.857	0.078	0.088	(0.717;1.023)
Mother's Occupation (ISCO): persons in semi-skilled and unskilled occupations or economically inactive (Ref: managers, professionals and associate professionals, clerks and service workers)	0.895	0.068	0.140	(0.771;1.037)
Mother's Occupation*Country of origin with Sex imbalances at birth	0.843	0.232	0.535	(0.491;1.446)
Father's Occupation (ISCO): persons in semi-skilled and unskilled occupations or economically inactive (Ref: managers, professionals and associate professionals, clerks and service workers)	1.199	0.073	0.003	(1.063;1.352)
Father's Occupation*Country of origin with Sex imbalances at birth	1.398	0.204	0.022	(1.049;1.862)
At least an Italian native parent	0.895	0.071	0.162	(0.765;1.045)

AIC Statistic = 1.386142 Hosmer-Lemeshow chi2: 5.34 Prob > chi2 = 0.7210

Std. Err. adjusted for 80 clusters Log pseudolikelihood = -2575.6403 Number of obs = 3,761

The second analysis was performed on data from the First Regional Survey on Sexual and Reproductive Health of Migrant Women held in Lombardy in 2010. The subsample comprises 2,609 births from 1,265 mothers of 22 different countries of origin (Farina, 2010). Children with parents both originating from Albania, China and India (24.5 percent of total sample) are considered as from a country with imbalanced SBR. In this model we control for age of the mother at birth, year of the child's birth, mother's level education, parity, number of mother's dead children, place of child's birth, ideal number of children. We also include a dummy for having an Italian father, a dummy for being the youngest child and a dummy indicating if the mother originate from a country where abortion is always legal.

Table 4: Odds ratios and standard errors from logistic regression with robust standard error for clustered data assessing associations between selected characteristics and male births

...	OR	SE	Sig.
Country of origin with Sex imbalances at birth: Yes (ref. No)	1,204	0,105	*
Child 's year of birth	0,995	0,005	
Mother's age at child's birth	1,000	0,009	
Child was born abroad: Yes (ref. No)	1,108	0,117	
Mother's Highest education level attained: Medium level (ref. Low level)	1,033	0,090	
Mother's Highest education level attained: High level (ref. Low level)	0,931	0,115	
Mother's ideal number of children: 4 or more (ref. Non numerical response)	0,985	0,120	
Mother's ideal number of children: 2-3 (ref. Non numerical response)	1,224	0,113	*
Mother's ideal number of children: 1-2 (ref. Non numerical response)	1,133	0,383	
Number of siblings who died before child's birth	1,214	0,132	
Parity	1,034	0,046	
The father is Italian: Yes (ref. No)	0,906	0,090	
Mother is from a country where abortion is always permitted: Yes (Ref. No)	0,939	0,098	
Older sibling: Yes (ref. No)	1,167	0,091	*

AIC Statistic = 1.388006

Hosmer-Lemeshow chi2: 7.10 Prob > chi2 = 0.9690

Std. Err. adjusted for 22 clusters

Log pseudolikelihood = -1797.1425

Number of obs = 2609

*p<0,05 **p<0,005 ***p<0,001

As the previous analysis on EUSILC data, a positive relation between male births and mothers with a background from countries with imbalanced SBR emerges. Again we see an association between male births and being the youngest child. In this model we found an association between male births and mothers considering 2 or 3 as the ideal number of children.

To sum up these models alone can't support the hypothesis of sex selection among immigrants from countries with imbalanced SBR but can stress which characteristics of the parents may be related to the skewed SBR at births observed in the descriptive analysis.

5 Preliminary conclusions

This paper aimed to explore SRB of migrants in Italy analyzing births from mothers with a foreign background from countries where sex selection at birth is widespread and that are among the largest immigrant communities in Italy, including Albania, China, India, Pakistan and Bangladesh. We found a significant bias in SRB at birth in particular in couple where both parents are Indian and Chinese origin migrants during the period 2005-2012 and for births by Albanian couples starting from 2008. In order to shed light on the factors affecting skewed sex ratio at birth we performed two logistic regressions with robust standard error for clustered data on two different datasets. In both models emerged a positive relation between male births and mothers with a background from countries with imbalanced SBR and a positive association between excess of male births and the youngest offspring of parents from countries with imbalanced SBR. The latter result suggests that when families reach the desired number of children they may opt for gender selection in order to have at least a male child. In addition, the results of the first model suggest an excess of male births for children born abroad. This can be interpreted either as the existence of a sex selection before emigration or as the existence of gender preference in the process of family reunion.

The last two analyses have some intrinsic limitations. The first is based only on information about cohabiting children. Consistently finding a higher number of male sons compared to other citizenships may be the results of both some effects of gender selection at birth and of gender selection in the process of family reunification. The third analysis on the contrary includes all births irrespectively of the place of births and the place of residence of each child but is based on a small sample of births (2,648). Results should therefore be interpreted with some caution and should be considered more as initial hypothesis to be tested in future studies.

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