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Abstract

In this paper, we examined whether the regularization law approved in Italy in 2002 led to changes in the fertility of immigrant women. We used the Birth Sample Survey, published by the Italian Institute of Statistics, to show that the Italian regularization increased the probability of having the first child by approximately 6 percentage points, whereas point estimates of the probability of having additional children beyond the first were negative, but not significant. By exploring alternative specifications, focusing on individuals eligible to receive the status of regular immigrant through employment, we find evidence of a stronger effect with respect to our baseline results. Robustness analyses confirmed our main findings.

Keywords: fertility, immigrant regularization, propensity score matching, difference-in-differences
JEL classification: I10, I12, I18

1 Introduction

At the beginning of the 21st century, the political party of the Italian center-right voted for an immigration law to combat irregular immigration and implement more restrictive rules for regular immigrants (Law 189/2002, i.e., Bossi-Fini Law). Despite the intention, only the Art. 33 of the Bossi-Fini Law concerning regularization became immediately effective after its official publication in July 2002, while the rest of the law was only approved in early 2005. Thus, during this two-and-a-half-year period, regularization was the most far-reaching measure used to increase the number of regular immigrants and to reveal illegal foreign workers.

The regular immigrants were included in the official labor market by way of permits to stay and the annual renewal of these permits depended on the existence of an employment contract. Numerically, 705,000 irregular immigrants were made eligible for regularization and, of these, 650,000 were approved. It should be noted that, of the foreigners who obtained permits to stay in 2003 more than 78% still had valid permits to stay in early 2007 (Avallone 2017). That is, the effect of regularization programs was to effectively initiate a course of legality for most formerly illegal immigrants. Conditional on being employed in Italy, regularized immigrants obtained access to formal labor market and, as a consequence, enjoyed lower risks of losing their job, obtained social contributions for pensions, improved their access to healthcare and, in general, decreased their shadow price of integration.

The increasing number of regular immigrants in Italy generated sharp testable predictions for possible unintended effects allowing us to analyze the interplay between immigration policy and fertility transitions in a country characterized by low fertility rates and may explain the slight recovery between 2001 and 2008[1](Goldstein et al. 2009). We argue that, as predicted by the standard Quantity-Quality (Q-Q) model of Becker & Lewis (1973), policies improving immigrants' opportunities in the host country reduce the price of child quality exerting possible effects on fertility decisions. So far, several papers have documented that the number of children and their quality (e.g., education, health, well-being) are affected by the price of quality (see, for example, Bleakley & Lange (2009), Qian (2009), Becker & Woessmann (2010)). Focusing on immigrants, Avitabile

[1]At the turn of the 21st century, more than half of Europe's population lived in societies with TFRs at or below the threshold of lowest-low fertility, put at 1.3 (Kohler et al. 2002). In 2001, Italy recorded a TFR at 1.26.

et al. (2014) investigated the effects of the German reform of citizenship at birth on immigrants' fertility choices. Applying the Q-Q model, they find that legally recognized citizenship status increased investments in child quality and reduced the optimal number of children. However, they did not consider that differences in fertility choices may arise between women at the first pregnancy (extensive margin) compared to women that already had children (intensive margin).

In this paper, we follow the extension of the Q-Q model of Becker & Lewis (1973), proposed by Aaronson & Mazumder (2009) and Aaronson et al. (2014), which accounts for different propensities in fertility decisions of women facing an improvement of their opportunities. The 'extended' Q-Q model defines child quantity and quality as complementary for mothers at their first pregnancy, since it is necessary to have at least one child in order to invest in quality, and as substitutes for mothers with already at least one child. In particular, Aaronson et al. (2014) examined fertility choices for two generations of rural black women in the American South in response to a large-scale school-building program (Rosenwald Initiative). Findings indicate that schooling opportunities for prospective children of rural black women reduced the price of child quality and increased their probability to have the first child.

We provide an empirical model to test the theoretical predictions of the extended Q-Q model and identify whether and how immigrant mothers, who changed their status from irregular to regular, varied their fertility outcomes. We used data from the Birth Sample Survey (BSS) conducted by the Italian Institute of Statistics (ISTAT) in 2002 and 2005 and concerning interviews with mothers between July 2000 and June 2001 ($wave_1$) and in 2003 ($wave_2$), respectively. The years in which the surveys were conducted are precisely those before and after the immigration law came into force and, thanks to this feature, we can adopt a difference-in-differences (DD) model combined with a propensity score matching (PSM) estimator (i.e., propensity score difference-in-differences, PSDD) to estimate the effects of the massive regularization of illegal immigrants on childbearing in Italy. The combination of these two methods allows us to account for time-invariant unobservable characteristics, which differ between treatment group - immigrant mothers with foreign nationality - and control groups - immigrant mothers with acquired Italian nationality and Italian mothers - comparing only those mothers with the most similar observable characteristics.

We find that leaving the status of illegal immigrant has significant benefits on the probability of having a first child, which increases by $6-7$ percentage points with respect to the control group of immigrant mothers with acquired Italian nationality. Consistent with the idea that parents substitute quality for quantity only at the intensive margin we show that point estimates of immigrant mothers' intentions to have other children are negative, although estimated parameters are not statistically significant. Extended analyses are carried out by focusing on family fertility decisions when subsamples of employed fathers or mothers are taken into account. The results suggest that, when we considered only individuals directly eligible for regularization, the probability of having the first child is stronger in magnitude, but not significantly different from our baseline estimates.

The rest of the paper is organized as follows. Section 2 discusses the theoretical model and derives its testable predictions. Section 3 summarizes changes produced by the regularization law in combating illegal immigration in Italy. Section 4 describes the data and our empirical strategy. Section 5 presents the main results and robustness, while Section 6 discusses the potential confounding of changes in the sample composition before and after the immigrants' regularization. Section 7 concludes.

2 Theoretical framework

In this section, we outline a synthetic framework that departs from Becker & Lewis (1973) and describes how regularization policies can affect fertility choices. While a general theoretical model is beyond the scope of this work, standard assumptions are introduced to generate some testable implications of the extended Q-Q model (Aaronson & Mazumder 2009, Aaronson et al. 2014).

Parents maximize a utility function $U(c, n, q)$, that depends on the consumption of goods and services (c), number of children (n) and the 'quality' per child (q). The optimal level of fertility is determined under a nonlinear budget constraint given by: $n\pi_n + n\pi_q q + c\pi_c = I$, where π_c is a unitary price for consumption, π_n represents the fixed cost for rearing children, which is not affected by the decision on children quality investments, π_q is the direct cost of investing in children, which also depends on the quantity of children

(n) and I is the household income. According to this simple model, a decrease in π_q will increase investments in child quality and, by contrast, will have a negative effect on the number of children, since the shadow price of quantity ($\pi_n + \pi_q q$) increases.

Within this framework, the regularization law can be seen as a reduction in π_q, since regular immigrants will avoid adverse wage shocks, at least at household level, along with the long-term non-economic benefits connected to the possibility to obtain permits to stay for relatives, legal protection in the case of criminal charges and the use of the healthcare service. Previous studies demonstrated that having a regular position in the labor market exposes women to a lower risk of losing their jobs and positively affects access to house mortgages. Prifti & Vuri (2013) showed that job protection for regular workers improved access to credit with the possibility of creating a family and reducing feelings of future economic insecurity and, in turn, did act as a baby booster for Italian working women[2]. In addition, the regular position in the labor market favors the access to major social housing programs, allowing immigrants to move to different places with respect to their own networks (Boeri et al. 2015), where children may arise with more opportunities (Facchini et al. 2015). The legal status promotes better use of prenatal care services by immigrant pregnant mothers. Salmasi & Pieroni (2015) and Chiavarini et al. (2016) found that newborns' health status improved after the Italian regularization. *Ceteris paribus*, regularizations can have a permanent effect on investment in child quality, for both the first child and other children, and this may induce an improvement in terms of economic status for new generations (Currie 2009, Carvalho 2012).

Considering all the above mentioned aspects, we can conclude that regularization expanded opportunities for immigrants and for their prospective children, reducing the price of child quality - π_q - and, according to the standard Q-Q model, also the total number of children. This interpretation is in accordance with that of Avitabile et al. (2014). However, as previously discussed, the relationship between quality and quantity is non-linear across household fertility levels, and it turns from complementarity (at low fertility levels) to substitution (at high fertility levels). Baudin et al. (2015) show that the transition from being childless to primiparous provides an increase in households utility, without which the interaction of quality and quantity in the budget constraint cannot become

[2]Dustmann et al. (2017) also suggested that labor market regularization in Italy produced a positive shift in immigrants consumption decisions. Their findings estimated that undocumented immigrants consuming about 40% less than documented immigrants.

effective. Aaronson et al. (2014) define the extension of the relationship between quality and quantity at low fertility levels as 'essential complementarity', because households can consume their good (i.e., child quality), only if they have at least one child.

As an example, consider that $V(I)$ is the indirect utility associated to remaining childless, and $V(I, \pi_n, \pi_q)$ is that of a woman with at least one child. If $V(I, \pi_n, \pi_q) > V(I)$ the decision to have the first child will be taken. It is clear that, under these assumptions, any change implying a decline in π_q will increase $V(I, \pi_n, \pi_q)$ without affecting $V(I)$, and this will induce more women to decide to have a child. In our setting, regularized women without children will experience an increase in $V(I, \pi_n, \pi_q)$ and will have an incentive to have their first child, while regularized women with already at least one child, will experience a decline in total fertility due to the increase in the shadow price of child quantity.

3 The regularization of immigrants through the 189/2002 Italian law

Law 189/2002 was the most important legislation to be introduced in an European country, only equaled later by the 2005 regularization law in Spain, that provided the status of regular immigrant to illegally resident individuals on the Italian soil. The law is composed of a set of rules to regulate the flow of migrants into Italy and to combat illegal immigration. This law also imposed more restrictive rules for regular immigrants, linking permits to stay with work contracts, and made procedures for renewals more expensive. However, the application of these restrictive conditions was delayed until February 2005 and only Art. 33, which mainly aimed to regularize domestic workers and personal assistants (care assistants), was immediately applied starting from its official publication in July 2002. The regularization law was later also extended to individuals employed in other sectors of the economy under Legislative Decree 195/2002[3].

The massive regularization of foreign workers provides an exogenous variation in the status of legal immigrant, and represents our main identification strategy. It is worth noting that the legislative procedure of this law started in the February 2002, with Senate approval. Formally, employers' declarations had to be sent to the Italian Institute of Social Security (INPS), together with a payment of 700 euros to cover the welfare costs

[3]Self-employed, unemployed, and family members were excluded from regularization.

for the three months before the amnesty, as well as other administrative costs. Demands for regularization had to be presented between September and November 2002. Then, workers requiring regularization and their employers were invited by the prefecture of the municipality of residence to verify the demand. If all the necessary conditions were met permits to stay were released during the same meeting. Operations were significantly faster compared with similar procedures carried out previously, despite a higher number of applications. Almost all permits to stay were administratively granted in the last months of 2002, giving us an even better idea of the extent of this regularization, after which the number of regularly employed foreign workers virtually doubled (Bonifazi et al. 2009).

Official data reveals some salient features of the evolution over time of immigration policies in Italy. Until the late 1990s, regularization policies displayed a strong gender imbalance: the percentage of regularized women in 1998 amnesties was around 30%, whereas after the Regularization Law 189/2002, women accounted for almost 46% of applicants. This increase in the proportion of women among regularized immigrants was the result of greater migration from areas such as the Balkans and Eastern Europe, pulled by the demand for employment in domestic jobs and care assistants during the positive business cycle of the Italian economy. The total number of permits to stay issued to immigrant women from countries of the former Soviet Union was of 383,000, i.e. nearly 60% of the total amount, almost doubling the numbers of women from the same area already legally residing in Italy.

4 Data and empirical strategy

4.1 Data

The main dataset used in this study is the BSS published by ISTAT in 2002 and 2005. This survey lists interviews of about 100,000 and 30,000 mothers for the long and short versions, respectively. We refer to both versions of the BSS because only the short version includes items concerning fertility intentions. The main information collected by both surveys regard the mother's and father's socio-demographic details and the newborn's health status.

The BSS collects information for a representative sample of foreign-born mothers whose fertility choices are of particular interest to the aims of the present study and represent our

treatment group. The BSS also allows us to identify the following control groups composed by mothers that were not eligible for regularization: (i) women born outside of Italy with acquired Italian nationality and (ii) Italian women. Interviews were collected between July 2000 and June 2001 in the first wave ($wave_1$) and in 2003, in the second wave ($wave_2$). We argue that, given the procedure previously described to apply for regularization and to obtain the permit to stay, a relevant share of - if not all - applications were already approved by the end of 2002, allowing us to observe the effects of the regularization already in 2003. Unfortunately, we do not have information about fertility outcomes after this date, but since this goes against finding a policy effect, if we estimate a significant effect despite it - as we show later - then our results should be even more convincing and, at most, interpreted as a lower bound of the true effect.

Table 1 lists the proportion of immigrant and Italian mothers who had babies for both the long (upper panel) and short (lower panel) versions of the BSS. The share of immigrant mothers, about 6-7% of the sample, does not vary substantially between the two waves and samples. Table 1 also shows the share of immigrant women, with or without Italian nationality in each wave. We can observe an increase in the percentage of immigrant mothers who decided to have a child by 7-8 percentage points, after the immigration law came into force. If we assume that the ethnic composition of immigrant women did not vary significantly between waves, it is reasonable to expect that the increase in the probability to have a child born to immigrant mothers spurred by the prospect of a reduction in socio-economic vulnerability due to the 2002 regularization.

Table 2 shows the distribution and the percentage variation of permits to stay granted to immigrants before and after the 2002 regularization. As we can observe, there are large differences for some ethnic groups. The most marked increase is observed for women from Central and Eastern Europe (+104%), but also permits to stay for immigrants from other countries experienced large variations, e.g. Europe (+66%), North and West of Africa (+35% and +32%), East Asia (+36%) and Central and South America (+58%). Looking at these figures, one may think that the increase in fertility of immigrant mothers observed in Table 1 is the result of variations in sample composition towards ethnic groups with higher total fertility rates (TFRs) rather than of the Italian regularization. We will devote further analyses in the next sections of the paper to show that this problem does not represent a threat to our identification strategy and provide evidence that: (i) the

distribution of births did not follow the same trend as the distribution of permits to stay, and (ii) the variation in fertility imputable to the composition of migrants is very limited and cannot be the only explanation for the observed variation in fertility after the regularization.

Table 1: Share of immigrant and Italian mothers.

			Nationality	
Wave	**Observations**	**Italian**	**Italian (acquired)**	**Foreign**
		Long-version of the Birth Sample Surveys		
$Wave_1$	49,093	0.936	-	0.064
$Wave_2$	48,018	0.931	-	0.069
$Wave_1$	3,153	-	0.683	0.317
$Wave_2$	3,380	-	0.602	0.398
		Short-version of the Birth Sample Surveys		
$Wave_1$	16,100	0.935	-	0.065
$Wave_2$	15,149	0.934	-	0.066
$Wave_1$	1,043	-	0.695	0.305
$Wave_2$	1,007	-	0.619	0.381

Source: Our estimates from Birth Sample Surveys.

Table 2: Number of permits to stay issued and percentage variations before and after the 2002 regularization.

	2002			**2003**			**% var. 2002/2003**		
Area of origin	**Men**	**Women**	**Total**	**Men**	**Women**	**Total**	**Men**	**Women**	**Total**
European Union	60,664	90,202	150,866	59,020	89,174	148,194	-0.03	-0.01	-0.02
Central and Eastern Europe	232,396	235,038	467,434	413,399	479,151	892,550	0.78	1.04	0.91
Other European countries	9,167	12,099	21,266	9,120	12,091	21,211	-0.01	0	0
Europe	302,227	337,339	639,566	481,539	580,416	1,061,955	0.59	0.72	0.66
North Africa	186,777	80,281	267,058	261,828	98,675	360,503	0.4	0.23	0.35
West Africa	65,279	32,871	98,150	87,679	41,591	129,270	0.34	0.27	0.32
East Africa	9,751	16,835	26,586	10,641	17,740	28,381	0.09	0.05	0.07
Central and Southern Africa	5,295	4,353	9,648	5,969	5,040	11,009	0.13	0.16	0.14
Africa	267,102	134,340	401,442	366,117	163,046	529,163	0.37	0.21	0.32
West Asia	12,064	6,571	18,635	12,472	6,956	19,428	0.03	0.06	0.04
East Asia	62,561	84,736	147,297	92,088	107,586	199,674	0.47	0.27	0.36
Central and South Asia	74,594	40,605	115,199	114,388	47,000	161,388	0.53	0.16	0.4
Asia	74,625	91,307	165,932	104,560	114,542	219,102	0.4	0.25	0.32
North America	17,286	31,203	48,489	16,821	31,038	47,859	-0.03	-0.01	-0.01
Central and South America	39,651	89,712	129,363	66,507	138,319	204,826	0.68	0.54	0.58
Americas	56,937	120,915	177,852	83,328	169,357	252,685	0.46	0.4	0.42
Oceania	1,204	1,476	2,680	1,170	1,487	2,657	-0.03	0.01	-0.01
Stateless	387	228	615	385	232	617	-0.01	0.02	0
Total	**702,482**	**685,605**	**1,388,087**	**1,037,099**	**1,029,080**	**2,066,179**	**0.48**	**0.5**	**0.49**

Source: Data from Italian Institute of Statistics (ISTAT).

4.2 Fertility outcomes

Table 3 lists the descriptive statistics for the fertility outcomes used in our analysis. First, we obtained a measure of fertility which identifies the share of women that had their first child in the two waves. It emerges that immigrant mothers having their first child increased by 5 and 12 percentage points in between the two waves looking at the long and short versions, respectively. The same share decreased for mothers with acquired Italian nationality (from 0.39 to 0.36 in the long version and from 0.38 to 0.35 in the short version) and remained stable for Italian mothers.

The second line of Table 3 lists the average number of children from immigrant and Italian mothers. There is evidence of a reduction in the number of children delivered to immigrant mothers over the immigration regularization changes period, which fell by around 10 points in both the long and short versions of BSS. The control groups displayed limited changes over these two years. This also implies that mothers with at least one child had a lesser propensity to deliver children in these years, in accordance with the suggestion of the Q-Q theory. However, there is a clear limitation to using the number of children as an outcome of total fertility in our sample. In fact, we can observe a very short fertility window for mothers who delivered newborns before and after the immigration regularization of the law 198/2002, such as we cannot estimate the completed fertility of mothers, which would be needed to test the extended Q-Q theory.

Alternatively, we use the intention to have other children to proxy effects on total fertility. Even though the fertility intentions may reflect also current conditions of individuals or households, rather than future prospects, they represent a powerful predictor of fertility behavior (Thomson et al. 1990, Schoen et al. 1999, Berrington 2004). In this respect, we use the short-version of the BSS, which included the following question: "Do you want to have other children in the future?" to build an indicator to proxy total fertility. Table 3 shows that there is a positive, although small, change in the fertility intentions of immigrant mothers and a stable trend for the control groups.

Tables A.1 and A.2 in the Appendix show descriptive statistics of the BSSs (short and long versions) for the variables of interest in our analysis by mother's nationality (i.e., mother's and father's age, years of residence in Italy, employment, marital status, education, and wealth). Clearly, the group of foreign-born mothers differs in terms of

Table 3: Fertility outcomes

Variable	Immigrant mothers		Immigrant mothers (but with acquired Italian nationality)		Italian mothers	
	Wave$_1$	**Wave$_2$**	**Wave$_1$**	**Wave$_2$**	**Wave$_1$**	**Wave$_2$**
Long-version of the BSS						
Mothers having their first child	0.44	0.49	0.39	0.36	0.43	0.44
Number of children	1.68	1.59	1.71	1.74	1.69	1.69
Short-version of the BSS						
Mothers having their first child	0.39	0.51	0.38	0.35	0.43	0.43
Number of children	1.68	1.57	1.69	1.73	1.68	1.69
Intentions to have other children (1+)	0.41	0.43	0.39	0.40	0.43	0.42

Source: Our estimates from Birth Sample Surveys.

observable characteristics from those of foreign-born mothers with acquired Italian nationality and Italian mothers, especially according to age, occupational status, and wealth (measured by a set of dummy variables which evaluate whether the accommodation where the respondent lives is owned or rented, and by the number of rooms in it).

4.3 Empirical strategy

The impact of the Italian immigration law on births is estimated using the PSM in a DD model, i.e., PSDD (Imbens (2000) and Lechner (2002)). The use of PSDD estimator has become standard practice in the evaluation literature for the case of single treatments, although some extensions to multiple treatments have been proposed (e.g., Moreno-Serra (2008)). The main advantage of this approach is the possibility of accounting, among treatment and control groups, for differences in initial conditions and other time-invariant unobservable characteristics with the DD strategy and to reduce, preliminary, the bias induced by differences in observable characteristics with the PSM approach.

We formalize our empirical framework starting from the classical DD model, expressed as follows:

$$Y_{it}^{l} = \gamma_0 + \gamma_1 T_i + \gamma_2 Time_t + \gamma_3 (T \times Time)_{it} + \sum_{h=1}^{H} \psi_h X_{ith} + \epsilon_{it} \tag{1}$$

where Y_{it}^{l} is a binary indicator for woman i at time t, who measures $l = 1, 2$ outcomes of interest represented by: (i) the probability to have the first child or (ii) the intentions of having children in future. T_i is a dummy variable indicating treatment status for each

individual. Immigrant women without Italian nationality represent our treatment group, since they are eligible to receive the status of regular immigrant through employment. We select two control groups that, according to the potential outcome framework, should be valid proxies of fertility choices for our treatment group in the absence of treatment. These two groups of women cannot be directly affected by the 2002 regularization, but should be able to capture variations in other conditions (e.g., income, health, education) incurred in the same years of the regularization and possibly correlated to fertility decisions. $Time_t$ is a time dummy variable which takes value 1 for observations collected during $wave_2$ and 0 otherwise.

The coefficient associated with T_i, γ_1, captures any pre-existing difference among treatment and control groups; the coefficient associated with $Time_t$, γ_2, is a proxy for unobserved variables not associated with the immigration law which may affect treatment and control group fertility. The effect of regularization is captured by γ_3, estimated as the interaction between T_i and $Time_t$.

Treatment and comparison groups may differ in terms of both unobservable and observable characteristics, suggesting that these sources of heterogeneity have a role to play in determining variations in migrant women's fertility decisions (Sobotka 2008). Legal and illegal immigrants in Italy are groups of people with distinct characteristics, possibly correlated with fertility behaviors, that if not taken into account may bias our estimates. For instance, if our treatment group after the regularization results in younger women with high education, it could be that the estimated increase in fertility is attributable to such changes rather than to the regularization. Variations in the ethnic composition of immigrants shown in Table 2 may also lead to unbalance the samples and bias our estimates, since the large increase in women from Eastern and Central Europe (+104%), mainly middle aged and involved in low-skill jobs as domestic workers and care-givers, affects births (see, Appendix A.4-A.5.).

Although this selection into treatment should be mitigated by the fact that regularization was assigned as a sort of amnesty to almost all applicants, we used the PSM to further mitigate its influence. Combination with the PSM estimator ensures that individuals in the treatment group are compared with their counterparts in the comparison group, who are similar according to observable characteristics. Blundell & Dias (2000) show that the combined PSDD estimate of γ_3 is given by the following equation:

$$\hat{\gamma}_{3,PSDD} = \frac{1}{N_{T_a}} \sum_{i \in T_a \cap S} \left[\left(Y_i^{l,T_a} - \sum_{i \in C_a \cap S} W_{ij} Y_j^{l,C_a} \right) - \left(\sum_{j \in T_b \cap S} W_{ij} Y_j^{l,T_b} - \sum_{j \in C_b \cap S} W_{ij} Y_j^{l,C_b} \right) \right] \quad (2)$$

where T_a and C_a represent the treatment and control groups after regularization. T_b and C_b represent the same groups before the immigration law came into force. S is joint common support, defined as the subset of treated individuals who are matched for the construction of each counterfactual group. N_{T_a} represents the number of treated individuals who also belong to joint common support S. As before, Y^l is either: the probability to have the first child or the intention to have children. W_{ij} is the weight attributed to matched individual j when compared with treated individual i. From an empirical point of view, matching on covariates X must be performed three times for each treated individual: the first time between T_a and T_b to find comparable treated individuals in the period before the law came into force, the second time between T_a and C_a and, the third, between T_a and C_b, to find comparable individuals in the comparison group before and after implementation of the law, respectively.

We also take into account the fact that the standard errors of ordinary least squares for the DD estimator may not be accurate in the presence of serial correlation within groups and between time periods. This problem has been specifically analyzed for the case with two groups and two time periods by Donald & Lang (2007) and Bertrand et al. (2004). Here, we use the two-step estimator proposed by the former authors as the most appropriate method to obtain consistent standard errors.

5 Results

5.1 Preliminary: the propensity score matching analysis

The results of the matching strategies for balancing covariates are listed in Table 4. We compare covariate distributions between the treatment and control groups before and after matching, using the variables already described in the previous section and listed in Appendix A.1 and A.2. We calculate the median and mean of the absolute standardized bias and the pseudo $R-squared$ index, using nearest-neighbor, radius and kernel matching methods. Panel 1 of Table 4 shows the results using the long-version of the BSS. Irrespective of matching strategy and control group, median and mean bias are reduced

drastically, meaning that differences among treatment and control groups (i.e., immigrant mothers with Italian nationality and Italian mothers) in observable characteristics decrease significantly after matching. In addition, the pseudo $R - squared$ fell to almost zero after matching. We find similar matching results for the short-version of the BSS (Panel 2 of Table 4).

The right part of Table 4 lists the number of observations in treated and comparison groups before and after each matching. In both versions of the BSS, we note how a small number of observations is discarded after matching in the case of kernel and radius matching, whereas a relatively larger number is lost with the nearest-neighbor method. This difference is explained by the fact that the nearest-neighbor strategy uses only those observations which represent the best matches for treated individuals, whereas the kernel and radius methods, using a wider set of observations, are more efficient but may be affected by higher levels of bias (Caliendo & Kopeinig 2005). Similar results are found for the short-version of the BSS.

5.2 Main estimates

Table 5 (panel a) shows the estimates on the probability of having the first child for regularized immigrant women using immigrant women with acquired Italian nationality as control group. Remind that part of immigrant mothers reside and work in Italy but only illegal women were potentially exposed to regularization. The left part of the table shows standard DD estimates of average treatment effect on the treated (ATT), with the corresponding number of observations; the right part lists PSDD estimates of ATT obtained from three matching strategies, nearest-neighbor, radius and kernel[4]. Although DD estimates reveal a slight increase in the probability to have the first child after regularization, the estimated coefficient is not statistically significant at the 95 percent confidence level $(0.029; S.E. = 0.023)$. Instead, the PSDD estimates indicate that the exposure to the regularization law increases the probability to have the first child by about $6 - 7$ percentage points. Note that, the effect estimated after radius matching is larger than others $(0.0684; S.E. = 0.032)$, even if the coefficient is not significantly different from those obtained with other methods, thus we can conclude that the matching procedure does not

[4]DD estimates were obtained by including the same control variables used for matching observations in the PSDD estimator.

Table 4: Tests for balancing covariates, before and after matching

Matching Method	Absolute standardized bias Median		Absolute standardized bias Mean		Pseudo R-squared		Treated group Observations			Comparison group Observations		
	Before	After	Before	After	Before	After	Before	After	Lost	Before	After	Lost
1. Long-version of the BSS - Outcome: the probability of having first child												
(1.a) Control group: immigrant mothers with Italian nationality												
N	4.3	0.8	6	1.1	0.026	0.001	2344	2217	127	4189	4039	150
R	4.3	0.7	6	1.6	0.026	0.003	2344	2217	127	4189	4086	103
K	4.3	1	6	1	0.026	0.001	2344	2217	127	4189	4086	103
(1.b) Control group: Italian mothers												
N	5.4	0.6	6.5	0.8	0.017	0	2344	2217	127	90578	35661	54917
R	5.4	2.7	6.5	2.9	0.017	0.003	2344	2217	127	90578	89156	1422
K	5.4	0.7	6.5	1.1	0.017	0.001	2344	2217	127	90578	89156	1422
2. Short-version of the BSS - Outcome: fertility intentions												
(2.a) Control group: immigrant mothers with Italian nationality												
N	3.1	1.2	4.4	2	0.01	0.003	701	657	44	1349	606	743
N - 1st child	3.1	1.4	4.4	2.2	0.01	0.004	320	280	40	519	171	348
R	3.2	1.1	4.2	1.9	0.01	0.003	701	657	44	1349	613	736
R - 1st child	3.2	1.5	4.2	2.3	0.01	0.004	320	280	40	519	212	307
K	3.3	1.1	4.4	1.9	0.01	0.003	701	657	44	1349	613	736
K - 1st child	3.3	1.8	4.4	2.2	0.01	0.003	320	280	40	519	212	307
(2.b) Control group: Italian mothers												
N	6.9	2.6	9.3	2.3	0.041	0.004	701	657	44	29189	12009	17180
N - 1st child	12.8	4.3	13.2	6.2	0.095	0.021	320	280	40	12563	5543	7020
R	6.9	2.5	9.3	2.2	0.041	0.003	701	657	44	29189	28824	365
R - 1st child	12.8	4.9	13.2	5.1	0.004	0.056	320	280	40	12563	12340	223
K	6.9	1.6	9.3	1.8	0.041	0.003	701	657	44	29189	28824	365
K - 1st child	6.5	1.8	8.3	2.3	0.056	0.006	320	280	40	12563	12340	223

Note: Matching methods, N=Nearest-neighbor; R=Radius; K=Kernel.

affect our results.

When we use Italian mothers as the control group (Table 5, panel b), we confirm the results obtained in previous estimates. We find significant effects of regularization on the probability of having the first child for immigrant mothers, after matching with radius and kernel, but with smaller magnitude (3 percentage points).

Tables 6 and 7 show the effect of regularization on fertility intentions. First, we use the intention to have other children as an outcome of total fertility since all women in our samples delivered at least one child. Point estimates in Table 6 highlight a negative effect of regularization on the intention to have other children, but this effect is never statistically significant, except when we used the kernel matching algorithm and the control group of Italian mothers. Second, as the theory suggests, women substitute out of quantity into quality such as the impact on total fertility depends on the magnitude of the increase along the extensive margin and declines along the intensive margin. We proxy the last

fertility effect by using the subsample of mothers who had their first child. Unsurprisingly, the results listed in Table 7 are in accordance with those obtained in Table 6, showing a negative, though not significant, effect on fertility intentions after regularization.

These results reveal opposing effects along the extensive and intensive margins, although appear to be not in according with the prediction of the standard Q-Q model. Instead, they are more consistent with the definition of 'essential complementarity' proposed by Aaronson et al. (2014), which may arise for women at the first pregnancy. For immigrant mothers, the Italian regularization can be viewed as a decline in the price of the child quality, as the program led to improvements in both labor market access and job quality, and stimulated increases in the value of having a child for the group of childless immigrant women. But it should also lead mothers (or parents) to invest more in the quality of children, predicting that fertility will decline along the intensive margin because quantity and quality become substitutes at higher fertility levels. This second prediction is not statistically confirmed by the data. A possible explanation may be that the duration of the permit to stay was initially limited to one year, after which a renewal was required. This improved immigrants' conditions in Italy in the short run but not in the medium/long-run perspective which, in turn, constrained investments in child quality. Importantly, looking at the results only based on standard Q-Q model might have led us to mistakenly conclude that the Italian regularization had no effect on the fertility of immigrant mothers. Enhancing the model to distinguish between the separate effects of 'essential complementarity' and the quantity-quality trade-off enables us to show that the effect was significant at least for women at their first pregnancy.

5.3 An extension of the effect of immigrant regularization: a family background

In this section, we test the robustness of our significant baseline estimates on the probability of having the first child, considering families where lives at least one individual that was eligible for regularization. We argue that regularization may induce positive effects on fertility either directly, for employed women, or indirectly, for unemployed women married to an employed man.

The DD model shown in equation (1) is extended defining two subgroups of the population. The first subgroup includes families where the father is in employment, while the

Table 5: Effect of the immigration law on probability of having first child, marginal effects

DD		PSDD		
ATT	**Observations**	**Matching method**	**ATT**	**Observations**
Panel a) control group of immigrant mothers with acquired Italian nationality				
0.029	6303	Nearest-neighbor	0.0601*	6256
(0.023)			(0.034)	
		Radius	0.0684**	6303
			(0.032)	
		Kernel	0.0599*	6303
			(0.031)	
Panel b) control group of Italian mothers				
0.0074	91,373	Nearest-neighbor	0.0317	37,878
(0.071)			(0.031)	
		Radius	0.034**	91,373
			(0.014)	
		Kernel	0.0382**	91,373
			(0.019)	

*Notes: Standard errors in brackets obtained with two-step procedure of Donald & Lang (2007). Significant levels: p-value *** ≤ 0.01, ** ≤ 0.05, * ≤ 0.1.*

second includes families with mothers or fathers in employment[5]. In particular, the latter subgroup was used to evaluate whether the combined effect of regularization on both parents is more effective in increasing the probability of having the first child. Formally:

$$Y_{it} = \gamma_0 + \gamma_1 T_i^k + \gamma_2 Time_t + \gamma_3 (T^k \times Time)_{it} + \sum_{h=1}^{H} \psi_h X_{ith} + \epsilon_{it} \tag{3}$$

where superscript $K = 1, 2$ corresponds to the already described subgroups and Y_{it} indicates only the probability of having the first child. Consequently, PSDD estimates are obtained from:

$$\hat{\gamma}^k_{3,PSDD} = \frac{1}{N_{T_a^k}} \sum_{i \in (T_a^k \cap S)} \left[\left(Y_i^{T_a^k} - \sum_{i \in (C_a^k \cap S)} W_{ij} Y_j^{C_a^k} \right) - \left(\sum_{j \in (T_b^k \cap S)} W_{ij} Y_j^{T_b^k} - \sum_{j \in (C_b^k \cap S)} W_{ij} Y_j^{C_b^k} \right) \right]. \tag{4}$$

The results of matching procedures are similar to those of the whole sample. Also in this case, the PSM obtained with the same methods as before (nearest-neighbor, kernel and radius) performs well in reducing bias from observable covariates (see, Appendix A.3).

[5]We do not show estimates for the subgroup of families where both parents are currently employed because the number of observations would be too small to guarantee reliable estimates.

Table 6: Effect of the immigration law on intentions to have other children, marginal effects

DD		PSDD		
ATT	**Observations**	**Matching method**	**ATT**	**Observations**
Panel a) control group of immigrant mothers with acquired Italian nationality				
-0.0618	1270	Nearest-neighbor	-0.0418	1263
(0.389)			(0.054)	
		Radius	-0.0388	1270
			(0.049)	
		Kernel	-0.0127	1270
			(0.038)	
Panel b) control group of Italian mothers				
-0.0321	29,481	Nearest-neighbor	-0.0482	12,666
(0.331)			(0.029)	
		Radius	-0.0481	29,481
			(0.029)	
		Kernel	-0.0528*	29,481
			(0.031)	

*Notes: Standard errors in brackets obtained with two-step procedure of Donald & Lang (2007). Significant levels: p-value *** ≤ 0.01, ** ≤ 0.05, * ≤ 0.1.*

Table 8 shows the results focusing on families where father is employed. Looking at the PSDD estimator, ATTs are generally significant and point estimates of the probability to have the first child range from 7 to 8 percentage points, using mothers with acquired Italian nationality, and from 3 to 4 percentage points when compared to Italian mothers. Estimates of the probability of having the first child are very similar to those obtained from the subgroup of employed fathers or mothers (Table 9). Compared with mothers with acquired Italian nationality, the positive effect is stable (i.e., around 7-8 percentage points), while it is slightly higher (i.e., 5 and 6 percentage points) than previously estimated when Italian mothers are used as control group. Overall, these results support the hypothesis that regularization had an indirect effect on unemployed mothers through fathers that were employed before 2002 and that obtained the status of regular immigrant, stimulating immigrant families to have a new child.

Table 7: Effect of the immigration law on intentions to have other children, subsample of women who had first child, marginal effects

	DD		**PSDD**	
ATT	**Observations**	**Matching method**	**ATT**	**Observations**
Panel a) control group of immigrant mothers with acquired Italian nationality				
-0.1162	492	Nearest-neighbor	-0.0104	451
(0.364)			(0.200)	
		Radius	-0.0101	492
			(0.200)	
		Kernel	-0.0204	492
			(0.211)	
Panel b) control group of Italian mothers				
-0.073	12,620	Nearest-neighbor	-0.0524	5823
(0.263)			(0.106)	
		Radius	-0.0524	12,620
			(0.106)	
		Kernel	-0.0559	12,620
			(0.152)	

*Notes: Standard errors in brackets obtained with two-step procedure of Donald & Lang (2007). Significant levels: p-value *** ≤ 0.01, ** ≤ 0.05, * ≤ 0.1.*

6 Potential confounding

The permits to stay described in Table 2 indicate a change in the composition of the treatment group such as the positive point estimates of the effects of Italian regularization on the probability of having the first child may be partially explained by a change in the composition of the immigrant group. Here, we examine the possibility that our results are capturing the effect of the group composition of immigrants exposed to regularization, rather than the effect of the reform, on the fertility decisions of immigrants.

Although ISTAT does not provide data about births from mothers with foreign nationality among its official statistics, we requested an *ad hoc* process to have access to a hitherto unpublished database to obtain this information. For comparison, we summarize the results in Table 10, with the same aggregation provided in Table 2. We also show raw data at country level in Appendix A.4-A.5. There is definite evidence of variations in

Table 8: Effect of the immigration law on probability of having first child on a subsample of newborns from families where only the father is employed, marginal effects

DD		PSDD		
ATT	**Observations**	**Matching method**	**ATT**	**Observations**
Panel a) control group of immigrant mothers with acquired Italian nationality				
0.0271	3748	Nearest-neighbor	0.0737***	3714
(0.029)			(0.025)	
		Radius	0.079**	3748
			(0.033)	
		Kernel	0.0755**	3748
			(0.033)	
Panel b) control group of Italian mothers				
0.0169	41,205	Nearest-neighbor	0.0244***	20,790
(0.084)			(0.007)	
		Radius	0.0432***	41.205
			(0.003)	
		Kernel	0.0381***	41.205
			(0.007)	

*Notes: Standard errors in brackets obtained with two-step procedure of Donald & Lang (2007). Significant levels: p-value *** ≤ 0.01, ** ≤ 0.05, * ≤ 0.1.*

terms of births in favor of Eastern European women (+15%), associated with an almost stable variation of newborns from African mothers (-4%). However, the difference between the two groups as regards to births is less marked than that estimated on permits to stay (see, Table 2). As column 3 of Table 10 shows, the variation of newborns from mothers of foreign nationality is very limited, with an overall incidence of 3%; we conclude that this result is not large enough to bias our estimates significantly.

We also prove that variations in the population of immigrant women had a very limited influence on TFR before and after the 2002 regularization law was applied. For a more precise idea of how variations in the composition of births may affect TFR, we estimate the average TFR of immigrants for each geographical area of origin. Then, we calculate the average TFR by geographical area of origin, weighted by two indicators: (i) the number of women with foreign nationality before and after the regularization and (ii) the total number of deliveries from mothers without Italian nationality before and after the 2002 regularization. From these figures, we analytically calculated the variation in TFR between the years. In other words, we calculate what should have been the change in

Table 9: Effect of the immigration law on probability of having first child on a subsample of newborns from families where either the mother or father is employed, marginal effects

DD		PSDD		
ATT	**Observations**	**Matching method**	**ATT**	**Observations**
Panel a) control group of immigrant mothers with acquired Italian nationality				
0.0286	6124	Nearest-neighbor	0.0738***	6077
(0.024)			(0.027)	
		Radius	0.0783***	6124
			(0.027)	
		Kernel	0.0736***	6124
			(0.028)	
Panel b) control group of Italian mothers				
0.0059	88,962	Nearest-neighbor	0.0633*	36,645
(0.072)			(0.038)	
		Radius	0.0517**	88,962
			(0.021)	
		Kernel	0.0492**	88,962
			(0.025)	

*Notes: Standard errors in brackets obtained with two-step procedure of Donald & Lang (2007). Significant levels: p-value *** ≤ 0.01, ** ≤ 0.05, * ≤ 0.1.*

TFR between 2002 and 2003, associated exclusively with the variation of the immigrant population in favor of nationalities with lower TFR. As columns 6 and 9 of Table 10 show, the absolute variation of TFR is always very limited, with an overall incidence of -1%, when weighted by number of births, and of -7% when weighted by the number of permits to stay. From this result we can argue that the variation in the ethnic composition happened towards countries with lower TFRs, and should be responsible for a decrease in births from regularized immigrant women. Despite this, we found a significant increase to deliver their first child for immigrant mothers. This implies that at most our results are downward biased by the change in sample composition and should be interpreted as a lower bound for the true effect.

Lastly, the presence in our sample of immigrants arrived in Italy after 2002 could represent a threat to our identification strategy. We know from official sources that the majority of immigrants who received the status of regular immigrant were already in Italy before 2002[6]. However, we also know that a part of the population of immigrants in 2003

[6]Almost 80 per cent of those regularised in the 2002 amnesty arrived in Italy before that year, with over 70 per cent in

could be represented by new arrivals, and this could explain the estimated increase in immigrant women fertility. We already shown in Table 1 that the share of immigrants in our sample is very stable but, to provide more convincing evidence on this regard, we propose a robustness that excludes from our baseline estimates individuals who declared to be arrived in Italy from less than 2 years. In this way we are sure that all immigrants in our sample were in Italy before 2002, excluding the possible negative effects induced by new arrivals on our estimates. These results are shown in Appendix (Table A.6) and estimated coefficients are very similar to those provided in our baseline estimates.

Table 10: Total number of newborns and TFR for mothers of foreign nationality.

	Newborns from mothers of foreign nationality			**Total Fertility Rate (TFR)** weighted by n. of births			**Total Fertility Rate (TFR)** weighted by n. of permits to stay		
Area of origin	**2002**	**2003**	**var.**	**2002**	**2003**	**var.**	**2002**	**2003**	**var.**
European Union	508	389	-0.23	1.76	1.74	-0.01	1.68	1.68	0
Central and Eastern Europe	9646	11045	0.15	1.46	1.45	-0.01	1.43	1.4	-0.02
Other European countries	36	36	0	1.62	1.54	-0.05	1.56	1.56	0
Europe	10190	11470	0.13	1.48	1.46	-0.01	1.5	1.44	-0.04
Northern Africa	9301	8902	-0.04	2.23	2.25	0.01	2.21	2.21	0
Western Africa	2479	2406	-0.03	4.6	4.63	0.01	4.48	4.54	0.01
Eastern Africa	325	355	0.09	3.7	3.69	0	4.23	4.2	-0.01
Central and Southern Africa	212	219	0.03	4.7	4.84	0.03	4.58	4.63	0.01
Africa	12317	11882	-0.04	2.79	2.82	0.01	3.1	3.09	0
Western Asia	279	293	0.05	2.56	2.61	0.02	2.28	2.24	-0.02
Eastern Asia	3876	3795	-0.02	2.06	2.07	0.01	2.3	2.22	-0.03
Central and Southern Asia	3085	3172	0.03	2.45	2.44	0	2.37	2.4	0.01
Asia	7240	7260	0	2.24	2.26	0.01	2.32	2.27	-0.02
Northern America	53	48	-0.09	1.95	1.98	0.02	1.99	1.99	0
Central and Southern America	1526	1721	0.13	2.2	2.2	0	2.08	2.12	0.02
America	1579	1769	0.12	2.19	2.2	0	2.06	2.1	0.02
Oceania	7	8	0.14	1.81	1.84	0.02	1.81	1.84	0.02
Stateless	0	3	-	-	-	-			-
Total	**31333**	**32392**	**0.03**	**2.21**	**2.18**	**-0.01**	**2.16**	**2.01**	**-0.07**

Notes: Data on newborns from mothers of foreign nationality obtained from ISTAT ad hoc processing service while TFR obtained from Central Intelligence Agency (2013)

7 Conclusions

Currently, Italy is one of the main immigration countries in Europe, with many foreign residents; this implies that immigration represents the vanguard of the political agenda, because there is an increasing concern over its economic and social consequences. If we

the 1999-2001 period (Blangiardo & Tanturri 2004)

look at Italian history, for almost a century after its unification, Italy was one of the leading European countries in terms of emigration, but this phenomenon stopped in the second half of the 1970s and Italy became a country with large immigration flows sustained by economic growth. The publics initial tolerant attitude towards immigration and the weak response to governing immigration helped to consolidate regular immigration flows based on labor market quotas. However, this recruitment never worked properly. The rationing of residence permits, which arose due to increasing rhetoric against immigration, encouraged illegal immigration and, in turn, the recurring need for regularization programs (Mastrobuoni & Pinotti 2015).

In this paper, we exploit plausibly exogenous variation in the number of legal immigrants in Italy - working in domestic services, as care assistants, and in industry - induced by the application of the law on regularization enacted in the second part of 2002, to study the impact on the probability of having the first child or other children, proxied by fertility intentions. We find that regularized immigrant women has an increased probability of having the first child (extensive margin) because of their better employment prospects and occupational standing. By exploring if fertility decisions occurred within families, we find that alternative specifications, focusing on individuals directly eligible for regularization, i.e, employed fathers and employed fathers or mothers, are larger but not significantly different from our baseline estimates.

In our context, the inflow of regular immigrants was beneficial to economic and social outcomes in Italy (Vianello et al. 2019). This does not imply that the regularization of immigrants should necessarily improve also the fertility rate. Rather, although the legal right to stay allows immigrants to plan their life under lower economic and social risks and increase opportunities for their prospective children, the prediction of the $Q - Q$ model suggests a reduction in the price of child quality and total fertility. While our findings suggest that regularization affected the increase in the extensive margin of fertility, the prediction of a reduction of the number of children for immigrants was not statistically significant. The motivation for the latter result may be that the time horizon at that the majority of regularized immigrants only had a short permit to stay linked with the duration of their job contract that could be not sufficient to decide to invest in child quality. The positive employment and income shock induced by regularization may therefore have influenced the expectation to become a mother for immigrant women,

leaving out the perspective of living in Italy for the long term. These observations suggests that one needs to be careful when extrapolating these results in other contexts and that the time horizon of the rights assigned by immigration policies may have different impacts on immigrants' fertility decisions.

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ONLINE APPENDIX

Table A.1: Descriptive statistics: short version of the Birth Sample Surveys

	Mothers born outside Italy		**Mothers born outside Italy** (but with acquired Italian nationality)		**Italian mothers**	
Variable	**Wave$_1$**	**Wave$_2$**	**Wave$_1$**	**Wave$_2$**	**Wave$_1$**	**Wave$_2$**
Mother's age: ≤ 29	0.53	0.62	0.46	0.4	0.43	0.41
Mother's age: 30-39	0.39	0.31	0.5	0.54	0.49	0.5
Mother's age: ≥ 40	0.08	0.07	0.04	0.06	0.08	0.09
Mother's years of residence: 0-7	0.49	0.55	-	-	-	-
Mother's years of residence: 8-14	0.32	0.28	-	-	-	-
Mother's years of residence: ≥ 15	0.18	0.16	-	-	-	-
Mother is unemployed	0.75	0.69	0.62	0.54	0.53	0.42
Mother is employed	0.25	0.31	0.38	0.46	0.47	0.58
Mother is employed with a temporary contract	0.43	0.46	0.18	0.25	0.16	0.23
Mother is employed with a full time contract	0.57	0.54	0.82	0.75	0.84	0.77
Mother is married	0.13	0.19	0.06	0.08	0.07	0.1
Mother is not married	0.87	0.81	0.94	0.92	0.93	0.9
Mother's education: degree	0.23	0.21	0.14	0.18	0.15	0.19
Mother's education: secondary school	0.46	0.56	0.57	0.53	0.52	0.53
Mother's education: primary school	0.31	0.23	0.29	0.29	0.33	0.29
Previous dead children	0.18	0.16	0.16	0.21	0.17	0.17
Previous abortions	0.01	0.01	0.02	0.02	0.01	0.01
Father was born in Italy	0.65	0.69	0.92	0.9	0.97	0.97
Father was born outside Italy	0.35	0.31	0.08	0.1	0.03	0.03
Father's age: ≤ 29	0.19	0.2	0.23	0.17	0.22	0.21
Father's age: 30-39	0.54	0.51	0.6	0.65	0.62	0.62
Father's age: ≥ 40	0.28	0.29	0.17	0.18	0.16	0.17
Father's years of residence: 0-7	0.73	0.78	-	-	-	-
Father's years of residence: 8-14	0.12	0.09	-	-	-	-
Father's years of residence: ≥ 15	0.15	0.13	-	-	-	-
Father is unemployed	0.03	0.05	0.06	0.04	0.04	0.03
Father is employed	0.97	0.95	0.94	0.96	0.96	0.97
Father's education: degree	0.15	0.14	0.12	0.11	0.13	0.15
Father's education: secondary school	0.46	0.49	0.45	0.5	0.45	0.46
Father's education: primary school	0.39	0.37	0.43	0.39	0.42	0.39
House: owned	0.51	0.38	0.28	0.22	0.28	0.2
House: rented	0.49	0.62	0.72	0.78	0.72	0.8
Number of rooms > 2	0.29	0.3	0.15	0.16	0.16	0.16
Number of rooms <= 2	0.71	0.7	0.85	0.84	0.84	0.84
Observations	318	383	725	624	15,053	14,136

Table A.2: Descriptive statistics: long version of the Birth Sample Surveys

	Mothers born outside Italy		**Mothers born outside Italy** (but with acquired Italian nationality)		**Italian mothers**	
Variable	**Wave$_1$**	**Wave$_2$**	**Wave$_1$**	**Wave$_2$**	**Wave$_1$**	**Wave$_2$**
% of low birth weight	0.07	0.06	0.05	0.05	0.05	0.05
Mother's age: ≤ 24	0.31	0.33	0.14	0.13	0.15	0.14
Mother's age: 25-29	0.27	0.29	0.32	0.26	0.28	0.27
Mother's age: 30-34	0.24	0.22	0.32	0.33	0.32	0.31
Mother's age: 30-34	0.12	0.1	0.16	0.2	0.17	0.19
Mother's age: ≥ 40	0.07	0.06	0.06	0.07	0.08	0.09
Mother's years of residence: 0-7	0.51	0.54	-	-	-	-
Mother's years of residence: 8-14	0.32	0.3	-	-	-	-
Mother's years of residence: ≥ 15	0.16	0.15	-	-	-	-
Mother unemployed	0.69	0.67	0.56	0.54	0.47	0.42
Mother employed	0.31	0.33	0.44	0.46	0.53	0.58
Mother married	0.13	0.2	0.08	0.09	0.07	0.1
Mother not married	0.87	0.8	0.92	0.91	0.93	0.9
Mother's education: degree	0.21	0.19	0.14	0.17	0.15	0.18
Mother's education: secondary school	0.5	0.55	0.56	0.53	0.51	0.52
Mother's education: primary school	0.3	0.25	0.3	0.3	0.34	0.29
Previous children born dead	0.02	0.01	0.01	0.01	0.01	0.01
Previous abortions/miscarriages	0.19	0.15	0.19	0.19	0.17	0.17
Father born in Italy	0.66	0.67	0.91	0.91	0.97	0.97
Father born outside Italy	0.34	0.33	0.09	0.09	0.03	0.03
Father's age: ≤ 24	0.03	0.05	0.04	0.03	0.05	0.05
Father's age: 25-29	0.13	0.13	0.16	0.13	0.17	0.16
Father's age: 30-34	0.31	0.26	0.35	0.32	0.34	0.33
Father's age: 30-34	0.27	0.28	0.27	0.31	0.27	0.29
Father's age: ≥ 40	0.26	0.28	0.18	0.22	0.16	0.17
Father's years of residence: 0-7	0.04	0.04	-	-	-	-
Father's years of residence: 8-14	0.11	0.1	-	-	-	-
Father's years of residence: ≥ 15	0.14	0.13	-	-	-	-
Father unemployed	0.05	0.04	0.06	0.04	0.04	0.04
Father employed	0.95	0.96	0.94	0.96	0.96	0.96
Father's education: degree	0.14	0.14	0.11	0.13	0.13	0.14
Father's education: secondary school	0.48	0.5	0.47	0.47	0.45	0.47
Father's education: primary school	0.38	0.35	0.43	0.4	0.42	0.39
Accommodation: rented	0.42	0.35	0.2	0.18	0.19	0.15
Accommodation: owned	0.47	0.6	0.68	0.76	0.71	0.78
Accommodation: other title	0.1	0.06	0.12	0.07	0.1	0.07
Number of rooms ≤ 2	0.29	0.28	0.17	0.17	0.18	0.17
Number of rooms > 2	0.7	0.72	0.83	0.83	0.82	0.83
Observations	1000	1344	2153	2036	45940	44638

Table A.3: Tests for balancing covariates, before and after matching, long version of the British Sample Surveys

Matching Method	Absolute standardized bias Median		Absolute standardized bias Mean		Pseudo R-squared		Treated group Observations			Comparison group Observations		
	Before	After	Before	After	Before	After	Before	After	Lost	Before	After	Lost
(a) Control group: immigrant mothers with Italian nationality												
N - (M&F)	5	0.8	6.1	1.2	0.028	0.001	2280	2158	122	4049	3919	130
N - (F)	6.4	1.7	7.9	1.7	0.03	0.002	1595	1493	102	2311	2221	90
R - (M&F)	5	0.7	6.1	1.6	0.028	0.004	2280	2158	122	4049	3966	83
R - (F)	6.4	0.9	7.9	1.7	0.03	0.003	1595	1493	102	2311	2246	65
K - (M&F)	5	0.7	6.1	1	0.028	0.001	2280	2158	122	4049	3966	83
K - (F)	6.4	0.9	7.9	1.1	0.03	0.001	1595	1493	102	2311	2246	65
(b) Control group: Italian mothers												
N - (M&F)	5.4	0.5	6.3	0.7	0.017	0	2280	2158	122	87890	34487	53403
N - (F)	3.8	0.9	5.9	1.5	0.016	0.002	1595	1493	102	40391	19297	21094
R - (M&F)	5.4	2.6	6.3	2.8	0.017	0.003	2280	2158	122	87890	86804	1086
R - (F)	3.8	2	5.9	2.5	0.016	0.004	1595	1493	102	40391	39703	688
K - (M&F)	5.4	0.7	6.3	1.1	0.017	0.001	2280	2158	122	87890	86804	1086
K - (F)	3.8	0.5	5.9	0.9	0.016	0.001	1595	1493	102	40391	39703	688

Note: Matching methods, N=Nearest-neighbor; R=Radius; K=Kernel. F: families where only father is employed; M&F: families where mother or father are employed.

Table A.4: Number of newborns and TFR for immigrant mothers, by country of nationality

Country code	Country	Area of origin	Number of newborns 2002	Number of newborns 2003	TFR
AFG	Afghanistan	Central and Southern Asia	0	1	5.43
ALB	Albania	Central and Eastern Europe	4870	5126	1.5
DZA	Algeria	Northern Africa	356	455	2.78
AGO	Angola	Central and Southern Africa	18	31	5.43
SAU	Saudi Arabia	Western Asia	1	0	2.17
ARG	Argentina	Central and Southern America	46	66	2.25
ARM	Armenia	Western Asia	5	1	1.64
AUS	Australia	Oceania	4	5	1.77
AUT	Austria	European Union	13	10	1.43
AZE	Azerbaijan	Western Asia	3	5	1.91
BGD	Bangladesh	Central and Southern Asia	596	771	2.45
BEL	Belgium	European Union	18	15	1.65
BLZ	Belize	Central and Southern America	0	1	3.02
BEN	Benin	Western Africa	33	26	5.04
BLR	Belarus	Central and Eastern Europe	4	6	1.47
BOL	Bolivia	Central and Southern America	23	31	2.8
BIH	Bosnia and Herzegovina	Central and Eastern Europe	304	346	1.26
BWA	Botswana	Central and Southern Africa	6	1	2.37
BRA	Brazil	Central and Southern America	88	95	1.79
BRN	Brunei	Eastern Asia	0	1	1.82
BGR	Bulgaria	Central and Eastern Europe	78	95	1.44
BFA	Burkina Faso	Western Africa	154	132	5.93
BDI	Burundi	Eastern Africa	3	5	6.14
KHM	Cambodia	Eastern Asia	3	1	2.66
CMR	Cameroon	Central and Southern Africa	93	89	4.82
CAN	Canada	Northern America	8	3	1.59
CPV	Cabo Verde	Western Africa	40	53	2.34
CZE	Czech Republic	Central and Eastern Europe	13	11	1.43
CAF	Central African Republic	Central and Southern Africa	1	2	4.46
TCD	Chad	Central and Southern Africa	2	2	4.68
CHL	Chile	Central and Southern America	14	14	1.84
CHN	China	Eastern Asia	2464	2370	1.55
CYP	Cyprus	Central and Eastern Europe	1	1	1.46
COL	Colombia	Central and Southern America	90	93	2.07
COG	Congo, Republic of the	Central and Southern Africa	41	40	4.73
COD	Congo, Democratic Republic	Central and Southern Africa	43	50	4.8
PRK	Korea, South	Eastern Asia	41	28	1.25
KOR	Korea, North	Eastern Asia	5	11	1.98
CRI	Costa Rica	Central and Southern America	4	1	1.91
CIV	Cote d'Ivoire	Western Africa	252	238	3.63
HRV	Croatia	Central and Eastern Europe	154	160	1.45
CUB	Cuba	Central and Southern America	28	28	1.46
DNK	Denmark	European Union	15	9	1.73
DMA	Dominica	Central and Southern America	14	10	2.05
DOM	Dominican Republic	Central and Southern America	111	106	2.36
ECU	Ecuador	Central and Southern America	387	474	2.29
EGY	Egypt	Northern Africa	1074	1111	2.87
SLV	El Salvador	Central and Southern America	67	61	1.95
ARE	United Arab Emirates	Western Asia	2	4	2.36
ERI	Eritrea	Eastern Africa	44	62	4.14
EST	Estonia	Central and Eastern Europe	0	3	1.46
ETH	Ethiopia	Eastern Africa	40	53	5.23
PHL	Philippines	Eastern Asia	1305	1322	3.06
FIN	Finland	European Union	6	7	1.73
FRA	France	European Union	148	99	2.08
GAB	Gabon	Central and Southern Africa	1	1	4.49
GMB	Gambia, The	Western Africa	8	12	3.85
GEO	Georgia	Western Asia	3	3	1.77
DEU	Germany	European Union	103	79	1.43
GHA	Ghana	Western Africa	633	526	4.09
JAM	Jamaica	Central and Southern America	1	0	2.05
JPN	Japan	Eastern Asia	23	29	1.4
JOR	Jordan	Western Asia	65	76	3.16
GRC	Greece	European Union	11	12	1.41
GTM	Guatemala	Central and Southern America	5	0	2.99
GIN	Guinea	Western Africa	36	44	4.93
GNB	Guinea-Bissau	Western Africa	6	5	4.3
GNQ	Equatorial Guinea	Central and Southern Africa	1	1	4.66
GUY	Guyana	Central and Southern America	1	0	2.14
HTI	Haiti	Central and Southern America	5	5	2.79
HND	Honduras	Central and Southern America	0	4	2.86
IND	India	Central and Southern Asia	926	896	2.51
IDN	Indonesia	Eastern Asia	5	5	2.18
IRN	Iran	Western Asia	48	35	1.85
IRQ	Iraq	Western Asia	12	16	3.41
IRL	Ireland	European Union	13	10	2
ISL	Iceland	Other European countries	7	2	1.88
ISR	Israel	Western Asia	18	16	2.62
KAZ	Kazakhstan	Central and Southern Asia	0	1	2.34
KEN	Kenya	Eastern Africa	7	11	3.54
KGZ	Kyrgyzstan	Central and Southern Asia	2	1	2.68
KWT	Kuwait	Western Asia	0	2	2.53
LVA	Latvia	Central and Eastern Europe	4	4	1.35
LBN	Lebanon	Western Asia	42	56	1.74
LBR	Liberia	Western Africa	4	5	4.81
LBY	Libya	Northern Africa	12	21	2.07
LIE	Liechtenstein	Other European countries	0	1	1.69
LTU	Lithuania	Central and Eastern Europe	1	6	1.29
LUX	Luxembourg	Other European countries	0	1	1.77

Notes: Number of newborns by mother's country of nationality from ISTAT ad hoc *processing service. TFR obtained from Central Intelligence Agency (2013).*

Table A.5: Number of newborns and TFR for immigrant mothers, by country of nationality (cont.)

Country code	Country	Area of origin	Number of newborns 2002	2003	TFR
MKD	Macedonia	Central and Eastern Europe	786	769	1.59
MDG	Madagascar	Eastern Africa	1	3	4.28
MWI	Malawi	Eastern Africa	1	1	5.66
MYS	Malaysia	Eastern Asia	2	0	2.58
MLI	Mali	Western Africa	9	21	6.16
MLT	Malta	Other European countries	3	1	1.54
MAR	Morocco	Northern Africa	6108	5583	2.15
MRT	Mauritania	Western Africa	22	14	4.07
MUS	Mauritius	Eastern Africa	141	144	1.77
MEX	Mexico	Central and Southern America	9	11	2.29
MDA	Moldova	Central and Eastern Europe	70	150	1.56
MCO	Monaco	Other European countries	4	6	1.52
MNG	Mongolia	Eastern Asia	1	0	2.22
MOZ	Mozambique	Eastern Africa	1	2	5.27
MMR	Myanmar	Eastern Asia	1	1	0
NAM	Namibia	Central and Southern Africa	1	0	2.25
NPL	Nepal	Central and Southern Asia	3	3	2.3
NIC	Nicaragua	Central and Southern America	0	1	1.99
NER	Niger	Western Africa	14	23	6.89
NGA	Nigeria	Western Africa	670	705	5.25
NOR	Norway	Other European countries	3	3	1.86
NZL	New Zealand	Oceania	3	1	2.05
OMN	Oman	Western Asia	0	1	2.86
NLD	Netherlands	European Union	35	22	1.78
PAK	Pakistan	Central and Southern Asia	599	558	2.86
PAN	Panama	Central and Southern America	1	0	2.38
PRY	Paraguay	Central and Southern America	3	6	1.96
PER	Peru	Central and Southern America	606	691	2.22
POL	Poland	Central and Eastern Europe	299	418	1.33
PRT	Portugal	European Union	21	21	1.52
GBR	United Kingdom	European Union	71	60	1.9
ROU	Romania	Central and Eastern Europe	1645	2480	1.32
RWA	Rwanda	Eastern Africa	2	1	4.62
RUS	Russia	Central and Eastern Europe	57	69	1.61
SLB	Solomon Islands	Oceania	0	1	3.36
WSM	Samoa	Oceania	0	1	2.94
KNA	Saint Kitts and Nevis	Central and Southern America	1	0	1.78
SMR	San Marino	Other European countries	5	4	1.49
VAT	Holy See	Other European countries	0	1	0
SEN	Senegal	Western Africa	555	571	4.52
SRB/MNG	Serbia Montenegro	Central and Eastern Europe	1076	1008	1.42
SYC	Seychelles	Eastern Africa	4	5	1.88
SLE	Sierra Leone	Western Africa	13	10	4.83
SGP	Singapore	Eastern Asia	1	2	0.8
SYR	Syria	Western Asia	67	62	2.68
SVK	Slovakia	Central and Eastern Europe	11	20	1.39
SVN	Slovenia	Central and Eastern Europe	12	8	1.33
SOM	Somalia	Eastern Africa	71	63	6.08
ESP	Spain	European Union	40	36	1.48
LKA	Sri Lanka	Central and Southern Asia	954	934	2.13
USA	United States	Northern America	45	45	2.01
ZAF	South Africa	Central and Southern Africa	5	2	2.23
SDN	Sudan	Northern Africa	22	16	3.92
SWE	Sweden	European Union	14	8	1.88
CHE	Switzerland	Other European countries	14	18	1.54
TAW	Taiwan	Eastern Asia	8	5	1.11
TZA	Tanzania	Eastern Africa	6	3	4.95
PSE	State of Palestine	Western Asia	8	11	4.24
THA	Thailand	Eastern Asia	8	7	1.5
TGO	Togo	Western Africa	30	21	4.53
TTO	Trinidad and Tobago	Central and Southern America	1	0	1.71
TUN	Tunisia	Northern Africa	1729	1716	2
TUR	Turkey	Central and Eastern Europe	126	144	2.08
TKM	Turkmenistan	Central and Southern Asia	0	1	2.1
UKR	Ukraine	Central and Eastern Europe	105	189	1.3
UGA	Uganda	Eastern Africa	3	2	5.97
HUN	Hungary	Central and Eastern Europe	30	32	1.42
URY	Uruguay	Central and Southern America	5	9	1.84
UZB	Uzbekistan	Central and Southern Asia	5	6	1.8
VEN	Venezuela	Central and Southern America	16	14	2.35
VNM	Vietnam	Eastern Asia	9	13	1.85
YEM	Yemen	Western Asia	5	5	4.09
ZMB	Zambia	Eastern Africa	1	0	5.76
-	Stateless	-	0	3	-

Notes: Number of newborns by mother's country of nationality from ISTAT ad hoc *processing service. TFR obtained from Central Intelligence Agency (2013)*

Table A.6: Effect of the immigration law on probability of having first child and fertility intentions, subsample excluding immigrant mothers and fathers with less than 2 years of residence in Italy, marginal effects

PSDD		
Matching method	**Probability to have the first child**	**fertility intentions**
Panel a) control group of immigrant mothers with acquired Italian nationality		
Nearest-neighbour	0.064**	-0.058
	(0.028)	(0.047)
Radius	0.072**	-0.058
	(0.031)	(0.047)
Kernel	0.064**	-0.061
	(0.028)	(0.054)
Panel b) control group of Italian mothers		
Nearest-neighbour	0.038	-0.042
	(0.034)	(0.054)
Radius	0.037**	-0.032
	(0.016)	(0.038)
Kernel	0.032*	-0.039
	(0.019)	(0.049)

*Notes: Standard errors in brackets obtained with two-step procedure of Donald & Lang (2007). Significant levels: p-value *** ≤ 0.01, ** ≤ 0.05, * ≤ 0.1.*