Regularization of Immigrants and the Effects on Fertility in Italy

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Abstract

At the beginning of the 21st century, the political party of the Italian center-right voted a law restricting immigration. The law became effective in early 2005, when the Italian parliament approved the decree for its application, but one of its articles, granting amnesty for illegal immigrant workers, became immediately effective in July 2002. As a result, 650,000 immigrants were granted the status of foreign nationals in Italy. In this paper, we examine whether the increase in the prevalence of ''regular immigrants" has led to an improvement in fertility decisions of migrant women. Two hitherto unexploited birth sample surveys published by Italian Institute of Statistics were used for this study. Our estimates show that regularized immigration increases fertility rate by 4 5 percentage points.

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

1 Introduction

Migration restrictions often produce a pool of unauthorized immigrants. In Italy, an important legislation was approved in July 2002 (Law 189/2002, i.e., Bossi-Fini Law) to better manage of migratory flows and make more effective prevention of illegal immigration, approving its implementation in early 2005. However, since the share of illegal immigrants in 2002 reached 1/3 of the total foreign population, this Law also included an amnesty. It allowed to irregular immigrants working in domestic service and as carers to be regularized, a situation extended two months later also to workers in industry.

A short-term effect of this law was that 705,000 irregular immigrants were made eligible for regularization and, of these, 650,000 were approved. These individuals were included in the official labor market, removing the increasing number of work-site roundups force businesses to fire suspected illegal immigrants on the pay roll, which in turn increases the opportunity cost of a socio-economic integration and fostered fertility choices.

This study examines the unintended effects on the fertility outcomes of immigrant mothers who changed their status from irregular to regular in 2002. Our working hypothesis is that the 2002 Italian law on immigration reduced immigrants' socio-economic vulnerability and fostered fertility choices. Linked with the health outcomes of pregnant mothers, the regularization process is also assumed to promote better use of prenatal care services by immigrant mothers and avoid fetal problems. This hypothesis seems to be supported also by the Italian Institute of Statistics (ISTAT). The official statistics showed that about 80% of total population growth was due to immigrants and, between 2001 and 2003 ISTAT (2001, 2002, 2003), babies born to foreign mothers increased by almost 20%. In contrast, we could call the standard ''quality-quantity" (framework (see Becker and Lewis 1973; Becker and Tomes 1976) in which the shock driven by mother regularization can be interpreted as a reduction in the price of ''child quality". This improvement in the child ''quality" level should decrease the optimal number of children, since an increase in quality causes a rise of the shadow price of quantity.

Our empirical strategy to test the two different hypothesis compares what happened in terms of newborns (i.e., fertility rate) in a treatment group of immigrant mothers with respect to a control group. A fundamental challenge to this approach is to determine counterfactual outcomes. When newborns' birth in the group of immigrant women is

observed, after the opportunity granted to illegal immigrants to regularize their status, the impact of the law should be assessed in relation to the potential outcomes in the absence of regularization inflows. This counterfactual outcome is approximated by observed newborns' birth in the selected groups of foreign-born mothers with Italian nationality and Italian mothers, which are not affected by the (unintended) effects of the immigration law.

The main criticism of this approach is that treatment and comparison groups may differ in terms of unobservable and observable characteristics. The economic and medical literature - focusing on migrant women's fertility decisions of industrialized countries - showed that there is a large gap, in terms of newborns' health, between immigrant and Italian-born mothers[1]. This gap is due to the fact that, although it is generally true that individuals who decide to migrate are healthy, they also usually belong to the lower part of the welfare distribution in their countries of origin, since those who are highly skilled or richer have fewer incentives to migrate. Thus, a mixed (unobserved) effect may arise, see Borjas (1990), Hildebrandt & McKenzie (2005)): on one hand, immigrant mothers have an advantage because of their better physical condition; on the other hand, they also present negative outcomes, since they usually migrate from countries with high inequality levels, so that low-skilled individuals are more likely to migrate. A simple comparison between Italian and immigrant mothers will thus fail to estimate the true difference in terms of fertility decisions.

We deal with this econometric issue by using a difference-in-differences (DD) model combined with a propensity score matching (PSM) estimator, and use the propensity score difference-in-differences (PSDD) model to estimate the effects of the massive regularization on fertility outcome. The combination of these two methods allows us to account for time-invariant unobservable characteristics, which differ between treatment and control groups, comparing only those mothers with the most similar observable characteristics. We also take into account the fact that ordinary least square standard errors for the DD estimator may not be accurate in the presence of correlations between outcomes within groups and between time periods. This problem has been specifically analysed for the case with two groups and two time periods by Donald & Lang (2007) and Bertrand et al.

[1] Urquia et al. (2010), in their recent review of this literature, suggest that different sources of heterogeneity have a role to play in determining positive, negative or non-significant outcomes at birth.

(2004). Here, we use the two-step estimator proposed by the former authors as the most appropriate method to obtain consistent standard errors in estimating treatment effects.

The contribution of this paper lies in the datasets and the opportunities it offers for econometric identification of immigration law effects. We use data from the Birth Sample Surveys (BSS) conducted by ISTAT in 2002 and 2005, concerning interviews with 100,000 mothers between July 2000 and June 2001 in the first survey ($wave_1$) and in 2003, in the second survey ($wave_2$). 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 quasi-experimental approach to estimate the effect of regularization on the probability of newborns' birth.

Although we cannot distinguish between eligible and non-eligible immigrants, we propose an extended analysis to test whether the estimated effect varies when we consider various groups of babies born to mothers with an employment status. Our results are partially in line with the expectation that leaving the status of illegal migrant has significant benefits in increasing fertility rate by $4-5$ percentage points of employed migrant mothers with respect to those unaffected by regularization, irrespective of whether this effect is caused directly by the mother or indirectly by the father.

The rest of the paper is organized as follows. Section 2 discusses the 189/2002 law and its application to immigrant regularization. Section 3 describes the data and our empirical strategy. Section 4 presents the main results, and Section 5 concludes.

2 Immigration issues: the 189/2002 Italian law

Law 189/2002 is composed of a set of rules to regulate the flow of migrants into Italy, to combat irregular immigration. Also, regular immigrants are subject to more restrictive rules linking permits to stay with work contracts, and making procedures for renewals more expensive.

The law was passed in response to problems of public order. At least in the developed countries of Western Europe, immigration is a public security problem and is often associated with increased criminal activities. This process became even more restrictive after the September 2001 terrorist attacks in the United States.

Despite the intention of tightening immigration regulations in Italy, only the regular-

ization norm (i.e., Art. 33 of Law 189/2002) became immediately effective after its official publication in July 2002. Thus, during this two-and-a-half-year period, regularization was the most far-reaching measure used to reveal illegal foreign workers and to increase the number of regular immigrants.

2.1 Eligibility to transit from illegal to legal immigrant status and the unintended effects of regularization

The regularization of illegal immigrants promoted by Law 189/2002 was the most important one introduced in a European country, equalled later by the 2005 regularization in Spain. In Italy, more than 705,000 applications were presented and nearly 650,000[2] were accepted (approximately 92 per cent), although over 60,000 of these were conditional (Carfagna et al. 2008). The regularization of domestic workers and personal assistants (carers) was later also extended to other employees under Legislative Decree 195/2002, converted into Law 222/2002. Formally, employers' declarations had to be sent to the Italian Institute of Social Security (INPS), together with payment of 700 euros to cover welfare costs for the three months before the amnesty, as well as other administrative costs. Thanks to improved organization, operations were significantly faster compared with similar procedures carried out previously, despite the far higher number of applications (see Table 1). The huge numbers of people applying for regularization were even more remarkable when we consider the relatively restrictive eligibility requirements compared with previous measures. In fact, only those working in families or employed in companies were able to apply, while self-employed, unemployed, and family members were excluded.

Clearly, this regularization, as well as those of the 1990s, had as one of its short-term effects a marked fall in irregular migration. For each legislative intervention, Table 1 lists the number of applicants, percentage of accepted applications, and gender differences about number of applications. The first intervention adopted was the so-called Martelli Law (Law 39/1990) which aimed at reducing the numbers of illegal immigrants. This trend continued in the two subsequent regularizations and culminated with Law 189/2002. In early 2000, the number of illegal immigrants in Italy was much larger than that recorded

[2]Before the 2002 Italian regularization, migrants without documents were estimated to number 750,000, becoming 250,000 immediately afterwards, implying that a very large number (66%) were regularized by the 2002 law (Salis 2012).

before the amnesties in 1995 and 1998[3]. As the only possible beneficiaries were employees, a comparison with the number of permits to stay for employees in early 2002 (623,000) gives 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).

Inspection of the official data (Table 1) reveals some salient features of the evolution over time of immigration in Italy. Regularizations until the end of the 1990s had in common a strong gender imbalance: the number of regularized women in the first three amnesties was around 30%, whereas after the regularization of 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 countries which in any case had a significant prevalence of women (Romania, Ukraine, Moldavia, Poland and Ecuador). The increase in demand for domestic help and carers, during the positive business cycle of the Italian economy, substantially increased women's immigration from the Balkans and Eastern Europe. This fact is even more evident from the number of applications made in 2002 by immigrant women from countries of the former Soviet Union: 383,000 permits to stay were issued, nearly 60% of the total amount, almost doubling the numbers of those from the same area already legally residing in Italy.

Table 1: Programs to grant immigrants regular status in Italy

	Law 39/1990	**Decree of Law 489/1995**	**Decree of Law 16/10/1998**	**Laws 189 and 222/2002**
Year	1990	1995-96	1998	2002
N. of application (000)	235	256	251	705
% of accepted applications	93.8	96.2	86.8	92
% of women	26.0	31.0	28.9	45.8

Source: Bonifazi et al. (2009), from Italian Ministry of the Internal Affairs and Ministry of Labor.

The exogenous variation in permits to stay not only represents an opportunity to evaluate the effect of immigration on some outcomes (in terms of newborns' birth); it can also describe the labor market demand in a medium-term perspective. Although the annual renewal of permits depended on the existence of an employment contract, among foreigners who obtained permits in 2003, it should be noted that more than 78% still had valid permits to stay in early 2007 (Carfagna et al. 2008). Thus, the (unintended) effects

[3]In 2002, there were 52 regularized immigrants for every 100 from countries with strong migratory pressure.

of regularization programs according to Italian law has not been repeatedly to regularize the same individuals who had returned to a state of illegality, but effectively to initiate a course of legality for most formerly illegal immigrants.

3 Data and empirical strategy

3.1 Data

AGGIUNGERE CHE USIAMO LONG VERSION CON FERTILITY INTENSIONS

The dataset used in this study is the Birth Sample Survey (BSS) published by the Italian Institute of Statistics (ISTAT) in 2002 and 2005, concerning interviews with about 30,000 mothers between July 2000 and June 2001 in the first survey ($wave_1$) and in 2003, in the second survey ($wave_2$). The main information collected regards mother's and father's socio-demographic characteristics and the newborn's health status. The BSS also collects information for a representative sample of foreign-born mothers - with or without Italian nationality - whose fertility choices are of particular interest for the aims of the present study. Table 2 shows descriptive statistics for the variables of interest in our analysis by mother's nationality: mother's and father's age, years of residence in Italy (if foreign-born), employment, marital status, education, and wealth. Clearly, the group of foreign-born mothers differs in terms of 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). However, we do not find any evidence of significant differences in sample composition between the two waves for each group analysed.

3.2 Empirical strategy

We use the propensity score matching estimator (PSM) of Imbens (2000) and Lechner (2002) in a DD model, to estimate the short-term impact of the Italian immigration law on the borns' birth. The use of PSDD estimators has become standard practice in the evaluation literature for the case of single treatments although extensions to multiple treatments have recently been proposed (e.g., Moreno-Serra (2008)). The main advantage

Table 2: Descriptive statistics

	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
Parity: 0	0.39	0.51	0.41	0.35	0.43	0.43
Parity: 1+	0.61	0.49	0.59	0.65	0.57	0.57
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
Number of children	1.78	1.57	1.69	1.73	1.68	1.69
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

of this approach is the possibility of accounting, among treatment and control groups, for differences in initial conditions or other time-invariant unobservable characteristics with the DD strategy, and to eliminate 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:

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

where Y_{it} is a binary indicator of the woman i at time t, with value 1 indicating the newborns' birth. T_i is a dummy variable indicating treatment status for each individual i. We define immigrant mothers as treated, whereas the two control groups are composed of foreign-born mothers with acquired Italian nationality and Italian mothers, respectively. $Time_t$ is a time dummy variable which indicates data collected during $wave_1$ or $wave_2$. 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 which may affect treatment and control group birth weight outcomes not associated with the immigration law. The effect of regularization is captured by γ_3, estimated as the interaction between T_i and $Time_t$.

Combination with the PSM estimator ensures that all 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:

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

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 is the fertility outcome, and W_{ij} is the weight attributed to matched individual j when compared with treated individual i. From the 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.

Lastly, in order to obtain consistent standard errors for the parameters of our DD

models, we use the two-step estimator proposed by Donald & Lang (2007), which produces efficient two-step estimation and t-statistics with approximately a t-distribution when the number of observations in each group is large.

4 Results

4.1 Preliminary evidence

In this section, we present descriptive evidence of immigrant women's fertility choices and the results of balancing tests after the PSM on observable covariates. Table 3 shows variations in the number of permits to stay granted to men and women by nationality, before and after regularization. There is a clear-cut prevalence of permits granted to women from Eastern Europe, which increased by 104% compared with African women, which increased by only 21%. This may imply that births from mothers of Eastern European nationality also increased more than those from Africa and, since the former are known to have lower fertility rates, we may total fertility rates which can be attributed to the variation in the composition of nationalities after the 2002 regularization. Since we expect to find a positive effect of regularization on births this negative effect would not be against our findings but could bias downward our estimated effects. In order to have a clearer idea of the magnitude of this bias we report how TFR varied in accordance to the change in composition after the regularization.

Although our data do not include information about mother's country of nationality, we used unpublished information from ISTAT to prove that variations in the population of immigrant women had a very limited influence on TFR.

The great increase in the number of permits to stay granted to Eastern European women does not imply that newborns' births from these women followed the same trend. In fact, Eastern European women have lower fertility rates than African ones. Estimates from the Central Intelligence Agency (2013) show that the total fertility rate (TFR) of African women ranges from 1.77 (Mauritius) to 6.89 (Niger), whereas that of Eastern European women ranges from 1.26 (Bosnia-Herzegovina) to 2.08 (Turkey). It should also be noted that most of the regularized Eastern European women were care-givers with an average age of 42 years, Pasquinelli & Rusmini (2008), implying even lower levels of fertility. For all these reasons, the distribution of births by mother's nationality around

Table 3: Number of permits to stay issued and percentage variations before and after the 2002 regularization.

	% var. 2002/2003		
Geographical area	**Men**	**Women**	**Total**
	% var. 2003/2004		
European Union	-0.03	-0.01	-0.02
East Eruope	0.78	1.04	0.91
Other European countries	-0.01	0	0
Europe	0.59	0.72	0.66
North Africa	0.4	0.23	0.35
West Africa	0.34	0.27	0.32
East Africa	0.09	0.05	0.07
Central and South Africa	0.13	0.16	0.14
Africa	0.37	0.21	0.32
West Asia	0.03	0.06	0.04
East Asia	0.47	0.27	0.36
Central and south Asia	0.53	0.16	0.4
Asia	0.4	0.25	0.32
North America	-0.03	-0.01	-0.01
Central and south America	0.68	0.54	0.58
America	0.46	0.4	0.42
Oceania	-0.03	0.01	-0.01
Stateless	-0.01	0.02	0
Total	0.48	0.5	0.49

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

the years of the Italian immigration reform is expected to be less unbalanced than that of permits to stay.

ISTAT does not provide these figures among its standard statistics and, in order to obtain this information, we requested an *ad hoc* process to have access to hitherto unexploited and unpublished data about births from mothers with foreign nationality. We summarize the results in Table 4, with the same aggregation provided in Table 3 for comparison. We also show raw data, at country level, in Appendix A.2-A.3 (columns 4-5). There is definite evidence of variations in 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 is less marked than before, varying from 80 percentage points, in the case of permits to stay, to 20 percentage points as regards births. For a more precise idea of how variations in the composition of births may affect TFR, we need to estimate the average TFR for each geographical area of origin. We then calculated 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 nation-

ality before and after the 2002 regularization. Then we calculated from these figures the variation between years for each geographical area. This allowed us to evaluate to what extent variations in the composition of the immigrant population affected TFR, net of other effects (i.e., the 2002 law). In other words, we calculated what should have been the decrease in 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 4 show, the absolute variation of TFR is always very limited, with an overall incidence of -0.01 points, when weighted by number of births, and by -0.07 points when weighted by the number of permits to stay granted.

Table 4: Total number of newborns and TFR for mothers of foreign nationality.

	Newborns from mothers of foreign nationality			**Total Fertility Rate (TFR) weighted by number of births**			**Total Fertility Rate (TFR)** weighted by number 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**

Table 5 lists the percentages of immigrant and Italian mothers who had babies. The share of immigrant mothers, about 6-7% of the sample, does not vary substantially between the two waves. Table 6 also shows the percentages of immigrant women, with or without Italian nationality in each wave, and indicates whether fertility decisions varied after implementation of the law. We find evidence of an increase in the percentage of immigrant mothers - our treatment group - who decided to have a child (6-8 % points) after the immigration law came into force. As the percentage of immigrant women did not

vary between waves, it is reasonable to conclude that the increase in the number of newborns of immigrant mothers was spurred by the prospect of a reduction in socio-economic vulnerability induced by the 2002 regularization.

Table 5: Percentage of immigrant and Italian mothers.

Year	**Obs.**	**% of Italian mothers**	**% of immigrant mothers**
Wave_1	16,100	0.935	0.065
Wave_2	15,149	0.934	0.066

Source: Birth Sample Surveys; our estimates.

Table 6: Percentage of immigrant mothers with or without Italian nationality.

Year	**Number of observations**	**Immigrant mothers with Italian nationality (%)**	**Immigrant mothers(%)**
Wave_1	1,043	0.695	0.305
Wave_2	1,007	0.619	0.381

Source: Birth Sample Surveys; our estimates.

Panel (a) of Table 7 lists the results of the matching strategies. We compare covariates distributions between treatment and control groups before and after matching, using the variables already described in the previous section and listed in Table 2. We compute the median and mean of the absolute standardized bias and the pseudo $R-squared$ index, using nearest-neighbor, radius and kernel matching methods. Irrespective of matching strategy and control group, median and mean bias is reduced drastically, meaning that differences among treatment and control groups in observable characteristics decrease significantly after matching. Again, Table 7 shows that pseudo $R-squared$ fell to almost zero after matching (from a value of 0.14 before matching). Yet, we find similar results when we compare our treatment group with the control group composed of Italian mothers (panel (b) of Table 7).

The right part of Table 7 lists the number of observations in treated and comparison groups before and after each matching. We note how, in the case of kernel and radius matching, a small number of observations is discarded after matching, whereas a relatively larger number is lost with the nearest-neighbor method (in order to obtain the required counterfactuals, about 10,000 observations over more than 90,000 were used when Italian mother are used as control group). 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, may be affected by higher levels of bias (Caliendo & Kopeinig 2005). In order to perform a sensitivity analysis, the next section presents the estimates of the effect of regularization on fertility, with the counterfactual samples obtained from all three matching strategies.

Table 7: Tests for balancing of covariates, before and after matching.

Matching Method	**Absolute standardized bias**				**Pseudo R-squared**		**Treated group**			**Comparison group**		
	Median		**Mean**				**Observations**			**Observations**		
	Before	**After**	**Before**	**After**	**Before**	**After**	**Before**	**After**	**Lost**	**Before**	**After**	**Lost**
(a) Control group: immigrant mothers with Italian nationality												
N - All	17.47	2.83	14.63	2.27	0.16	0.01	701	621	80	1349	1253	96
N - Emp mothers	23.43	8.1	21.37	8.5	0.22	0.03	195	179	16	544	522	22
R - All	17.47	2.9	14.63	2.67	0.16	0.01	701	621	80	1349	1253	96
R - Emp mothers	23.43	8.03	21.37	8.37	0.22	0.03	195	179	16	544	522	22
K - All	17.47	2.67	14.63	2.47	0.16	0	701	637	64	1349	1253	96
K - Emp mothers	23.43	6	21.37	4.93	0.22	0.02	195	184	11	544	522	22
(b) Control group: Italian mothers												
N - All	17.47	3.67	13.63	3.17	0.16	0.01	701	621	80	29189	27259	1930
N - Emp mothers	21.77	9.87	17.1	9.87	0.19	0.07	195	179	16	14608	14297	311
R - All	17.47	3.33	13.63	3.03	0.16	0.01	701	621	80	29189	27259	1930
R - Emp mothers	21.77	9.9	17.1	10.03	0.19	0.07	195	179	16	14608	14297	311
K - ALL	17.47	4.27	13.63	2.6	0.16	0.02	701	637	64	29189	27259	1930
K - Emp mothers	21.77	8.6	17.1	6.77	0.19	0.03	195	184	11	14608	14297	311

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

4.2 Main estimates

Table 8 (panel a) shows the estimates of the effect of immigrants' regularization, followed by the introduction of the Italian law in 2002, on newborns' birth of immigrant mothers using acquired Italian nationality as the control group. The left part of the table shows standard DD estimates of 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 show a slight increase on fetility outcome after regularization, the estimated coefficient is not statistically significant at the 95 percent confidence level. Instead, PSDD estimates show a reduction in terms of newborns' birth in the treatment group after regularization, although the marginal effects are not significant.

When we use Italian mothers as the control group (panel b), we confirm previous

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

estimates, finding no significant effects of regularization on fertility outcome irrespective if we use the DD estimator or the PSDD estimator.

However, our aim is to evaluate if employed mothers have been affected by the regularization on fertility decisions and in which direction. In fact, treated mothers are presumed to be affected directly, because eligibility for regularization is connected with employment status. In particular, to keep our estimates consistent, we need to verify whether currently employed mothers had the same status also during pregnancy, otherwise we may have in our subgroup mothers who found a job after pregnancy, but who were non-eligible for regularization in 2002. To verify this condition, we recovered information from a restricted sample of the BSS on how many mothers were employed during pregnancy and whether they changed employment status after the birth of their babies. About 50% of immigrant mothers were employed during pregnancy; the remaining 50% were housewives. Of those in employment, 90% was still in employment at the moment of the interview. The remaining 50% of housewives, may have been affected by regularization indirectly, if their husband or partner was eligible for regularization.

The DD model, shown in equation (1), can be extended to estimate the effects of regularization on various subgroups of the population. For instance:

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

where superscript $K = 1$ corresponds to the already described subgroup. 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.

Table 9 shows the results of the estimated effects of the 2002 regularization on the employed mother subgroup. Focusing on the PSDD estimator, ATTs are generally significant and point estimates range significantly from 4 to 5 percentage points. Thus, at least in the short term, we obtained an increase of newborns' birth from mothers greatly

integrated in the Italian society.

Table 8: Effect of immigration law on fertility and fertility intentions using immigrant mothers with acquired Italian nationality as control group, marginal effects

DD		PSDD		
ATT	**Observations**	**Matching method**	**ATT**	**Observations**
Panel a) number of children				
-0.1032	1,189	Nearest-neighbour	-0.047	1,532
(0.2775)			(0.029)	
		Radius	-0.0461*	1,532
			(0.027)	
		Kernel	-0.0472	1,532
			(0.029)	
Panel b) intentions to have children				
0.0035	1,855	Nearest-neighbour	-0.1572**	1,532
(0.2845)			(0.071)	
		Radius	-0.1357***	1,532
			(0.052)	
		Kernel	-0.1573**	1,532
			(0.071)	

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

5 Conclusions

This study examines the application of a regularization norm proposed within the 189/2002 Italian immigration law, addressed to regularize immigrants working in domestic service, as carers, and in industry, and investigates its effects on the health outcomes of newborns. Unexploited official datasets on babies born in Italy, before and after the immigration law, allowed us to use a quasi-experimental setting to estimate the impact on fertility outcome of the massive regularization.

We used a PSDD estimator, which combines a PSM approach within a DD model, to account for observable and unobservable differences among treatment and control groups. We assumed that the exogenous variation in immigration regularization implied an improvement in immigrants' economic and social security and fostered their fertility choices. Irrespective of control group adopted, we found that overall fertility was not affected,

Table 9: Effect of immigration law on fertility and fertility intentions using Italian mothers as control group, marginal effects

DD		PSDD		
ATT	**Observations**	**Matching method**	**ATT**	**Observations**
Panel a) number of children				
0.0284558	17,013	Nearest-neighbour	-0.0578	1,532
(0.1509)			(0.037)	
		Radius	-0.0568*	1,532
			(0.034)	
		Kernel	-0.0600	1,532
			(0.037)	
Panel b) intentions to have children				
-0.0695	27,705	Nearest-neighbour	-0.0698**	1,532
(0.232)			(0.035)	
		Radius	-0.0582**	1,532
			(0.026)	
		Kernel	-0.0712**	1,532
			(0.030)	

*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 10: Effect of immigration law on fertility and fertility intentions using immigrant mothers with acquired Italian nationality as control group, subsample of employed mothers, marginal effects

DD		PSDD		
ATT	**Observations**	**Matching method**	**ATT**	**Observations**
Panel a) number of children				
0.0273	452	Nearest-neighbour	0.07	1,532
(0.0573)			(0.062)	
		Radius	0.0473	1,532
			(0.059)	
		Kernel	0.07	1,532
			(0.062)	
Panel b) intentions to have children				
-0.1914***	757	Nearest-neighbour	0.2208	1,532
(0.0645)			(0.202)	
		Radius	0.275	1,532
			(0.252)	
		Kernel	0.2208	1,532
			(0.202)	

*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 11: Effect of immigration law on fertility and fertility intentions using Itlian mothers with acquired Italian nationality as control group, subsample of employed mothers, marginal effects

DD		PSDD		
ATT	**Observations**	**Matching method**	**ATT**	**Observations**
Panel a) number of children				
0.0364	8,660	Nearest-neighbour	0.0921*	1,532
(0.1523)			(0.054)	
		Radius	0.0667	1,532
			(0.057)	
		Kernel	0.0929*	1,532
			(0.055)	
Panel b) intentions to have children				
-0.1387**	15,220	Nearest-neighbour	0.233	1,532
(0.0563)			(0.241)	
		Radius	0.2613	1,532
			(0.247)	
		Kernel	0.2307	1,532
			(0.237)	

*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 12: Effect of immigration law on fertility and fertility intentions using immigrant mothers with acquired Italian nationality as control group, subsample of employed mothers and fathers, marginal effects

DD		PSDD		
ATT	**Observations**	**Matching method**	**ATT**	**Observations**
Panel a) number of children				
0.0433	434	Nearest-neighbour	0.0054	1,532
(0.2121)			(0.068)	
		Radius	0.0471	1,532
			(0.043)	
		Kernel	0.0054	1,532
			(0.068)	
Panel b) intentions to have children				
-0.1903***	721	Nearest-neighbour	0.3963*	1,532
(0.0658)			(0.240)	
		Radius	0.2543	1,532
			(0.289)	
		Kernel	0.3963*	1,532
			(0.240)	

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

while, irrespective of the matching method used, we find an estimated increase for employed mothers ranging from 4 to 5.2 percentage points.

Table 13: Effect of immigration law on fertility and fertility intentions using Itlian mothers with acquired Italian nationality as control group, subsample of employed mothers and fathers, marginal effects

DD		PSDD		
ATT	**Observations**	**Matching method**	**ATT**	**Observations**
Panel a) number of children				
0.0467	8,472	Nearest-neighbour	0.0786*	1,532
(0.1632)			(0.047)	
		Radius	0.0601	1,532
			(0.053)	
		Kernel	0.0779	1,532
			(0.048)	
Panel b) intentions to have children				
-0.1336**	14,890	Nearest-neighbour	0.2429	0
(0.0582)			(0.253)	
		Radius	0.2651	0
			(0.253)	
		Kernel	0.2324	0
			(0.250)	

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

Our findings indicate that immigration policies which favor socio-economic integration of immigrants are effective in increasing fertility. More importantly, our analysis shows that the channel of transmission of the regularization benefits occurs by means of employment of immigrate mothers.

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APPENDIX A

Table A.1: Tests for balancing of covariates, before and after matching, with control group of immigrant mothers with Italian nationality

		Absolute standardized bias				**Pseudo R-squared**		**Treated group**			**Comparison group**		
		Median		**Mean**				**Observations**			**Observation**		
		Before	**After**	**Before**	**After**	**Before**	**After**	**Before**	**After**	**Lost**	**Before**	**After**	**Lost**
(a) Control group: immigrant mothers with Italian nationality													
NN	$Subgroup_1$	14.1	2.13	11.57	1.8	0.15	0.00	1275	1214	61	4912	3562	1350
	$Subgroup_2$	13.83	2.03	11.43	1.8	0.15	0.00	1313	1236	77	5016	3562	1350
R	$Subgroup_1$	14.1	2.27	11.57	1.83	0.15	0.00	1275	1214	61	4912	4792	120
	$Subgroup_2$	13.83	2.33	11.43	1.77	0.15	0.00	1313	1236	77	5016	4877	139
K	$Subgroup_1$	14.1	1.93	11.57	1.53	0.15	0.00	1275	1214	61	4912	4792	120
	$Subgroup_2$	13.83	1.9	11.43	1.37	0.15	0.00	1313	1236	77	5016	4877	139
(a) Control group: Italian mothers													
NN	$Subgroup_1$	15.27	3.6	11.03	3.47	0.17	0.01	1275	1218	57	87257	8216	79041
	$Subgroup_2$	15	3.77	11.23	3.67	0.17	0.01	1313	1247	66	88857	8463	80394
R	$Subgroup_1$	15.27	4.97	11.03	2.87	0.17	0.02	1275	1218	57	87257	86529	728
	$Subgroup_2$	15	4.9	11.23	2.87	0.17	0.02	1313	1247	66	88857	86804	2053
K	$Subgroup_1$	15.27	3.43	11.03	2.17	0.17	0.01	1275	1218	57	87257	86529	728
	$Subgroup_2$	15	3.47	11.23	2.3	0.17	0.01	1313	1247	66	88857	86804	2053

Note: Matching methods, N=Nearest-neighbor; R=Radius; K=Kernel. $Subgroup_1$ = employed father, $Subgroup_2$ = employed mother or father

Table A.2: Number of newborns, LBW, probability of LBW, and TFR for immigrant mothers, by country of nationality

Country code	Country	Area of origin	Number of newborns		Number of newborns LBW		Probaility of LBW	TFR
			2002	2003	2002	2003	various years	2013
AFG	Afghanistan	Central and Southern Asia	0	1	0	0	15.44	5.43
ALB	Albania	Central and Eastern Europe	4870	5126	328	340	6.74	1.5
DZA	Algeria	Northern Africa	356	455	21	27	6	2.78
AGO	Angola	Central and Southern Africa	18	31	2	4	12	5.43
SAU	Saudi Arabia	Western Asia	1	0	0	0	8.8	2.17
ARG	Argentina	Central and Southern America	46	66	3	5	7.2	2.25
ARM	Armenia	Western Asia	5	1	0	0	8	1.64
AUS	Australia	Oceania	4	5	0	0	6.2	1.77
AUT	Austria	European Union	13	10	1	1	6.9	1.43
AZE	Azerbaijan	Western Asia	3	5	0	1	10	1.91
BGD	Bangladesh	Central and Southern Asia	596	771	131	170	22	2.45
BEL	Belgium	European Union	18	15	1	1	7	1.65
BLZ	Belize	Central and Southern America	0	1	0	0	11.1	3.02
BEN	Benin	Western Africa	33	26	5	4	15	5.04
BLR	Belarus	Central and Eastern Europe	4	6	0	0	5.1	1.47
BOL	Bolivia	Central and Southern America	23	31	1	2	6	2.8
BIH	Bosnia and Herzegovina	Central and Eastern Europe	304	346	14	16	4.5	1.26
BWA	Botswana	Central and Southern Africa	6	1	1	0	13	2.37
BRA	Brazil	Central and Southern America	88	95	7	8	8.5	1.79
BRN	Brunei	Eastern Asia	0	1	0	0	11.9	1.82
BGR	Bulgaria	Central and Eastern Europe	78	95	7	8	8.8	1.44
BFA	Burkina Faso	Western Africa	154	132	22	19	14.1	5.93
BDI	Burundi	Eastern Africa	3	5	0	1	12.9	6.14
KHM	Cambodia	Eastern Asia	3	1	0	0	11.3	2.66
CMR	Cameroon	Central and Southern Africa	93	89	10	10	11	4.82
CAN	Canada	Northern America	8	3	0	0	6.1	1.59
CPV	Cabo Verde	Western Africa	40	53	2	3	6	2.34
CZE	Czech Republic	Central and Eastern Europe	13	11	1	1	8	1.43
CAF	Central African Republic	Central and Southern Africa	1	2	0	0	13.7	4.46
TCD	Chad	Central and Southern Africa	2	2	0	0	19.9	4.68
CHL	Chile	Central and Southern America	14	14	1	1	5.9	1.84
CHN	China	Eastern Asia	2464	2370	229	231	9.27	1.55
CYP	Cyprus	Central and Eastern Europe	1	1	0	0	11.5	1.46
COL	Colombia	Central and Southern America	90	93	9	9	9.5	2.07
COG	Congo, Republic of the	Central and Southern Africa	41	40	5	5	13	4.73
COD	Congo, Democratic Republic	Central and Southern Africa	43	50	4	5	9.5	4.8
PRK	Korea, South	Eastern Asia	41	28	2	2	5.7	1.25
KOR	Korea, North	Eastern Asia	5	11	0	0	4.4	1.98
CRI	Costa Rica	Central and Southern America	4	1	0	0	7.3	1.91
CIV	Cote d'Ivoire	Western Africa	252	238	43	40	17	3.63
HRV	Croatia	Central and Eastern Europe	154	160	8	8	4.95	1.45
CUB	Cuba	Central and Southern America	28	28	1	1	5.2	1.46
DNK	Denmark	European Union	15	9	1	0	5.4	1.73
DMA	Dominica	Central and Southern America	14	10	2	1	10.8	2.05
DOM	Dominican Republic	Central and Southern America	111	106	12	12	11	2.36
ECU	Ecuador	Central and Southern America	387	474	33	41	8.6	2.29
EGY	Egypt	Northern Africa	1074	1111	140	144	13	2.87
SLV	El Salvador	Central and Southern America	67	61	6	5	8.7	1.95
ARE	United Arab Emirates	Western Asia	2	4	0	0	6.1	2.36
ERI	Eritrea	Eastern Africa	44	62	6	9	14	4.14
EST	Estonia	Central and Eastern Europe	0	3	0	0	4.6	1.46
ETH	Ethiopia	Eastern Africa	40	53	8	11	20	5.23
PHL	Philippines	Eastern Asia	1305	1322	274	278	21	3.06
FIN	Finland	European Union	6	7	0	0	4.2	1.73
FRA	France	European Union	148	99	10	7	6.6	2.08
GAB	Gabon	Central and Southern Africa	1	1	0	0	14	4.49
GMB	Gambia, The	Western Africa	8	12	1	1	10.2	3.85
GEO	Georgia	Western Asia	3	3	0	0	6.5	1.77
DEU	Germany	European Union	103	79	7	5	6.9	1.43
GHA	Ghana	Western Africa	633	526	68	56	10.7	4.09
JAM	Jamaica	Central and Southern America	1	0	0	0	11.3	2.05
JPN	Japan	Eastern Asia	23	29	2	3	9.6	1.4
JOR	Jordan	Western Asia	65	76	8	10	13	3.16
GRC	Greece	European Union	11	12	1	1	9.8	1.41
GTM	Guatemala	Central and Southern America	5	0	1	0	11.4	2.99
GIN	Guinea	Western Africa	36	44	4	5	12	4.93
GNB	Guinea-Bissau	Western Africa	6	5	1	1	11	4.3
GNQ	Equatorial Guinea	Central and Southern Africa	1	1	0	0	13	4.66
GUY	Guyana	Central and Southern America	1	0	0	0	14.3	2.14
HTI	Haiti	Central and Southern America	5	5	1	1	23	2.79
HND	Honduras	Central and Southern America	0	4	0	0	9.9	2.86
IND	India	Central and Southern Asia	926	896	259	251	28	2.51
IDN	Indonesia	Eastern Asia	5	5	0	0	9	2.18
IRN	Iran	Western Asia	48	35	4	3	7.7	1.85
IRQ	Iraq	Western Asia	12	16	2	2	13.4	3.41
IRL	Ireland	European Union	13	10	1	1	5.2	2
ISL	Iceland	Other European countries	7	2	0	0	4.2	1.88
ISR	Israel	Western Asia	18	16	1	1	8	2.62
KAZ	Kazakhstan	Central and Southern Asia	0	1	0	0	6.1	2.34
KEN	Kenya	Eastern Africa	7	11	1	1	8	3.54
KGZ	Kyrgyzstan	Central and Southern Asia	2	1	0	0	6.3	2.68
KWT	Kuwait	Western Asia	0	2	0	0	8.3	2.53
LVA	Latvia	Central and Eastern Europe	4	4	0	0	4.6	1.35
LBN	Lebanon	Western Asia	42	56	5	6	11.5	1.74
LBR	Liberia	Western Africa	4	5	1	1	14	4.81
LBY	Libya	Northern Africa	12	21	1	2	10.23	2.07
LIE	Liechtenstein	Other European countries	0	1	0	0	6.52	1.69
LTU	Lithuania	Central and Eastern Europe	1	6	0	0	4.8	1.29
LUX	Luxembourg	Other European countries	0	1	0	0	7.1	1.77

Notes: Number of newborns by mother's country of nationality from ISTAT ad hoc *processing service. Number of LBW newborns by mother's country of nationality calculated by multiplying total number of newborns and probability of LBW, obtained by UNICEF (2014). TFR obtained from Central Intelligence Agency (2013).*

Table A.3: Number of newborns, LBW, probability of LBW, and TFR for immigrant mothers, by country of nationality (cont.)

Country code	Country	Area of origin	Number of newborns		Number of newborns LBW		Probaility of LBW	TFR
			2002	2003	2002	2003	various years	2013
MKD	Macedonia	Central and Eastern Europe	786	769	43	42	5.5	1.59
MDG	Madagascar	Eastern Africa	1	3	0	0	16	4.28
MWI	Malawi	Eastern Africa	1	1	0	0	13.5	5.66
MYS	Malaysia	Eastern Asia	2	0	0	0	11.1	2.58
MLI	Mali	Western Africa	9	21	2	4	18	6.16
MLT	Malta	Other European countries	3	1	0	0	7	1.54
MAR	Morocco	Northern Africa	6108	5583	916	837	15	2.15
MRT	Mauritania	Western Africa	22	14	8	5	34.7	4.07
MUS	Mauritius	Eastern Africa	141	144	20	20	14	1.77
MEX	Mexico	Central and Southern America	9	11	1	1	9.15	2.29
MDA	Moldova	Central and Eastern Europe	70	150	4	9	5.8	1.56
MCO	Monaco	Other European countries	4	6	0	0	6	1.52
MNG	Mongolia	Eastern Asia	1	0	0	0	4.7	2.22
MOZ	Mozambique	Eastern Africa	1	2	0	0	16.9	5.27
MMR	Myanmar	Eastern Asia	1	1	0	0	8.6	0
NAM	Namibia	Central and Southern Africa	1	0	0	0	16	2.25
NPL	Nepal	Central and Southern Asia	3	3	1	1	17.8	2.3
NIC	Nicaragua	Central and Southern America	0	1	0	0	7.6	1.99
NER	Niger	Western Africa	14	23	4	6	27	6.89
NGA	Nigeria	Western Africa	670	705	102	107	15.2	5.25
NOR	Norway	Other European countries	3	3	0	0	5.2	1.86
NZL	New Zealand	Oceania	3	1	0	0	5.7	2.05
OMN	Oman	Western Asia	0	1	0	0	10	2.86
NLD	Netherlands	European Union	35	22	2	1	6.3	1.78
PAK	Pakistan	Central and Southern Asia	599	558	192	179	32	2.86
PAN	Panama	Central and Southern America	1	0	0	0	8.3	2.38
PRY	Paraguay	Central and Southern America	3	6	0	0	6.3	1.96
PER	Peru	Central and Southern America	606	691	42	48	6.9	2.22
POL	Poland	Central and Eastern Europe	299	418	17	24	5.7	1.33
PRT	Portugal	European Union	21	21	2	2	8.5	1.52
GBR	United Kingdom	European Union	71	60	5	4	7	1.9
ROU	Romania	Central and Eastern Europe	1645	2480	138	208	8.4	1.32
RWA	Rwanda	Eastern Africa	2	1	0	0	7.1	4.62
RUS	Russia	Central and Eastern Europe	57	69	3	4	6.1	1.61
SLB	Solomon Islands	Oceania	0	1	0	0	12.5	3.36
WSM	Samoa	Oceania	0	1	0	0	10.2	2.94
KNA	Saint Kitts and Nevis	Central and Southern America	1	0	0	0	10.4	1.78
SMR	San Marino	Other European countries	5	4	1	0	10	1.49
VAT	Holy See	Other European countries	0	1	0	0	6.52	0
SEN	Senegal	Western Africa	555	571	103	106	18.6	4.52
SRB/MNG	Serbia Montenegro	Central and Eastern Europe	1076	1008	60	56	5.6	1.42
SYC	Seychelles	Eastern Africa	4	5	1	1	12.8	1.88
SLE	Sierra Leone	Western Africa	13	10	1	1	10.5	4.83
SGP	Singapore	Eastern Asia	1	2	0	0	9.5	0.8
SYR	Syria	Western Asia	67	62	7	6	10.3	2.68
SVK	Slovakia	Central and Eastern Europe	11	20	1	2	7.9	1.39
SVN	Slovenia	Central and Eastern Europe	12	8	1	0	6	1.33
SOM	Somalia	Eastern Africa	71	63	9	8	12.8	6.08
ESP	Spain	European Union	40	36	3	3	8.2	1.48
LKA	Sri Lanka	Central and Southern Asia	954	934	162	159	17	2.13
USA	United States	Northern America	45	45	4	4	8.1	2.01
ZAF	South Africa	Central and Southern Africa	5	2	1	0	13.51	2.23
SDN	Sudan	Northern Africa	22	16	2	2	10.23	3.92
SWE	Sweden	European Union	14	8	1	0	4.5	1.88
CHE	Switzerland	Other European countries	14	18	1	1	6.7	1.54
TAW	Taiwan	Eastern Asia	8	5	1	0	9.27	1.11
TZA	Tanzania	Eastern Africa	6	3	1	0	8.4	4.95
PSE	State of Palestine	Western Asia	8	11	1	1	9.1	4.24
THA	Thailand	Eastern Asia	8	7	1	1	11.3	1.5
TGO	Togo	Western Africa	30	21	3	2	11.1	4.53
TTO	Trinidad and Tobago	Central and Southern America	1	0	0	0	11.9	1.71
TUN	Tunisia	Northern Africa	1729	1716	119	118	6.9	2
TUR	Turkey	Central and Eastern Europe	126	144	14	16	11	2.08
TKM	Turkmenistan	Central and Southern Asia	0	1	0	0	4.8	2.1
UKR	Ukraine	Central and Eastern Europe	105	189	6	10	5.3	1.3
UGA	Uganda	Eastern Africa	3	2	0	0	11.8	5.97
HUN	Hungary	Central and Eastern Europe	30	32	3	3	8.6	1.42
URY	Uruguay	Central and Southern America	5	9	0	1	8.1	1.84
UZB	Uzbekistan	Central and Southern Asia	5	6	0	0	5	1.8
VEN	Venezuela	Central and Southern America	16	14	1	1	8.6	2.35
VNM	Vietnam	Eastern Asia	9	13	0	1	5.1	1.85
YEM	Yemen	Western Asia	5	5	2	2	32	4.09
ZMB	Zambia	Eastern Africa	1	0	0	0	11	5.76
-	Stateless	-	0	3	-	-	-	-

Notes: Number of newborns by mother's country of nationality from ISTAT ad hoc *processing service. Number of LBW newborns by mother's country of nationality calculated by multiplying total number of newborns and probability of LBW, obtained by UNICEF (2014). TFR obtained from Central Intelligence Agency (2013).*