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Working Paper

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GLO Discussion Paper, No. 729

Provided in Cooperation with:
Global Labor Organization (GLO)

Suggested Citation: Bertoli, Paola; Grembi, Veronica; Nguyen, The Linh Bao (2020) : Birth in Hard Times When You Belong To Minorities, GLO Discussion Paper, No. 729, Global Labor Organization (GLO), Essen

This Version is available at:
https://hdl.handle.net/10419/226828

Birth in Hard Times When You Belong To Minorities*

Paola Bertoli †‡ Veronica Grembi § The Linh Bao Nguyen ¶

Abstract

Combining a unique dataset of birth records with municipal-level real estate information, we assess the impact of the 2008 recession on the health of immigrant newborns in Italy. Health at birth (*e.g.*, low birth weight) of immigrants deteriorated more than health at birth of Italians. The negative effects on immigrants are not equally distributed across ethnicities, but rather they are driven by the main economic activity of the ethnicity and its related network at the municipal level. Immigrants whose ethnicity is mainly employed in the sectors most affected during the recession, suffered the most. By contrast, the recession hardship is mitigated for immigrants in municipalities where their ethnic network is organized through more registered immigrant associations. The characteristics of ethnic groups and their organization at the municipal level do not explain the heterogeneous effects on Italian newborns and this confirms network rather than neighborhood effects.

JEL Classification: I1, I12; J15; J60
Keywords: Recessions, Immigrants, Low birth weight, Premature babies, Networks

*We are grateful to the suggestions of the editor in chief of the Journal of Population Economics, Klaus F. Zimmermann, and two anonymous referees that improved the paper. We are thankful to Yaa Akosa Antwi, Diogo Britto, Christopher Carpenter, Calogero Guccio, Maarten Lindeboom, Mario Macis, Catia Nicodemo, Giacomo Pignataro, Marcello Sartarelli, Judit Vall-Castello, and Tianyi Wang for their comments and suggestions on previous versions of this paper. We also thank the participants at the Petralia Workshop of Economics 2017, IX Workshop on Institution, Individual Behavior and Economic Outcomes (Alghero 2018), The Young Economists' Meeting (Brno 2018), EuHEA 2018, the 2019 IV Immigration, Health, and Wellbeing Workshop (University of Pittsburg), the 2019 Essen Health Conference, and the participants to the seminar at the Research Institute of Industrial Economics (IFN- Stockholm), University of Alicante, Johns Hopkins University, University of Catania, University of Economics Prague, University of Manchester, University of Milan, University of Pavia, and CRES-University Pompeu Fabra for their comments.

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1 Introduction

As the first quarter of 2020 appears to be the beginning of unprecedented hard times for the economy, it is crucial to understand the potential consequences of recessions on health and the possible mitigation channels. For instance, a large body of literature has addressed the link between the business cycle and health at birth and has provided findings that are often conflicting. Being born in hard times seems to have a positive impact on babies' health in the US (Dehejia and Lleras-Muney, 2004) and in Spain (Aparicio *et al.*, 2019) due to selection in the fertility of women who decide to give birth despite a recession. Birth in hard times increases the probability of subsequent negative outcomes in the lives of babies born during a recession in Denmark and the Netherlands (van den Berg *et al.*, 2009; van den Berg *et al.*, 2016), while it has no effect on the birth weights of Swedish babies (van den Berg and Modin, 2013), a measure used to predict health in adulthood. However, birth in hard times has a negative impact on the health of UK newborns (De Cao *et al.*, 2018). This negative impact has been further confirmed, absent a fertility selection mechanism, by the findings from the 2001 Argentinian crisis analyzed by Bozzoli and Quintana-Domeque (2014). To date, this literature has mainly examined the socioeconomic status of mothers to be, as proxied by their education, to investigate the heterogeneous effects of the cycle on health. Still, this has not reconciled the mixed evidence.

We contribute to this debate by analyzing the effects of the 2008 recession on the health at birth of immigrant newborns using a unique dataset of 540,000 deliveries, for which the conception year can be dated between 2002 and 2013. We improve the existing evidence in three ways. First, we focus on a specific episode — the 2008 recession — which had clear expected effects on the labor market. As pointed out by Hoynes *et al.* (2012), the effects of the Great Recession (GR) were stronger than previous recessions for certain socio-economic groups: more fragile groups and the groups more involved in the industry most affected by the recession suffered the most. Second, we propose a more in-depth investigation of the channels of the average effects. Third, to our knowledge, this is the first work to shed light on the effect of the GR on infant health in Italy. Alhough a vast number of studies in the literature have examined how the GR impacted Italian adults' health (de Vogli et al., 2014;Mattei et al., 2014; Moscone, Tosetti, and Vittadini, 2016 Caltabiano et al, 2017; Di Pietro, 2018; Cavicchioli and Pistoresi, 2019; d'Errico et al., 2019), previous works on infant health either approach the topic from a cross-country perspective (Ensor et al, 2010; Angelini and Mierau, 2014) or examine the effect of macroeconomic conditions rather than the effect of the GR (Cavalieri and Ferrante, 2016; Simeoni et al., 2019).

We identify the spread of the GR across Italian municipalities by exploiting information

on the prices per square meter of commercial real estate (*e.g.*, stores) at the municipal level. The prices of commercial real estate capture the GR spread without necessarily suffering from reverse causation problems on fertility such as unemployment rates (Schaller, 2016) and residential real estate prices (Dettling and Kearny, 2014). We use the growth rates of commercial real estate prices to define the status of a treated municipality in a staggered difference-in-differences setting through which we proxy the spread of the intensity of the crisis. Our granular data allow us to more precisely capture the dynamic of the GR with respect to local idiosyncratic economic shocks rather than economic shocks driven by broader macro conditions, which would occur, for instance, when using the state level (Lindo, 2015).

The GR deteriorated the health at birth, along the main proxies used by the literature to measure it, for both immigrant and Italian newborns with a stronger impact on immigrant newborns. The incidence of low weight increased by +8.7% (at the mean of low weight), the incidence of very low weight increased by +36%, and the incidence of preterm babies increased by +8.3% in our preferred specification. We do not find these results to be driven by a change in fertility as shown in Table A1. These effects are robust to the use of several sets of covariates and fixed effects at the municipal and ethnic group levels through which we control for language proximity and cultural differences in the use of prenatal care. The impact on immigrant babies significantly overcomes the impact of the recession on Italian babies, for whom there is an increase by 5.3% in the probability of being low weight, an increase by 21% of being very low weight, and an increase by 3.8% of being preterm at the mean of each variable.

We examine the channels of the effects on immigrants exploiting the organization of their ethnic network. The economic literature has shown that being in a strong ethnic network, as proxied by geographical ethnic concentration indexes, is a privileged way for immigrants to find a job and earn higher wages (see *e.g.*, Edin *et al.*, 2003; Damm, 2009; Xie and Gough, 2011; Patacchini and Zenou, 2012), which might have a positive impact on health. However, being in a strong network decreases the incentives to invest in human capital (*e.g.*, Battisti *et al.* 2018) and may also restrict out-of-network employment opportunities, which generates a type of lock-in situation. These elements might reinforce the negative impact of a recession.

We proxy ethnic networks per each newborn by using three sets of measures based on the ethnic group *size* (*e.g.*, the demographic incidence of each group), the *organization* of the immigrant community in the municipality of birth (*e.g.*, the number of registered associations), and the *diversification* among the sectors of employment of each group (*e.g.*, manufacturing or construction as the main sectors of employment).

A higher number of register associations (or their proximity) at the municipal level and a higher diversification among the sectors of employment of each ethnicity buffered the negative

effects of the recession. Babies born in a municipality closer to an immigrant association (or where there were more associations) were less likely to have worse health outcomes at birth. This is coherent with the fact that approximately 60% of immigrant associations in Italy are active in the area of social assistance and provide medical and psychological support services (Frisanco, 2007). The average negative impact on immigrant newborns is driven by the ethnic groups that are more concentrated in the sectors mainly affected by the crisis and that have fewer outside options in the labor market. By contrast, the size of the ethnic network did not exert any role. These results are robust to the inclusion of municipality fixed effects to capture the time invariant attitudes towards immigrants that could make the registration of an immigrant association or the settling of a specific ethnic group more or less likely. In addition, we do not find these channels to have differential effects on Italian babies, which suggests the importance of network effects rather than neighborhood effects.

Although the results driven by a higher concentration of employment in manufacturing and construction are quite intuitive, we further investigate the positive effects of immigrant associations (or their proximity) to check if they might be related to any composition effect of immigrant communities. For municipalities nearer to an immigrant association, we estimate an increase of the healthiest ethnic groups (see Chiswick, 1999; Farre', 2015) and of the groups that use more prenatal care, although this last effect is not always precisely estimated. Finally, we find less in utero selection of baby boys. This finding is important because it has been shown that exposure to psychological and economic distress during pregnancy increases the probability that more baby girls will be born over baby boys, which could explain the increase in the incidence of low-weight newborns during recessions.

Our results have two main implications. First, minorities suffer more during a significant recession, which should be kept in mind when designing policy interventions. Second, if interventions should prioritize minorities more involved in the most affected economic sectors, they should also exploit the work of immigrant associations and ultimately consider favoring their activities in areas that are the most deprived of these associations.

This paper is organized as follows. Section 2 describes the main features, the timeline of the GR in Italy and the approach that we use to proxy its spread across Italian municipalities. Section 3 provides a description of our dataset and the main outcomes of interest. Section 4 describes the econometric specification and the average results, while Section 5 defines the ethnic drivers and their effects. Section 6 concludes.

2 The Great Recession in Italy and How to Measure It

Italy was among the European countries most affected by the GR, along with Greece, Spain, and Portugal (Lin *et al.*, 2013). The crisis began during the second quarter of 2008, when a 1.9% drop in GDP was accompanied by a 2% contraction in consumption, a 7.4% fall in exports, and an 8.9% decrease in investment (Busalacchi *et al.*, 2009). The manufacturing industry and the construction sector were among the sectors most affected by the crisis, whose negative impact was especially felt in northern and central Italy (Eurofond, 2010). In 2010, the national economy seemed to register a mild improvement. However, in the summer of 2011, the crisis resurged through a sharp increase in the national bond yield. The weak GDP recovery of less than 1% in 2010 was then followed by a severe drop of almost 9% during the 2011-2014 period. Overall, the labor market suffered similar trends to the GDP trends, with the first clear growth in the unemployment rate occurring in 2008 and a second increase occurring in 2011, as shown in Figure 1.

In the literature on health at birth and the business cycle, the cycle is usually proxied by unemployment rates, but this could be problematic in our setting. For the unemployment rate to be meaningful, the level of aggregation is generally higher than the municipal level.[1] Moreover, unemployment can be endogenous to fertility decisions and behavioral decisions on how much to invest in the quality of the offspring. For these reasons, Dettling and Kearney (2014) propose an alternative measure: the prices of residential real estate. However, residential real estate prices also create identification concerns, with people who are most likely to have a baby also being the most likely to buy a house (rather than renting one). Therefore, as a measure of the economic cycle experienced by the population at large (*i.e.*, natives and immigrants), we use commercial real estate prices that are expected to be less prone to endogeneity problems than residential real estate prices and unemployment.[2]

Through the Observatory of Real Estate Transactions (*Osservatorio del Mercato Immobiliare*) of the Italian Land Agency, we collected data on the prices of stores.[3] For each municipality, the Observatory provides the maximum and minimum sales price per square meter, which are based on the transaction flow of the clusters of pre-defined stores, per type

[1] A recent attempt to construct a more granular level of unemployment is in De Cao *et al.* (2018). The authors exploit the requests for unemployment-related benefits in the Middle Layer Super Output Areas (MSOAs) in England to proxy for the unemployment level.

[2] Additionally, as a point of comparison with the previous literature, we carry out the same analysis, but we use residential prices instead of commercial prices to capture the effects of the GR. Using housing prices leads to consistent results.

[3] These data are available for all Italian municipalities, except for two regions (*i.e.*, Friuli Venezia Giulia and Trentino Alto Adige), which are omitted from our dataset.

of municipal area and commercial position. Then, we take the mean between the maximum and minimum sales price of the stores located in *central* municipal areas and in *normal* commercial positions.

The focus on the *central* areas avoids the problem of a possible variation in the number of stores over time, which could affect price fluctuations through changes in the stock supply. In fact, we can assume that in the central areas of Italian municipalities, the supply of commercial locations has low elasticity: it is the *type* of commercial activity practiced in a store that usually changes, while new constructions are more constrained. The choice of commercial locations that have a *normal* economic position eliminates the risk of capturing the trends of a few stores with extremely high or low prices due to an exceptionally good or bad commercial position. That is, our treatment is not based on the price fluctuations of a store located in Cathedral Square in Milan or in Saint Mark's Square in Venice.

Although there might be a lower number of transactions during recessions, store prices provide a good proxy for the spread of the GR while focusing on the municipal level. The trend in store prices proxies well the trend in the unemployment rate measured at the provincial level, as shown in Figure 1. As unemployment increases, the (central and normal) store prices decrease. These two measures are strongly and negatively correlated and their correlation is significant at the 0.1 level.

Figure 1, about here

To capture the dynamic of the GR at the municipal level, we define a dummy, GR, that is equal to 1 from the first year after 2008 (2008 included) in which the growth rate of store prices turns negative for each municipality.[4] This approach exploits both the within and between variation generated by the GR more accurately than the use of a continuous value of the price growth rate. Since the crisis struck the Italian economy at two moments (2008 and 2011), the dummy allows us to disregard situations in which there might be a temporary recovery of the local economy, which was canceled out by the second and more dramatic round of the crisis. Figure 2 provides an example of how our measure is constructed and how it is staggered across municipalities by using two major cities, namely, Milan in northern Italy and Bologna in central Italy. GR was equal to 1 in 2009 in Milan and in 2008 in Bologna. Figure 3 shows the overall spread of the crisis across Italy based on our dummy becoming

[4]Our results are robust to alternative definitions of our GR dummy as shown in Tables B1 - B4 where the GR dummy is defined by using different cut-offs based on the distribution of the growth rate of store prices. For example, in Table B1, GR is equal to 1 from the first year after 2008 in which the decline in store prices is higher than the median of its distribution (*i.e.*, -6%). The cut-off value for Table B2 coincides with the 55th centile (-5.3%), with the 65th centiles (-4.3%) for Table B3 and the 70th centiles (-3.7%) for Table B4. As an alternative specification, in Table B5, we show the results that use the continuous version of our treatment.

equal to 1, which perfectly captures how the recession spread according to other sources (Di Quirico, 2010).

Figures 2 and 3, about here

3 Datasets and Outcomes

Our analysis exploits several data sources, which are described in Table A2 in the Appendix. Overall, our data refer to the 2002-2013 conception period (2003-2014 delivery period) and to the municipalities of northern and central Italy. We restrict the sample to this part of the country for two reasons. First, the northern and central regions count the highest percentages of resident immigrants. During our observation period, the incidence of immigrants increased in this part of the country and it was higher than the average national level, as plotted in Figure A1. This allows us to work on a larger and homogeneous sample: immigrants in these regions tend to be more educated, and this trend did not change due to the crisis. Second, the northern and central regions were the most affected by the crisis because they represent the most industrialized areas with the highest concentration of the two sectors that suffered the most from the GR (*i.e.*, manufacturing and construction).

Our final sample includes data from 4,497 municipalities (approximately 56% of all Italian municipalities), with an average size of 7,821 residents, and we can link almost 540,000 deliveries to these municipalities.

3.1 Measures of Health at Birth

From the Patient Discharge Records (*i.e.*, *Schede di Dimissione Ospedaliera*) of Italian hospitals provided by the Ministry of Health, we recover the ethnicity of mothers and newborns and the information most used in the literature to assess health at birth: if the baby was less than 2,500 grams (*Low weight*) or less than 1,500 grams (*Very low weight*), and if she was born before the 37th gestational week ($Preterm$).[5] Obviously, these measures are related. For instance, 23% of $Preterm$ cases are $Very\ low\ weight$; 85% of $Preterm$ cases are $Low\ weight$, and 97% of $Very\ low\ weight$ are $Preterm$. As such, these measures should be considered to be interchangeable proxies of the same outcome: poor health at birth. In addition, being born *Low Weight* or *Very Low Weight* are predictive of health and other

[5]These measures are registered for both legal and illegal immigrants. Delivery is free of charge in public hospitals, with no fear of being turned away. We keep other measures, as infant mortality, out of the analysis because we cannot recover the data on mortality within the first 30 days from birth at the municipal level. Infant mortality in Italy is extremely low.

outcomes later on in life (Royer, 2009; Helgertz, Nilsson, 2019). Descriptive statistics are reported in Table 1.

These data have a few shortcomings. They do not provide any information on the socioeconomic status of the mother (*e.g.*, the level of education or employment), and they do not allow us to know the actual consumption of prenatal care during each individual pregnancy. Additionally, we do not have information on the birth order, and consequently we cannot discuss the implications of delayed fertility versus childlessness (Currie and Schwandt, 2014; Brenøe and Molitor, 2018; Aparicio *et al.*, 2019).

4 Effects on Health at Birth

We estimate the impact of the spread of the GR on the health of newborn i born in municipality m at time T and conceived in year t by using the model in Equation 1, where the prices of commercial real estate are measured at the time of conception t, γ_t are the conception year fixed effects, τ_m are the municipal fixed effects, ρ_a are the macro-areas fixed effects (*i.e.*, North-East, North-West, and Central), and β_a are the macro area trends.[6]

$$Health_{imT} = \delta GR_{mt} + \tau_m + \gamma_t + \beta_a(\rho_a * t) + E'_{mt}\sigma + \epsilon_{imT} \tag{1}$$

E'_{mt} groups the controls for education at the municipal level (*i.e.* the percentage of college graduates and percentage of high school graduates). Standard errors are clustered at the municipal level to address possible serial correlation problems (Bertrand *et al.*, 2004).[7] We consider two samples: the sample with all deliveries and the sample of singletons, as multiple pregnancies (*i.e.*, two or more babies) naturally increase the probability of being born at a low weight or preterm. The results on the singletons are our preferred results, but we obtain similar results in the overall sample as reported in Table A3.

As shown in Table 2, the GR worsens the health of newborns; it increases the probability of being low weight by 8.7% at the mean of the variable and the probability of being very low weight by 36%, while the magnitude of the effect on premature babies is +8.3% (Column 1).

[6]Since the data on health at birth are the only information available at the individual level, we also estimated equation 1 at the aggregate/municipal level. The results are shown in Table B6 in Appendix B and are consistent with the individual analysis.

[7]As a robustness check, the standard errors have also been clustered at the municipality and local health authority level (LHA) since most decisions related to healthcare are taken at the LHA level rather than at the municipal level. In fact, LHAs are health districts that group municipalities and run their own hospitals and local clinics or buy health services from independent public hospitals or private-accredited hospitals. The results of this robustness check are reported in Table A4 and are consistent with our main findings.

Table 2, about here

Our results are not associated with a change in the fertility rates of immigrants (see Table A1), and they are robust to several checks. In column (2), we add two controls for maternal age (*i.e.*, the percentage of mothers who deliver a baby between 25 and 35 years of age and the percentage of mothers older than 35) and we control for the municipal average income in column (3). Column (4) presents the results when we include ethnicity fixed effects to control for the time-invariant characteristics linked to a baby's ethnicity that could affect her health, as the traditional consumption of prenatal care. We control for population density in column (5) to account for the fact that wealthy areas might be more densely populated. The specification in column (6) includes all controls together, that is, both controls for maternal age, the municipal average income and population density. In column (7), we control for regional trends to account for geographical differences in health services and for restrictions to health care services due to the crisis, which, in Italy, are provided by regions. According to this last specification, the crisis increased the probability to be born with low weight by 7.5%, very low weight by 30%, and preterm by 6.9%. When testing the same model on Italian newborns, we detect a similar negative effect on health but with a lower magnitude: a +4.9% increase in the likelihood to be low weight, +21% increase in the likelihood to be very low weight, and 3.3% to be preterm (Table A5).[8]

We check for any anticipatory effect by estimating the leads and lags of Equation 1. The coefficients are plotted in Figure 4 and confirm the soundness of our approach.

Figure 4, about here

5 Drivers

When we investigate the main drivers of the observed effects, we move from the model in Equation 2.

[8]In Table B7 (Appendix B), we test for the significance of the difference of the impact in the two groups, which shows that the estimated effects are statistically different. We also examine the effect of the GR on the full sample of Italian newborns (Table B8) and on the entire population. As shown in Table B9, the GR increases the probability to be born with low weight, very low weight and preterm for all babies in the country. These findings are in line with the experience observed in other countries such as in India (Bhalotra, 2010) and Argentina (Bozzoli and Quintana-Domeque, 2014). Still, the literature has also found opposite results as in the cases of the US (Dehejia and Lleras-Muney, 2004) and Spain (Aparicio, González and Vall-Castello, 2019) or no significant outcomes as in the case of Sweden (van den Berg and Modin, 2013). Our findings also complement previous studies that show that the GR deteriorates the health conditions and health behaviors in Italy at large (Mental health: Mattei et al., 2014; Moscone, Tosetti, and Vittadini, 2016; Changes in health behaviors: Di Pietro, 2018).

$$Health_{imT} = \delta GR_{mt} * D_* + \lambda D_* + \omega GR_{mt} + \tau_m + \gamma_t + \beta_a(\rho_a * t) + E_{mt}^{'}\sigma + Age_{mt}^{'}\pi + \epsilon_{imT} \quad (2)$$

where D is the dummy for each driver, which is equal to 1 if the value of the variable is above the median of its distribution in 2007 and 0 otherwise and it can be defined at the municipal level ($* = m$), at the ethnic group level ($* = g$) or at both ($* = gm$). We use the 2007 distribution to exploit the conditions of the network before the spread of the recession. We consider 7 different D that capture the size and organization of the ethnic network and the diversification of employment of each group. The results of the heterogeneities for the sample of singletons are reported in Table 3. The results on Italian newborns, which we use as a placebo, are shown in Table A6.

Table 3, about here

5.1 Size

The size of an ethnic group is a standard measure used in the literature to measure the strength of a network. Accordingly, for each newborn whose mother resides in municipality m, we calculate the share of her mother group g on the total number of residents. A higher share can capture a stronger community support and the potential redistribution of help during a recession, but it could also mean less access to external sources of support; ex-ante, the impact of the mother group is difficult to say. Therefore, it is not surprising that this measure does not capture any heterogenous response as shown in Column 4.[9]

[9]We also considered the following three additional proxies to express the ethnic composition of the reference immigrant community:*ethnic group on Italian residents*, *ethnic group on foreign residents*, and *same language ethnic groups on total residents*. *ethnic group on Italian residents* is the share of residents that belong to a given ethnic group among the Italian resident population in a given municipality, while *ethnic group on foreign residents* is the ratio between residents who belong to a given ethnic group and the overall number of foreign residents in a given municipality. The *same language ethnic groups on total residents* is the proportion of immigrant residents who share the same mother tongue among the total population in a given municipality. The results obtained confirm that size does not matter, as shown in Table A7 in the Appendix. Finally, the last column of Table A7 tests the impact of *language proximity*. Language is clearly a key element of integration (Chiswick and Miller, 2002). As an immigrant's mother tongue is more similar to Italian, the role of the ethnic group in conveying information and providing support should become less relevant. To measure how far the official language of each ethnic group in our dataset is from Italian, we rely on the index developed by Melitz and Toubal (2014). This index is based on the scoring that the Automated Similarity Judgment Program (ASJP) assigned to each pair of languages by comparing the linguistic similarity of a set of 200 words. A higher level of language proximity is associated with a positive impact on health at birth.

5.2 Organization

The fact that the size of a group might not be informative might not be surprising if one considers that when the migration process of a given ethnic group is older to an area, its size becomes less important. Therefore, we also consider how well organized an ethnic group is in the municipality of residence of the mother or in its proximity. As an expression of the group's organization, we use the presence of immigrant associations, that is, voluntary organizations either established by immigrants or actively run by them. These associations can be registered at the municipal level in the registry of local associations as parts of volunteer work networks. The size of ethnic groups does not drive the creation of these associations in Italy; thus, better organized groups do not necessarily coincide with larger ethnic communities. For example, in our sample, the group size and number of associations at the municipal level have a negligible negative correlation of -0.016. Rather than the size, the settlement patterns turn out to be more important (Caponio 2005).

Associations are important for immigrants to integrate into the hosting society and gain practical and informational support (Somerville and Goodman, 2010; Caselli, 2010). According to a 2006 survey by the Italian Volunteering Foundation (FIVOL), almost 60% of immigrant associations in Italy are active in the area of social assistance and provide medical and psychological support services (Frisanco, 2007). Through the Ministry of Labour and Social Policies, we obtain a unique dataset on the distribution of registered immigrant associations across Italian municipalities, and we generate three variables: *distance to the nearest association*, *number of associations*, and *ethnic association*. The *ethnic association* is a dummy that takes the value of 1 if there is at least one immigrant association in the municipality of residence of the mother specific to her ethnic group.[10] The *distance to the nearest association* measures the distance in kilometers between the centroid of the municipality of residence of the newborn and the centroid of the nearest municipality with at least one association; this considers that in many small municipalities, there might be zero associations.[11] As a mother lives far from an organized immigrant community, the benefit that she receives from it decreases (Patacchini and Zenou, 2012).

Being near a registered association (Column 1) and living in a municipality with more associations (Column 2) decrease the probability of being born at a low weight, at a very low weight, and preterm, while there is no significant effect driven by the existence of one's own ethnicity association (Column 3).[12]

[10]Figure A2 illustrates the distribution of immigrant associations across Italian provinces.

[11]This means that the distance will be zero when at least one association is located in the municipality of residence.

[12]To rule out that the distance to the nearest association could proxy the municipal population, the distance to a highly populated municipality or the distance to a hospital, we run a set of additional hetero-

5.3 Diversification of Employment

For the 44 main ethnicities residing in Italy, we recover information on the over-qualification of female respondents and their main sector of employment from the Labour Force Survey (ISTAT 2008). *Affected sectors* captures the percentage of people in each ethnicity employed in the construction and manufacturing sectors, which were the sectors most affected by the GR. *Overqualified females* is a dummy equal to one if the females who belong to ethnicity i are overqualified more than the median value across all ethnicities. The role of the first variable is intuitive, while *overqualified females* captures the problem of a high level of over-qualification across immigrant communities: because immigrants accept any type of employment, they tend to be more over-qualified for their jobs than natives. Overall, immigrant women experience more over-qualification than immigrant men, and they generally struggle more with this problem in the European Union (6.5% more likely) than in the US (3%) (OECD, 2015).[13] The community might help to maintain over-qualification through the channel of sector over-representation.[14] Over-qualification is often associated with poor mental health.

As an alternative to *affected sectors*, *exiting firms* is based on data obtained through the registry of the municipal chamber of commerce, which count the number of closing firms at the municipal level per economic sector. This measure combines the information on the main sector of employment per ethnic group (not necessarily manufacturing or construction) and how this sector was struck in the municipality of residence of the mother, since we can count how many firms per sector were canceled from the registry because they closed.

geneities whose results are displayed in Table B10 in Appendix B. Specifically, the *distance to the nearest hospital* measures the distance in kilometers between the centroid of the municipality of residence of the newborn and the centroid of the nearest municipality with at least one hospital. The *distance to the nearest highly populated municipality* measures the distance in kilometers between the centroid of the municipality of residence of the newborn and the centroid of the nearest highly populated municipality, that is, a municipality with more than the median population in our dataset (i.e., 28,459 residents). There is no significant heterogeneous response.

[13]According to the OECD, although the incidence of over-qualification among immigrants in general did not change as a consequence of the GR, in Italy, over-qualification increased by 10% among immigrants and by 4% among natives due to the recession (OECD, 2015). The phenomenon is also associated with a high level of heterogeneity across institutions and educational patterns in the countries of origin. Nevertheless, over-qualification is very likely to become even more pronounced during economic downturns.

[14]For instance, in the UK, Bangladeshi and Pakistani immigrants are "disproportionately concentrated" in the trade, accommodation, and transportation sectors (Owen *et al.*, 2015). In the US, Hispanic men are more likely to be employed in the construction sector (United States Department of Labor, 2016). In France, Turkish and Tunisian immigrants work mainly in the manufacturing and service sectors (Gabrielli, 2015). In Italy, Moroccans are employed in the construction sector, while Chinese are involved in trade and manufacturing, and almost the entire community of Sri Lankan immigrants work as domestic workers (ISTAT, 2009). Over-representation might have several important consequences on immigrants' employment opportunities. If an immigrant's ethnic group is over-represented in a sector, then she may have a greater chance of earning a position in this specific sector but fewer outside options if this sector is struck by an economic crisis, as in a sort of lock-in situation.

Worse health outcomes for immigrant newborns are associated with higher levels of female over-qualification (Column 5), a higher involvement of the ethnic group in the main sectors affected by the crisis (Column 6), and a higher involvement in the economic sectors most affected at the municipal level (Column 7).

6 The Composition Effect

The heterogeneous effects driven by the different characteristics of an ethnic network could have several explanations, among which, since we are dealing with immigrants, there could be the decision to move. Although at the aggregate level, Italy did not experience a loss of immigrants because of the recession, there could be a relocation across municipalities and this relocation could account for our findings by changing the composition of the ethnic groups. We test this scenario by applying Equation 1 to three outcomes. The first is the share of immigrants in the overall population (*immigrant Share*) at the municipal level. The second is the share of female immigrants aged 15-49 years in the overall immigrant population aged 15-49 years (*share of females 15-49*). The third outcome is the share of immigrants aged 15-49 years in the overall immigrant population (*share of immigrants 15-49*). As shown in Table A8, the *immigrant share* decreases by less than 3%, and the share of female immigrants aged 15-49 years increases by less than 1%.

However, it might be that specific *types* of immigrants relocate. We check how this is related in particular to the distribution of immigrant associations, since it filtered the negative impact of the crisis. We estimate Equation 2 on a set of 3 outcomes at the municipal level: the share of the healthiest groups, the share of the higher users of prenatal care, and the distribution of female newborns, to capture any in utero selection process. We proxy the *healthiest* groups according to the well-used measure in the literature on migration, which is the distance between the host country and the country of origin (Chiswick, 1999). As the distance (from capital to capital) increases, immigrants should be more selected health wise. As a result, *healthiest* is constructed based on the ethnicities whose country of origin is the farthest from Italy. As a consequence of the crisis, the healthiest groups moved to municipalities near or with more associations (Table 4).

We use the data provided by the WHO on antenatal care use in the countries of origin to identify the ethnicities with the highest use of prenatal care and construct the *highest consumers of prenatal*. As apparent from Table 5, although it is not always precisely estimated, the heterogeneous effect suggests that where there are more associations or in their proximity, there are larger shares of the highest consumers of prenatal care.

A final phenomenon that could affect our results is in utero selection: males are weaker

than females in utero; therefore, the incidence of newborn girls increases during economic downturns (Trivers and Willard, 1973; Krackow, 2002), which explains the higher incidence of low weight births. Consistent with the hypothesis of in utero selection, the share of females is higher when there are fewer associations or the mother is far from them (Table 6).

Tables 4, 5, and 6 about here

7 Conclusion

In the context of Italy, which is one of the countries that was most affected during the GR, we provide new evidence on the effect of the recession on three measures of health at birth: the probability of low birth weight (less than 2,500g); the probability of very low birth weight (less than 1,500g); and the probability of being born premature. The GR increases the probability of newborns being low weight by 8.7%, the probability of being very low weight by 36%, and the probability of being premature by 8.3%. Our results are consistent with different specifications and the constructions of the GR spread. Compared with immigrant newborns, the negative effects of the recession on Italians are milder.

We further examine different possible drivers to explain the effects of the GR on immigrant newborns. We show that the burdens of the crisis on immigrant newborns were driven by their ethnicity involvement in the sectors most affected by the crisis, and the lack of diversification of the economic sectors in which their ethnicity is employed. The same channels do not exert any effects on Italian newborns, which confirms the presence of network effects rather than neighborhood effects.

Substantial evidence emphasizes that health conditions at birth have not only long-lasting effects on health but also socio-economic outcomes later in life (Helgertz and Nilsson, 2019). Our findings suggest that relative to natives, immigrants in Italy start off their life-cycle with more disadvantages during a time of economic crisis. This could translate into widening the socio-economic gap between natives and immigrants later on. To this point, it is important for the policies that aim to ease the economic burden during an economic downturn episode to weigh in the extra obstacles that minorities are subject to. Furthermore, since immigrants who are locked in the most affected economic sectors and immigrants who receive less support from associations are worse off the most, pro-immigrant policies may consider to prioritize these groups.

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Tables and Figures

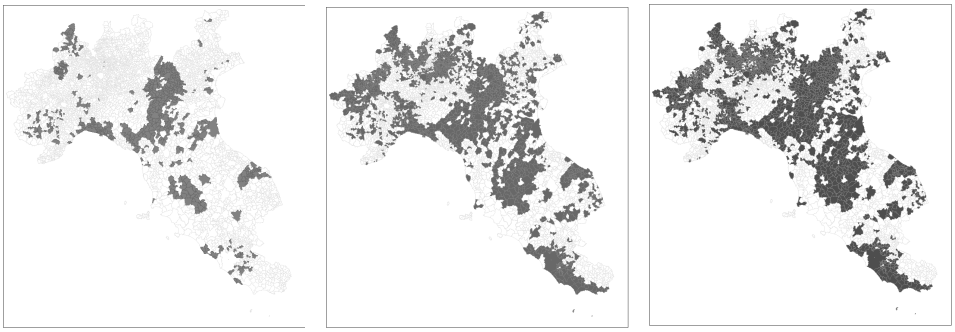
Figure 1: **Treatment and unemployment**

Notes: The figures combine data on the unemployment rate as recorded at the provincial level and the growth rate of store prices per square meter at the municipal level.

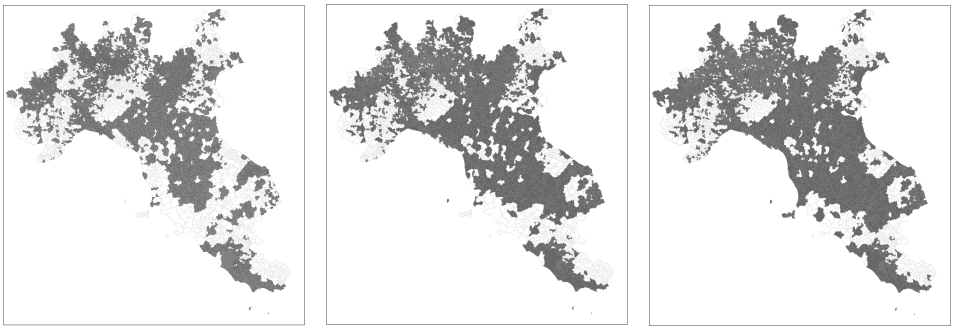
Figure 2: **Treatment across municipalities: Examples**

Notes: Each figure plots the trend of the growth rate of store prices per square meter between 2002 and 2013. Milan is located in the north, while Bologna is in the center of the country. According to our definition of the treatment (first year in which the growth rate turns negative), Milan is considered treated in 2009 and Bologna in 2008.

Figure 3: **Spreading of the GR**



(a) 2008 (b) 2009 (c) 2010



(d) 2011 (e) 2012 (f) 2013

Notes: Each map represents the municipalities treated as we move from conception year 2008 to 2013.

Table 1: **Summary statistics**

	Mean	SD
Outcomes		
Low weight (<2,500g)	0.084	0.278
Very low weight (<1,500g)	0.021	0.143
Preterm	0.090	0.286
GR variables		
Store prices	2,760.963	1,958.646
House prices	2,402.389	1,651.386
Unemployment	6.047	2.275
Heterogeneous effect variables		
Distance to the closest association	4.887	6.835
Number of immigrant associations	28.189	61.779
Ethnic association	1.072	3.274
Ethnic density	0.160	0.087
Shr. most educated female immigrants	1.281	0.919
Affected sector	9.693	3.739
Local exiting firms	0.220	0.162
Far females on female population	0.446	0.512
Shr. healthiest female immigrants	0.547	0.472
Shr. females using utero selection	0.451	0.195
Other controls		
Shr. immigrant deliveries (aged 25 - 35)	0.586	0.114
Shr. immigrant deliveries (aged > 35)	0.158	0.086
Shr. graduated	0.074	0.042
Shr. high school	0.244	0.047
Average income	2,2497.571	4,111.394
Population density	1,480.332	1,886.207

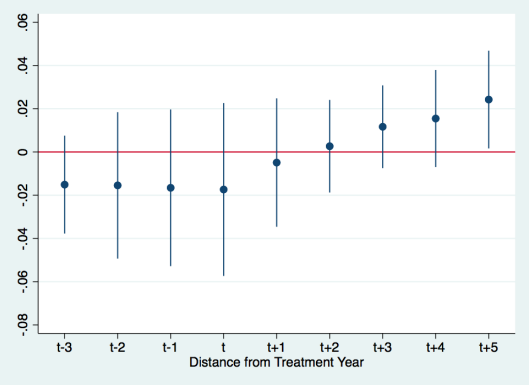
Notes: See Table A2 for variable descriptions.

Table 2: **Effects of the GR on birth outcomes - Single deliveries sample**

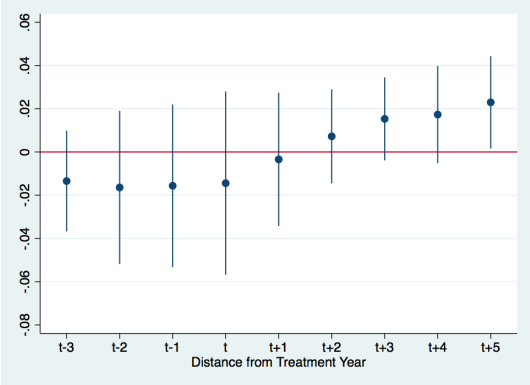
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL A: LOW WEIGHT (<2,500g)							
Crisis	0.736**	0.732*	0.706**	0.750**	0.701*	0.715**	0.630*
	(0.374)	(0.375)	(0.348)	(0.373)	(0.376)	(0.345)	(0.328)
Mean	8.433	8.433	8.433	8.433	8.433	8.433	8.433
PANEL B: VERY LOW WEIGHT (<1,500g)							
Crisis	0.760**	0.761**	0.730**	0.766**	0.757**	0.734**	0.634**
	(0.338)	(0.339)	(0.309)	(0.340)	(0.340)	(0.309)	(0.285)
Mean	2.103	2.103	2.103	2.103	2.103	2.103	2.103
PANEL C: PRE-TERM							
Crisis	0.741**	0.735**	0.701**	0.758**	0.707**	0.712**	0.620*
	(0.356)	(0.357)	(0.333)	(0.354)	(0.358)	(0.330)	(0.317)
Mean	8.957	8.957	8.957	8.957	8.957	8.957	8.957
Observations	538,367	538,367	538,367	538,367	538,367	538,367	538,367
% mothers between 25-35		✓				✓	
% mothers above 35		✓				✓	
Average income			✓			✓	
Ethnicity FE					✓		
Population density				✓		✓	
Regional trends							✓

Notes: The results obtained estimating equation (1) through a linear probability model. The dependent variable in Panel A is *low weight*, and the dependent variable in Panel B is *very low weight*, and the dependent variable in Panel C is *preterm*. The sample includes only immigrant single deliveries. Each specification controls for municipal fixed effects, conception year fixed effects, the percentage of the municipal population with a high school degree, and the percentage of the municipal population with a college degree. Models (1) - (6) also include macro-area trends. The period considered (2002-2013) refers to the conception year. The conception year is defined in the text. See Table A2 for variable descriptions. The coefficients are multiplied by 100. Standard errors are clustered at the municipal level. *** p<0.01, ** p<0.05, * p<0.1.

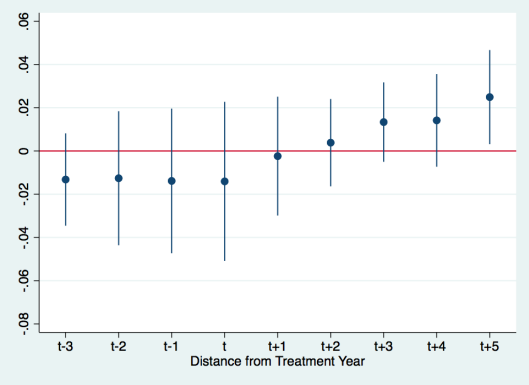
Figure 4: **Leads and lags**



(a) Low Weight



(b) Very Low Weight



(c) Pre-term

Notes: The figures plot the coefficients for the specified outcome in (a), (b) and (c) of a leads and lags regression of the effects of the Great Recession. t is the first conception year in which the recession was recorded at the municipal level.

Table 3: **Ethnic network and birth outcomes**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Distance to the closest associations	Number of immigrant associations	Ethnic association	Ethnic density	Overqualified females	Affected sector	Number of local exiting firms
PANEL A: LOW WEIGHT (<2,500g)							
	Near	**Less**	**Low**	**No**	**No**	**Unaffected**	**Less**
Crisis	-2.007*	1.178**	0.984*	0.516	-0.467	-0.093	0.731*
	(0.976)	(0.567)	(0.522)	(0.491)	(0.788)	(0.693)	(0.376)
	Far	**More**	**High**	**Yes**	**Yes**	**Affected**	**More**
Crisis	0.765**	0.636	0.406	0.759**	0.761**	0.756**	0.898*
p-value	0.041	0.191	0.212	0.042	0.042	0.043	0.061
Difference	2.772***	-0.816*	-0.578	0.243	1.228*	0.850	0.167
	(0.925)	(0.454)	(0.385)	(0.421)	(0.706)	(0.602)	(0.382)
PANEL B: VERY LOW WEIGHT (<1,500g)							
	Near	**Less**	**No**	**Low**	**No**	**Unaffected**	**Less**
Crisis	-0.208	1.071*	0.959*	0.559	0.055	-0.162	0.738**
	(0.530)	(0.549)	(0.504)	(0.413)	(0.480)	(0.441)	(0.340)
	Far	**More**	**Yes**	**High**	**Yes**	**Affected**	**More**
Crisis	0.770**	0.498**	0.550**	0.781**	0.775**	0.782**	1.420***
p-value	0.023	0.020	0.023	0.019	0.022	0.021	0.000
Difference	0.979**	-0.573	-0.408	0.222	0.719**	0.945***	0.682***
	(0.434)	(0.441)	(0.396)	(0.187)	(0.334)	(0.284)	(0.254)
PANEL C: PRE-TERM							
	Near	**Less**	**Low**	**No**	**No**	**Unaffected**	**Less**
Crisis	-1.610*	1.214**	0.898*	0.840	-0.254	-0.221	0.727**
	(0.949)	(0.526)	(0.490)	(0.520)	(0.766)	(0.675)	(0.359)
	Far	**More**	**Yes**	**High**	**Yes**	**Affected**	**More**
Crisis	0.766**	0.341	0.515	0.730**	0.761**	0.764**	1.155**
p-value	0.031	0.228	0.317	0.042	0.032	0.032	0.026
Difference	2.376***	-0.873**	-0.383	-0.011	1.015	0.984*	0.428
	(0.905)	(0.425)	(0.397)	(0.418)	(0.693)	(0.596)	(0.452)

Notes: The results obtained estimating equation (2) through a linear probability model. The dependent variable in Panel A is *low weight*, and the dependent variable in Panel B is *very low weight*, and the dependent variable in Panel C is *preterm*. Each specification controls for municipal fixed effects, conception year fixed effects, macro-area trends, and the percentage of the municipal population with a high school degree, the percentage of the municipal population with a college degree. The period considered (2002-2013) refers to the conception year. The conception year is defined in the text. See Table A2 for the variable descriptions. *Difference* refers to the coefficient on the interaction term between *crisis* and the driver in consideration, δ. *near* in Column (1), *less* in Columns (2) and (7), *Low* in Column (3), *No* in Columns (4)-(5), and *unaffected* in Column (6) refer to the coefficients on *crisis*, ω. *far* in Column (1), *more* in Columns (2) and (7), *High* in Column (3), *yes* in Columns (4)-(5), and *affected* in Column (6) refer to the sum of the coefficients on *crisis* and the interaction term between *crisis* and the driver in consideration, $\omega + \delta$. Standard errors are clustered at the municipal level. The coefficients are multiplied by 100. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: **Healthiest groups**

	Top 5 groups		**Top 10 groups**	
	(1)	(2)	(3)	(4)
	Distance to the closest associations	Number of immigrant associations	Distance to the closest associations	Number of immigrant associations
PANEL A: FAR ON POPULATION				
	Near	**Less**	**Near**	**Less**
Crisis	0.015***	-0.0002	0.018***	0.001
	(0.006)	(0.005)	(0.007)	(0.006)
	Far	**More**	**Far**	**More**
Crisis	-0.009*	0.006	-0.012**	0.006
p-value	0.066	0.242	0.038	0.345
Difference	-0.024***	0.007	-0.030***	0.005
	(0.006)	(0.006)	(0.007)	(0.007)
PANEL B: FAR FEMALES ON POPULATION				
	Near	**Less**	**Near**	**Less**
Crisis	0.007*	-0.0004	0.008**	0.001
	(0.003)	(0.003)	(0.004)	(0.004)
	Far	**More**	**Far**	**More**
Crisis	-0.004	0.003	-0.006	0.003
p-value	0.200	0.358	0.134	0.525
Difference	-0.011***	0.003	-0.014***	0.002
	(0.004)	(0.004)	(0.005)	(0.004)
PANEL C: FAR FEMALES ON FEMALE POPULATION				
	Near	**Less**	**Near**	**Less**
Crisis	0.038**	0.004	0.045**	0.006
	(0.016)	(0.015)	(0.019)	(0.019)
	Far	**More**	**Far**	**More**
Crisis	-0.014	0.021	-0.022	0.019
p-value	0.374	0.169	0.248	0.314
Difference	-0.052***	0.018	-0.067***	0.013
	(0.018)	(0.017)	(0.022)	(0.021)

Notes: The results obtained estimating equation (2) through a linear probability model. In Panel A, the dependent variable is the measure of *far on population*; In Panel B, the dependent variable is the measure of *far females on population*. In Panel C, the dependent variable is the measure of *Far Females on Female Population*. In Columns (1) - (2), the dependent variable measures are constructed for the top 5 healthiest ethnic groups; In Columns (3) - (4), the dependent variable measures are constructed for the top 10 healthiest ethnic groups. Each specification controls for municipal fixed effects, conception year fixed effects, macro-area trends, the percentage of the municipal population with a high school degree, and the percentage of the municipal population with a college degree. The conception year is defined in the text. See Table A2 for the variable descriptions. *Difference* refers to the coefficient on the interaction term between *crisis* and the driver in consideration, δ. *near* in Columns (1) and (3), and *less* in Columns (2) and (4), refer to the coefficients on *crisis*, ω. *far* in Columns (1) and (3), and *more* in Columns (2) and (4), refer to the sum of the coefficients on *crisis* and the interaction term between *Crisis* and the driver in consideration, $\omega + \delta$. Standard errors are clustered at the municipal level. The coefficients are multiplied by 100. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: **Groups with the highest use of prenatal care**

	Top 5 groups		**Top 10 groups**	
	(1)	(2)	(3)	(4)
	Distance to the closest associations	Number of immigrant associations	Distance to the closest associations	Number of immigrant associations
PANEL A: HIGHEST USERS ON POPULATION				
	Near	**Less**	**Near**	**Less**
Crisis	0.010	-0.006	-0.011	-0.041**
	(0.007)	(0.007)	(0.018)	(0.018)
	Far	**More**	**Far**	**More**
Crisis	-0.012	0.004	-0.048***	-0.018
p-value	0.128	0.546	0.009	0.308
Difference	-0.022**	0.011	-0.037**	0.023
	(0.009)	(0.009)	(0.018)	(0.018)
PANEL B: HIGHEST FEMALE USERS ON POPULATION				
	Near	**Less**	**Near**	**Less**
Crisis	0.008*	-0.002	-0.005	-0.022**
	(0.004)	(0.005)	(0.009)	(0.009)
	Far	**More**	**Far**	**More**
Crisis	-0.005	0.005	-0.027***	-0.009
p-value	0.287	0.295	0.005	0.315
Difference	-0.014**	0.007	-0.022**	0.013
	(0.006)	(0.005)	(0.009)	(0.009)
PANEL C: HIGHEST USERS ON FEMALE POPULATION				
	Near	**Less**	**Near**	**Less**
Crisis	0.028	-0.010	-0.051	-0.118***
	(0.021)	(0.023)	(0.043)	(0.045)
	Far	**More**	**Far**	**More**
Crisis	-0.012	0.024	-0.113**	-0.05
p-value	0.616	0.296	0.017	0.272
Difference	-0.040	0.033	-0.062	0.069
	(0.027)	(0.026)	(0.043)	(0.043)

Notes: Thw results obtained estimating equation (2) through a linear probability model. In Panel A, the dependent variable is the measure of *highest users on population*; In Panel B, the dependent variable is the measure of *highest females users on population*; In Panel C, the dependent variable is the measure of *highest females users on female population*. In Columns (1) - (2), the dependent variable measures are constructed for the top 5 highest users ethnic groups; In Columns (3) - (4), the dependent variable measures are constructed for the top 10 highest users ethnic groups. Each specification controls for municipal fixed effects, conception year fixed effects, macro-area trends, the percentage of the municipal population with a high school degree, the percentage of the municipal population with a college degree. The conception year is defined in the text. See Table A2 for the variable descriptions. *Difference* refers to the coefficient on the interaction term between *crisis* and the driver in consideration, δ. *near* in Columns (1) and (3), and *less* in Columns (2) and (4) refer to the coefficients on *crisis*, ω. *far* in Columns (1) and (3), and *more* in Columns (2) and (4) refer to the sum of the coefficients on *crisis* and the interaction term between *crisis* and the driver in consideration, $\omega + \delta$. Standard errors are clustered at the municipal level. The coefficients are multiplied by 100. *** p<0.01, ** p<0.05, * p<0.1.

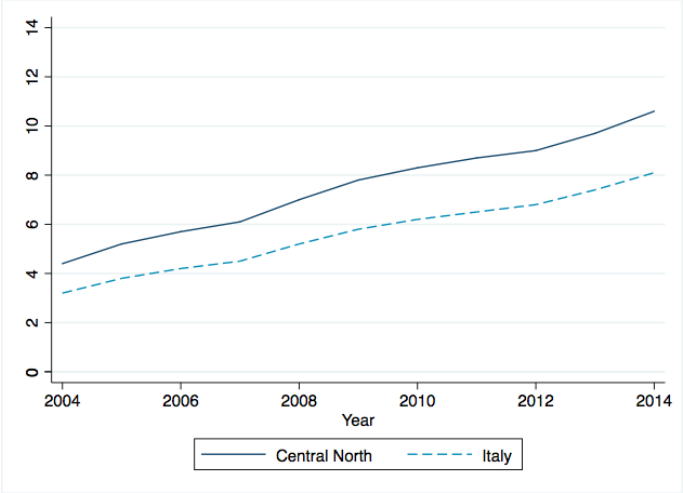
Table 6: **In utero selection: The share of females aged zero**

	(1)	(2)
	Distance to the closest associations	Number of immigrant associations
	Near	**Less**
Crisis	-3.020***	-1.333**
	(0.600)	(0.651)
	Far	**More**
Crisis	0.457	-1.402**
p-value	0.512	0.027
Difference	3.477***	-0.070
	(0.735)	(0.714)

Notes: The results obtained estimating equation (2) through a linear probability model. The dependent variable is *share of females aged zero*. Each specification controls for municipal fixed effects, conception year fixed effects, macro-area trends, the percentage of the municipal population with a high school degree, and the percentage of the municipal population with a college degree. The conception year is defined in the text. See Table A2 for the variable descriptions. *Difference* refers to the coefficient on the interaction term between *crisis* and the driver in consideration, δ. *near* in Column (1), and *less* in Column (2) refer to the coefficients on *crisis*, ω. *far* in Columns(1), and *More* in Column (2) refer to the sum of the coefficients on *crisis* and the interaction term between *crisis* and the driver in consideration, $\omega + \delta$. Standard errors are clustered at the municipal level. The coefficients are multiplied by 100. *** p<0.01, ** p<0.05, * p<0.1.

Appendix

Figure A1: **Immigrants per 100 residents**



Notes: The figure plots the trend over time of the number of immigrants per 100 residents at the national level and considering only Northern and Central regions.

Table A1: **Effects of the GR on birth rates**

	Full sample	Singletons
	(1)	(2)
Crisis	-0.012	0.026
	(0.121)	(0.120)
Mean	8.256	8.148
Observations	53,584	53,528
% mothers between 25-35	✓	✓
% mothers above 35	✓	✓

Notes: The results obtained estimating equation (1) at the municipal level. The dependent variable is the *birth rates*. In Column (1), the sample includes all immigrant deliveries; in Column (2), the sample includes only immigrant singletons. Each specification controls for municipal fixed effects, conception year fixed effects, macro-area trends, the percentage of the municipal population with a high school degree, the percentage of the municipal population with a college degree. The period considered (2002-2013) refers to the conception year. The conception year is defined in the text. See Table A2 for the variable descriptions. Standard errors are clustered at the municipal level. The coefficients are multiplied by 100. *** p<0.01, ** p<0.05, * p<0.1.

Table A2: **Variable explanation**

Variable Name	Variable Description	Source	Level
Composition			
Birth Rate	Number of births over the number of female residents 15-49	PDC	M
Far on population	Residents belonging to the 5 (10) ethnicities whose country of origin is the farthest from Italy on the overall population	ISTAT	M
Far females on population	Female residents belonging to the 5 (10) ethnicities whose country of origin is the farthest from Italy on the overall population	ISTAT	M
Far females on female population	Female residents belonging to the 5 (10) ethnicities whose country of origin is the farthest from Italy on female population	ISTAT	M
Highest use on population	Residents belonging to the 5 (10) ethnicities with the highest use of prenatal care on the overall population	ISTAT/ WHO	M
Highest use females on population	Female residents belonging to the 5 (10) ethnicities with the highest use of prenatal care on the overall population	ISTAT/ WHO	M
Highest use females on female population	Female residents belonging to the 5 (10) ethnicities with the highest use of prenatal care on female population	ISTAT/ WHO	M
Share of Females Aged Zero	Female newborns aged zero on overall newborns aged zero	ISTAT	M
Health Outcomes: Newborns			
Low weight	Dummy=1 if weight< 2,500 gr	PDC	I
Very low weight	Dummy=1 if weight<1,500 gr	PDC	I
Preterm	Dummy=1 if birth is before 37th week	PDC	I
Controls			
% High School	Percentage of residents completed high school out of the total residents	Census 2001&2011	M
% Graduated	Percentage of residents completed college or higher out of the total residents	Census 2001&2011	M
Treatment			
Store price	Price per square meter Growth rate	IAoL	M
Channels			
Number of immigrant associations	Number of immigrant association in the municipality of residence of the immigrant	MoL	M
Distance to the closest association	Euclidean distance to the nearest municipality with at least one immigrant association	MoL	M
Linguistic proximity	Linguistic proximity on the basis of the databank of the ASJP	Melitz & Toubal (2014)	I
Affected sectors	Percentage of people in each ethnicity employed in the construction and manufacturing sectors	$ISTAT^*$	EG
Overqualified	Percentage of female respondents per group stating that their degree overqualified them for their occupations	$ISTAT$	EG
Number of local exiting firms	Dummy=1 if the sector with the highest number of exiting firms is the same as the sector that a foreign group is most active in	CC	M
Other			
Immigrant share	Share of immigrant on the overall population	ISTAT	M
Share of female 15-49	Share of female immigrants aged 15-49 on the overall immigrant population	ISTAT	M
Share of immigrants 15-49	Share of immigrants aged 15-49 on the overall immigrant population	ISTAT	M
Unemployment	Continuous for immigrants	ISTAT	P

Notes: $ASJP$= Automated Similarity Judgment Program. CC= Chambers of Commerce. EG=Ethnic group. I= Individual. $IAoL$= Italian Agency of Land. $IIRS$= Italian Internal Revenue Service, only released for 2013 and 2014. $ISTAT$= Italian Institute of Statistics. $ISTAT^*$= Italian Institute of Statistics, Surveys on the integration of immigrants workers, 2nd quarter 2008. M= Municipal. MoL= Ministry of Labor. MoF= Ministry of Finance. P=Provincial level. PDC= Patient Discharge Card for conception years 2002-2013. WHO= World Health Organization.

Table A3: **Effects of the GR on birth outcomes - Full sample**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL A: LOW WEIGHT (<2,500g)							
Crisis	0.711*	0.707*	0.679*	0.726*	0.677*	0.690**	0.609*
	(0.375)	(0.376)	(0.349)	(0.374)	(0.377)	(0.346)	(0.329)
Mean	8.547	8.547	8.547	8.547	8.547	8.547	8.547
PANEL B: VERY LOW WEIGHT (<1,500g)							
Crisis	0.757**	0.758**	0.727**	0.763**	0.755**	0.731**	0.631**
	(0.338)	(0.339)	(0.309)	(0.340)	(0.339)	(0.308)	(0.284)
Mean	2.112	2.112	2.112	2.112	2.112	2.112	2.112
PANEL C: PRE-TERM							
Crisis	0.710**	0.705**	0.669**	0.728**	0.677*	0.681**	0.595*
	(0.358)	(0.359)	(0.336)	(0.356)	(0.361)	(0.332)	(0.319)
Mean	9.066	9.066	9.066	9.066	9.066	9.066	9.066
Observations	539,927	539,927	539,927	539,927	539,927	539,927	539,927
% mothers between 25-35		✓				✓	
% mothers above 35		✓				✓	
Average income			✓			✓	
Ethnicity FE					✓		
Population density				✓		✓	
Regional trends							✓

Notes: The esults obtained estimating equation (1) through a linear probability model. the dependent variable in Panel A is *low weight*; the dependent variable in Panel B is *very low weight*, and the dependent variable in Panel C is *preterm*. The sample includes all immigrant deliveries. Each specification controls for municipal fixed effects, conception year fixed effects, the percentage of municipal the population with a high school degree, and the percentage of the municipal population with a college degree. Models (1) - (6) also include macro-area trends. The period considered (2002-2013) refers to the conception year. The conception year is defined in the text. See Table A2 for the variable descriptions. The coefficients are multiplied by 100. Standard errors are clustered at the municipal level. *** p<0.01, ** p<0.05, * p<0.1.

Table A4: **Effects of the GR on birth outcomes - Single deliveries sample Municipality and LHA Cluster**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL A: LOW WEIGHT (<2,500g)							
Crisis	0.736*	0.732*	0.706*	0.750*	0.701*	0.715*	0.630*
	(0.394)	(0.395)	(0.370)	(0.394)	(0.397)	(0.367)	(0.346)
Mean	8.433	8.433	8.433	8.433	8.433	8.433	8.433
PANEL B: VERY LOW WEIGHT (<1,500g)							
Crisis	0.760**	0.761**	0.730**	0.766**	0.757**	0.734**	0.634**
	(0.368)	(0.369)	(0.341)	(0.371)	(0.370)	(0.341)	(0.313)
Mean	2.103	2.103	2.103	2.103	2.103	2.103	2.103
PANEL C: PRE-TERM							
Crisis	0.741*	0.735*	0.701**	0.758**	0.707*	0.712**	0.620*
	(0.378)	(0.379)	(0.357)	(0.376)	(0.381)	(0.353)	(0.338)
Mean	8.957	8.957	8.957	8.957	8.957	8.957	8.957
Observations	538,367	538,367	538,367	538,367	538,367	538,367	538,367
% mothers between 25-35		✓				✓	
% mothers above 35		✓				✓	
Average income			✓			✓	
Ethnicity FE					✓		
Population density				✓		✓	
Regional trends							✓

Notes: The results obtained estimating equation (1) through a linear probability model. Dependent variable in Panel A is *low weight*; dependent variable in Panel B is *very low weight*; dependent variable in Panel C is *preterm*. The sample includes only immigrant single deliveries. Each specification controls for municipal fixed effects, conception year fixed effects, the percentage of municipal the population with a high school degree, and the percentage of the municipal population with a college degree. Models (1) - (6) also include macro-area trends. The period considered (2002-2013) refers to the conception year. The conception year is defined in the text. See Table A2 for the variable descriptions. The coefficients are multiplied by 100. Standard errors are clustered at the LHA level. *** p<0.01, ** p<0.05, * p<0.1.

Table A5: **Effects of the GR on birth outcomes - Single delivery sample of Italian newborns**

	(1)	(2)	(3)	(4)	(5)	(6)
PANEL A: LOW WEIGHT (<2,500g)						
Crisis	0.435***	0.423***	0.416***	0.440**	0.409***	0.414***
	(0.137)	(0.137)	(0.129)	(0.136)	(0.128)	(0.139)
Mean	8.181	8.181	8.181	8.181	8.181	8.181
PANEL B: VERY LOW WEIGHT (<1,500g)						
Crisis	0.335***	0.333***	0.320***	0.336***	0.319***	0.335**
	(0.126)	(0.126)	(0.114)	(0.126)	(0.114)	(0.131)
Mean	1.586	1.586	1.586	1.586	1.586	1.586
PANEL C: PRE-TERM						
Crisis	0.318**	0.304**	0.295**	0.325**	0.290**	0.289**
	(0.132)	(0.132)	(0.123)	(0.131)	(0.122)	(0.133)
Mean	8.466	8.466	8.466	8.466	8.466	8.466
Observations	3,038,443	3,038,443	3,038,443	3,038,443	3,038,443	3,038,443
% mothers between 25-35		✓			✓	
% mothers above 35		✓			✓	
Average income			✓		✓	
Population density				✓	✓	
Regional trends						✓

Notes: The results obtained estimating equation (1) through a linear probability model. The dependent variable in Panel A is *low weight*, and the dependent variable in Panel B is *very low weight*, and the dependent variable in Panel C is *preterm*. The sample includes only single Italian deliveries. Each specification controls for municipal fixed effects, conception year fixed effects, the percentage of the municipal population with a high school degree, and the percentage of the municipal population with a college degree. Models (1) - (6) also include macro-area trends. The period considered (2002-2013) refers to the conception year. The conception year is defined in the text. See Table A2 for the variable descriptions. The coefficients are multiplied by 100. Standard errors are clustered at the municipal level. *** p<0.01, ** p<0.05, * p<0.1.

Table A6: **Ethnic network and birth outcomes - Single delivery sample of Italian newborns**

	(1)	(2)	(4)	(5)	(6)
	Distance to the closest associations	Number of immigrant associations	Ethnic density	Affected sector	Number of local exiting firms
PANEL A: LOW WEIGHT (<2,500g)					
	Near	**Less**	**Low**	**Unaffected**	**Less**
Crisis	0.468***	0.349*	0.506***	0.523***	0.417**
	(0.135)	(0.520)	(0.193)	(0.130)	(0.201)
	Far	**More**	**High**	**Affected**	**More**
Crisis	0.395**	0.486***	0.375***	0.346*	0.442***
p-value	0.040	0.000	0.079	0.197	0.001
Difference	-0.072	0.137	-0.131	-0.177	0.025
	(0.181)	(0.167)	(0.193)	(0.193)	(0.159)
PANEL B: VERY LOW WEIGHT (<1,500g)					
	Near	**Less**	**Low**	**Unaffected**	**Less**
Crisis	0.302***	0.365*	0.375**	0.297***	0.386**
	(0.097)	(0.187)	(0.188)	(0.093)	(0.191)
	Far	**More**	**High**	**Affected**	**More**
Crisis	0.376**	0.317***	0.301***	0.375*	0.317***
p-value	0.046	0.002	0.002	0.051	0.004
Difference	0.073	-0.048	-0.074	0.178	-0.069
	(0.147)	(0.128)	(0.149)	(0.165)	(0.118)
PANEL C: PRE-TERM					
	Near	**Less**	**Low**	**Unaffected**	**Less**
Crisis	0.364***	0.300	0.371**	0.370***	0.332*
	(0.127)	(0.192)	(0.186)	(0.121)	(0.196)
	Far	**More**	**High**	**Affected**	**More**
Crisis	0.260	0.328***	0.271**	0.264	0.313**
p-value	0.163	0.010	0.045	0.170	0.014
Difference	-0.103	0.028	-0.100	-0.105	-0.019
	(0.171)	(0.165)	(0.418)	(0.185)	(0.157)

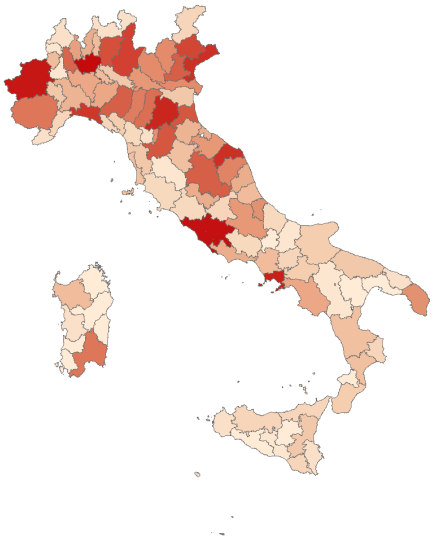
Notes: The results obtained estimating equation (2) through a linear probability model. The dependent variable in Panel A is *low weight*, and the dependent variable in Panel B is *very low weight*, and the dependent variable in Panel C is *preterm*. Each specification controls for municipal fixed effects, conception year fixed effects, macro-area trends, the percentage of the municipal population with a high school degree, and the percentage of the municipal population with a college degree. The period considered (2002-2013) refers to the conception year. The conception year is defined in the text. See Table A2 for the variable descriptions. *Difference* refers to the coefficient on the interaction term between *crisis* and the driver in consideration, δ. *near* in Column (1), *less* in Columns (2) and (6), *low* in Column (4), and *unaffected* in Column (5) refer to the coefficients on *crisis*, ω. *Far* in Column (1), *more* in Columns (2) and (6), *high* in Column (4), and *affected* in Column (5) refer to the sum of the coefficients on *crisis* and the interaction term between *crisis* and the driver in consideration, $\omega + \delta$. Standard errors are clustered at the municipal level. The coefficients are multiplied by 100. *** p<0.01, ** p<0.05, * p<0.1.

Table A7: **Additional heterogeneous effects**

	(1)	(2)	(3)	(4)
	Ethnic group on Italian residents	Ethnic group on foreign residents	Same language ethnic groups on total residents	Language proximity
PANEL A: LOW WEIGHT (<2,500g)				
	Low	**Low**	**Low**	**Far**
Crisis	0.576	0.392	0.661	1.088**
	(0.496)	(0.732)	(0.626)	(0.452)
	High	**High**	**High**	**Near**
Crisis	0.754**	0.751**	0.744	0.969**
p-value	0.043	0.041	0.039	0.024
Difference	0.178	0.359	0.082	-0.119**
	(0.326)	(0.547)	(0.418)	(0.053)
PANEL B: VERY LOW WEIGHT (<1,500g)				
	Low	**Low**	**Low**	**Far**
Crisis	0.618	0.467	0.499	1.082***
	(0.421)	(0.678)	(0.560)	(0.409)
	High	**High**	**High**	**Near**
Crisis	0.776**	0.773**	0.787	0.999**
p-value	0.020	0.019	0.014	0.011
Difference	0.158	0.306	0.288	-0.082**
	(0.188)	(0.470)	(0.303)	(0.035)
PANEL C: PRE-TERM				
	Low	**Low**	**Low**	**Far**
Crisis	0.905*	0.299	0.669	1.163***
	(0.514)	(0.734)	(0.601)	(0.422)
	High	**High**	**High**	**Near**
Crisis	0.723**	0.760**	0.748**	1.006**
p-value	0.043	0.030	0.030	0.014
Difference	-0.183	0.460	0.079	-0.157***
	(0.402)	(0.582)	(0.421)	(0.051)

Notes: The results obtained estimating equation (2) through a linear probability model. The dependent variable in Panel A is *low weight*, and the dependent variable in Panel B is *very low weight*, and the dependent variable in Panel C is *preterm*. Each specification controls for municipal fixed effects, conception year fixed effects, macro-area trends, the percentage of the municipal population with a high school degree, the percentage of the municipal population with a college degree. The period considered (2002-2013) refers to the conception year. The conception year is defined in the text. See Table A2 for the variable descriptions. *Difference* refers to the coefficient on the interaction term between *crisis* and the driver in consideration, δ. *Low* in Columns (1) - (3), *far* in Column (4), refer to the coefficients on *crisis*, ω. *High* in Columns (1) - (3), *near* in Column (4), refer to the sum of the coefficients on *Crisis* and the interaction term between *crisis* and the driver in consideration, $\omega + \delta$. Standard errors are clustered at the municipality level. The coefficients are multiplied by 100. *** p<0.01, ** p<0.05, * p<0.1.

Figure A2: **Distribution of association**



(a) N association

Notes: (a) number of immigrant associations at the provincial level. The darker areas indicate higher values.

Table A8: **Effects of the GR on the immigrant population**

	(1) Immigrant Share	(2) Share of Female 15-49	(3) Share of Immigrants 15-49
Crisis	-0.175***	0.337*	0.153
	(0.045)	(0.191)	(0.210)
Observations	53,528	53,528	53,528
Mean	6.093	50.591	69.471

Notes: The results obtained estimating equation (1) at the municipal level through a linear probability model. The dependent variable in Column (1) is *immigrant share*, the dependent variable in Column (2) is *share of female 15-49*, the dependent variable in Column (3) is *share of immigrants 15-49*. Each specification controls for municipal fixed effects, conception year fixed effects, macro-area trends, the percentage of municipal population with a high school degree, the percentage of municipal population with a college degree. The period considered (2002-2013) refers to the conception year. The conception year is defined in the text. See Table A2 for the variable descriptions. Standard errors are clustered at the municipality level. Coefficients are multiplied by 100. *** p<0.01, ** p<0.05, * p<0.1.

Appendix B

This Appendix provides additional tables. In particular, we present the following:

- Effects of the GR on birth outcomes - Single deliveries sample: Treatment Cutoff at the Median of Store Prices (Table B1);
- Effects of the GR on birth outcomes - Single deliveries sample: Treatment Cutoff at the 55th Percentile of Store Prices (Table B2);
- Effects of the GR on birth outcomes - Single deliveries sample: Treatment Cutoff at the 65th Percentile of Store Prices (Table B3);
- Effects of the GR on birth outcomes - Single deliveries sample: Treatment Cutoff at the 70th Percentile of Store Prices (Table B4);
- Effects of the GR on birth outcomes - Single deliveries sample: Continuous Treatment (Table B5);
- Effects of the GR on birth outcomes - Single deliveries sample: Aggregate Level (Table B6);
- Heterogeneous effects of the GR on birth outcomes, Italians and Immigrants - Single deliveries sample (Table B7);
- Effects of the GR on birth outcomes, full sample of Italian newborns (Table B8);
- Effects of the GR on birth outcomes - Single deliveries sample: Overall population (Table B9); and
- Additional Heterogeneous effects of the GR on birth outcomes - Single deliveries sample (Table B10).

Table B1: **Effects of the GR on birth outcomes - Single deliveries sample Treatment Cutoff at the Median of Store Prices**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL A: LOW WEIGHT (<2,500g)							
Crisis	1.091**	1.089**	1.109**	1.147**	1.012**	0.151**	0.860**
	(0.473)	(0.474)	(0.491)	(0.484)	(0.474)	(0.490)	(0.436)
Mean	8.433	8.433	8.433	8.433	8.433	8.433	8.433
PANEL B: VERY LOW WEIGHT (<1,500g)							
Crisis	0.917**	0.916**	0.934*	0.942**	0.894*	0.948**	0.772*
	(0.460)	(0.460)	(0.481)	(0.474)	(0.462)	(0.481)	(0.404)
Mean	2.103	2.103	2.103	2.103	2.103	2.103	2.103
PANEL C: PRE-TERM							
Crisis	0.961**	0.959**	0.984**	1.026**	0.887*	1.032**	0.788*
	(0.455)	(0.456)	(0.469)	(0.461)	(0.455)	(0.467)	(0.405)
Mean	8.957	8.957	8.957	8.957	8.957	8.957	8.957
Observations	538,367	538,367	538,367	538,367	538,367	538,367	538,367
% mothers between 25-35		✓				✓	
% mothers above 35		✓				✓	
Average income			✓			✓	
Ethnicity FE					✓		
Population density				✓		✓	
Regional trends							✓

Notes: The results obtained estimating equation (1) through a linear probability model. The dependent variable in Panel A is *low weight*, and the dependent variable in Panel B is *very low weight*, and the dependent variable in Panel C is *preterm*. The sample includes only immigrant single deliveries. Each specification controls for municipal fixed effects, conception year fixed effects, the percentage of the municipal population with a high school degree, and the percentage of the municipal population with a college degree. Models (1) - (6) also include macro-area trends. The period considered (2002-2013) refers to the conception year. *Crisis* refers to the treatment defined by the median cutoff of the store prices. The conception year is defined in the text. See Table A2 for the variable descriptions. The coefficients are multiplied by 100. Standard errors are clustered at the municipal level. *** p<0.01, ** p<0.05, * p<0.1.

Table B2: **Effects of the GR on birth outcomes - Single deliveries sample Treatment Cutoff at the 55th Percentile of Store Prices**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL A: LOW WEIGHT (<2,500g)							
Crisis	1.138**	1.138**	1.146**	1.175**	1.064**	1.174**	0.907**
	(0.501)	(0.501)	(0.507)	(0.507)	(0.502)	(0.506)	(0.460)
Mean	8.433	8.433	8.433	8.433	8.433	8.433	8.433
PANEL B: VERY LOW WEIGHT (<1,500g)							
Crisis	0.903*	0.903*	0.911*	0.919*	0.881*	0.918*	0.750*
	(0.494)	(0.494)	(0.503)	(0.503)	(0.496)	(0.502)	(0.439)
Mean	2.103	2.103	2.103	2.103	2.103	2.103	2.103
PANEL C: PRE-TERM							
Crisis	0.977**	0.976**	0.987**	1.020**	0.904*	1.018**	0.805*
	(0.477)	(0.478)	(0.482)	(0.480)	(0.477)	(0.480)	(0.428)
Mean	8.957	8.957	8.957	8.957	8.957	8.957	8.957
Observations	538,367	538,367	538,367	538,367	538,367	538,367	538,367
% mothers between 25-35		✓				✓	
% mothers above 35		✓				✓	
Average income			✓			✓	
Ethnicity FE					✓		
Population density				✓		✓	
Regional trends							✓

Notes: The results obtained estimating equation (1) through a linear probability model. The dependent variable in Panel A is *low weight*, and the dependent variable in Panel B is *very low weight*, and the dependent variable in Panel C is *preterm*. The sample includes only immigrant single deliveries. Each specification controls for municipal fixed effects, conception year fixed effects, the percentage of the municipal population with a high school degree, and the percentage of the municipal population with a college degree. Models (1) - (6) also include macro-area trends. The period considered (2002-2013) refers to the conception year. *Crisis* refers to the treatment defined by the 55th percentile cutoff of the store prices. The conception year is defined in the text. See Table A2 for the variable descriptions. The coefficients are multiplied by 100. Standard errors are clustered at the municipal evel. *** p<0.01, ** p<0.05, * p<0.1.

Table B3: **Effects of the GR on birth outcomes - Single deliveries sample Treatment Cutoff at the 65th Percentile of Store Prices**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL A: LOW WEIGHT (<2,500g)							
Crisis	1.172**	1.170**	1.170**	1.200**	1.098**	1.192**	0.962*
	(0.556)	(0.556)	(0.552)	(0.560)	(0.557)	(0.551)	(0.513)
Mean	8.433	8.433	8.433	8.433	8.433	8.433	8.433
PANEL B: VERY LOW WEIGHT (<1,500g)							
Crisis	0.985*	0.985*	0.983*	0.997*	0.955*	0.989*	0.841*
	(0.559)	(0.559)	(0.556)	(0.566)	(0.560)	(0.556)	(0.505)
Mean	2.103	2.103	2.103	2.103	2.103	2.103	2.103
PANEL C: PRE-TERM							
Crisis	1.008*	1.006*	1.006*	1.041**	0.932*	1.030**	0.838*
	(0.522)	(0.523)	(0.519)	(0.524)	(0.522)	(0.516)	(0.475)
Mean	8.957	8.957	8.957	8.957	8.957	8.957	8.957
Observations	538,367	538,367	538,367	538,367	538,367	538,367	538,367
% mothers between 25-35		✓				✓	
% mothers above 35		✓				✓	
Average income			✓			✓	
Ethnicity FE					✓		
Population density				✓		✓	
Regional trends							✓

Notes: The results obtained estimating equation (1) through a linear probability model. The dependent variable in Panel A is *low weight*, and the dependent variable in Panel B is *very low weight*, and the dependent variable in Panel C is *preterm*. The sample includes only immigrant single deliveries. Each specification controls for municipal fixed effects, conception year fixed effects, the percentage of the municipal population with a high school degree, and the percentage of the municipal population with a college degree. Models (1) - (6) also include macro-area trends. The period considered (2002-2013) refers to the conception year. *Crisis* refers to the treatment defined by the 65th percentile cutoff of the store prices. The conception year is defined in the text. See Table A2 for the variable descriptions. The coefficients are multiplied by 100. Standard errors are clustered at the municipal level. *** p<0.01, ** p<0.05, * p<0.1.

Table B4: **Effects of the GR on birth outcomes - Single deliveries sample Treatment Cutoff at the 70th Percentile of Store Prices**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL A: LOW WEIGHT (<2,500g)							
Crisis	1.310**	1.308**	1.300**	1.328**	1.240**	1.313**	1.116**
	(0.575)	(0.576)	(0.561)	(0.577)	(0.577)	(0.559)	(0.531)
Mean	8.433	8.433	8.433	8.433	8.433	8.433	8.433
PANEL B: VERY LOW WEIGHT (<1,500g)							
Crisis	1.054*	1.054*	1.043*	1.061*	1.026*	1.047*	0.911*
	(0.582)	(0.583)	(0.567)	(0.586)	(0.583)	(0.566)	(0.527)
Mean	2.103	2.103	2.103	2.103	2.103	2.103	2.103
PANEL C: PRE-TERM							
Crisis	1.106**	1.103**	1.092**	1.127**	1.034*	1.106**	0.948*
	(0.540)	(0.541)	(0.527)	(0.540)	(0.541)	(0.524)	(0.493)
Mean	8.957	8.957	8.957	8.957	8.957	8.957	
Observations	538,367	538,367	538,367	538,367	538,367	538,367	538,367
% mothers between 25-35		✓				✓	
% mothers above 35		✓				✓	
Average income			✓			✓	
Ethnicity FE					✓		
Population density				✓		✓	
Regional trends							✓

Notes: The results obtained estimating equation (1) through a linear probability model. The dependent variable in Panel A is *low weight*, the dependent variable in Panel B is *very low weight*, the dependent variable in Panel C is *preterm*. The sample includes only immigrant single deliveries. Each specification controls for municipal fixed effects, conception year fixed effects, the percentage of the municipal population with a high school degree, and the percentage of the municipal population with a college degree. Models (1) - (6) also include macro-area trends. The period considered (2002-2013) refers to the conception year. *Crisis* refers to the treatment defined by the 70th percentile cutoff of the store prices. The conception year is defined in the text. See Table A2 for the variable descriptions. The coefficients are multiplied by 100. Standard errors are clustered at the municipal level. *** p<0.01, ** p<0.05, * p<0.1.

Table B5: **Effects of the GR on birth outcomes - Single deliveries sample Continuous treatment**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL A: LOW WEIGHT (<2,500g)							
Crisis	0.077*	0.076*	0.070*	0.079*	0.073	0.072*	0.060
	(0.045)	(0.045)	(0.040)	(0.045)	(0.045)	(0.050)	
Log prices	-4.470	-4.480	-4.661	-4.506	-4.306	-4.684	-5.227
	(4.026)	(4.019)	(4.265)	(4.068)	(4.039)	(4.282)	(4.250)
Mean	8.433	8.433	8.433	8.433	8.433	8.433	8.433
PANEL B: VERY LOW WEIGHT (<1,500g)							
Crisis	0.089**	0.089**	0.083**	0.090**	0.090**	0.084**	0.071**
	(0.040)	(0.040)	(0.035)	(0.040)	(0.040)	(0.035)	(0.033)
Log prices	-4.586	-4.584	-4.770	-4.602	-4.579	-4.772	-4.973
	(4.186)	(4.181)	(4.436)	(4.208)	(4.201)	(4.436)	(4.474)
Mean	2.103	2.103	2.103	2.103	2.103	2.103	2.103
PANEL C: PRE-TERM							
Crisis	0.076*	0.075*	0.068*	0.079*	0.073*	0.070*	0.058
	(0.043)	(0.043)	(0.039)	(0.043)	(0.044)	(0.039)	(0.038)
Log prices	-5.091	-5.104	-5.336	-5.134	-4.951	-5.364	-5.358
	(3.747)	(3.740)	(3.971)	(3.787)	(3.760)	(3.988)	(4.047)
Mean	8.957	8.957	8.957	8.957	8.957	8.957	8.957
Observations	534,247	534,247	534,247	534,247	534,247	534,247	534,247
% mothers between 25-35		✓				✓	
% mothers above 35		✓				✓	
Average income			✓			✓	
Ethnicity FE					✓		
Population density				✓		✓	
Regional trends							✓

Notes: The results obtained estimating equation (1) through a linear probability model. The dependent variable in Panel A is *low weight*, the dependent variable in Panel B is *very low weight*, and the dependent variable in Panel C is *preterm*. The sample includes only immigrant single deliveries. Each specification controls for municipal fixed effects, conception year fixed effects, the percentage of the municipal population with a high school degree, and the percentage of the municipal population with a college degree. Models (1) - (6) also include macro-area trends. The period considered (2002-2013) refers to the conception year. The coefficients are multiplied by 100. *** p<0.01, ** p<0.05, * p<0.1.

Table B6: **Effects of the GR on birth outcomes - Single deliveries sample Aggregate Level**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL A: LOW WEIGHT (<2,500g)							
Crisis	0.658***	0.653***	0.640***	0.679***	0.629**	0.657***	0.621***
	(0.249)	(0.249)	(0.246)	(0.249)	(0.249)	(0.246)	(0.240)
Mean	7.647	7.647	7.647	7.647	7.647	7.647	7.647
PANEL B: VERY LOW WEIGHT (<1,500g)							
Crisis	0.556***	0.555***	0.539***	0.562***	0.557***	0.544***	0.489**
	(0.204)	(0.204)	(0.198)	(0.206)	(0.205)	(0.200)	(0.191)
Mean	1.885	1.885	1.885	1.885	1.885	1.885	1.885
PANEL C: PRE-TERM							
Crisis	0.604**	0.598**	0.578**	0.627**	0.578**	0.595**	0.550**
	(0.244)	(0.244)	(0.242)	(0.244)	(0.244)	(0.243)	(0.237)
Mean	8.146	8.146	8.146	8.146	8.146	8.146	8.146
Observations	335,895	335,895	335,895	335,895	335,895	335,895	335,895
% mothers between 25-35		✓				✓	
% mothers above 35		✓				✓	
Average income			✓			✓	
Ethnicity FE					✓		
Population density				✓		✓	
Regional trends							✓

Notes: The results obtained estimating equation (1) at the municipality level through a linear probability model. The dependent variable in Panel A is *low weight*, the dependent variable in Panel B is *very low weight*, the dependent variable in Panel C is *preterm*. The sample includes only immigrant single deliveries. Each specification controls for municipal fixed effects, conception year fixed effects, the percentage of the municipal population with a high school degree, and the percentage of the municipal population with a college degree. Models (1) - (6) also include macro-area trends. The period considered (2002-2013) refers to the conception year. The conception year is defined in the text. See Table A2 for the variable descriptions. The coefficients are multiplied by 100. Standard errors are clustered at the municipal level. *** p<0.01, ** p<0.05, * p<0.1.

Table B7: **Heterogeneous effects of the GR on birth outcomes - Single deliveries sample - Italians and immigrants**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL A: LOW WEIGHT (<2,500g)							
	Italian	**Italian**	**Italian**	**Italian**	**Italian**	**Italian**	**Italian**
Crisis	0.578***	0.581***	0.555***	0.583***	0.590***	0.563***	0.548***
	(0.116)	(0.116)	(0.117)	(0.116)	(0.116)	(0.118)	(0.113)
	Immigrant	**Immigrant**	**Immigrant**	**Immigrant**	**Immigrant**	**Immigrant**	**Immigrant**
Crisis	0.977***	0.980***	0.917***	0.974***	0.946***	0.919***	0.897***
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Difference	0.399**	0.399**	0.362*	0.391**	0.356*	0.356*	0.349*
	(0.192)	(0.192)	(0.192)	(0.192)	(0.192)	(0.192)	(0.192)
Mean	8.219	8.219	8.219	8.219	8.219	8.219	8.219
PANEL B: VERY LOW WEIGHT (<1,500g)							
	Italian	**Italian**	**Italian**	**Italian**	**Italian**	**Italian**	**Italian**
Crisis	0.420***	0.422***	0.403***	0.421***	0.428***	0.405***	0.408***
	(0.104)	(0.104)	(0.106)	(0.104)	(0.104)	(0.107)	(0.100)
	Immigrant	**Immigrant**	**Immigrant**	**Immigrant**	**Immigrant**	**Immigrant**	**Immigrant**
Crisis	0.628***	0.629***	0.582***	0.627***	0.558***	0.582***	0.615***
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Difference	0.208**	0.207**	0.179*	0.206**	0.129	0.178*	0.206**
	(0.096)	(0.096)	(0.096)	(0.096)	(0.097)	(0.096)	(0.096)
Mean	1.663	1.663	1.663	1.663	1.663	1.663	1.663
PANEL C: PRE-TERM							
	Italian	**Italian**	**Italian**	**Italian**	**Italian**	**Italian**	**Italian**
Crisis	0.472***	0.474***	0.444***	0.478***	0.484***	0.454***	0.434***
	(0.113)	(0.113)	(0.114)	(0.113)	(0.113)	(0.115)	(0.110)
	Immigrant	**Immigrant**	**Immigrant**	**Immigrant**	**Immigrant**	**Immigrant**	**Immigrant**
Crisis	0.841***	0.843***	0.770***	0.836***	0.723***	0.771***	0.791***
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Difference	0.370*	0.370*	0.326*	0.358*	0.238	0.317*	0.357*
	(0.193)	(0.193)	(0.193)	(0.193)	(0.194)	(0.193)	(0.193)
Mean	8.540	8.540	8.540	8.540	8.540	8.540	8.540
Observations	3,576,810	3,576,810	3,576,810	3,576,810	3,576,810	3,576,810	3,576,810
% mothers between 25-35		✓				✓	
% mothers above 35		✓				✓	
Average income			✓			✓	
Ethnicity FE					✓		
Population density				✓		✓	
Regional trends							✓

Notes: The results obtained estimating equation (2) through a linear probability model. The dependent variable in Panel A is *low weight*, the dependent variable in Panel B is *very low weight*, and the dependent variable in Panel C is *preterm*. Each specification controls for municipal fixed effects, conception year fixed effects, macro-area trends, the percentage of the municipal population with a high school degree, the percentage of the municipal population with a college degree, the additional interaction of *crisis* with *immigrant* and the share of immigrant babies. The period considered (2002-2013) refers to the conception year. The conception year is defined in the text. See Table A2 for the variable descriptions. *Difference* refers to the coefficient on the interaction term between *crisis* and *immigrant*, δ. *Italian* in Columns (1) - (6), refer to the coefficients on *crisis*, ω. *Immigrant* in Columns (1) - (6), refer to the sum of the coefficients on *crisis* and the interaction term between *crisis* and *immigrant*, $\omega + \delta$. Standard errors are clustered at the municipal-year-month level. The coefficients are multiplied by 100. *** p<0.01, ** p<0.05, * p<0.1.

Table B8: **Effects of the GR on birth outcomes - Full sample of Italian newborns**

	(1)	(2)	(3)	(4)	(5)	(6)
PANEL A: LOW WEIGHT (<2,500g)						
Crisis	0.428***	0.416***	0.409***	0.433***	0.402***	0.407***
	(0.137)	(0.138)	(0.130)	(0.137)	(0.129)	(0.140)
Mean	8.289	8.289	8.289	8.289	8.289	8.289
PANEL B: VERY LOW WEIGHT (<1,500g)						
Crisis	0.335***	0.333***	0.320***	0.336***	0.319***	0.336***
	(0.125)	(0.126)	(0.113)	(0.126)	(0.114)	(0.131)
Mean	1.593	1.593	1.593	1.593	1.593	1.593
PANEL C: PRE-TERM						
Crisis	0.312**	0.298**	0.289**	0.320**	0.285**	0.285**
	(0.132)	(0.132)	(0.123)	(0.131)	(0.123)	(0.133)
Mean	8.570	8.570	8.570	8.570	8.570	8.570
Observations	3,046,432	3,046,432	3,046,432	3,046,432	3,046,432	3,046,432
% mothers between 25-35		✓			✓	
% mothers above 35		✓			✓	
Average income			✓		✓	
Population density				✓	✓	
Regional trends						✓

Notes: The results obtained estimating equation (1) through a linear probability model. The dependent variable in Panel A is *low weight*, and the dependent variable in Panel B is *very low weight*, and the dependent variable in Panel C is *preterm*. The sample includes all Italian deliveries. Each specification controls for municipal fixed effects, conception year fixed effects, the percentage of the municipal population with a high school degree, and the percentage of the municipal population with a college degree. Models (1) - (6) also include macro-area trends. The period considered (2002-2013) refers to the conception year. The conception year is defined in the text. See Table A2 for the variable descriptions. The coefficients are multiplied by 100. Standard errors are clustered at the municipal level. *** p<0.01, ** p<0.05, * p<0.1.

Table B9: **Effects of the GR on birth outcomes: Overall population Single deliveries sample**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL A: LOW WEIGHT (<2,500g)							
Crisis	0.463***	0.466***	0.440***	0.470***	0.442***	0.449***	0.436***
	(0.151)	(0.151)	(0.140)	(0.150)	(0.151)	(0.139)	(0.150)
Mean	8.219	8.219	8.219	8.219	8.219	8.219	8.219
PANEL B: VERY LOW WEIGHT (<1,500g)							
Crisis	0.380***	0.382***	0.363***	0.381***	0.373***	0.365***	0.368**
	(0.143)	(0.143)	(0.128)	(0.143)	(0.143)	(0.128)	(0.144)
Mean	1.663	1.663	1.663	1.663	1.663	1.663	1.663
PANEL C: PRE-TERM							
Crisis	0.364**	0.366**	0.337**	0.374***	0.343**	0.349***	0.329**
	(0.143)	(0.143)	(0.131)	(0.142)	(0.143)	(0.131)	(0.142)
Mean	8.54	8.54	8.54	8.54	8.54	8.54	8.54
Observations	3,576,810	3,576,810	3,576,810	3,576,810	3,576,810	3,576,810	3,576,810
% mothers between 25-35		✓				✓	
% mothers above 35		✓				✓	
Average income			✓			✓	
Ethnicity FE					✓		
Population density				✓		✓	
Regional trends							✓

Notes: The results obtained estimating equation (1) through a linear probability model. The dependent variable in Panel A is *low weight*, the dependent variable in Panel B is *very low weight*, and the dependent variable in Panel C is *preterm*. The sample includes only Italian and immigrant single deliveries. Each specification controls for municipal fixed effects, conception year fixed effects, the percentage of the municipal population with a high school degree, and the percentage of the municipal population with a college degree. Models (1) - (6) also include macro-area trends. The period considered (2002-2013) refers to the conception year. *Crisis* refers to the treatment indicator defined by the commercial real estate prices. The conception year is defined in the text. See Table A2 for the variable descriptions. The coefficients are multiplied by 100. Standard errors are clustered at the municipal level. *** p<0.01, ** p<0.05, * p<0.1.

Table B10: **Additional heterogeneous effects of the GR on birth outcomes Single deliveries sample**

	(1)	(2)	(3)	(4)
	Distance to the Nearest Hospital	Population	Population Density	Distance to the Nearest Highly Populated Municipality
PANEL A: LOW WEIGHT (<2,500g)				
	Far	**Low**	**Low**	**Far**
Crisis	0.423	0.987*	0.924*	0.484
	(0.315)	(0.524)	(0.523)	(0.318)
	Near	**High**	**High**	**Near**
Crisis	1.092**	0.523*	0.574*	1.045**
p-value	0.040	0.098	0.072	0.049
Difference	0.669	-0.464	-0.349	0.561
	(0.411)	(0.390)	(0.398)	(0.397)
PANEL B: VERY LOW WEIGHT (<1,500g)				
	Far	**Low**	**Low**	**Far**
Crisis	0.555**	0.924*	0.860*	0.602**
	(0.233)	(0.505)	(0.503)	(0.238)
	Near	**High**	**High**	**Near**
Crisis	0.993*	0.621***	0.674***	0.954*
p-value	0.054	0.009	0.005	0.062
Difference	0.438	-0.303	-0.185	0.352
	(0.384)	(0.356)	(0.363)	(0.362)
PANEL C: PRE-TERM				
	Far	**Low**	**Low**	**Far**
Crisis	0.447	0.891*	0.771	0.574*
	(0.309)	(0.492)	(0.486)	(0.308)
	Near	**High**	**High**	**Near**
Crisis	1.075**	0.613**	0.715**	0.945*
p-value	0.031	0.046	0.021	0.057
Difference	0.627	-0.278	-0.056	0.371
	(0.386)	(0.368)	(0.367)	(0.373)

Notes: The results obtained estimating equation (2) through a linear probability model. The dependent variable in Panel A is *low weight*, the dependent variable in Panel B is *very low weight*, and the dependent variable in Panel C is *preterm*. Each specification controls for municipal fixed effects, conception year fixed effects, macro-area trends, the percentage of the municipal population with a high school degree, and the percentage of the municipal population with a college degree. The period considered (2002-2013) refers to the conception year. The conception year is defined in the text. See Table A2 for the variable descriptions. *Difference* refers to the coefficient on the interaction term between *crisis* and the driver in consideration, δ. *Far* in Columns (1) and (4), *low* in Columns (2) - (3), refer to the coefficients on *crisis*, ω. *Near* in Columns (1) and (4), *high* in Columns (2) - (3), refer to the sum of the coefficients on *crisis* and the interaction term between *crisis* and the driver in consideration, $\omega + \delta$. Standard errors are clustered at the municipal level. The coefficients are multiplied by 100. *** p<0.01, ** p<0.05, * p<0.1.