The Healthy Immigrant Effect:
Evidence from the Ecuadorian Exodus

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Abstract

This paper provides new empirical evidence on the factors behind the healthy immigrant effect by analyzing a very interesting episode in international migration, namely the exodus of Ecuadorians in the aftermath of the economic collapse in the late 1990s. Between 1999 and 2005, more than 600,000 Ecuadorians left the country and most of them headed towards Spain. Using administrative data from the Vital Statistics, I can compare the health distribution (in terms of birth weight) of immigrant children born in Spain to that of non-immigrants in the source country, and not only to that of natives at destination. I find evidence of an important health advantage for immigrants, that seems to be partly driven by positive selection in health.

Key words: Immigration, selection, health and birth weight.
JEL codes: J61, I14, C14

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1.- Introduction

Questions about the characteristics of those who migrate remain fundamental in immigration research. To evaluate the costs and benefits of population movements, immigrants are compared to non-immigrant in the source country and the native population at destination in different dimensions (e.g. education, age, risk and entrepreneurial attitudes or health).

The health of immigrants is an issue of concern. Some critical voices argue that migration may represent a burden to the public health system at destination financed mainly by natives. The health of immigrants may also be a relevant factor for their integration and assimilation process. For the sending country, the characteristics of those who leave may also have implications at the aggregate level in terms, for instance, of health and inequality.

A well established regularity is that new immigrants to developed countries such as the US, Canada, and Australia enjoy significant health advantages relative to comparable native-born individuals in these countries.[1] This positive gap has come to be known as the "healthy immigrant effect" (HIE). The HIE is present among most immigrant groups, even though a large majority come from developing countries with worse life expectancy indicators. There is also evidence that the gap does not respond to socio-economic differences in terms of education and income as most recent immigrants fall behind the native population on these dimensions.

This paper provides new empirical evidence on the factors behind the HIE by analyzing a very interesting episode in international migration: the Ecuadorian exodus in the aftermath of the economic collapse of the late 1990s. Between 1999 and 2005, more than 600,000 Ecuadorians left the country and most of them headed towards Spain rather than the US, a traditional destination for Ecuadorian migration (Bertoli et al. 2011). Taking advantage of some interesting features of this migration episode, I find a health advantage in terms of birth weights and other birth outcomes (i.e. gestational age, pre-term birth and incidence of low birth) among the children of new Ecuadorian immigrants in Spain. The comparison with the children of non-immigrants in Ecuador

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[1] For the US see Jasso et al. 2004, Abraido-Lanza et al. 1999, Antecol and Bedard 2006, and Giuntella 2012. Chen et al. 1996, Perez 2002, Deri 2003, McDonald 2003, and Laroche 2000 document a healthy immigrant effect for immigrants to Canada, while Donovan et al. 1992, Chiswick et al 2008, and Powles 1990 do so for immigrants to Australia.

and with those of other recent minorities in Spain (i.e. Romanians) suggests that positive selection in health is largely responsible for the HIE.

Health economists argue that birth weights are strongly correlated with a mother's habits during pregnancy and her health, and that it also represents an important marker of the infant's health at birth and as an adult (Currier and Moretti 2007, Currier 2007 and Conley and Bennet 2000). Accordingly, I employ administrative data on birth outcomes (i.e. Vital Statistics for Spain and Ecuador) to investigate health differences between immigrants and natives in both countries.

The paper is structured as follows: the next section provides a brief overview of the literature on the healthy immigrant effect, section 3 highlights the main features of the recent process of Ecuadorian migration, section 4 describes the data, section 5 presents the main results, section 6 investigates the fertility behavior of different groups and the implications for the results. Some concluding remarks are presented in Section 7.

2.- Previous findings

Researchers from a wide array of disciplines have studied health differences between immigrants and native-born individuals, mainly in the US, Canada and Australia. Three main explanations have been proposed to account for the positive health advantage of recent immigrants: health screening by the host country authorities, favorable habits and behaviors of individuals in the home country prior to migration, and immigrant self-selection where the healthiest and wealthiest are most likely to have the financial and physical means to migrate.

Some recent literature suggests that host country health screening policies are not likely to be the principal determinant of the health gap. For example, Laroche (2000) reports that the percentage of applicants to Canada that are rejected on health grounds is very low. Uitenbroek and Verhoeff (2002) argue that selection by authorities based on health can not explain the lower mortality of Mediterranean immigrants in Amsterdam.

The second explanation is that healthy diets, habits and behaviors in the home country lead to potential immigrants who are relatively healthier than the average person in the recipient country. The hypothesis based on cultural differences is put forward in Abraido-Lanza et al. (1999) who argue that the lower mortality of Latinos in

the US results from their more favorable health habit behaviors (i.e. less alcohol and cigarette consumptions which are the major risk factors for cancer and heart diseases, the most common causes of death for both Latinos and non-Latino Whites).

Thirdly, it is the notion of immigrant self-selection. There are reasons (and evidence) to suspect that immigrants tend to be different from those who do not migrate. The literature on selection based on labor market outcomes (wages) and education tend to find evidence of positive selection (Chiquiar and Hanson 2005; McKenzie and Rapoport 2007, 2010; Orrenius and Zavodny 2005; Chiswick 1978, 1999, 2007; Belot and Hatton 2008; Grogger and Hanson 2008), though some evidence of negative selection has also been reported for Mexico (Borjas 1987; Fernández-huertas Moraga 2011).

Given the strong correlation between income and health, if positive selection dominates migration movements, we should also observe healthy immigrants. Indeed if immigrants are selected from the high end of the income distribution in their home countries, they are likely to have access to better diets, better access to clean water and sanitation, less exposure to environmental risks and better child/maternal health care. Even in the absence of selective migration in terms of skills, positive selection in health is also expected if immigrants are forward looking (i.e. make current behavioral choices that emphasize future health at the expenses of current time/effort) or if sick individuals are more reluctant to leave the origin to make his or her way in an unfamiliar labor market.[2]

A major drawback in previous studies is that most of the conclusions regarding the nature of the healthy immigrant effect are based on comparisons between immigrants (generally legal) and natives in the host country. Such a comparison does not allow disentangling the contribution of selection from that of healthy habits or any direct effect of migration on health. There are however a couple of recent exceptions that shed light on the contribution of selective migration by examining the health of immigrants and non-immigrants prior to migration. The study by Rubalcava et al. (2008) employs longitudinal data from the Mexican Family Life Survey to compare emigrants from Mexico to the US to similar non-emigrants. The results suggests some evidence of positive selection in terms of physical health outcomes. In contrast,

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[2] Evidence of positive self-selection on health has been documented in Jasso et al. (2004), Palloni and Morenoff (2001) and Antecol and Bedard (2006).

Stillman et al (2009) using data from Tongan potential immigrants and non-immigrants find that individuals with poor mental health are more likely to apply to migrate.

Data to compare potential immigrants and non-immigrants previous to migration are rather scarce since most migrants originate from developing countries without tradition on data collection. In this paper, I employ the Vital Statistics in Ecuador and Spain to compare the birth outcomes of immigrant children in Spain to that of non-immigrants in Ecuador and natives in Spain. Due to confidentiality issues, the same individual cannot be identified in the Vital Statistics of the two countries, and therefore immigrants and non-immigrants cannot be compared before the movement occurs. This represents a limitation to the study since the contribution of selection can not be disentangled from any direct effect of migration on health outcomes. However, the migration episode between Ecuador and Spain has some features that make it an interesting case study to gain further understanding on the nature of the HIE.

First, the Vital Statistics in Spain since 2001 contain information on immigrants irrespectively of the legal status (illegal immigrants are also represented). Second, since the bulk of Ecuadorian immigrants moved to Spain between 1999 and 2003, the sorting of immigrants across different countries are not likely to distort my results. Third, immigration to Spain is a recent phenomenon, and most of the foreign-born in the early 2000s were likely to be recent immigrants. Hence, the effect of acculturation or assimilation on the health gap observed in the early 2000s (if any) is likely to be small. Fourth, at the beginning of the 2000s immigrants from different origins arrived to Spain attacked by the growing economy and the many job opportunities, in particular in the construction sector. The similarity among some of these immigrant groups allows me to test the hypothesis that selection is inversely proportional to distance and thus shed some light on its contribution to the healthy immigrant effect.

3.- Some features of the Ecuadorian Exodus

As a result of the economic and financial crisis Ecuador collapsed in 1999. This represented an important push factor for abut 600,000 individuals who over a period of a few years (1999-2005) left from a country with a population of 12.7 millions. A unique feature of this migration episode is that the US and Spain received about 80 to 90% of all Ecuadorians. Moreover, the number of Ecuadorians that migrated to Spain was roughly 3 times larger than the corresponding flow to the US. Bertoli et al (2011,

2013) argue that the lower cost of migrating explains the huge exodus towards the low income country.

The migration policy in Spain was particularly attractive for Ecuadorians. Since 1963 a visa waiver program allow them to visit Spain for a period of up to 3 months. Those who wished to migrate could simply overstayed the three-months period, became undocumented workers, and wait for one of the frequent amnesties in the early 2000s to legalize their status.[3] The lax Spanish immigration policy substantially influence the location choices of immigrants. According to the calculations in Bertoli et al (2011) the Ecuadorian population in Spain increased from 76,000 individuals before the crisis to 457,000 in 2005, and represented 12 percent of immigration flows to Spain between 1999 and 2005.[4]

Table 1 display the stock of immigrants in Spain during the 2000s recorded in the Local Population Registry. Since 2001, the data should provide an accurate measure of the number of immigrants, both legal and illegal. The reason is that by 2000 a new migration law (Ley Organica 4/2000) increased the incentives for illegal migrants to register, by allowing them to document their residence in Spain in the occurrence of an amnesty and by granting access to the public health and education system.[5]

The visa waiver program between Ecuador and Spain was terminated in August 2003. After this date, Ecuadorian migrants needed a visa to enter any EU member state. The inflows of Ecuadorians to Spain dropped sharply immediately after the requirement, and the United States became the main destination for Ecuadorians in 2004 and 2005 (Bertoli et al 2011). Table 1 also shows the stabilization in the stock of immigrants from Ecuador during the second half of the 2000s.

A salient feature of the Ecuadorian Exodus is that most of those who moved in the aftermath of the crisis headed towards Spain. Thus the analysis of the birth outcomes of immigrants in the early 2000s in Spain should be weakly affected by sorting across countries.[6]

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[3] There were three amnesties to illegal immigrants in Spain (2000, 2001 and 2005).

[4] The same authors estimate that the Ecuadorian population in the US increased from 272,000 individuals before the crisis to 394,000 in 2005, and represented 1.3 percent of immigration flows in the US during this period.

[5] The Spanish data protection policy prevents the police to access the Local Population Registry to identify illegal aliens.

[6] Bertoli et al (2011) investigate the selection and sorting of Ecuadorian immigrants in terms of productive skills (education and wages) during this period. They find that immigration to Spain is gender balanced and some evidence of negative selection in education (particularly among men).

4.- Data

This study employs birth outcomes, in particular weights, as a measure of an individual's health. Several studies have demonstrated that weight at birth is sensitive to many environmental factors, including maternal behaviors like smoking and drinking and nutritional practices (e.g. Currier et al 2009; Hoynes et al. 2011). Economists have also been active in showing that health at birth is predictive of future outcomes such as health, education and other labor market variables (e.g. Behrman and Rozenzweig 2004; Black et al. 2007).

Birth weight is the body weight of a baby measured at most one hour after birth. While it may suffer from measurement error, it is not affected by the biases inherent to self-reported health questions employed in other studies. A main problem with reported assessments of one's own health is that it depends on the reference group. If the group is not stated, comparisons across individuals become difficult (King et al. 2004). This is particular relevant for immigrants whose comparison group may change with the process of assimilation.

The use of the prevalence rate of diabetes, heart diseases, asthma or diseases of the lung are also subject to criticism. The reason is that the lower incidence of chronical diseases reported by the foreign-born may simply result from their less frequent contact with western medial diagnostics.

I employ the information in the Vital Statistics of Ecuador and Spain. The information corresponds to all births in the Local Population Registry. In both countries, registration is the administrative procedure to legalize a vital event.[7] Hence, the Vital Statistics give coverage to all legalized births occurred in both countries. As discussed, immigrants in Spain since 2001, independently of their legal status, have strong incentives to appear in the Local Population Register to have access to the public health and education system and to prove residence in Spain for future amnesties.

There are some differences regarding the information in the Vital Statistics. In the cross-country comparisons, I restrict the analysis to variables that are common in both surveys (e.g. date of birth, gender, place of birth, weight, and mother's age and nationality). Information of interest such as gestational weeks appear in the Ecuadorian data only after 2004, and maternal education is collected in Spain only after 2006.

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[7] In order to register a birth, the parents or the legal representative of the child has to present a document with statistical information on the birth outcome (Informe Estadístico del Nacido Vivo in Ecuador, figure 1A or Boletín Estadístico del Parto in Spain, figure 2A).

The analysis is restricted to the early years of 2000s, and in particular to 2001-2002. There are several reasons for this time constraint. First, the Vital Statistics do not contain information on years since arrival and it is therefore not possible to account for the effect of acculturation and assimilation on birth outcomes. The inflow of Ecuadorians to Spain started in 1999 and was substantially interrupted after August 2003, when the visa waiver program terminated. Hence, the majority of births to Ecuadorian mothers registered between 2001 and 2002 are likely to be to recent immigrants. The time restriction will then minimize the impact of assimilation for our results. Second, the Local Population Registry (and thus the Vital Statistics) contains accurate information on immigrants (both legal and illegal) only after the approval of the new immigration law in 2000. Finally, the Vital Statistics in Spain until 2006 only contain the nationality of the mother and not the country of birth. In the early 2000s there were 3 amnesties to legalize immigrants (2001, 2002 and 2005). Hence by the mid-2000s many Ecuadorians may have obtained the Spanish citizenship and thus could not be identified as immigrants.[8]

Table 2 shows the percentage of births occurred in Spain by some of the most popular nationalities. The effect of the large immigration inflow is clear from the table.[9] The number of total births increased from 406,380 in 2001 to 519,779 in 2008 (the first year of the Spanish economic recession) and the share of births to foreign mothers shifted from 8,24 to 20,81 percent. The incidence of the Ecuadorian Exodus is also present in the table. The number of birth to Ecuadorian mothers doubled between 2001 and 2003 (from 5,649 to 10,517) and by 2003 represented the 2,38 percent of total births. This percentage is similar to that of Moroccans (2,41 in 2003), a minority group with a large tradition in the country. Between 2001 and 2003, 10,5 percent of the births in Spain were to foreign mothers, and those to Ecuadorian and Moroccan mothers represented a 20 percent each. The table also shows the increase in the birth rate to Romanians, the largest minority group in the late 2000s.

Table 3 displays the mean weight in grams for the period 2000-2005 by nationality in Spain. For a 5% of the births the information on weight is not recorded, and these observations are excluded from the analysis. Following previous work on the determinants of birth weight, I focus on mothers aged 15-49, exclude multiple births and those newborns whose weight was either under 500 grams or above 9,000 grams.

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[8] After two years of legal residence in Spain, Ecuadorians become elegible for naturalization.
[9] The share of immigrants in Spain shifted from less than 3% in 1999 to about 16% in 2011.

The table indicates that newborns to foreign mothers are about 50 to 80 grams heavier than those born to natives (in 2001, 3,292 grams for immigrants and 3,237 for natives). By nationality, the heaviest babies are born to Moroccans (3,360 grams in 2001), followed by Ecuadorians (3,273 grams in 2001) and Romanians (3,219 grams in 2001). The previous ranking is not consistent with the aggregate statistics reported by the World Bank on the incidence of low birth weight (i.e. live births under 2,500) in the origin countries. Accordingly, Romania is the country with the lowest incidence of low birth weight (9 percent of the births in 2000), followed by Morocco (15.4 percent in 2004) and Ecuador (16 percent in 2000). The low weight birth rate in Spain was 6.5 percent in 2000 and increased to 7.7 in 2010.[10]

The second data source in the analysis is the Vital Statistics for Ecuador, from the Instituto Nacional de Estadística y Censos. The data covers all registered births occurred in the country. To register a birth, the parents or legal representative of the newborn has to present an administrative form ("Informe Estadístico del Nacido Vivo") that contains information on the birth outcome. When the birth occurs at a hospital the form is completed by a health professional, otherwise it is completed by an administrative officer at the registry. A key piece of information for the current study is the birth weight, which has to be measured at most one hour after occurrence. It is then very likely that when the birth does not occur in a hospital or is not assisted by a health professional the information is missing. In the early 2000s the rate of underreported birth weight is around 40%. However, this rate is unevenly distributed across different groups. According to Table 4, underreporting in 2001 is less than 30% among mothers with more than primary education and among births that happen in hospitals. The rate of underreporting in urban areas is also much lower than in rural areas (38 percent versus 73 percent). By 2002, the underreporting rate had decreased to 32% in urban areas, to 20% in hospitals and to 24% among mothers with more than primary education.

Due to the incidence of underreporting, the information on birth weights collected in the Vital Statistics is not likely to be representative of the whole Ecuadorian population: more educated and middle/high-income groups living in urban areas are likely to be overrepresented. While this is an obvious limitation, the validity of the study is reassured when looking at the characteristics of the migrants. Bertoli (2010) documents that the wave of Ecuadorian migration who moved in the aftermath of the

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[10] World Bank Health Nutrition and Population Statistics.

crisis came mostly from the urban areas, which were more severely hit by the crisis (suspension of the wage payment to public employees and slash in real wages due to devaluation). Its has also been argued that in the early stage of the migration process is the middle class of the wealth distribution who has the means and incentives to migrate (McKenzie and Rapoport 2007). Hence, the group of non-immigrants in Ecuador with valid information on birth weights in the early 2000s is likely to be closer to immigrants to Spain than the Ecuadorian population as a whole. This will limit the magnitude of the bias due to different composition of the comparison group.

Table 5 compares the mean birth weights of non-immigrants in Ecuador to that of immigrants in Spain in the early 2000s. The comparison indicates an important health advantage in favor of immigrants: babies born in Ecuador are about 170-150 grams lighter than babies born in Spain to Ecuadorian mothers. In the next section, I formally investigate the observed differences in birth outcomes.

5.- Results

I first examine whether the gap in birth weight between newborns to natives and Ecuadorian mothers living in Spain is statistically significant. In doing so I estimate the following model:

$$BW_i = \beta_0 + \beta_1 Immigrant_i + \beta_2 gender_i + \delta_{mother\ age} + \gamma_{month} + \lambda_{province} + u_i \quad (1)$$

where the birth weight of child i (BW_i) is regressed on an indicator for being born to an Ecuadorian mother ($Immigrant_i$), an indicator for the gender of the child ($gender_i$), a set of dummies for the age of the mother when the birth occurs (δ), an indicator for the month of birth (γ), and a set of dummies for the province of residence in Spain.[11] The estimates of the model in equation (1) are presented in Table 6. I have estimated the regressions separately for the years from 2000 to 2005. In interpreting the results one should bear in mind that immigrants in Spain had incentives to appear in the Local Population Registry (and thus the Vital Statistics) only after 2000, and that most Ecuadorians landed in Spain between 1999 and 2002. Hence the most accurate estimates for the healthy immigrant effect are those obtained from comparisons in 2001-2002.

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[11] Spain is divided into 52 administrative provinces. Previous work has documented that immigrants by nationality are highly segregated across provincies (see, for example, Farré et al. 2011).

The estimated difference in birth weight shows an advantage in favor of immigrants of 89.08 grams in 2001 and 84.97 in 2002, and it is statistically significant at any conventional level. Since the majority of Ecuadorians in the early 2000s were recent immigrants, these estimates are not likely to be affected by the process of assimilation or acculturation.

By 2005, the estimated difference in birth weight had increased to 116.02 grams. The interpretation of the evolution of the health gap requires caution. First, the Vital Statistics do not contain information on the years since arrival and thus after 2001-2002, after the massive arrival of Ecuadorians to Spain, it is not possible to disentangle the contribution of assimilation from that of the initial health advantage. Moreover, by 2005 a non negligible fraction of Ecuadorians had been naturalized and could not longer be identified in the data as immigrants.

Figure 1 plots the kernel estimates of the birth weight distribution of immigrants (solid line) and natives (dashed line) in 2001 and Figure 2 the difference between the two distributions. The figures suggest that the health advantage in terms of birth weight is not only concentrated in the mean of the distribution, but it also present in other parts of the distribution, in particular the upper tail.

Natives and immigrants may differ in many dimensions, some of them having a direct impact on birth outcomes. First, natives tend to be positively selected in terms of education and productive skills. The health economics literature has established a strong relationship between parental education and a child's health (Currier 2009). Hence, positive selection in education could lead to higher birth weight among immigrants. Unfortunately the Spanish Vital Statistic does not contain information on maternal education until 2007. For the years in our analysis we can only control for differences in productive skills by including in equation (1) the mother's labor market status and an indicator for employed in a high skilled occupations. Since these variables are not perfect proxies for educational achievement, the estimate of the health gap could still be biased. However, Bertoli et al (2011) notice some evidence of negative selection in term of the education of Ecuadorian immigrants to Spain. Thus, the omission of maternal education from equation (1) should, if any, produce a negative bias on the estimated health gap.

Second, differences in family size may also be relevant for health outcomes. The child quality investment model (Becker 1981 and Chiswick 1988) predicts that, at any given level of family resources, more children imply smaller levels of investment per

children and thus lower quality. Accordingly I extend the model in equation (1) by including the presence and number of previous children, and a variable that captures the effect of birth spacing. Section 5 will further investigates the implications of differences in fertility behavior for the estimated health gap.

Last but not least, it has been documented that parent's income affects child health (Currie and Moretti 2007). The Vital Statistics do not contain information on the economic situation of the mother or the family. To proxy for the level of economic resources at the time of birth I include as additional regressors in equation (1) an indicator for the marital status of the mother and another for being born at a hospital, in addition to the labor market indicators previously discussed.

The results of the extended model are presented in Table 7. For all the years, the birth weight advantage in favor of immigrants increases by about 10 grams and remains highly significant. The variables capturing the economic situation of the family (being born in a hospital, married, mother's work and mother working in a high skilled occupation) have all a positive effect on birth weight. The coefficients on the variables related to family size are also positive. There is also evidence of a negative effect from birth spacing.

There is evidence of a faster acculturation process among interethnic couples (Meng and Gregoy 2005 and Chiswick et al 1997). In an attempt to investigate the effect of acculturation on birth outcomes, I estimate the effect of intermarriage on birth outcomes. According to the estimates in Table 2A, intermarriage does not have any effect on birth weights. This is likely to be driven by the high degree of sorting in the data. In 2001, a 0.31 percent of the births were to interethnic couples and this percentage increased to only 0.71 percent in 2005.

Table 8 examines the presence of the health immigrant effect in alternative birth outcomes that are popular in the literature. The table shows the estimates for the model in equation (1) where the dependent variable has been replaced by a low birth weight indicator (column 1), the number of gestational weeks (column 2), an indicator of preterm birth (column 3), one for death in the first 24 hours after birth (column 4), and a gender indicator (column 5).[12] The estimates indicate a health advantage for immigrants in terms of the incidence of low birth weight (i.e. 2 percentage points lower probability), gestational age (i.e. 0.043 additional weeks of gestation) and the probability of preterm

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[12] There is evidence that poor maternal nutrition around the time of conception skews the sex ration in favor of girls (Mathews et al. 2008; Cameron 2004; Song 2013)

birth (i.e. 1 percentage point lower). No differences are observed for sex ratios and the probability of dying 24 hours after birth.

From the previous results we can conclude that, upon arrival to Spain, newborns to Ecuadorian mothers are heavier and healthier than those born to native women. As the economic literature has suggested, this may have implications on future economic outcomes, and maybe compensate part of the negative effect associated to the presence of discrimination (Bosch et al. 2010). The findings are also consistent with the extensive evidence on the health immigrant effect documented for Mexican immigrants in the US and other minority groups in Canada and Australia.

Next, I compare the weight of babies born to Ecuadorian immigrants in Spain to that of non-immigrants in Ecuador. Table 9 indicates that newborns to immigrants are between 168-148 grams heavier than those born to non-immigrants. Health indicators are in general better in Spain than in Ecuador (see Table 1A in the appendix), and this may partly reflect better health care systems or some other environmental factors (i.e. less pollution[13]). Table 10 removes from the previous estimate the effect of being born in Spain (common to both natives and immigrants). The net birth weight difference is reduced to 60-65 grams, and remains highly significant at any conventional level.

Figure 2 plots the birth weight distribution of immigrants in Spain (solid line) and non-immigrants in Ecuador (dashed line) in 2001. The distribution for migrants lies clearly to the right of that for non-immigrants, reassuring that the health advantage estimated for the mean of the distribution by OLS is present along all the domain of the distribution, in particular the middle/upper part.[14] This result is also evident from the plot of the difference between the native and immigrant distribution (see figure 2b).

Table 11 investigate the implications of differences in observable characteristics between immigrants and non-immigrants. Unfortunately the only variables that are common in the Vital Statistics of both countries are those related to fertility histories (i.e. the presence and number of previous children) and whether the child was born at a hospital. The impact of these controls in birth weight is small, as differences the birth weight gap is only reduced by 10 grams.

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[13] Currie and Walker (2011) show that trafic congestion (and thus polution) contributes significantly to poor health among infants.

[14] Table 3A replicates the results in Table 6 but replacing the birth weight dependent variable by a low birth indicator. While there is a statistically negative effect on the immigrants' low birth probability, its magnitude is very small (i.e. the likelihood of low birth is 0.3 percentage points lower among immigrants than natives). This reinforces the result that most of the action occurs in the midde/upper part of the distribution.

Two additional considerations should be taken into account when analyzing the results in Table 9 to 11. First, Ecuador was immerse in a major economic recession in the early 2000s, which may have had a negative effect of birth outcomes. Indeed, Bozzoli and Quintana (2013) documents the existence of procyclicality in birth weights for Argentina. Second, an important fraction of the observations in the Ecuadorian Vital Statistics do not report information on birth weights in the early 2000s. To investigate the implications of these concerns for the results, Table 4A compares the estimates of the birth weight gap obtained from different samples. Column (1) shows the estimate of the gap between immigrants and non-immigrants for the year 2001-2002. In column 2 the gap is estimated from comparing the birth weight of immigrants in 2001 and 2002 to those of non-immigrants in Ecuador in 2006 and 2007 when the crisis was over. Finally, column 3 compares immigrants in Spain in 2001-2002 with non-immigrants in Ecuador over the period 2000-2010. In all three specifications, the birth weight advantage in favor of immigrants remains statistically significant and of similar magnitude, suggesting that the previous concerns do not have implications for the results.

The birth weight advantage of immigrants relative to non-immigrants in Ecuador suggests that healthier practices or habits cannot be the only responsible for the healthy immigrant effect, and that additional factors intrinsic to immigrants should be behind the health advantage observed upon arrival at the host country.

Unfortunately, the data available for this study does not allow us to disentangle the contribution of immigrant selection to that of any direct effect from migration on birth weight. To the best of my knowledge, no paper has been able to identify the causal effect of migration on birth outcomes. The closest evidence is reported in the paper by Stillman et al. (2012) where using the Tongan migrant lottery investigate the effect of migration on child health. They find that migration increases height and reduces stunning of infants and toddler, but also increases BMI and obesity among 3 to 5 years old. The authors argue that changes in dietary habits (i.e. larger intakes of meat, fat and milk) rather than the income gains associated to migration explain the findings.

While those changes in dietary habits would most probably have a positive effect on birth weight, there may be countervailing effects from migration that are not identified in Stillman et al. (2012) as children in their sample are born before migration occurs. The migration episode may be stressful (i.e. social, cultural and economic changes involved) and newcomers may face some post-migration living difficulties that

may negatively affect birth outcomes. It has been recently documented that restricted maternal nutrition and stress associated to economic difficulties during critical windows of fetal development can negatively affect birth outcomes.[15]

To gain a better understanding of the factors behind the health gap I take advantage from the large and diverse inflow of immigrants to Spain in the 2000s. The share of foreign born population shifted from less than 4% in 2000 to 10% in 2005 and 14% in 2010 (see Table 1). Immigrants originated from a variety of countries in North Africa, South America and Eastern Europe. The three top sending countries in the 2000s were Morocco, Ecuador and Romania.

The costs of migration should increase with the geographic distance between the source and the host country. Accordingly, the simplest model of migration would predict that, given skill prices, countries located at a great distance from Spain should be sending more skilled and healthier immigrants. Using the origin diversity among immigrants in Spain I can test this prediction and shed more light on the role of selection in explaining the health advantage in favor of children born to Ecuadorians.

I will mainly focus on the comparison with immigrants from Romania. The difference in the geographic distance between Spain and the two source countries is enormous, however immigrants from Romania and Ecuador destinations are comparable in many other dimensions. First, there are low cultural and linguistic barriers for both groups (i.e. Spanish is the language of Ecuador, and Romanian is a Romance language very close to Spanish[16]). Second, while Moroccans were a well established minority group in Spain before 2000, the bulk of Ecuadorians and Romanians arrived between 2000 and 2002.[17] Third, these two groups moved to Spain for economic reasons. Ecuadorians moved escaping from the economic and financial collapse in 1999, while immigrants from Romania arrived looking for jobs, as a result of the high unemployment rates after the massive restructurings of state enterprises in the late 1990s (Stan 2009). Finally, the Spanish migration law was also relatively lax between Romania and Spain. After January 2002 a visa waiver program enabled

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[15] Almond and Mazumder (2011) have shown that prenatal exposure to Ramadan among Arab mothers results in lower birth weight and reduced gestation length. Bozzoli and Quintana (2013) that nutritional deprivation and maternal stress affected the birth outcomes of low-educated mothers during the Argentinean crisis.

[16] The lexical similarity of Romanian with Spanish has been estimated at 71%.

[17] Table 5A in the appendix indicates that among Moroccan immigrants living in Spain between 2000 and 2004 a 70% of them had arrived before 2001. In contrast, a 70% of Ecuadorian migrants arrived between 2000 and 2004. This percentage is 60% among Romanians.

Romanians to enter as a tourist and stay for 3 months. Many overstayed the legal period and became illegal aliens while waiting for an amnesty.

Table 6A compares the socio-economic outcomes of the most popular minority groups in Spain. There are clear differences between Moroccans and the other two minority group, particularly for females. Moroccan females are older, disproportionately low-educated, have more kids and work much less. Romanian and Ecuadorian females are closer in terms of those characteristics, though females in the former group are, on average, half a year younger, more educated (a 66% of Romanians have a high school diploma or higher education, as opposed to 46% of Ecuadorians) and have lower fertility rates (a 49 percent of the Rumanians have children, as opposed to 76 percent of the Ecuadorians and the average number of kids is 1.42 for Romanians and 1.79 for Ecuadorians). These observed differences in family composition may respond to the fact that many Romanian women, due to the geographical proximity between the two countries, moved mainly to work leaving their family behind and with a clear intention to return after a few years. Section 5 discusses the potential implications of different fertility behavior for our results.

Table 12 compares the three ethnic groups. The excluded category in all regressions are immigrants from Ecuador. Most of the birth outcomes indicate a clear health advantage with respect to immigrants from Romania: newborns to Ecuadorian mothers are 40 grams heavier, have a smaller probability of low-birth weight (2.5 percentage points lower), longer gestational age (0.1 weeks), a lower incidence of pre-term birth (1.8 percentage points) and a lower probability of death during the first 24 hours (0.2 percentage points).[18] These findings are consistent with the hypothesis that selection is inversely proportional to geographical distance.

The results for Moroccans indicate a health advantage with respect to Ecuadorians in terms of birth weight of 42 grams. Babies born to Moroccan mothers have also older gestational age and a lower probability of preterm birth. However, the probability of death during the first 24 hours after birth is higher. While, in general, these results indicate a health advantage in favor of immigrants from Morocco (a country that is only 14 km from the Spanish border), the evidence should not be interpret as evidence against selection based on distance, as this group has been in Spain

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[18] These results are obtained after controlling for differences in socioeconomic characteristics. A similar message is obtained when the models are estimated without including these additional controls.

for many years and its socioeconomic composition is different from that of other groups.

Overall, the previous results reveal a health advantage for children born to new Ecuadorian immigrants in Spain. Upon arrival, newborn babies are 99-84 grams heavier than those born to natives, and 64-48 grams heavier than those left behind. While I cannot precisely estimate the contribution of selection to these results, the comparison between similar newly arrived immigrants from different geographical origins suggests that Ecuadorian immigrants are positively selected in health.

6.- Differences in fertility

Differences in the fertility behavior of immigrants and natives may have implications for our results. Migration may affect the fertility pattern of families through several channels (Blau 1992). The *assimilation mechanisms* predicts that different tastes or preferences for the number of children formed in the origin country can explain initial differences in fertility between natives and immigrants. Over time, immigrants are likely to alter their reproductive behavior to conform to childbearing practices in the host country. In the case of high-fertility source countries, the fertility of immigrant women is expected to exceed that of their native-born counterparts initially but approach native fertility over time (see Kahn 1988 and Ben-Porath 1973).

Migration however may have disruptive effects on fertility. The postponement of fertility can arise for, at least, two reasons. First, the economic resources of the household can temporary decrease, and may fertility fall as a results of a negative income effect. Second, fertility may also decrease due to demographic factors such as delayed marriages or temporary separation of couples. If disruption occurs, the fertility of recent immigrants will be low, and will progressively increase to achieve the desired level (see Ford 1990 and Adserà and Ferrer 2013).

Finally, differences in fertility may also result from selection. Immigrant women may be a self-selected group whose fertility is low relative to others in the source country due to either tastes or to characteristics associated with labor market success. These women may also have a stronger preferences to invest in child quality and reduce quantity (Schultz 1984).

I first explore differences between natives and immigrants in the probability of having a children upon arrival to the country. Accordingly, I estimate the following fertility model:

$$infant_i = \beta_0 + \beta_1 Immigrant_i + \beta_2 ysm_i + \boldsymbol{\beta X}_i + \delta_{mother\ age} + \gamma_{year} + \lambda_{province} + u_i \quad (2)$$

where the dependent variable $infant_i$ is an indicator for the presence of an infant in the household. $Immigrant_i$ is the foreign-born indicator, ysm_i captures years since arrival in the country, $\boldsymbol{X}_i$ is a vector of mother's controls that include education, marital status, fertility history, and labor supply. The model also includes a set of dummies for the age of the mother ($\delta_{mother\ age}$), and province ($\lambda_{province}$) and year (γ_{year}) indicators.

The model is estimated using data from the Spanish Labor Force Survey (Encuesta de Población Activa, EPA) for the year 2001 to 2003 and Ecuador (Encuesta Nacional de empleo, desempleo y subempleo, EMENDU) for the year 2001.[19] Most of the analysis is conducted on a sample of recent immigrants (with less than 4 years of residence in the country).[20]

To further explore differences in the fertility behavior of immigrants I also estimate a model of total fertility where the dependent variable in equation (2) is replaced by the number of children younger than 17 living with the mother at the time of the interview.

Table 13 presents the first set of results, where the fertility behavior of Ecuadorian immigrants is compared to that of natives in Spain. The first column displays an estimate of the raw difference in the propensity of having an infant between 2001 and 2003. The estimate reveals a 4 percentage points higher probability for immigrants. This positive gap in fertility remains after controlling for years since migration (column 2) and socioeconomic characteristics (column 3).[21] In none of the previous specifications years since migration is statistically significant, suggesting that the fertility behavior of immigrants does not change, at least during the first 3 years of residence in the country.[22] In column (4) the time period is extended to include the year

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[19] Additional waves of the EMENDU will be included in the analysis when available.

[20] To investigate the robustness of the results, the model is also estimated in an extended period (2000-2004) and including also immigrants with larger experience in the country.

[21] The Labor Force Survey allows us to include in estimation as controls the education of the mother, her marital status, the presence of previous children and an indicator for whether the woman is employed.

[22] Adserà and Ferrer (2013) document important changes in the fertility behavior of immigrants during the first years of arrival to Canada.

2000 and 2004 and column (5) adds to the analysis immigrants with longer experience in the country. All the specifications indicate a statistically significant and positive effect of being an immigrant on the probability of having an infant, with a magnitude that oscillates between 3.3 and 4.2.

Column (6) and (7) explores differences in total fertility (i.e. number of children at the time of the interview). The columns also reveal a higher fertility among Ecuadorian immigrants in terms of total number of children. In addition, there is a positive effect on the total number of children related to the number of years in the country.

The higher fertility of Ecuadorian immigrants with respect to natives upon arrival is likely to respond to cultural differences. Ecuador is a high-fertility country (the average number of children per women was 5.1 in 1980, 3.7 in 1990, 3 in 2000 and 2.5 in 2010), while Spain presents a low fertility rate (2.2 in 1980, 1.3 in 1990, 1.2 in 2000 and 1.4 in 2010).[23] The high-fertility context in which Ecuadorian immigrants were reared may have shaped their preferences for large families. Moreover the positive effect of years since migration on the total number of children indicates that upon arrival the fertility of Ecuadorian immigrants was below desired levels. This suggests some disruptive associated to the migration episode.

The "quality-quantity" trade off model of child investment, suggests that the stronger preferences for larger families observed among immigrants should produce, if any, a negative bias in the estimate of the health gap reported in the previous section. The existence of disruptive effects, if derived from economic difficulties, will reinforce the negative sign of the bias.

Given the high levels of fertility in Ecuador, the results in Table 13 could also be consistent with the presence of immigrant selection. That is, immigrants have a higher fertility rate than natives in Spain but still lower that those in Ecuador. Table 14 compares the fertility behavior of immigrants to that of non-immigrants in Ecuador. Column (1) to (3) presents the results for the probability of having an infant, while column (4) presents the estimates for total fertility. In all the specifications, the fertility of immigrants is lower than that of natives. Immigrants to Spain between 2001 and 2003 have a probability 7 to 8 percentage points lower of having an infant and the total number of children is also smaller (i.e. on average, immigrant women have 0.5 less

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[23] World Bank indicators.

children than non-immigrants). Moreover these differences do not change with years in the country. These results support the hypothesis that immigrants to Ecuador are selected on the basis of characteristics that lead to lower fertility and probably to higher child quality.

Finally, Table 15 explores differences in the fertility behavior of the most popular minority groups in Spain, also employed in the analysis of birth outcomes (Romanians and Moroccans). Note that there are sharp differences in the fertility rate of their country of origin. Morocco is a high-fertility country (i.e. 5.6 in 1980, 4.0 in 1990, 2.7 in 2000 and 2.3 in 2010) while Romania presents very low-fertility rates (2.4 in 1980, 1.8 in 1990, 1.3 in 2000 and 1.3 in 2010).

Table 15 estimates the differences in the probability of having an infant during the period 2001-2003 among recent immigrants (column 1) and also among immigrants with longer experience in the country (column 2). The excluded category are always immigrants from Ecuador. Both sets of results report a lower probability of having an infant upon arrival for Romanians and Moroccans. However, the negative effect disappears for Moroccans after a few years in the country, while it remains for Moroccans. Regarding total fertility (column (3) and (4)) the negative initial effect is only present among Romanians. In this case, the number of children increases with years in the country at a similar rate for all groups.

Overall the previous results suggest the presence of important disruptive effects on the fertility of Moroccan immigrants. This group originate from a high-fertility country. Their lower fertility upon arrival (in terms of the presence of infants) and the subsequent increase in the number of births indicate that fertility is lower than desired upon arrival but that it converges to the desired level afterwards.

The results for Romanians would also be consistent with disruption (i.e. initial fertility lower than desired and convergence over time). However, the low-fertility rate in the source country is also likely to affect their fertility behavior, and lead to smaller families. Indeed, the negative effect in the probability of having an infant does not vanish over time. Also the initial negative difference in the number of children with respect to Ecuadorian immigrants only vanishes after 13 years in the country. This pattern is more consistent with an assimilation mechanism of immigrants originating from low-fertility countries than with disruptive effects, as those should have been very

persistent.[24] Accordingly, the positive health advantage in favor of Ecuadorian immigrants with respect to immigrants from Romania documented in the previous section, will be, if any, underestimated as a result of the stronger preferences of Romanian for less children (more quality).

7.- Conclusions

(To be completed)

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[24] Note that while we cannot rule out the existence of disruptive effects in the fertility behavior of Romanian immigrants, these effects do not seem to be more severe than for Ecuadorians (i.e. the interaction of the years since migration and the Romanian immigrant indicator are never statistically significant).

References

Abraido-Lanza A, B. Dohrenwend, D. Ng-Mak and J. Tuner. 1999. The Latino mortality paradox: a test of the "salmon-bias" and healthy migrant hypothesis. American Journal of Public Health, 89, 1543-48

Adserà, A. and A. Ferrer. 2013. The Fertility of Recent Immigrants to Canada. IZA working paper 7289.

Almond, D. and b. Mazumder. 2013. Health capital and the prenatal environment: the effect of maternal fasting during pregnancy. American Economic Journal: Applied Economics, Vol 3 (4): 56-85

Antecol, H. and K. Bedard. 2006. Unhealthy Assimilation: do Immigrants Converge to American Weights? Demography, 43 (2), May 2006, 337-360

Anuario de Nacimientos. Ecuador. Several years. http://www.inec.gob.ec/estadisticas/?option=com_content&view=article&id=114&Item id=91

Becker, G. 1981 A Treatise on the Family. Cambridge, Mass: Harvard University Press.

Behrman, J. and M. R. Rosenzweig. 2004. Returns to Birthweight. Review of Economics and Statistics. 86(2): 586-601

Belot, M.V. and T.J. Hatton. 2008. Immigrant Selection in the OECD. Australian National University Centre for Economic Policy Research discussion paper 571.

Ben-Porath, Yoran. 1973. Economic Analysis of Fertility in Israel: Point and Counterpoint. Journal of Political Economy 81 (March/April): S202-S233

Bertoli, S. 2010. Sorting and Self-Selection of Ecuadorian Migrants. Annals of Economcis and Statistics, No 97/98, pp. 261-288

Bertoli, S., J. Fernández-Huertas and F. Ortega. 2011. Immigration Policies and The Ecuadorian Exodus. World Bank Economic Review 25(1), 57-76.

Bertoli, S., J. Fernández-Huertas and F. Ortega. 2013. Crossing the Border: Self-selection, Earnings, and Individual Migration Decisions. Journal of Development Economics 101, 75-91.

Black, S., P.J. Devereux, and K. Salvanes. 2007. From the Cradle to the Labor Market? The Effect of Birth Weight on Adult Outcomes. Quarterly Journal of Economics, 122:1, 409-439.

Blau, F.D. (1992) The Fertility of Immigrant Women: Evidence from High Fertility Source Countries. In Immigration and the Work Force: Economic Consequences for the United States and Source Areas, edited by G.J. Borjas and R.B. Freeman, 93-133. Chicago: UCP.

Borjas, G.J. (1987) Self-Selection and the Earnings of Immigrants. American Economic Review, 77(4), 531-551

Bosch, M., M.A. Carnero and L. Farre. 2010. Information and Discrimination in the Rental Housing Market: Evidence from a field experiment. Regional Science and Urban Economics, 40: 11-19

Bozzoli, C. and Q. Climent. 2013. The Weight of the Crisis: Evidence from Newborns in Argentina. Review of Economics and Statistics (forthcoming)

Cameron, E. Facultative adjustment of mammalian sex ratios in support fo the trivers-willard hypothesis: evidence for a mechanism. Proceedings of the Royal Society B: Biological Sciences, 271(1549):1723–1728, 2004.

Chiquiar, D. and G.H. Hanson. 2005. International Migration, Self-Selection, and the Distribution of Wages: Evidence form Mexico and the United Sates. Journal of Political Economy 113:2, 239-281

Chiswick, B.R. 1978. The Effect of Americanization on the Earnings of Foreign. Born Men. Journal of Political Economy. 86, 897-921

Chiswick, B. 1988. Differences in Education and Earnings across Racial and Ethnic Groups: Tastes, Discrimination and Investment in Child Quality. Quarterly Journal of Economics 103 (August): 571-97

Chiswick, B., Y.L. Lee and P.W. Miller. 1999. Immigrant Selection Systems and Immigrant Health. Contemporary Economic Policy. Vol 26(4): 555-578.

Chiswick, B. 2007. Are Immigrants Favorably Self-Selected? An Economic Analysis. in Caroline D. Brettell and James F. Hollifield (Eds.) Migration Theory: Taling Across the Disciplines, 2nd e.d

Chiswick, B.R., Y. Cohen and T. Zach. 1997. The labor market status of immigrants: effects of the unemployment rate at arrival and duration of residence. Industrial and Labor Relations Review, Vol. 50 (2): 289-303

Chiswick, B.R., Y.L. Lee and P.W. Miller. 2008. Immigrant Selection Systems and Immigrant Health. Contemporary Economic Policy, Vol 26, N 4, 555-578

Chen, Jiajian, E. Ng and R. Wilkins. 1996. The Health of Canada's Immigrants in 94-95. Health Reports 7(4):33-45

Currie, J. 2009. Healthy, wealthy, and wise: Is there a causal relationship between child health and human capital development. Journal of Economic Literature XLVII(1), 87-122.

Currie, J. and E. Moretti. 2007. Biology as destiny? short- and long-run determinants of intergenerational transmission of birth weight. Journal of Labor Economcis 25(2), 231-263.

Currie, Janet, Matthew Neidell, and Johannes F. Schmeider. 2009. "Air Pollution and Infant Health: Lessons from New Jersey." Journal of Health Economics, 28(3): 688-703.

Currie, Janet, and Reed Walker. 2011. "Traffic Congestion and Infant Health: Evidence from E-ZPass." *American Economic Journal: Applied Economics*, 3(1): 65-90

Conley, D. and N.G. Bennett. 2000. Is biology destiny? birth weight and life chances. American Sociological Review 65(3), 458-476.

Deri, Catherine. 2003. Understanding the Healthy Immigrant Effect in Canada. Unpublished Manuscript.

Donovan, J, E. d'Espaignet, C. Metron and M. van Ommeren. eds 1992. Immigrants in Australia: A Health Profile, Australian Institute of Health and Welfare Ethnic Health Series, No 1. Canberra: AGPS

Farré, L., González, L. and F. Ortega. 2011. Immigration, Family Responsibilities and the Labor Supply of Skilled Native Women. B.E. J. Economic Analysis & Policy (Contributions), Vol (11), 1-46

Fernández-Huertas Moragas, J. 2011. New Evidence on Emigrant Selection. The Review of Economic Studies, 93(1): 72-96

Ford, K. 1990. Duration of Residence in the United States and the Fertility of U.S. Immigrants. International Migration Review 24: 34-68.

Grogger, J. and G.H. Hanson. 2008. Income Maximization and the Selection and Sorting of International Migrants. NBER working paepr 13821

Gibson, J., D. McKenzie and S. Stillman. 2013. Natural Experiment Evidence on the Effect of Migration on Blood Pressure and Hypertension. Health Economics, 22(6), 655-672

Giuntella, O. 2012. Why Does the Health of Immigrants Deteriorate? Boston University Mimeo.

Jasso, G., D. Massey, M. Rosenzweigh and J. Smith. 2004- Immigrant Health - Selectivity and Acculturation. Chapter 7 in Anderson, Bulatao and Cohen (eds) Critical Perspectives on Racial and Ethnic Differences in Health in Late Life, Committee on Population, National Research Council, Washington DC: The National Academies Press.

Kahn, J. 1994. Immigrant and Native Fertility during the 1980s: Adaptation and Expectations for the Future. International Migration Review 28 (3): 501-19.

Hoynes, H., M. Page and A. Stevens. Can Targeted Transfers Improve Birth Outcomes? Evidence from the Introduction of the WIC Program. Journal of Public Economics, 95: 813-827.

King G, Murray CJL, Salomon JA, Tandon A. 2004. Enhancing the validity and cross-cultural comparability of measurement in survey research. American Political Science Review. 98:191–207.

Powles, J. 1990. The best of both worlds: attempting to explain the persisting low mortality of Greek migrants to Australia. in J. Caldwell, S. Findlay, P Caldwell and G Santwo. What we know about health transition: the cultural, social and behavioral determinants of Health. Canberra: Health Transition Center

Mathews, F. Paul J. Johnson, and Andrew Neil. You are what your mother eats: evidence for maternal preconception diet influencing foetal sex in humans. Proceedings of the Royal Society B, pages 1–8, April 2008.

McDonald, J. T. 2003. The Health of Immigrants to Canada. mimeo University of New Brunswick.

McDonald, J.T. and S. Kennedy. 2004. Insights into the healthy immigrant effect: health status and health service use of immigrants to Canada. Social Science and Medicine, 59, 1613-1627.

McKenzie, D.J. and H. Rapoport. 2007. Network Effects and the Dynamics of Migration and Inequality: Theory and Evidence from Mexico. Journal of Development Economics 84:1, 1-24

McKenzie, D.J. and H. Rapoport. 2010. Self-Selection Patterns in Mexico-U.S. Migration: The Role of Migration Networks. Review of Economics and Statistics, 92:4, 811-821

Meng, X. and R.G. Gregory. 2005. Intermarriage and the economic assimilation of immigrants. Journal of Labor Economics, Vol. 23 (1): 135-75

Orrenius, P.M. and M. Zavodny. 2005. Self-Selection among Undocumented Immigrants from Mexico. Journal of Development Economics 78, 215-240

Perez, C. 2002. Health Status and Health Behaviour Among Immigrants. Health Reports 13 (Suppl.): 1-12

Ramírez Gallegos, F. and J. Ramírez (2005). La Estampida Migratoria Ecuatoriana: Crisis, redes transnacionales y repertorios de acción migratoria. Abya-Yala, Quito.

Rubalcava, L., Teruel, G. Thomas, D., Goldman, N. 2008. The healthy migrant effect: New findings from the Mexican Family Life Survey. American Journal of Public Health 98, 78-84

Schultz, T. Paul. 1984. The Schooling and Health of Children of U.S. Immigrants and Natives. Research in Population Economics 5: 251-88.

Song, S. 2013. Does famine influence sex ratio at birth? Evidence from the 1959-1961 Great Leap Forward Famine in China. Proceedings of the Royal Society. DOI: 10.1098/rspb.2012.0320

Spain Vital Statistics. Several years. Spanish Statistical Institute. http://www.cdc.gov/nchs/data_access/Vitalstatsonline.htm#Downloadable

Stain, S. 2009. Romanian Migration to Spain and Its Impact on the Romanian Labour Market. UAB working paper.

Stillman, S. D. McKenzie and J. Gibson. 2009. Migration and mental health: Evidence from a natural experiment. Journal of Health Economics, 28, 677-687.

Uitenbroek, D. and A. Verhoeff. 2002. Life expectancy and mortality differences between migrant groups living in Amsterdam, the Netherlands. Social Science and Medicine, 54, 1379-1388.

US Vital Statistics. Several years. http://www.cdc.gov/nchs/data_access/Vitalstatsonline.htm#Downloadable

Tables

Table 1: Stock of immigrants in Spain (2000-2012)

Year	Total Population	Foreign born	Born in Ecuador	Born in Morocco	Born in Romania
2000	40,499,790	1,472,458	21,736*	236,517	7,543
2001	41,116,842	1,969,270	140,631	299,907	33,044
2002	41,837,894	2,594,052	259,779	370,720	68,561
2003	42,717,064	3,302,440	387,565	438,221	137,834
2004	43,197,684	3,693,806	470,090	474,523	206,395
2005	44,108,530	4,391,484	487,239	557,219	312,099
2006	44,708,964	4,837,622	456,641	605,961	397,270
2007	45,200,737	5,849,993	434,673	621,295	510,983
2008	46,157,822	6,044,528	458,437	683,102	706,164
2009	46,745,807	6,466,278	479,117	737,818	762,163
2010	47,021,031	6,604,181	484,623	760,238	784,834
2011	47,190,493	6,677,839	480,626	769,106	810,348
2012	47,265,321	6,759,780	471,640	779,481	833,764

Source: Local Municipality Registry. Spanish Statistical Office.
Notes:(*) The numbers for 2000 are likely to underestimate the stock of immigrants. Only after the approval of the new immigration law (Ley Organica 4/2000), immigrants (legal and illegal) had incentives to register to gain access to the public health and education system and to document their residence in Spain for future amnesties.

Table 2: Births by nationality occurred in Spain

	Total number of births	Share to mothers of differnt nationalities			
		Foreign	Ecuadorian	Moroccan	Romanian
2000	397,632	6.2	0,65	1,57	0,14
2001	406,380	8.24	1,39	1,81	0,25
2002	418,846	10.55	2,01	2,11	0,50
2003	441,881	12.23	2,38	2,41	1,11
2004	454,591	13.78	2,44	2,86	1,27
2005	466,371	15.07	2,13	3,13	1,48
2006	482,957	16.54	1,88	3,59	1,82
2007	492,527	18.98	1,89	4,09	2,35
2008	519,779	20.81	1,84	4,89	2,62
2009	494,997	20.72	1,65	5,26	2,41
2010	486,575	20.55	1,39	5,58	2,55
2011	471,999	19.51	1,13	5,24	2,46

Source: Vital Statistics. Spanish Statistical Office.

Table 3: Descriptive Statistics: Birth weight by nationality in Spain

	Native	Foreign	Ecuadorian	Moroccan	Romanian
2000	3,243.86 (484.32)	3,298.24 (524.00)	3,238.28 (521.68)	3,378.89 (520.04)	3,254.24 (516.47)
2001	3,236.50 (484.39)	3,292.50 (513.56)	3,273.47 (489.08)	3,360.48 (520.50)	3,219.54 (517.83)
2002	3,233.54 (486.85)	3,294.82 (517.33)	3,275.26 (497.51)	3,356.11 (522.58)	3,230.73 (564.14)
2003	3,232.32 (484.84)	3,298.35 (521.07)	3,282.09 (512.28)	3,353.89 (520.98)	3,231.90 (544.87)
2004	3,236.86 (484.10)	3,308.54 (521.99)	3,313.38 (508.73)	3,361.70 (532.63)	3,227.89 (538.54)
2005	3,233.93 (487.75)	3,317.62 (523.97)	3,317.80 (516.43)	3,369.33 (514.55)	3,248.96 (551.11)

Source: Vital Statistics. Spanish Statistical Office.
Note: Mean and standard deviation of birth weights to mothers 15 to 49, excluding multiple births and newborns whose weight was either under 500 grams or above 9,000 grams.

Table 4: Missing birth weight information in the Vital Statistics for Ecuador

	2001		2009	
	Number of observations	% with missing information on birth weight	Number of observations	% with missing information on birth weight
<u>Year recorded:</u>				
Same year	192,786	43.61%	215,906	15.49%
One year after	85,384	53.73%	82,431	22.98%
<u>Gender:</u>				
female	137,112	44.34%	145,739	17.35%
male	141,058	44.51%	152,499	17.76%
<u>Education:</u>				
No education	41,470	62.67%	6,940	42.69%
Primary	116,291	53.83%	113,745	27.78%
Higher	120,409	29.06%	151,808	8.92%
<u>Area:</u>				
Urban	229,043	37.97%	267,509	11.65%
Rural	40,432	73.48%	27,565	67.33%
Periphery	4,350	84.20%	2,668	81.77%
<u>Assisted by:</u>				
Health professional	253,848	40.10%	268,068	9.11%
Other	24.322	89.52%	21,654	91.57%
<u>Place born:</u>				
Public hospital or similar	116,112	27.90%	163,354	5.39%
Private hospital or similar	79.541	22.22%	90,800	4.50%
Other (house)	73.507	89.08%	44,183	89.38%

Source: Vital Statistics. Ecuadorian Statistical Office.

Table 5: Descriptive Statistics:
Birth weight (Immigrants in Spain and Non-Immigrants in Ecuador)

	Immigrants	Non-immigrants
2000	3,238.28 (521.68)	3,110.32 (542.41)
2001	3,273.47 (489.08)	3,098.76 (520.54)
2002	3,275.26 (497.51)	3,116.40 (515.25)
2003	3,282.09 (512.28)	3,117.55 (471.67)
2004	3,313.38 (508.73)	3,058.35 (403.26)
2005	3,317.80 (516.43)	3,070.07 (421.47)

Source: Vital Statistics. Ecuadorian Statistical Office and Spanish Statistical Office
Note: Information on birth weights for immigrants is taken from the Vital Statistics in Spain,
while that for non-immigrants comes from the Vital Statistics in Spain.

Table 6: Evidence of the Healthy Immigrant Effect

	Birth Weight 2000	Birth Weight 2001	Birth Weight 2002	Birth Weight 2003	Birth Weight 2004	Birth Weight 2005
Immigrant from Ecuador	54.636*** [9.957]	89.082*** [6.853]	84.973*** [5.714]	91.214*** [5.101]	111.631*** [4.966]	116.015*** [5.230]
sex	118.801*** [1.632]	118.787*** [1.624]	115.994*** [1.624]	116.476*** [1.586]	116.777*** [1.583]	116.357*** [1.581]
age dummies	YES	YES	YES	YES	YES	YES
monthly dummies	YES	YES	YES	YES	YES	YES
province dummies	YES	YES	YES	YES	YES	YES
Constant	3,029.093*** [27.846]	3,029.677*** [28.024]	3,009.225*** [28.769]	3,075.785*** [27.688]	3,064.146*** [29.321]	2,987.179*** [28.528]
R2	0.023	0.023	0.021	0.021	0.022	0.021
Nobs	345,168	348,050	352,719	367,320	372,482	374,515

Source: Vital Statistics. Spanish Statistical Office
Note: OLS estimates of the linear model in equation (1)

Table 7: Evidence of the Healthy Immigrant Effect (additional controls)

	Birth Weight 2000	Birth Weight 2001	Birth Weight 2002	Birth Weight 2003	Birth Weight 2004	Birth Weight 2005
Immigrant from Ecuador	67.802***	99.476***	95.181***	98.001***	119.030***	121.749***
	[9.950]	[6.869]	[5.748]	[5.141]	[5.019]	[5.275]
sex	118.845***	118.559***	115.868***	116.292***	116.380***	116.208***
	[1.625]	[1.618]	[1.618]	[1.581]	[1.578]	[1.576]
born at a hospital	48.886***	36.986***	43.886***	14.482	17.746	16.496
	[13.151]	[13.193]	[13.374]	[12.897]	[12.850]	[12.049]
presence of previous children	88.700***	95.410***	90.660***	88.334***	89.246***	93.808***
	[3.398]	[3.387]	[3.410]	[3.339]	[3.358]	[3.369]
number of previous children	8.612***	3.828**	6.297***	6.991***	4.345**	2.428
	[1.811]	[1.828]	[1.866]	[1.847]	[1.888]	[1.908]
married	59.039***	49.602***	47.667***	44.513***	39.179***	39.145***
	[2.394]	[2.311]	[2.246]	[2.137]	[2.083]	[2.037]
working	15.558***	13.390***	19.069***	17.496***	16.592***	15.575***
	[1.899]	[1.893]	[1.888]	[1.848]	[1.855]	[1.858]
working in a high skilled occupation	17.978***	20.492***	18.051***	20.318***	16.707***	17.619***
	[2.436]	[2.380]	[2.346]	[2.250]	[2.210]	[2.176]
years since the last birth	-4.359***	-4.242***	-5.009***	-4.553***	-4.572***	-4.431***
	[0.385]	[0.384]	[0.389]	[0.386]	[0.391]	[0.397]
Constant	2,982.149***	2,994.085***	2,968.485***	3,063.172***	3,047.309***	2,973.894***
	[30.600]	[30.832]	[31.556]	[30.457]	[31.876]	[30.832]
R-squared	0.032	0.031	0.029	0.029	0.028	0.028
Observations	344,958	347,808	352,444	367,017	372,162	374,203

Source: Vital Statistics. Spanish Statistical Office

Note: OLS estimates of the linear model in equation (1), included in estimation are also the gender of the child, the set of age dummies for the mother, and monthly and province dummies.

Table 8: Evidence of the Healthy Immigrant Effect (Other birth outcomes, 2001/02)

	Low birth Weight	Gestational age	Pre-term birth	Death before 24 hours	Male
Immigrant from Ecuador	-0.020***	0.043***	-0.011***	0	0.002
	[0.002]	[0.016]	[0.003]	[0.000]	[0.005]
sex	-0.011***	-0.061***	0.010***	0.000**	
	[0.001]	[0.004]	[0.001]	[0.000]	
born at a hospital	-0.014***	0.015	-0.031***	-0.003***	-0.007
	[0.004]	[0.037]	[0.007]	[0.001]	[0.010]
presence of previous children	-0.029***	-0.022**	-0.020***	-0.001***	0.004*
	[0.001]	[0.009]	[0.002]	[0.000]	[0.003]
number of previous children	0.004***	-0.055***	0.013***	0	0
	[0.001]	[0.005]	[0.001]	[0.000]	[0.001]
married	-0.017***	0.085***	-0.014***	-0.001***	0.002
	[0.001]	[0.006]	[0.001]	[0.000]	[0.002]
working	-0.007***	0.017***	-0.007***	-0.001***	0
	[0.001]	[0.005]	[0.001]	[0.000]	[0.001]
working in a high skilled occupation	-0.008***	-0.003	-0.008***	0	-0.003*
	[0.001]	[0.006]	[0.001]	[0.000]	[0.002]
years since the last birth	0.002***	0.004***	0.001***	0	0
	[0.000]	[0.001]	[0.000]	[0.000]	[0.000]
Constant	0.119***	38.739***	0.197***	0.002*	0.534***
	[0.010]	[0.084]	[0.016]	[0.001]	[0.023]
R-squared	0.005	0.009	0.007	0.001	0
Observations	700,252	635,053	635,053	635,242	700,252

Source: Vital Statistics. Spanish Statistical Office

Note: OLS estimates of the linear model in equation (1), included in estimation are also the gender of the child, the set of age dummies for the mother, monthly and province dummies dummies,

Table 9: Difference in birth weight of immigrants in Spain and non-immigrants in Ecuador

	Birth Weight 2000	Birth Weight 2001	Birth Weight 2002	Birth Weight 2003	Birth Weight 2004	Birth Weight 2005
Immigrant from Ecuador	123.498*** [11.148]	168.033*** [7.319]	148.361*** [5.984]	158.466*** [4.948]	246.640*** [4.187]	235.347*** [4.585]
sex	75.509*** [2.753]	75.108*** [2.643]	74.230*** [2.477]	74.435*** [2.345]	65.934*** [2.063]	71.618*** [2.075]
age dummies	YES	YES	YES	YES	YES	YES
monthly dummies	YES	YES	YES	YES	YES	YES
Constant	2,981.054*** [14.815]	3,001.450*** [14.206]	2,986.936*** [12.662]	3,010.979*** [11.837]	2,950.960*** [10.553]	2,964.072*** [10.620]
R-squared	0.009	0.014	0.016	0.02	0.034	0.03
Observations	153,957	153,088	170,637	161,451	157,037	167,270

Source: Vital Statistics. Spanish Statistical Office and Ecuador Statistical and Census Office
Note: The sample includes non-immigrants in Ecuador and Ecuadorian immigrants in Spain

Table 10: Difference in birth weight of immigrants in Spain and non-immigrants in Ecuador

	Birth Weight 2000	Birth Weight 2001	Birth Weight 2002	Birth Weight 2003	Birth Weight 2004	Birth Weight 2005
Being born in Spain	106.918***	108.381***	84.678***	83.277***	152.280***	133.909***
	[1.718]	[1.713]	[1.680]	[1.668]	[1.635]	[1.615]
Immigrant from Ecuador	17.260*	59.980***	64.226***	73.758***	93.027***	100.093***
	[10.279]	[6.920]	[5.724]	[4.966]	[4.664]	[4.965]
sex	105.524***	105.367***	102.466***	103.949***	101.450***	102.537***
	[1.418]	[1.398]	[1.373]	[1.327]	[1.283]	[1.278]
age dummies	YES	YES	YES	YES	YES	YES
monthly dummies	YES	YES	YES	YES	YES	YES
Constant	2,963.873***	2,976.830***	2,968.848***	2,993.354***	2,931.520***	2,942.007***
	[11.974]	[11.851]	[10.927]	[10.706]	[10.648]	[10.409]
R-squared	0.028	0.03	0.026	0.027	0.044	0.04
Observations	496,734	495,951	515,666	519,074	519,246	532,648

Source: Vital Statistics. Spanish Statistical Office and Ecuador Statistical and Census Office
Note: The sample includes non-immigrants in Ecuador, Ecuadorian immigrants in Spain, and natives in Spain

Table 11: Difference in birth weight of immigrants in Spain and non-immigrants in Ecuador (additional controls)

	Birth Weight 2000	Birth Weight 2001	Birth Weight 2002	Birth Weight 2003	Birth Weight 2004	Birth Weight 2005
Being born in Spain	144.579***	142.155***	115.350***	109.272***	144.868***	130.671***
	[1.886]	[1.881]	[1.850]	[1.829]	[1.631]	[1.620]
Immigrant from Ecuador	7.453	48.137***	50.653***	60.358***	65.218***	66.667***
	[10.246]	[6.908]	[5.723]	[4.970]	[4.258]	[4.550]
sex	105.585***	105.398***	102.325***	103.904***	87.324***	89.140***
	[1.413]	[1.393]	[1.369]	[1.325]	[1.168]	[1.168]
Being born at a hospital	-173.292***	-129.116***	-71.150***	-8.961*	-19.399***	-59.926***
	[5.137]	[5.194]	[4.932]	[5.383]	[5.127]	[4.928]
Presence of previous children	60.430***	63.633***	56.133***	55.051***	49.606***	51.312***
	[2.052]	[2.030]	[1.998]	[1.952]	[1.736]	[1.729]
Number of previous children	9.724***	7.050***	8.461***	7.741***	5.662***	7.254***
	[0.999]	[1.000]	[0.977]	[0.980]	[0.890]	[0.878]
age dummies	YES	YES	YES	YES	YES	YES
monthly dummies	YES	YES	YES	YES	YES	YES
Constant	3,119.661***	3,091.274***	3,029.577***	2,994.994***	2,954.170***	3,003.121***
	[12.877]	[12.800]	[11.855]	[11.853]	[10.879]	[10.624]
R-squared	0.035	0.036	0.031	0.031	0.041	0.038
Observations	496,734	495,951	515,666	519,074	519,246	532,648

Source: Vital Statistics. Spanish Statistical Office and Ecuador Statistical and Census Office

Note: The sample includes non-immigrants in Ecuador, Ecuadorian immigrants in Spain, and natives in Spain

Table 12: Comparing different immigrants groups in Spain (2001-2002)

	Birth Weight	Low birth Weight	Gestational age	Preterm birth	Death before 24 hours	Male
Immigrant from Romania	-40.007***	0.026***	-0.091**	0.018**	0.002***	0.005
	[11.390]	[0.005]	[0.043]	[0.008]	[0.001]	[0.011]
Immigrant from Morocco	42.056***	-0.002	0.246***	-0.014**	0.002**	0.007
	[8.247]	[0.004]	[0.031]	[0.006]	[0.001]	[0.008]
Male	106.508***	-0.006**	-0.033	0.011**	0.001	
	[5.962]	[0.003]	[0.023]	[0.004]	[0.000]	
Being born at a hospital	132.086***	-0.034**	0.417***	-0.055**	0.001	0.067*
	[36.695]	[0.016]	[0.149]	[0.027]	[0.003]	[0.036]
Presence of previous children	51.027***	-0.012**	-0.04	-0.01	0.001	0.011
	[11.179]	[0.005]	[0.043]	[0.008]	[0.001]	[0.011]
Number of previous children	25.159***	-0.002	0.021	0.002	0	-0.004
	[4.109]	[0.002]	[0.016]	[0.003]	[0.000]	[0.004]
Married	30.128***	-0.011***	0.141***	-0.027***	-0.002***	-0.008
	[7.234]	[0.003]	[0.027]	[0.005]	[0.001]	[0.007]
Working	-11.494	0.004	-0.107***	0.007	0	0
	[7.856]	[0.003]	[0.029]	[0.005]	[0.001]	[0.008]
Working in a high skilled occupation	8.048	-0.001	0.048	0.009	0	0.008
	[20.733]	[0.009]	[0.077]	[0.014]	[0.002]	[0.021]
Years since the last birth	-0.771	0.001	0.004	-0.001	0	0.001
	[1.413]	[0.001]	[0.005]	[0.001]	[0.000]	[0.001]
Constant	2,896.373***	0.125***	37.945***	0.260***	-0.003	0.385***
	[89.802]	[0.038]	[0.342]	[0.063]	[0.007]	[0.089]
Observations	28,774	28,774	25,501	25,501	25,513	28,774
R-squared	0.04	0.008	0.032	0.024	0.005	0.004

Source: Vital Statistics. Spanish Statistical Office
Note: ROM_img: immigrants from Ecuador; MOR_img: immigrants from Morocco. The excluded category are immigrants from Ecuador.

Table 13: The fertility of Ecuadorian immigrants and natives in Spain

	Infant	Infant	Infant	Infant	Infant	Total fertility	Total fertility
Immigrant from Ecuador	0.037***	0.033***	0.042***	0.041***	0.034***	0.150***	0.163***
	[0.008]	[0.013]	[0.013]	[0.009]	[0.007]	[0.040]	[0.023]
years since migration		0.002	0.005	-0.004	0	0.058***	0.042***
		[0.007]	[0.007]	[0.003]	[0.002]	[0.021]	[0.006]
primary education			-0.040***	-0.042***	-0.042***	-0.018***	-0.020***
			[0.001]	[0.001]	[0.001]	[0.004]	[0.003]
secondary education			-0.027***	-0.029***	-0.029***	-0.052***	-0.050***
			[0.001]	[0.001]	[0.001]	[0.005]	[0.004]
married			0.073***	0.075***	0.075***	0.453***	0.467***
			[0.001]	[0.001]	[0.001]	[0.004]	[0.003]
work			-0.035***	-0.034***	-0.034***	-0.172***	-0.172***
			[0.001]	[0.001]	[0.001]	[0.003]	[0.003]
previous children			-0.052***	-0.053***	-0.053***		
			[0.001]	[0.001]	[0.001]		
Constant	0.830***	0.830***	0.838***	0.610***	0.610***	0.469	0.359*
	[0.102]	[0.102]	[0.101]	[0.066]	[0.066]	[0.319]	[0.210]
Time period	2001-2003	2001-2003	2001-2003	2000-2004	2000-2004	2001-2003	2000-2004
Sample	Native and recent immigrants	Native and recent immigrants	Native and recent immigrants	Native and recent immigrants	Native and all immigrants	Native and recent immigrants	Native and all immigrants
R-squared	0.082	0.082	0.101	0.1	0.1	0.253	0.252
Observations	266,491	266,491	266,491	448,670	448,824	266,491	448,824

Source: Spanish Labor Force Survey
Note: Estimates from the linear probability model in equation (2). Infant is an indicator for the presence of an infant (1 year old or less) at the time of the interview.
Total fertility is the total number of children at the time of the interview.

Table 14: The fertility of Ecuadorian immigrants in Spain and non-immigrants in Ecuador

	Infant	Infant	Infant	Total fertility
Immigrant from Ecuador	-0.061***	-0.079***	-0.083***	-0.487***
	[0.013]	[0.020]	[0.021]	[0.062]
years since migration		0.012	0.016	0.007
		[0.011]	[0.011]	[0.033]
Primary education			0.051***	0.733***
			[0.011]	[0.033]
Secondary education			0.017	0.277***
			[0.012]	[0.035]
married			0.049***	0.224***
			[0.011]	[0.032]
work			-0.050***	0.002
			[0.008]	[0.024]
previous children			-0.058***	
			[0.010]	
Constant	0.286***	0.286***	0.221***	-0.547**
	[0.081]	[0.081]	[0.082]	[0.245]
Time period	2001-2003	2001-2003	2001-2003	2001-2003
Sample	Non-immigrants and recent immigrants	Non-immigrants and recent immigrants	Non-immigrants and recent immigrants	Non-immigrants and recent immigrants
R-squared	0.113	0.113	0.125	0.453
Observations	9,401	9,401	9,397	9,397

Source: Spanish and Ecuadorian Labor Force Survey
Note: Estimates from the linear probability model in equation (2). Infant is an indicator for the presence of an infant
(1 year old or less) at the time of the interview. Total fertility is the total number of children at the time of the interview.

Table 15: The fertility of Ecuadorian, Romanian and Moroccan immigrants

	Infant	Infant	Total fertility	Total fertility
Immigrant from Romania	-0.048**	-0.051**	-0.510***	-0.535***
	[0.024]	[0.022]	[0.071]	[0.065]
Immigrant from Morocco	-0.050**	-0.047***	-0.021	-0.071
	[0.020]	[0.018]	[0.060]	[0.054]
years since migration	-0.001	-0.004	0.083***	0.044***
	[0.008]	[0.005]	[0.023]	[0.016]
years since migration (immigrants from Romania)	0.018	0.012	-0.046	-0.003
	[0.012]	[0.009]	[0.037]	[0.026]
years since migration (immigrants from Morocco)	0.048***	0.022***	-0.005	-0.026
	[0.011]	[0.007]	[0.032]	[0.020]
primary	-0.068***	-0.062***	0.123**	0.210***
	[0.017]	[0.016]	[0.051]	[0.047]
secondary	-0.046***	-0.051***	0.065	0.125***
	[0.017]	[0.016]	[0.052]	[0.048]
married	0.006	-0.01	0.395***	0.402***
	[0.012]	[0.011]	[0.036]	[0.033]
work	-0.093***	-0.104***	-0.316***	-0.376***
	[0.011]	[0.010]	[0.032]	
children	0.086***	0.088***		
	[0.005]	[0.004]		
Constant	0.063	0.065	-0.047	-0.213
	[0.201]	[0.179]	[0.611]	[0.540]
Time period	2001-2003	2000-2004	2001-2003	2000-2004
Sample	Recent immigrants	All immigrants	Recent immigrants	All immigrants
R-squared	0.207	0.202	0.267	0.254
Observations	4,801	5,755	4,801	5,755

Source: Spanish Labor Force Survey
Note: Estimates from the linear probability model in equation (2). Infant is an indicator for the presence of an infant (1 year old or less) at the time of the interview. Children is the total number of children at the time of the interview.

Figure 1:
a) Birth weight distribution of immigrants and natives in Spain (2001)
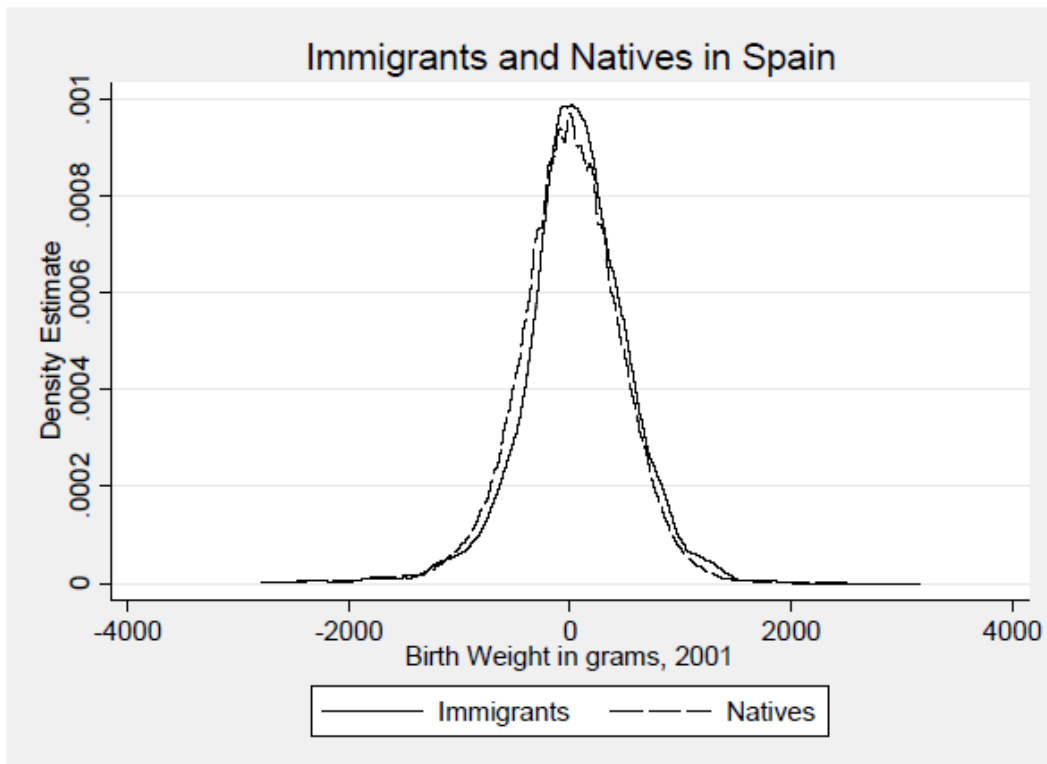
Note: The graph represents the kernel density estimate of the residuals from a regression of birth weight on a set of dummmeis for the age of the mother at birth, a set of month of birth indicator and a gender dummy. The value of the Kolmogovrov-Smirnov test for the equality of the two distributions is 0.1735.

b) Difference in the birth weight distribution between immigrants and natives in Spain (2001)
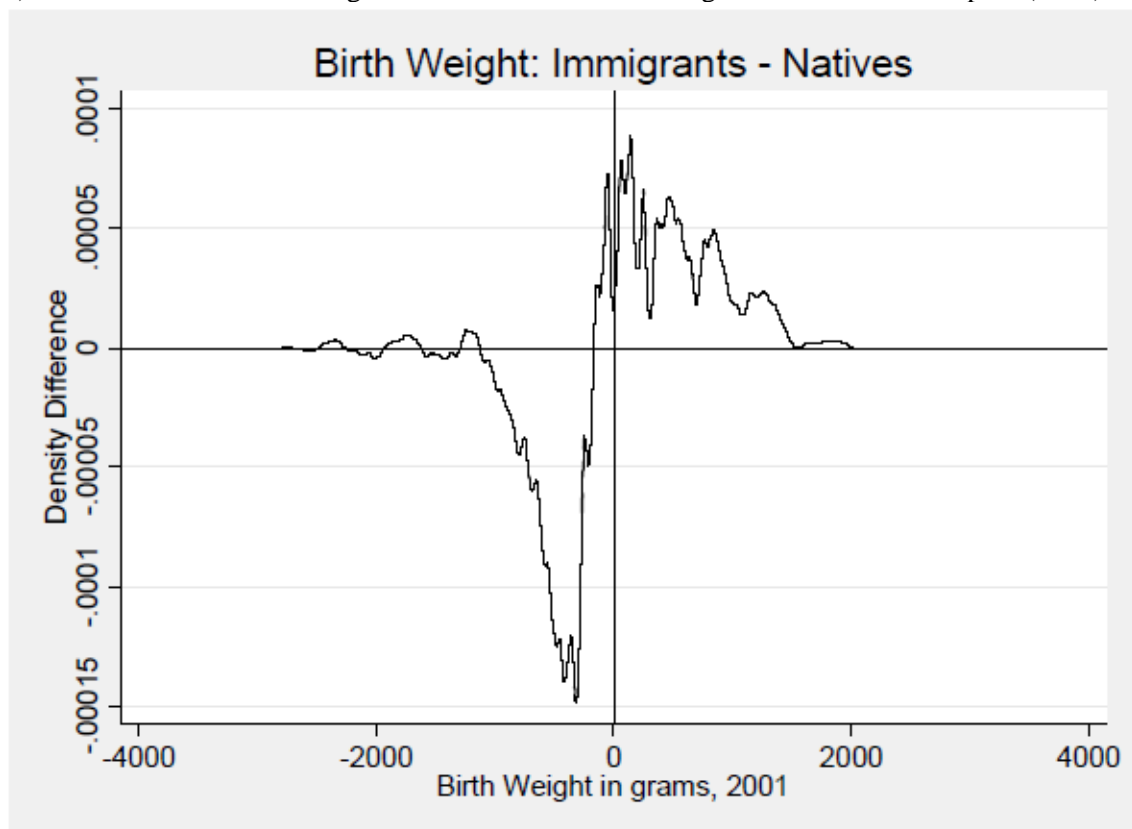
Figure 2:
a) Birth weight distribution of immigrants in Spain and non-immigrants in Ecuador (2001)
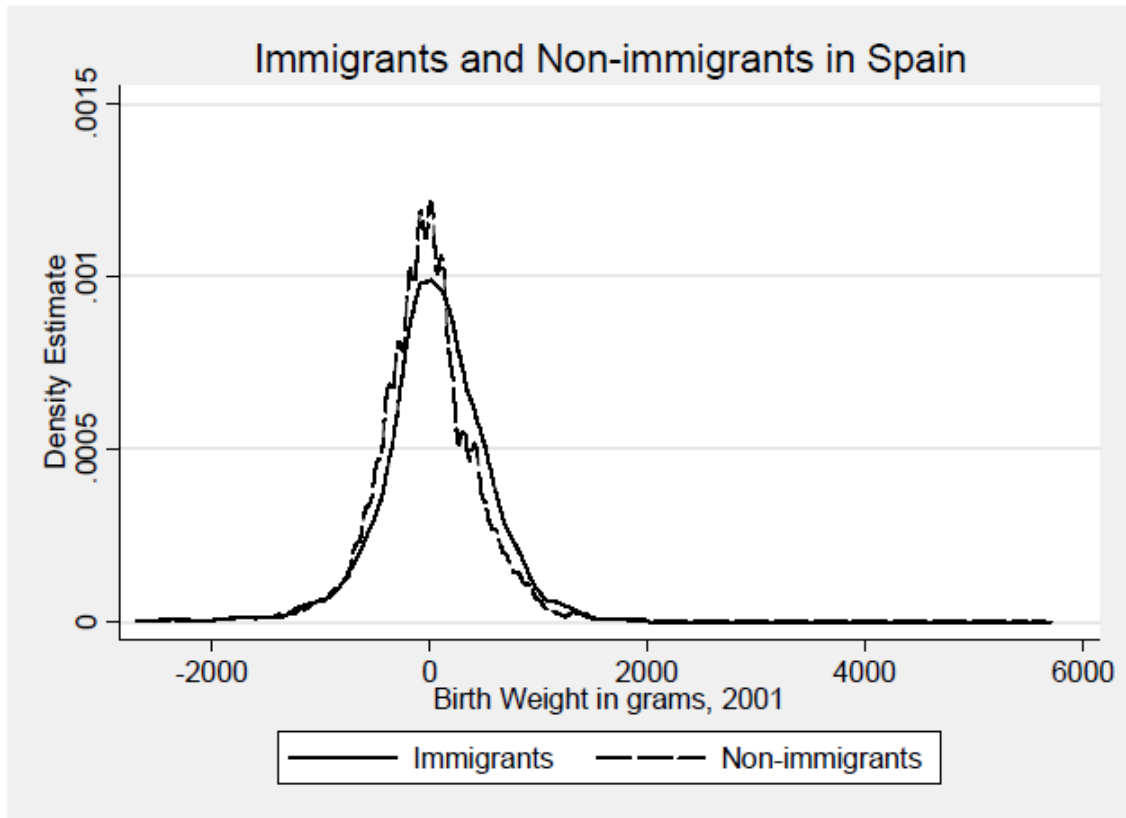
Note: The graph represents the kernel density estimate of the residuals from a regression of birth weight on a set of dummies for the age of the mother at birth, a set of month of birth indicator and a gender dummy. The value of the Kolmogovrov-Smirnov test for the equality of the two distributions is 0.4398.

b) Difference in the birth weight distribution (2001)
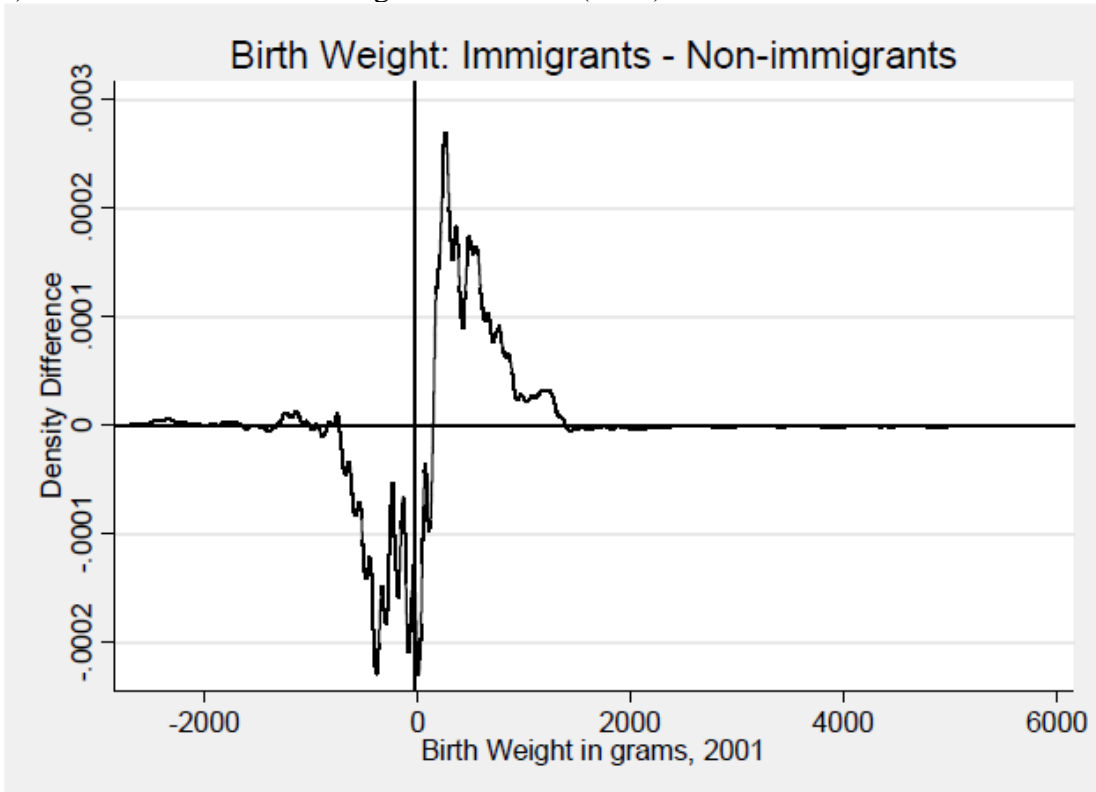
Appendix

Table 1A:

	Spain	Ecuador	Morocco	Romania
Body mass Index (2000)				
Male	26,6	25	24	24,7
Female	26	26,4	25,5	24,9
Life Expectancy (2000)	83	76	71	75
Infant Mortality Rate, prob of dyng between birth and age; per 1000 live births (2000)	6	28	44	23
Child Mortality Rate, prob of dying before age 5; per 1000 live births (2000)	6	31.4	49	23.8
Low-birth weight	6 (2000)	16 (2000)	15.4 (2004)	9 (2000)
Maternal mortality ratio; per 100,000 live births (2000)	6	110	100	27

Source: World Health Statistics. Several years

Table 2A: The incidence of interethnic marriage

	Birth weight 2000	Birth weight 2001	Birth weight 2002	Birth weight 2003	Birth weight 2004	Birth weight 2005
Immigrant from Ecuador (mother)	73.652*** [19.778]	113.536*** [14.768]	99.637*** [12.361]	126.930*** [10.622]	130.761*** [9.852]	112.763*** [9.570]
Father is not from Ecuador	5.061 [21.598]	14.939 [15.880]	1.188 [13.201]	31.807*** [11.281]	14.847 [10.463]	-11.430 [10.225]
sex	119.094*** [1.633]	118.877*** [1.626]	115.999*** [1.627]	116.256*** [1.588]	116.860*** [1.586]	116.276*** [1.583]
age dummies	YES	YES	YES	YES	YES	YES
monthly dummies	YES	YES	YES	YES	YES	YES
province dummies	YES	YES	YES	YES	YES	YES
Constant	2,994.568*** [38.993]	3,000.633*** [36.500]	2,971.152*** [36.150]	3,037.293*** [34.383]	3,044.695*** [35.187]	3,002.493*** [34.569]
R-squared	0.031	0.031	0.029	0.029	0.028	0.028
Observations	340,777	343,391	347,682	362,356	367,409	369,577

Source: Vital Statistics. Spanish Statistical Office
Note: OLS esimates of the linear model in equation (1) with the additional controls in Table 7

Table 3A: Difference in low birth weight probability of immigrants in Spain and non-immigrants in Ecuador

	Low birth weight 2000	Low birth weight 2001	Low birth weight 2002	Low birth weight 2003	Low birth weight 2004	Low birth weight 2005
Being born in Spain	-0.006***	-0.003***	-0.003***	0	-0.009***	-0.007***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Immigrant from Ecuador	0.007	-0.011***	-0.008***	-0.007***	-0.011***	-0.015***
	[0.005]	[0.003]	[0.003]	[0.002]	[0.002]	[0.003]
sex	-0.011***	-0.011***	-0.011***	-0.010***	-0.011***	-0.012***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
age dummies	YES	YES	YES	YES	YES	YES
monthly dummies	YES	YES	YES	YES	YES	YES
Constant	0.091***	0.098***	0.099***	0.082***	0.091***	0.096***
	[0.005]	[0.006]	[0.005]	[0.005]	[0.005]	[0.005]
R-squared	0.002	0.002	0.002	0.001	0.002	0.002
Observations	496,990	496,221	515,946	519,360	519,498	532,902

Source: Vital Statistics. Spanish Statistical Office and Ecuador Statistical and Census Office
Note: The sample includes non-immigrants in Ecuador, Ecuadorian immigrants in Spain, and natives in Spain

Table 4A: Difference in birth weight of immigrants in Spain and non-immigrants in Ecuador (Robustness Checks)

	birth weight	birth weight	birth weight
Being born in Spain	125.870***	109.264***	127.373***
	[1.135]	[1.343]	[0.987]
Immigrant from Ecuador	39.999***	41.547***	38.194***
	[3.791]	[3.815]	[3.759]
male	87.706***	89.654***	77.342***
	[0.841]	[0.817]	[0.518]
Born at a hospital	-60.993***	-44.478***	-59.933***
	[3.078]	[3.842]	[1.643]
Presence of previous children	53.834***	46.843***	34.375***
	[1.226]	[1.206]	[0.743]
Number of previous children	5.441***	8.583***	10.066***
	[0.601]	[0.592]	[0.301]
Constant	3,013.552***	3,009.273***	3,014.001***
	[7.495]	[7.036]	[3.364]
Observations	1,011,617	1,084,721	2,646,270
R-squared	0.037	0.033	0.033

Note: Column (1) compares the birth weight of immigrants in Spain and non-immigrants in Ecuador for the year 2001/2002. Column (2) compares the birth weight of immigrants in Spain in 2001/2002 to non-immigrants in Ecuador in 2006/2007. Column (3) compares the birth weight of immigrants in Spain in 2001/2002 to non-immigrants in Ecuador for the period 2000 to 2010. In the three specifications the additional controls included are: year dummies, and dummies for the age of the mother and the month of birth.

Table 5A: Years since arrival by country of origin

	Immigrants	Ecuador	Morocco	Romania
before 2000	49.58	21.6	69.22	18.63
year 2000	14.67	26.32	10.34	18.09
year 2001	14.83	24.63	9.59	20.58
year 2002	11.6	18.11	5.54	20.37
year 2003	6.16	7.49	2.89	15.1
year 2004	3.16	1.85	2.42	7.22
Nobs	45,360	6,152	7,160	3,338

Source: EPA 2000-2004.
Note: % per year of arrival until 2004

Table 6A: Socio-economic characteristics of natives and immigrants in Spain (2000-2004)

	Natives (all)	Immigrants (all)	Ecuador (all)	Morocco (all)	Romania (all)	Ecuador (females)	Morocco (females)	Romania (females)
Age	38.91	35.96	31.52	37.72	31.33	31.54	37.87	30.98
Male	0.5	0.47	0.47	0.54	0.52			
Years since migration		5.56	2.29	6.73	2.17	2.29	6.51	2.02
Year of arrival		1997	2000	1996	2001	2000	1996	2001
Education:								
Primary	0.3	0.24	0.31	0.44	0.18	0.29	0.59	0.17
HS dropout	0.29	0.23	0.26	0.21	0.16	0.25	0.19	0.17
HS graduate	0.26	0.34	0.34	0.16	0.54	0.37	0.15	0.52
College	0.15	0.19	0.09	0.09	0.12	0.09	0.07	0.14
Work	0.57	0.63	0.76	0.53	0.73	0.7	0.27	0.64
High Occupation	0.12	0.11	0.01	0.09	0.01	0.01	0.07	0.01
Middle Occupation	0.18	0.13	0.01	0.07	0.02	0.01	0.14	0.03
Low Occupation	0.69	0.76	0.97	0.83	0.97	0.98	0.79	0.96
% with kids	0.36	0.53	0.74	0.61	0.49	0.76	0.62	0.49
Number of kids	1.47	1.66	1.76	1.97	1.45	1.79	1.99	1.42
Number of observations	2,216,983	85,476	7,066	12,725	3,777	3,712	5,905	1,800

Figure 1A: Administrative form completed in Ecuador to legalize a birth

INSTRUCCIONES PARA LLENAR EL INFORME ESTADÍSTICO DE NACIDO VIVO

El informe Estadístico de Nacido Vivo, constituye el requisito indispensable para la inscripción del Nacido Vivo en las Oficinas de Registro Civil.

DEFINICIÓN DE NACIDO VIVO.- Se entenderá por nacido vivo, a la expulsión o extracción completa del cuerpo de la madre, prescindiendo de la duración del embarazo de un producto de la concepción, que después de tal separación, respire o manifieste cualquier otro signo de vida, tal como el latido del corazón, pulsaciones del cordón umbilical o movimiento efectivo de músculos voluntarios, haya o no haya sido cortado el cordón umbilical y esté o no unida a la placenta; cada producto de tal alumbramiento se considerará nacido vivo.

Todos los niños nacidos vivos deben inscribirse y considerarse como tales, cualquiera que sea el período de gestación y esté vivo o muerto en el momento de ser inscrito; y si mueren en cualquier momento posterior al nacimiento debe inscribirse su nacimiento y su defunción.

¿QUIÉN DEBE LLENAR EL INFORME ESTADÍSTICO?.- Cuando el nacimiento haya ocurrido en un establecimiento de salud y con atención de médico, obstetriz o enfermera, el Informe Estadístico de Nacido Vivo deben llenar dichos profesionales, desde el numeral 6 al 37, a excepción de los espacios sombreados (*USO INEC*). Los numerales 1 al 5 deben llenar los funcionarios de las Oficinas del Registro Civil en donde se inscriben los nacimientos. Si el nacimiento ocurre sin atención "profesional" el Informe Estadístico debe llenar un funcionario de salud, en todos los espacios que corresponde.
En los lugares donde no haya funcionario de salud el Informe Estadístico llenará el Jefe de Registro Civil en todo su contenido, dejando los espacios en blanco que es para USO INEC, y anotando en Observaciones cualquier indicación que permita aclarar algún dato.
Cuando el nacimiento ocurre en un establecimiento de salud y es atendido por Auxiliar de Enfermería, registrará la información en el numeral 36 e igual tratamiento se dará en el caso de que sea asistido por partera calificada, comadrona no capacitada u otro.

Este formulario debe ser llenado a máquina o con letra clara y legible de la siguiente manera:

1) Anote el nombre de la capital de la provincia, cabecera cantonal, parroquia rural, y nombre de la Oficina de Registro Civil donde se inscribe.
2) Escriba el nombre de la provincia, cantón y parroquia urbana o rural donde está ubicada la Oficina en la cual se inscribe el nacimiento. En el caso de las oficinas cantonales el espacio de parroquias puede dejarse en blanco.
3) En las casillas correspondientes, anote el año, mes y día en el que se efectúa la inscripción del nacimiento.
4) Anote el número de Acta de Inscripción (que consta en el libro de Registros), empezando con el número (1) la primera inscripción realizada en el año de información, siguiendo la numeración en orden ascendente, sin repetir ni omitir ningún número, hasta el 31 de diciembre del mismo año. Esta numeración secuencial única comprenderá tanto a las inscripciones normales, como a las tardías, a excepción de Oficinas del Registro Civil que mantienen dos libros diferentes, en esos casos tendrán dos numeraciones secuenciales.

(A) DATOS DEL NACIDO VIVO

5) Apellidos y Nombres.- Escriba los apellidos y nombres completos del nacido vivo al que corresponde la inscripción.
6) Sexo.- Marque con una "X" la casilla correspondiente al sexo del nacido vivo.
7) Talla,.- Anote la Talla en centímetros que fue medido desde el talón a la coronilla del recién nacido. Rango válido (38 a 52 cm.)
8) Peso. El peso debe ser medido y registrado máximo a una hora del nacimiento. (Rango válido 1100 a 3800 gramos)
9) Grupo Sanguíneo.- Marque con una " X" el tipo de sangre y Factor Rh del recién nacido. Si no se conoce, marque las casillas "9" Ignorado.
10) Tipo de Parto.- Marque con una "X" el casillero que corresponde si el tipo de parto fue normal o por cesárea.
11) Fecha de nacimiento.- En las casillas correspondientes, anote el año, mes y día en el que ocurrió el nacimiento.
12) Semanas de Gestación.- Es el período en semanas que va desde la última menstruación hasta el momento de la salida del producto de la concepción. Es válida la información que va desde 28 a 42 semanas.
13) Tipo de Embarazo,.- Marque con una "X" la casilla respectiva. Si marcó las casillas (2), (3) o (4), y todos nacieron vivos, se debe elaborar sendos informes en forma individual. Si uno o más de los niños nacieron muertos, se debe llenar el Informe Estadístico de Defunción Fetal
14) Nacido en.- Marque con una "X" la casilla correspondiente al establecimiento o lugar donde se produjo el nacimiento.
En establecimiento del Ministerio de Salud, se marcará cuando el nacimiento haya ocurrido en cualquier casa de salud perteneciente a dicho Ministerio. En establecimiento del IESS (INSTITUTO ECUATORIANO DE SEGURIDAD SOCIAL), se marcará el nacimiento ocurrido en sus hospitales o clínicas. En otro establecimiento del Estado, se marcará el nacimiento ocurrido en hospitales de las Fuerzas Armadas, Municipio, Policía,etc. Hospital, clínica o consultorio particular, se marcará cuando el nacimiento haya ocurrido en cualquier establecimiento del sector privado. Casa, se marcará cuando el nacimiento haya ocurrido en un domicilio particular. Otro, se marcará cuando el nacimiento haya ocurrido en un lugar que no sea ninguno de los anteriormente mencionados.
15) Asistido por.- Según el caso marque con una "X" una de las casillas que corresponda a las alternativas de respuesta. Se marcará en Otro (7), cuando el parto haya sido asistido por alguna persona diferente a las categorías que se mencionan.
16) Lugar de nacimiento.- Escriba con claridad el nombre de la provincia, cantón, ciudad, parroquia rural o localidad donde ocurrió el nacimiento.
17) Área.- No llene estos casilleros, son de uso exclusivo del INEC.

(B) DATOS DE LA MADRE

18) Nombres y apellidos.- Escriba los nombres y apellidos de la madre del nacido vivo.
19) Edad de la madre.- Anote la edad de la madre en años cumplidos a la fecha del parto.
20) Nacionalidad:- Según sea el caso marque la Nacionalidad de la madre.
21) Identificación.- Se hará constar el número de cédula o pasaporte de la Madre.
22) Cuántos hijos vivos tiene actualmente?.- Anote el número de hijos actualmente vivos, incluyendo al recién nacido que inscribe. Si es el primer hijo nacido vivo el que se inscribe, Anote 01.
23) ¿Cuántos hijos que nacieron vivos han muerto?.- Anote en las casillas correspondientes, el número de hijos que han nacido vivos, pero que han fallecido hasta la fecha del parto. Cuando la respuesta sea ninguno anote 00.
24) ¿Cuántos hijos nacieron muertos?.- Anote el número de hijos que han nacido muertos. Cuando la respuesta sea ninguno, anote 00.
25) Recibió atención profesional durante este embarazo.- Indique si la madre del nacido vivo, recibió o no atención profesional durante el embarazo. Si se desconoce, marque la casilla 9 (Ignorado)
26) Etnicidad de la Madre.- Marque con una "X" una de las casillas predeterminadas que corresponda a la auto identificación de la madre del recién nacido. Si la persona que informa no se identifica con ninguna de las siete mencionadas, marque Otra (8).
27) Estado civil y/o conyugal.- Marque con una "X" el estado civil o conyugal de la madre del recién nacido, si se ignora marque la casilla (9). ALFABETISMO E INSTRUCCIÓN
28) ¿Sabe leer y escribir?.- Marque con una "X" la casilla que corresponda a la respuesta.
29) Nivel de instrucción alcanzado.- Marque con una "X" una de las casillas del nivel de instrucción alcanzado por la madre del recién nacido, si se ignora marque el (9).
30) Residencia habitual de la madre.- Escriba con claridad el nombre de la provincia, cantón, ciudad, parroquia o localidad, donde reside habitualmente la madre del nacido vivo.
31-32) Área.- No llene estos casilleros, son de uso exclusivo del INEC.

(C) DATOS DEL PADRE

33) Nombres y apellidos.- Escriba los nombres y apellidos del Padre del nacido vivo.
34) Edad del padre.- Anote la edad del padre del nacido vivo en años cumplidos a la fecha del nacimiento.
35) Nacionalidad:- Según sea el caso del padre, marque la Nacionalidad del mismo.

(D) INFORMACIÓN GENERAL

36) Datos de la persona que atendió el parto.- Registre los nombres y apellidos, Número de teléfono, Número de Registro Profesional y firma de la persona que atendió el parto.
37) Establecimiento de Salud donde ocurrió el nacimiento.- Cuando el nacimiento ocurrió en un establecimiento de salud, escriba con claridad el nombre de dicho establecimiento, la ciudad o parroquia rural, la provincia y la dirección con número telefónico. Deje en blanco en caso de que el nacimiento no ocurrió en un establecimiento de salud.

Figure 2A: Administrative form completed in Ecuador to legalize a birth

Estadística del Movimiento Natural de la Población

Boletín Estadístico de Parto

Nacimientos y abortos

Datos de la inscripción (A rellenar por el Encargado del Registro Civil)

Registro Civil n° _____

Municipio de _____

Provincia de _____

Inscripción realizada el día |__|__| del mes |__|__| del año |__|__|__|__|

Libro (s) |__|__|

Tomo (s) |__|__|

Página (s) |__|__|__|

En caso de aborto, incorporado al legajo de abortos el día |__|__| del mes |__|__| del año |__|__|__|__|

Los datos recogidos en el Cuestionario para la declaración de nacimiento del Registro Civil que también figuren en este boletín, serán transmitidos a los Ayuntamientos para dar de alta al recién nacido en el Padrón Municipal de Habitantes (artículo 79.2 del Reglamento de Población y Demarcación Territorial de las Entidades Locales)

4. Datos del nacimiento o del aborto (Se rellena un apartado por cada nacido vivo o muerto)

1. Datos del primer nacido

Nombre

1er Apellido

2° Apellido

Sexo	Varón	☐ 1
	Mujer	☐ 6
Nació	Vivo	☐ 1
	Muerto	☐ 2
Vivió más de 24 horas	Si	☐ 1
	No	☐ 2
Peso en gramos		

Si nació muerto o vivió menos de 24 horas, indique la causa fundamental del aborto o de la muerte
(Se ruega escribir con mayúsculas)

Causa materna o del parto

Causa del feto o del recién nacido

2. Datos del segundo nacido (en caso de parto múltiple)

Nombre

1er Apellido

2° Apellido

Sexo	Varón	☐ 1
	Mujer	☐ 6
Nació	Vivo	☐ 1
	Muerto	☐ 2
Vivió más de 24 horas	Si	☐ 1
	No	☐ 2
Peso en gramos		

Si nació muerto o vivió menos de 24 horas, indique la causa fundamental del aborto o de la muerte
(Se ruega escribir con mayúsculas)

Causa materna o del parto

Causa del feto o del recién nacido

3. Datos del tercer nacido (en caso de parto múltiple)

Nombre

1er Apellido

2° Apellido

Sexo	Varón	☐ 1
	Mujer	☐ 6
Nació	Vivo	☐ 1
	Muerto	☐ 2
Vivió más de 24 horas	Si	☐ 1
	No	☐ 2
Peso en gramos		

Si nació muerto o vivió menos de 24 horas, indique la causa fundamental del aborto o de la muerte
(Se ruega escribir con mayúsculas)

Causa materna o del parto

Causa del feto o del recién nacido

Sello del Registro Civil   Firma del declarante*   Firma del médico**

Médico colegiado con el n°

* Indíquese debajo de la firma, el parentesco con los nacidos
** Cuando se trate de un nacido muerto o fallecido antes de las 24 horas
NOTA: Si el número de nacidos, en el parto, es superior a tres se cumplimentará un segundo boletín con los datos de inscripción y los datos del cuarto, quinto, etc... nacido.

Naturaleza, características y finalidad

El Movimiento Natural de la Población es el recuento de los nacimientos, matrimonios y defunciones que se producen en el territorio español en un año determinado.

Legislación

Los Encargados del Registro Civil remitirán al Instituto Nacional de Estadística, a través de sus Delegaciones, los boletines de nacimientos, abortos, matrimonios, defunciones u otros hechos inscribibles (art. 20 del Reglamento de la Ley del Registro Civil).

Secreto Estadístico

Serán objeto de protección y quedarán amparados por el **secreto estadístico** los datos personales que obtengan los servicios estadísticos, tanto directamente de los informantes como a través de fuentes administrativas (art. 13.1 de la Ley de la Función Estadística Pública de 9 de mayo de 1989 (LFEP)). Todo el personal estadístico tendrá la obligación de preservar el secreto estadístico (art. 17.1 de la LFEP).

Obligación de facilitar los datos

La Ley 4/1990 establece la **obligación de facilitar los datos** que se soliciten para la elaboración de esta Estadística.

Los servicios estadísticos podrán solicitar datos de todas las personas físicas y jurídicas nacionales y extranjeras, residentes en España (artículo 10.1 de la LFEP).

Todas las personas físicas y jurídicas que suministren datos, tanto si su colaboración es obligatoria como voluntaria, **deben contestar de forma veraz, exacta, completa y dentro del plazo** a las preguntas ordenadas en la debida forma por parte de los servicios estadísticos (art. 10.2 de la LFEP).

El incumplimiento de las obligaciones establecidas en esta Ley, en relación con las estadísticas para fines estatales, **será sancionado** de acuerdo con lo dispuesto en las normas contenidas en el presente Título (art. 48.1 de la LFEP).

Naturaleza, características y finalidad

El Movimiento Natural de la Población es el recuento de los nacimientos, matrimonios y defunciones que se producen en el territorio español en un año determinado.

Legislación

Los Encargados del Registro Civil remitirán al Instituto Nacional de Estadística, a través de sus Delegaciones, los boletines de nacimientos, abortos, matrimonios, defunciones u otros hechos inscribibles (art. 20 del Reglamento de la Ley del Registro Civil).

Secreto Estadístico

Serán objeto de protección y quedarán amparados por el **secreto estadístico** los datos personales que obtengan los servicios estadísticos, tanto directamente de los informantes como a través de fuentes administrativas (art. 13.1 de la Ley de la Función Estadística Pública de 9 de mayo de 1989 (LFEP)). Todo el personal estadístico tendrá la obligación de preservar el secreto estadístico (art. 17.1 de la LFEP).

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