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INTERACTIONS BETWEEN FERTILITY AND MIGRATION FOR FOREIGN IMMIGRANTS IN SPAIN

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1. Presentation.

The main aim of this work is to study interactions of fertility and migration for foreign populations living in Spain. By interactions we understand not only the fact that the migratory movements may affect reproductive behaviors, especially if they take place during the fertile age years; but also that the fertility behaviors at place of origin can be a factor of the migration process.

In order to study this interaction process, we choose to consider all the reproductive life of migrants, which means in most cases before and after the main migratory event. In this sense duration of residence at the place of destination as well as age at migration, are clearly key variables for studying differential behavior of migrants relative to autochthonous population, but time until the migratory movement may also be an important variable.

Therefore, our main research objective is to study the effects of the migratory movement on reproductive behaviors and the reverse, analyzing fertility of immigrant women before, during and after migration and their possible effect on the migration process. This research

will allow us to look for answers to several questions: Does the migration process affect the reproductive behavior? Are the effects of the migratory movement on fertility limited to the post migration period? What is the relative importance of the disruption and the adaption processes? How different is fertility of migrants by age at arrival, or by origin?

2. Background

There is abundant literature about the interrelations between migration and fertility, especially for migrants to the United States (Carter, 2000; Khan, 1994; Lindstrom and Giorguli, 2007; Parrado and Morgan, 2008) but also for to some European countries, like France, Sweden or Germany (Alders, 2000; Anderson, 2001, Toulemon, 2004). This previous research has focused on the complementary relationships between the three main "classical" effects of migration on fertility and other behaviors: adaptation, disruption and selection (Kulu, 2003; Milewsky, 2007). However, most of this literature is focused on post-migration fertility behaviors, and usually does not take into account migrants behaviors at their place of origin.

Hence, the bulk of studies on fertility of migrants are concerned by what happen after the arrival to the place of destination, and the main research question asked is whether there is a convergence (or adaptation) process with the autochthonous population. Indeed this question is important, but we think that convergence is only one of the effects of migration on fertility for migrant populations: the migration may interrupt the reproductive life and the migration may be the result of fertility behaviors at place of origin. In this sense, what may appear as an adaptation process may be only the consequence of the disruption: for example if migrants postpone their fertility before the migratory movement and then catch-up at the place of destination, this catching-up process may be falsely identified as an adaptation process.

The main reason why there are very few studies which take into account behaviors before and after the migratory movement is the lack of appropriate data source: a longitudinal retrospective survey with detailed maternal history that includes both the autochthonous

and the immigrant population is needed for fully studying those interaction effects. Our research is strongly influenced by Toulemon (2004 and 2006) who developed the methodology we use in the present paper and applied it to foreign migrants in France. He argued that the comparison between natives and immigrants is traditionally done using Total Fertility Rates (TFR) computed from births at the place of destination, but that this is not the more suitable indicator to do so, because it does not take into account the discontinuity that migration suppose in the reproductive cycle of immigrant women, and in that way ends up overestimating migrant's fertility, due to the catching-up effect after the arrival.

3. Data and Methods

The statistical source used in this paper is the Catalan Demographic Survey 2007, conducted by the Statistical Institute of Catalonia (IDESCAT). Its biographical data allow us to explore the full reproductive cycle of women up to the time of survey. Foreign-born population represents 14% of survey's total sample (27,911 individuals). In our analysis we select women aged 15 years and more, for a final sample of 10,474 native-born women and 1,631 foreign-born women.

This data source allow us to take into account duration of stay UNTIL and SINCE arrival as a key variable for the study of migrant fertility, as duration data are not usually available when working with traditional data sources (i.e. Vital Statistics or Census data). Although the population surveyed is living in Catalonia region, we use "age at arrival" into Spain (not into Catalonia) considering that the significant migration is the transnational one and that internal movements inside Spain should be excluded. Also, the "native" group to which we compare migrants refers to women born in Spain and residing in Catalonia.

We applied two kinds of methodology for the analysis of this dataset. Firstly, we compute traditional period age specific fertility rates by age at arrival of women. ASFR are calculated for groups of foreign-born women who have had children between 1986 and 2006 either in Spain or their origin countries and are residing in Catalonia in 2007, at time

of survey. It is worth noting that these rates take into account the fertility of migrants at their place of origin. Secondly, we use a statistical modeling of duration of stay until or since the migratory movement. Duration models are estimated using three main variables: 1) age at arrival of immigrants; 2) main geographical origins (Europeans, Africans, and Americans); and 3) union status at moment of migration (to be in union vs. not in union).

4. Some Findings

Descriptive analysis through ASFR

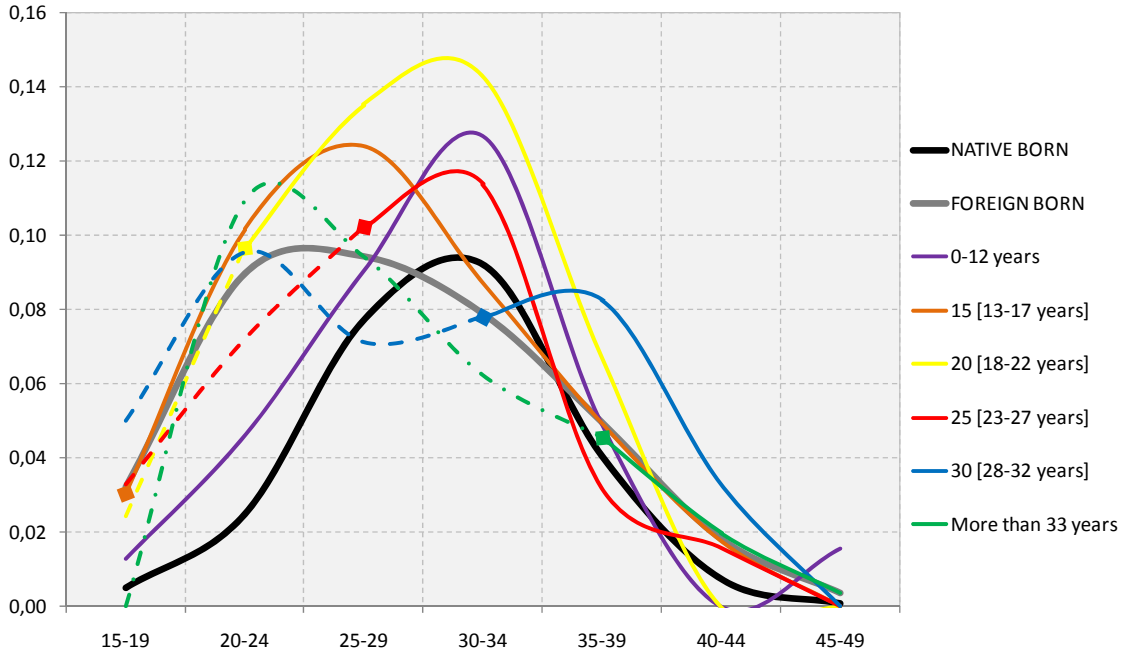
Results clearly suggest important differences in reproductive behavior when we take into account the age at arrival of immigrant women. For example Figure 1 presents the Age-Specific-Fertility Rates by age at arrival based on births for the period 1986-2006. It is a period analysis in which we take into account births during all the fertile age span of women, before and after their arrival in Spain. We also include the fertility rates for the autochthonous population, which refers to women born in Spain and living in Catalonia in year 2007. The TFR for these women is 1.2 children per women. Comparing with natives, fertility age rates for the whole immigrant population reach the same overall level but presents strong differences in timing. Their fertility level is generally higher at less than 25 years of age, with a much higher relative level for teenagers. The level of the curve also suggests that the fertility is higher at more than 35 years old, which could be explained by the behavior of women who arrived to Spain at more than 25 years of age. The TFR value for the whole immigrant population is 1.8 children per women.

The figure 1 also shows immigrants' fertility patterns by age at arrival. Women whose age at entry into Spain was less than 12 years have had all their children in Spain, which means that migration has no direct effect on their fertility, but their immigrant origin may explain the differences observed with fertility of the native women. The timing of their fertility is very similar to autochthonous women one, but the actual level is higher, with a TFR value of 1.73 children per women. It is remarkable that their teenage fertility level is closer to native levels than to immigrants ones, which suggests that the fertility of these women

shows important signs of an adaptation process, but only for the timing, not for the overall level.

Secondly, women who migrated to Spain between age 13 and 17 years had spent most of their socializing process in their country of origin, but there is almost no interaction between migration and fertility, as their migratory movement took place just at the beginning of their reproductive cycle. It is remarkable that the timing of their fertility is much younger than the autochthonous one and also than the timing for migrant women who arrived before 13 years of age. In that sense, an important observation is that the teenage fertility rate is much higher for these women in comparison with the two previous groups. So we can say that the fertility pattern of these women is very distant from the autochthonous one, which may be seen as an incomplete adaptation process.

Figure 1. Age-specific fertility of immigrant women by age at migration into Spain (1986-2006).



* The black curve shows the age-specific fertility rates for women born in Spain, and the grey one for women born abroad. For immigrant women by age at arrival, the curves are in dashed lines until the age at migration. A large dot represents the point of entry and afterwards the curves are in solid lines for post-entry ages.

Data Source: Catalan Demographic Survey, 2007, IDESCAT.

The third group refers to women who arrived in Spain at an age between 18 and 22 years and whose fertility before that age took place in their country of origin. Their fertility pattern is younger than the autochthonous one and its level much higher than migrant women who arrived at a younger age, with a TFR value of 2.3. The distance with native women is much higher than for the two previous migrant groups, and their adaptation process is the weaker.

The fourth group corresponds to women who arrived when they were between 23 and 27 years old. They are also women who spent the first part of their reproductive life in their country of origin, but what differs in relation to the previous group is that the overall level before the migratory movement is much lower, which is the consequence of the disruption process due precisely to the migratory movement.

Finally, for women who arrived in Spain at age 28-32 and at more than 33 years, their fertility pattern clearly shows the disruption caused by the migratory movement. These two groups present the same overall fertility patterns than the other immigrants groups, characterized by an early timing. But after the reduction in fertility associated with the migration, which force an interruption of the reproductive life, we can see a peak at later ages which can be explained by a catching-up process.

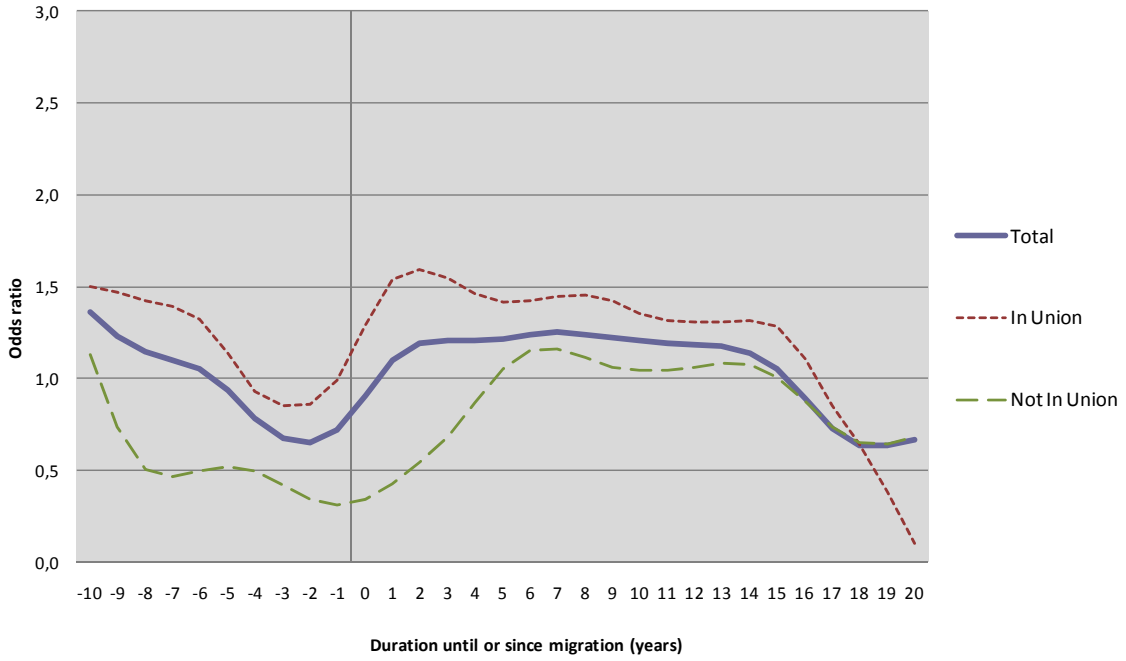
If we focus on the three last groups, we can understand why computing the TFR for immigrant women from births in the place of destination can lead to an overestimation of the true level of their total fertility: the migration process is associated with an anticipation and a disruption process which manifest themselves as a lower fertility level before and during the migratory movement. This is followed by a catching-up process, which takes place after the migration. So migrant women tend to have a higher fertility than usual at their place of destination, as a compensation effect for their lower fertility at their place of origin.

Modeling of duration of stay after or since migration

In a second stage of our analysis we use statistical modeling of duration of stay until or since migration, as a way to explore further the difference in fertility patterns between native and non-native women. We compute the relative odds of having a birth at each duration until or since entry into Spain, for immigrant women in relation to autochthones one, controlling for age. We also stratify our sample in order to look at the differences in the relative odds for three variables: age at migration, geographical origin and union status at time of migration. To compute the duration models we transform the database in a person-year file. The dependent variable is a dummy variable "birth" which has value of "1" if there is a birth during the year and takes a value of "0" if not. The variable "duration until or since migration" has a negative value if a birth occurs before migration and a positive value if it occurs afterward. The duration "0" corresponds to the year of the migratory movement. The relative odds are estimated using logistic regression.

Figure 2 presents the fertility levels by duration until or since migration for all the immigrant women, relative to the natives one. Since, all the women are grouped, those who arrived at a very young age have their children at duration above 10 years, and those who arrived at a later age have children at negative and positive durations. The comparison is made in terms of the odds of having a child at each duration for migrants in relation to the odds of having a child for women born in Spain, controlling for age. The curve for the whole group of immigrants shows in a clear way the presence of a strong anticipation effect, as the odds ratio falls under 1 before the migratory movement. We observe also a clear pattern of recuperation after migration, but the relative level remains stable up to duration 15, in such a way that it is quite difficult to separate the catching-up effect from the convergence or adaptation effect.

Figure 2. Immigrants' fertility by duration since migration and by union status at time of migration, relative to natives' level, controlling for age.



* The duration curves are smoothed using the 4235H.Twice algorithm of Velleman (1980)

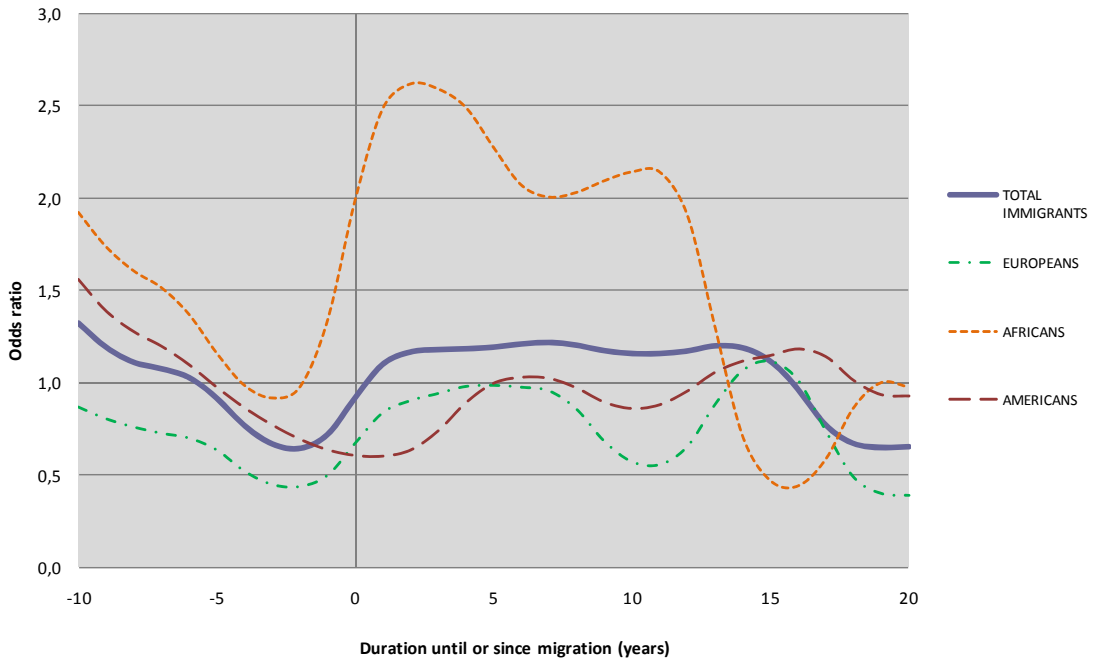
Data Source: Catalan Demographic Survey, 2007, IDESCAT.

When we stratify our sample by union status of migrant women at time of migration, strong differences appear. For women who were in union at time of migration, we observe the presence of marked anticipatory and recuperation effects, as well as the adaptation one, which is appreciable through the downward trend for relative fertility levels beginning at duration 3. In the case of women who were not in union at time of migration, we observe almost no anticipatory effect, and the recuperation effect takes place much later, after 5 years of residence or more. It is interesting to highlight that this difference in the timing of the recuperation effect is the explanation why we observed no adaptive effect in the curve for all women.

Taking into account geographical origin of immigrant women (Figure 3) some more interesting differences appear. For women born in European or American countries, the

pattern of effects is similar, with a level of fertility close to Spanish women one. Nonetheless there are differences between these three groups as the disruption of reproductive life seems to be the highest for American women, and the recuperation effect takes place later (3-4 years of residence) and is the weakest for the three groups of immigrants. On the other hand, for women born in an African country, the anticipation and recuperation effects are the strongest, with a much higher fertility levels than the other groups. We observe also the presence of a convergence effect, as there is a downward trend in the curve beginning at duration 3.

Figure 3. Immigrants' fertility by duration since migration and by origin, relative to natives' level, controlling for age.



* The duration curves are smoothed using the 4235H.Twice algorithm of Velleman (1980)

Data Source: Catalan Demographic Survey, 2007, IDESCAT.

In the full version of the paper we will present further stratification by age at arrival and by origin, from which we will be able to show the presence of reverse causation, where fertility at place of origin may explain the migratory movement. Also we will use parametrical modeling in order to assess the statistical significance of the main effects observed in the duration curves.

5. Discussion

We have found several evidences of the interaction between migration and fertility for the Spanish case. Firstly, we identified an intermediate stage of immersion in the cultural and economic context of the host society for those women who arrived before 13 years of age and grew up in Spain. Their fertility patterns do not differ in their timing from the natives, but their slightly higher intensity may be the consequence of a socialization process still taking place in between the two contexts. Since migration in itself did not disrupt their fertility, we consider that their own immigrant origin has a perceptible role in their behavior. A second group of women, those who arrived as teenagers, differs from the previous group in the earliest timing of their fertility. This fact may illustrate both the importance of age at arrival -as they spent their child years in their country of origin- and the duration of stay -because they had births after fewer years of residence than the previous group- in shaping the fertility and other associated behaviors.

Thirdly, we see how women who arrived in their twenties have divided their fertility between the place of origin and of destination. They have had children at early ages as expected from the general pattern for immigrant women, and once installed in Spain they have in some cases spread and in others increased their fertility. In any case, the intensity of post-migration fertility of these women is closer to the natives one. Also, the closer to thirty is their age at migration, the higher is the disruption in their reproductive life.

The fourth pattern observed is that of women who arrived in Spain after 30 years of age. These women had spent most of their fertile years in their country of origin, but as a result of migration they experienced a recovery of their fertility at a late stage of their

reproductive life, either through family reunification or new unions. We observe also that the greater the age at migration is, the lower the time they wait to have a baby in Spain, as if the end of the fecund period determined that duration.

In short, we have seen that depending on the stage of their reproductive life cycle when the women migrate, the magnitude of the effects changes. We can identify in the fertility curves several effects common to all, albeit with a greater or lesser degree depending on the age at migration. The *anticipation effect* is widespread and consists of a control and a delay of fertility during the 4-5 years prior to emigration. Only women who have migrated as children or as teenagers do not experience this effect for obvious reasons. Teenagers' curves show what could be called a *causal effect*, which link migration to fertility. Women who delay their maternity in the years before the migration experience, experiment afterwards an *arrival effect* which is characterized by a high level of fertility in the early years of residence, probably closely linked to family reunification. However, among those who migrated in their twenties and thirties, the arrival effect expands in time and after a period of more than 8 years of residence is intensified in which one might call an *installation effect* which includes time for social inclusion and even new conjugal relationships. Finally we conclude that after a high fertility post-migration period, there is a *convergence or adaptation effect* for young immigrant women, since the convergence among those who migrated in the older age group is caused by the end of childbearing age span.

Beyond the general profile of migrant women, there are also notable differences by origin. African women have the greatest differential behavior compared to the native and the rest of origins. Due to their high fertility level, the anticipation effect is the weakest and the arrival effect is the sharpest. African immigrant women are largely women who arrive in Spain either as spouses or who get married just after the arrival. Their labor insertion is lower than other non-native groups. If we add that their fertility is also high in their country of origin and that having children in Spain has the added value of a series of social guarantees, it is not surprising that these women contribute significantly to Spanish fertility.

While sex ratio of African immigrants into Spain is characterized by an excess of men, who tend to arrive alone and later to regroup with their wives, American flows have been traditionally more feminized, which may explains why their transition to post-migratory motherhood require a longer period of residence in Spain, because either they need time to do a family reunification if they were in union at time of migration, or they need to form a new conjugal relationship if they were single. Europeans have reproductive patterns closer to the native population, which is consistent with the common patterns of countries characterized by low fertility rates as Spain. Moreover, the absence of legal impediments and free movement within Europe might explain why the European fertility is not as sensitive to the effects associated with migration.

By using longitudinal data we have been able to achieve a more accurate view of migrant's fertility than previous research about the Spanish case. The duration model developed in this work constitutes an exploratory approach to study fertility patterns in a life cycle perspective. However it could be interesting to deepen on this research topic into two directions. Firstly, it would be nice to have larger samples of immigrant population as an essential requirement in order to analyze migrants' behavior of people of separate or smaller groups of countries rather than continental aggregations. Secondly, it could be important as well, to look at what factors or specific determinants (demographic, economic or cultural) are behind each of the observed effects. Future research may consider how elements as religion, educational skills or occupation are related with migrant's fertility decisions, as well as the role of institutional context over causes and patterns of fertility behavior. Another useful extension would be to conduct the same kind of analysis for men, something that regretfully we have not been able to do with the survey we use, as it does not include full paternal history.

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