# Was Fertility Decline Determined by Child Mortality Levels? Factors behind divergent regional transitional patterns in early 20<sup>th</sup> Century Spain

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## Paper's aim

Within the Demographic Transition context, the period between the beginning of the 20<sup>th</sup> century and the start of the Spanish Civil War (1936-1939) was crucial for Spanish demographic modernization, as it was a key period for both fertility and mortality declines (Arango, 1987; Dopico and Reher, 1998). However, even though changes in both phenomena accelerated, their spatial impact was not the same throughout the country. In fact, the greatest regional fertility and (child) mortality differences are found in this period, particularly in the 1920s and 1930s. While Catalan marital fertility and child mortality were very low, both indicators were extremely high in the Meseta (central Spain) provinces. At the same time, Galicia had low mortality but high marital fertility and Andalusia intermediate levels in both.

This paper uses Spanish 1930 and 1940 census data at a provincial level, and specifically retrospective questions posed to ever married women on the number of children ever-born, and those dead, to firstly analyze pre civil war fertility decline and then, to study child mortality decline through indirect estimation methods based on W. Brass' work (1964). Former research analyzing both phenomena separately has strongly concluded that they followed extremely different spatial trajectories which formed very clear fertility and child mortality regional trends (Blanes, 2007; Devolder et al., 2006; García-Soler and Gil-Alonso, 2007; Gil-Alonso, 2007; Gómez-Redondo, 1992; Nicolau, 1991). Here both phenomena are studied together so that a regional demographic transition typology can be built. The paper more specifically focuses on phenomena interdependences and regional specificities which have led to extremely diverse regional transitional trajectories.

At a second stage, rural and urban fertility and mortality declines are compared to obtain information on how regional transitional trajectories were affected by the way interactions between cities and the surrounding countryside worked. In other words, we analyze if new "modern" demographic behavior spread out from urban to rural areas or if, on the contrary, cities became rural immigrant (with more traditional demographic behavior) reception poles.

#### **Hypothesis**

This paper intends to verify two opposed hypothesis regarding transitional trajectories. The first supports the idea that, at a provincial level, child mortality and fertility falls are directly related –in other words, all provinces followed similar trends,

but at different paces. On the contrary, the second hypothesis sustains that there was no direct relationship between the two phenomena and that, therefore, each province followed its own trajectory based on local factors.

Subsequently, an urban-rural interrelationship hypothesis is tested: that demographic modernization started in provincial capitals and then spread through out surrounding rural areas.

## Background

Despite provincial differences, child survival levels significantly increased between 1918 (Spanish flu) and 1936 due, in part, to a change in risk factors (health transition theory) which affected survival level geographic distribution. Indeed, during the 1930's, urban child survival levels overtook rural ones, breaking historical urban over-mortality trends (Pérez-Moreda et al., 2004; Reher, 2001). At the same time, the center (more mortality) / periphery (less mortality) geographical dichotomy evolved into a somewhat different pattern opposing Northern provinces -higher childhood survivalto central and southern ones -with higher mortality. Several factors would seem to be behind new picture: living condition, education and personal hygiene improvements, particularly in urban areas; sanitary and health infrastructure extension (sewage systems or hospital networks) and massive application of new medical technologies (like vaccines and other advances related to the microbial theory), among others. Previous ecological advantages (linked to the climatic conditions) favoring coastal provinces, lost relevance in front of other factors more related to social, educational and economic developments, or to societies and institutions' ability to mobilize and organize themselves (Cussó and Nicolau, 2000; Muñoz-Pradas, 2005).

That period was also characterized by sustained marital fertility reductions throughout the whole country. However, significant differences among regions appear again, being Catalonia (very low fertility) and the Northern Meseta (high fertility) the most extreme cases. What factors influenced fertility decline? Did child mortality levels have any influence at all, or was it caused by other non demographic factors?

## Data and methodology

Fertility information has been directly obtained from 1930 and 1940 Census data on children ever born, from two questions posed to ever married women: "How many children, who were born alive, have you ever had?" and "How many children have you had who have died?". Child mortality data, on its side, has also been obtained from this fertility retrospective information: thanks to the latter two questions, the number of surviving children (or those who have died) has been obtained out of those ever born. It is well kwon that proportions of children ever born who have died are indicators of child mortality and can yield robust estimates of childhood mortality. The births to a group of women follow some distribution over time, and the time since birth is the length of exposure to the risk of dying of each person. The proportion dead among the children ever born by a group of women will therefore depend upon the distribution of the children by length of exposure to the risk of dying and upon the mortality risks themselves. Therefore, such a proportion of children dead can be transformed into a conventional mortality indicator expressing their average experience. Specifically, the proportions of children dead classified by the mother's five-year age group or duration of marriage can provide estimates of the probability of dving between birth and various

childhood ages. William Brass (1964, 1985) was the first to develop this method, which was later further developed and diversified by other authors (Coale and Trussell, 1977), creating a family of child mortality indirect estimation methods which have been collected in the United Nation's *Manual X* (1983). They probably constitute the most powerful demographic indirect estimation technique, particularly when valid child mortality estimates are difficult to obtain from register data and when deaths of young children are particularly susceptible to be omitted.

## **Preliminary results**

As a first result, provincial data cluster analysis has drawn well-differentiated regional transitional patterns. Several regional reproduction systems, similar to the "Catalan reproduction system" described by Anna Cabré (1999), have been found. In each of them, marital fertility decline is not only determined by social, cultural or economic external factors but also, and maybe more significantly, by demographic interrelationships in general and child mortality levels in particular.

These spatially clustered data on fertility and mortality levels also give relevant information on the specific causes contributing to demographic modernization in that key period of Spanish history. Generally speaking, results seem to point out to endogenous factors, that is to say, to the importance of demographic factors. Marital fertility would have dwindled later where population growth was limited by other demographic factors (high child mortality, high emigration or low marriage levels). High child mortality levels, basically due to climatic reasons, would be the main factor differentiating inner provinces from coastal ones. High emigration levels, on their side, would be the one distinguishing northern provinces from Mediterranean ones. The latter would have adopted birth control methods earlier to counteract higher child survival levels in a context of low emigration.

Finally, regarding urban-rural differences, results show that in general rural areas had higher fertility levels than urban ones. However, some cities, like Barcelona (which received immigrants coming from rural provinces), constantly have higher levels than the surrounding areas. On its side, in this period, rural-urban child mortality patterns completely changed. Even though urban over-mortality was the norm for those children born until 1920's, urban cohorts born in the 1930's experienced lower mortality levels than their rural contemporaries.

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