# Stalled Fertility Decline in Egypt: a Multilevel Analysis

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Fertility behaviors are the result of the interaction between several factors. Proximate and remote determinants influence the evolution of the total fertility rate. In Egypt, among the first, early age at first marriage and the increased use of contraceptive methods play a decisive role. Among the remote determinants, education, religious conformity, economic stagnation and infant mortality are the most significant variables.

Furthermore, fertility evolution in the Egyptian governorates has not been homogeneous along the time. We can notice a huge fertility difference between Lower and Upper Egypt and also between urban and rural zones. During the sixties, fertility was higher in Upper Egypt and in rural settings. Between 1960 and 1975 fertility has declined quite fast in the urban zones, and then it has fall in rural zones. In the period 1988-200, fertility level stayed almost stable in urban zones, especially in the big cities and in the cities on the Nile Delta. The decline has continued in the rural zones, nevertheless total fertility rate in 2003 was still quite high. For this year, TFR was 4.3 children per women in Upper Egypt and 2.2 in the big cities where, after a period of stalling fertility, the decline seems to have restarted.

To explain regional differences in fertility, we will consider the individual characteristics and the social structure where women live. Often, in the demographic research the micro and the macro level has been studied separately or through statistical model not adequate to represent those two levels (Hox , 1995).

This is a classical debate in the social sciences: social development is characterized often from a dialectical relationship between individual behavior and social structure (Erbring and Young, 1979).

The statistical method that we will use is the multilevel analysis, it is applied to hierarchical data sets where individuals are the basic unit of the analysis and they are aggregated in one or several hierarchical structures.

Coming to theories of fertility transition we are going to test several hypotheses: first, the institutional approach (McNicoll) and the political economy of fertility (Greenalgh), that give a great importance to institutions in the explanation of fertility determinants. And again to take into account the social development, we will consider also the diffusion of ideas theories including researchers as Lesthaeghe, Watkins, Coale.

Therefore we are going to show how institutional; economics and social variables can explain regional differences in fertility. The multilevel statistical model, allows us to study contextual variables with individual characteristics.

We will use 3 sources of data: first, the individual questionnaire of the 2000 Egyptian Demographic and Health Survey (EDHS) 2000, then PSU with information about Global Positioning System (GPS) locators (obtained by DHS Measure Macro International ORC Macro) and governorate-level indicators available in the 2003 Egypt Human Development Report (Saad 2003) based on estimated values for 2001. In the multilevel modeling, a three-level hierarchy in the data will be considered: individual, PSU, and governorate.

The three-level logistic model that will be applied is written as:

$$\log_e[p_{ijk}/(1- p_{ijk})]=\alpha + \beta_k x_{ijk}+U_{jk}+V_k+\varepsilon_{ijk}$$

Where $p_{ijk}$ denotes the probability of having 4 or more children and $1- p_{ijk}$ is the probability of having less than 4 children for individual i in PSU j in governorate k. We will test the probability of having a TFR above the national level that was 3.5 children per women in 2000.

Preliminary results show that fertility varies according to the regional context; however, individual characteristics play an important role in the explanation of fertility transition in Egypt. Some individual variables, especially infant mortality and standard of living explain a great part of the regional and local differences in fertility.