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Fertility Levels and Differentials in Informal Settlements in South Africa: Evidence from the 2001 South African Population Census.

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2006-11-13T13:28:09Z
http://hdl.handle.net/10539/1651

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CHAPTER THREE

METHODOLOGY

3.1 Introduction.

The study is a secondary data analysis of the 2001 South Africa census 10 percent sample data. The 2001 South Africa Census was the second conducted in a post apartheid SA exactly five years after the previous, which provided the country with comprehensive and nationally representative demographic data for the different areas of the country.

3.2 Source of Data.

Approximately 100 000 temporary employees of Statistics South Africa visited the various metros, cities, towns, townships, informal settlements, villages, farms and deep rural areas throughout the country. Their task was to record the details of the people who were present in the country on the night of 9–10 October 2001. People living in households across the country, as well as those in hostels, hotels, hospitals and all other types of communal living quarters, and even the homeless, were all visited .In preparation for the count, the entire country had been divided into approximately 80 000 'parcels' of land called enumeration areas (EAs), each containing an average of 150 households, or in the case of communal living quarters, an equivalent workload. One enumerator was allocated to each EA to visit all the households and individuals in the EA and complete a questionnaire or leave a questionnaire to be filled in. Immediately after the count, fieldworkers in the provinces, working independently of the census, re-visited a representative sample of 600 enumeration areas, identified their boundaries, listed afresh the dwellings, and visited the households again to complete another questionnaire. Hostels were also revisited but no other communal living quarters. The questionnaire contained a subset of the census questions and also sought to ascertain the whereabouts of each household member or hostel dweller on census night.

3.3 Sample

3.3.1 Sample size.

Data used in this study comes from the 10 % sample of the South African 2001 Census conducted by Statistics South Africa in 2001. The data includes a weighting factor, designed to correct for undercount and for making inference about the relevant population. The Census household records were implicitly stratified according to municipality, geographic type and Enumeration Area (EA). All variables as per the questionnaire were included in the 10 % sample, along with several other derived variables.

3.3.2 Study population.

Informal Settlements in South Africa can be divided into three broad categories .The first one ,the low density peri-urban, comprise informal Settlements from the Winterveld area to the north-west of Pretoria.(Abboott et al,2001:79). It is constituted of people who were forcibly relocated from urban area and literally dumped in the nearest homeland, during apartheid period. The second is the rural informal settlement found mainly in the areas outside metropolitan boundaries, such as the settlements on the outskirts of Durban (Abboott et al, 2001). It includes people who on their own came from the rural areas who moved onto tribal land on the outskirts of the city where they were unaffected by apartheid laws. The third type of Settlement is that of land invasion on pockets of land that lie within the municipal boundaries (Abboott et al, 2001). All informal areas outlined above share the same characteristics namely high density areas, with poor infrastructure and services, similar to the rural areas. According to the 2001 census figures, the total population living in Informal Settlements in South Africa was approximately 3,560,383 (Stats SA, 2001). The population of study comprises all women of childbearing age (15 to 49 years olds) in these informal settlements in South Africa numbering 23910 (or 23%) of the 10 percent census sample data.

3.4 Instrumentation (Questionnaire Design)

The Census questionnaire in 2001 women of childbearing age, three questions from which estimates of fertility in any geographic area of the country may be obtained. These are questions on the number of children ever born to particular woman, births that occurred in the twelve months before the Census and the total number of women of childbearing age. Demographic variables such as level of education, marital status, income, employments and household ownership of durable goods were also collected during the 2001 Census.

3.5 Data Analysis

Two types of analysis were performed viz univariate, and multiple regression analysis. Univariate analysis was meant to present relevant summary statistics for the socio-economic variables of the respondents. Multiple regressions have been performed in order to analyse the causal relationship between fertility (the response variable) and the different predictors of interest. The general purpose of multiple regressions is to learn more about the relationship between several independent or predictor variables and a dependent or criterion variable.

A linear equation of the form $Y = a + b1 * X1 + b2*x2 + \ldots bp * Xp$ was used. Where Y is the dependent variable (in this case, fertility as measured by the total number of children ever born); a is a constant; Xi's are scores on different predictors variables. Contribution of each independent variable to the prediction of the dependent variable is then represented by the coefficient b.

The principal assumptions behind the technique are among others that relationships among variables are linear, no interaction effect for all variables under analysis and, low multicollinearity (See Galpin.J, 2004). Because of the nature of the variables which are principally categorical, fitness of the above assumptions has been assumed

3.6 Summary of indirect methods of fertility estimation**.**

William Brass (1967) developed a useful formula of comparing lifetime fertility to cumulative current fertility and the ratio of the two under the following assumptions.

- Fertility for the population under study remained constant for sometime in the past;
- The reported number of children ever born to women in the early ages, say 15-35 is more or less accurately reported;
- The reported number of births for the preceding year of the survey or census may suffer from errors resulting from inaccurate perception by the respondents of the reference period, but these errors are invariant with age.

In the P/F ratio analysis Brass (1967) recommended P_2 / F_2 as adjustment factor. The assumption behind the technique was that women in the age group 20 – 24 remember the number of children born by them sufficiently accurately because such women will have only a small number of births that could have occurred in recent years thereby reducing recall error. But some of these women could have entered into reproductive life in recent years. This can lead to a false conclusion about the level of fertility. In addition, the cumulative fertility F_2 which is based on women in the age group 15-24 is assumed to have misstatement errors that will have no effect on the age structure of the current fertility schedule. This is not often the case.

Coale and Trussel developed a variant to Brass's method of estimating fertility. They proposed fitting a second-degree polynomial to 3 consecutive values of $\boldsymbol{\Phi (i)}$ evaluating the integral of the polynomial. In other words, the table of multipliers for both methods are different. The assumptions for this variant are the same as those for the Brass method.

In order to minimize the shortcoming of P/F, Brass modified his traditional P/F method through the intermediary of Relational Gompertz model. Relational Gompertz method try to estimate fertility from the mean parities reported at a census or any enquiry. It is furthermore designed for the evaluation and adjustment of birth distributions derived from reports of births during the last twelve months and children ever born (Zaba, 1981). Fertility is assumed to be relationally constant and parities are also the current synthetic cohort values. However, experience has shown that the parities for the older women are too low because of the omission of births and possibly selection factors. Arriaga is furthermore the other method for fertility estimation which tries to overcome the shortcoming of P/F method.

Arriaga (1983) is another variant of P/F approach. This method modified P/F technique by extending it to a case of changing fertility than transforming the recorded ages specific fertility figures to children ever born type figures. The difference between Arriaga method and P/F ratio methods is that P/F ratio technique transforms the current data into an equivalent measure of lifetime fertility. Arraiga's approach however, transforms the data on children ever born into estimates of age specific fertility rates (ASFR) consistent with the mean parities. The following steps are required to estimate fertility:

1 For a given Pi, ASFR consistent with the mean parity are generated;

2 ASFR are cumulated and compared with the reported cumulated ASFR;

3 For these sets of ASFR, the adjustment factors are then derived from the ratio of these two cumulated ASFR.

Using information on total children ever born, and births last year to the women according to the different age groups extracted from women surveyed in the South Africa 2001 Census, fertility in South Africa informal settlements is then estimated by P/F ratio, Coale and Trussel method and Arriaga's technique.

3.7 Variables

The outcome variable is fertility, will be measured by the number of Children Ever Born (CEB) and Total Fertility Rate (TFR). The independent variables include level of education, marital status, employment status, income and ownership of household goods including radio and television. For the highest level of education achieved by women, the categories used are no education, primary, secondary and higher. Marital status has been grouped in two categories viz ever married (comprising of married women, those living together, widows, separated and divorced women) and never married. Religious composition has 4 categories namely: Christian, African and traditionalist, non Christian and no religion. Women income includes those with low income (those with non taxable income or with income less than R 3,200) and high income (with income from R3, 201 and above). Employment status includes employed women and unemployed ones. Ownership of household goods include women dwelling house with Radio and TV.