Validity of the Own-Children Method of Fertility Estimation: Results from the Iran 1986, 1996 and 2006 censuses[*]

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This paper examines the validity of the own-children method (OCM) of fertility estimates derived from the Iran 1986, 1996 and 2006 Censuses and the 2000 IDHS by a detailed investigation of mortality assumptions, the presence of non-own children, age misreporting and undercount. ASFRS and TFRs are estimated for Iran by such variables as place of residence, province, religion, and nationality for the period 1972-2006. The results obtained alternatively from two matching procedures (using relationship to head of household and mothers' line number) are investigated to see the accuracy of the fertility levels and trends. The OCM estimates will also be compared with those obtained from other indirect methods. Despite some shortcomings, the results suggest that most of the underlying assumptions of the OCM are still valid, and this method is still a useful indirect method in estimating fertility for Iran and countries in transition.

The own-children method is one of the techniques which can be used to estimate fertility measures where vital registration data are incomplete, or where relevant questions have not been asked in the census. This method is a reverse-survival technique for estimating age-specific fertility rates for years previous to a census or household survey. The method was first developed by Grabill and Cho (1965) to measure current fertility from population data on young children. It was then applied to the 1910, 1940, 1950 and 1960 Censuses of the United States to study differential current fertility (Cho, Grabill and Bogue 1970; Cho 1973). The technique and its application have been elaborated in a series of publications dating back to 1965 (Grabill and Cho 1965; Cho et al. 1970; Cho 1971, 1973; Rindfuss 1976, 1977; Retherford and Cho 1978; Retherford et al. 1979; Retherford, Cho and kim 1984; Cho, Retherford and Choe 1986; UN 1983; Jain 1989; Dugbaza 1994; Abbasi-Shavazi 1997).

Cho et al. (1970: 18) marked three advantages of using the own-children method in studying differential fertility. First, the method involves an additional set of coding steps or matching procedure to the existing census or household survey data. Secondly, using available census data, the method allows the study of differential fertility for years preceding the census. Thirdly, the technique can be applied to sample surveys with

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modifications and refinements, thereby enhancing the power of these surveys to study differential fertility. Furthermore, the own-children method is superior to children-ever-born data in that it provides time-associated measures of fertility. The method gives an estimation of 'current fertility', whereas children-ever-born data are useful in estimating 'cumulative fertility'. Cho et al. (1970) argued that cumulative fertility carries a lag in fertility change over time while the current fertility clearly indicates the results of the actual change in recent fertility. For example, if we compare cumulative fertility rates based on children ever born and those constructed by cumulating current fertility data for 2000, the latter would reflect the actual fertility in 2000, while the former would reflect the fertility which mostly occurred in the 1980s.

This paper aims to assess the reliability of the own-children estimates derived from the Iran 1986, 1996 and 2006 censuses as well as the Iran Demographic and Health Survey. The method is applied to the three decennial censuses to estimate fertility measures for the period 1971 to 2006. Each of the censuses provide fertility estimates for 15 years prior the survey, i.e 1971-1986; 1981-1996; 1991-2006. Thus, in addition to the fertility measures for a three more than three decades, there are five year overlaps in the fertility estimates in each of the census (i.e. 1981-1986; 1991-1996; and 2001-2006). These measures provide an excellent opportunity to examine the accuracy of the results in each of the censuses. Furthermore, the 2000 Iran Demographic and Health Survey provides additional source of information for estimating fertility during 1986 and 2000. The results of the own-children estimates using the censuses can be checked against an independent source of data ensuring the reliability of the results.

The results of the own-children method using the three censuses will also compared with the results obtained from other direct and indirect method of fertility estimation. For example, children born during the past 365 days prior the census have been asked in the 2006 census. Using this information, we will calculate fertility measures for the census year and compare the results with those obtained from the own-children method.

Furthermore, for the first time the 2006 census has asked question on mother's line number. Using this information, it is possible to directly link every child with his/her mother in the household. Thus, fertility measures can be estimated either based on matching procedure using the relationship to the head of household or based on the mother's line number. It is well established that the mother line number provide a more accurate result. However, this additional information would be very valuable for investigating the results from the alternative matching procedure using the relationship to the head of household.

Other examinations for the accuracy of the results include a detailed investigation of mortality assumptions, the presence of non-own children, age misreporting and undercount.

Having examined the reliability of the results of the own-children estimates, fertility measures will be presented for Iran by province and rural/urban areas for the period 1971-

2006. In addition, using the 2006 census, for the first time in Iran, the results will be obtained by religion (Muslim, Christians, Zoroastrian and Jews) and nationality (Iranians, Afghans, and Iraqis).

Conclusion

Using the own-children method, as one of the useful indirect techniques of fertility estimation, current fertility measures for Iran by province and other variables are calculated. The results of the own-children method are assessed through a detailed investigation of different assumptions of the own-children method. Our preliminary results suggest that despite some of the shortcomings, the result was not affected by age misreporting and underreporting, nor by mortality assumptions. The proportion of non-own children was not very high, except for some provinces, so that its effects on the own-children fertility estimates, too, were found to be minimal. The largest effects occurred when the 'constancy of group-membership' assumption was violated through changing population composition of a large influx of recently arrived migrants to urban areas who were dissimilar to those they joined. Apart from this, control of the own-children estimates against fertility estimates against other methods and data sources shows the accuracy of the own-children estimates. This suggests the usefulness of the own-children method in studying differential fertility in Iran.

Although the own-children method has been developed in the 1960s to overcome the incompleteness of vital registration or the census data, it is still a useful method for estimating current differential fertility particularly in the transitional countries. Other indirect methods of fertility estimation are based on the assumption that fertility is constant during the years preceding the census or surveys. Using this assumption would be misleading for countries that are experiencing fertility decline. For example, Iran has experienced a rise and sharp fall of fertility over the last three decades (Abbasi-Shavazi and McDonald 2005, 2006). The yearly fluctuation of fertility has only been possible through the application of the own-children method.

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