Empirical Test of the Caldwell’s Fertility Theory of Intergenerational
Wealth Flows in India: Evidence from National Family Health Survey Data

Uttam Kumar Sikder
Assistant Professor (Stage 3), Department of Economic and Politics,
Visva-Bharati, Satiniketan, West Bengal, India

Abstract: There is a close association between population growth and economic development. India is the second most populous country in the world which is obviously the obstacle of economies development. The slow decline in population growth depends on the high level of fertility rate of population. There are available various theories of demographic transition in the world. In the present paper we examine or test of the Caldwell’s fertility theory of intergenerational wealth flows in India from the evidence of the third rounds of national family health survey (NFHS-3) data in 2005-06. The theory proposes that fertility decisions in all societies are economically rational response to familial wealth flows. In societies with net upward wealth flows, the economically rational decision is to have as many survival children as possible. On the other hand, in societies with net downward wealth flows, the economically rational decision is to have no children or minimum number allowed by psychological disposition.

To test the Caldwell’s theory of fertility in Indian context the multiple regression model of total fertility rate is applied where lowest wealth quintile and highest wealth quintile are taken as explanatory variables. After running multiple regressions it is found that the results reveal the opposite picture of the proposition of Caldwell’s theory of fertility. Therefore, there is no empirical support of the Caldwell’s fertility theory in Indian context. Actually cultural transmission of new family values is principal driving force in fertility transition. Basically culture is an admixture of many things which differs from country to country. This cultural phenomenon in India might have been caused of the failiour of Caldwell’s fertility theory of intergenerational wealth flows.

I. Introduction

India is the second most populous country of world, had a population of 846 million at the time of 1391 census and estimated 950 million at the end of the 1997. The implicit average annual growth rate during 1981-91 was 2.1 percent, only slightly lower than 2.2 percent observed during the two decades of 1961-81 (GOI, 1993a). The near-stagnation in the growth rate reflects the downward trends in both-mortality and fertility. According 2011 census the population in India was 1.221 billion. Total fertility rate is the important indicators of population growth. This huge pressure of population affects the economic development of the country look like India.

Average number of children that would be born per women if the women lived to the end of their child bearing years and born children according to a given fertility rate at each age is not only direct measure of the level of fertility (since it refers to births per women) but also an indicator of the potential for population change in the country. Fertility differs significantly between different countries due to various economic, social, political and cultural factors. The multi-cultural society look like India is therefore likely to show a verity of fertility behavior. In the present paper we will seek to empirical test of the Caldwell’s. “Fertility theory of Intergenerational Wealth Flow” in respect of India by the evidence from third rounds of national family health survey data in 2005-06.

John Caldwell’s wealth flow theory proposes a direct link between family structure and fertility (Caldwell, 1976). According to the theory there are only two forms of family structure, differing principally in the direction of wealth flows among generations. In ‘primitive’ and ‘traditional’ societies, net wealth flows are primarily upward from younger to older generations and individual interests are subjugated to corporate interests. In developed nations, family structure is organized in terms of downward wealth flows where parents are expected to provide for children’s economic well-being. The theory proposes that fertility decisions in all societies are economically rational responses to familial wealth flows. In societies with not upward wealth flows, the economically rational decision is to have as many surviving children as possible (within the constraint imposed by biology), because each additional children adds positively to a parent’s wealth, security in old age, and social and political well-being. In societies with not
downward wealth flows, the economically rational decision is to have no children or minimum number allowed by psychological disposition that derives pleasure from children and parenting. The worldwide transition from high to low fertility is the result of a change in family structure from upward to downward wealth flows.

II. Data, Methodology and Econometric Model

The entire data used in the present study is from secondary sources of data collected throng the third rounds of national family health survey (NFHS-3). We consider 22 states in India as a cross sectional unit according to consistent data out of 29 states. To test the Caldwell’s fertility theory of intergenerational wealth flow in India the following functional relationship would be taken up.

\[ \text{TFR} = f(\text{LWQ}, \text{HWQ}, \text{U}) \quad (1) \]

Where

TFR: Total Fertility Rate
IWQ: Lowest Wealth Quintile
HWQ: Highest Wealth Quintile
U: error term

Now we would like to define the explanatory variables included in our model. One of the background characteristics used throughout the NFHS-3 report is a wealth index of the economics status of households called the wealth index. The wealth index has been developed and tested is a large number of countries in relation to inequalities in household income use of health services and health outcomes (Rutstein et al., 2000). It is an indicator of the level of wealth that is consistent with expenditure and income measures (Rutstein et al., 1999). The economic index was constructed using households’ asset data and housing characteristics.

Each household asset is assign to wealth (factor score) generated through principle component analysis, and resulting asset scores are standardized in relation to a normal distribution with a mean of zero and standard deviation of one (Gwatkin et al., 2000). Each household is then assigned a score for each asset, and scores were summed for each household, individuals are ranked according to the score of the household in which they reside. The sample is then divided into quintiles i.e., five groups with an equal number of individuals each. In our study we consider lowest quintile and highest quintile wealth index for each state in our consideration (Delhi, Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Rajasthan, Uttaranchal, Chhattisgarh, Madhya Pradesh, Uttar Pradesh, Bihar, Jharkhand, Orissa, and West Bengal, Arunachal Pradesh, Assam, Manipur Meghalaya, Mizoram, Nagaland, Sikkim and Tripura).

III. Results and Discussion

In order to test the fertility theory of Caldwell we should regress total fertility rate on LWQ and HWQ (equation-1). Before running robust multiple regression of TFR correlation analysis was done to verify whether multi-collinearity exists among the explanatory variables in the total fertility function which is presented in table-1 in appendix. The findings indicate nature and degree of association between the paired variables do not satisfy the a priori theoretical expectation as per Caldwell’s theory of fertility in every case. Not only that there exists inter correlation among the explanatory variables which obviously will lead to the problem of multicollinearity. The result of the multiple regressions (robust) is presented in table 2 in the appendix. In terms of multiple coefficient of determination (R-squared) the goodness-of-fit of the chosen model is not satisfactory at all as it observed to be 0.2374. Hence about 24% of the variation of total fertility rate (dependent variable) can be explained in terms of explanatory variables lowest wealth quintiles and highest wealth quintiles. The goodness-of-fit of our model is poor due to the fact that there are so many variables which can explain the TFR and those variables are not included in our model. The observed value of probability of F indicates the overall model is statistically significant at 5% level. Therefore we should reject the null hypothesis. Further as the average variable inflation factor is 1.77 which indicates the model does not suffer from seven multicollinearity problem.

The signs of the estimated coefficients have not established the hypothesis of the Caldwell’s fertility theory of intergenerational wealth flow in India as coefficients of lowest wealth quintile and highest wealth quintile are positive and negative respectively and we obtained totally opposite picture of Caldwell’s theory. This scenario is not surprising at all since in the developing country look like India, it is true that poverty leads to more population. Hence the Caldwell’s theory of fertility is not applicable in the country look like India.

IV. Conclusion

In this paper, an attempt has been made to test the Caldwell’s fertility theory of intergenerational wealth flows in India based on the NFHS-3 data where twenty two states were considered as a cross sectional unit. Regression results totally reject the fundamental contribution of wealth flows theory of Caldwell. On the other word there was not found any empirical support of the Caldwell’s theory of fertility in Indian context. According to
Caldwell’s theory, cultural transmission of new family values is the principal driving force in fertility transition. Culture is many things: a body of accumulated information, a set of customs and rituals, group beliefs, and a mindset about the organization of the social and physical environments. Each of these components may be related to fertility, but a generalized culture concept cannot be successfully used to explain patterning and variation in fertility without risking circularity (Boek, 1999).

It also inspired and influences a large number of empirical studies. However, in the strict sense of predicting two fertility regimes to associate with upward and downward wealth flows, empirical evidence does not strong support in the country look like India. In the weak sense of predicting a negative relationship between net wealth flows to children and fertility, there is a good deal of empirical support. One important limitation of my theory is our study is based on the cross section data. The time series or pooled data may find another picture. I hope it will do in future research.

References

Appendix

Table 1: Pair Wide Correlation between Total Fertility Rate and Among Highest Wealth Quintiles & Lowest Wealth Quintiles

<table>
<thead>
<tr>
<th></th>
<th>tfr</th>
<th>hwq</th>
<th>hwq,star(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corr</td>
<td>1.0000</td>
<td>0.3739</td>
<td>1.0000</td>
</tr>
<tr>
<td></td>
<td>hwq</td>
<td>-0.4813*</td>
<td>-0.6584</td>
</tr>
</tbody>
</table>

Source: Author’s Own Calculation from NFHS-3 Data

Table 2: Determinant of TFR: A Robust Multiple Regression Model

```
. reg tfr hwq hwq, robust
Linear regression
Number of obs = 22
F( 2, 19) = 4.73
Prob > F = 0.0216
R-squared = 0.2374
Root MSE = .5886
```

|     | Coef. | Std. Err. | t | P>|t| | [95% Conf. Interval] |
|-----|-------|-----------|---|-------|---------------------|
| tfr | .0042214 | .0099046 | 0.43 | 0.675 | -.0165091 | .024952 |
| hwq | -.0173568 | .0095231 | -1.82 | 0.084 | -.0372889 | .0025753 |
| hwq | 3.111337 | .4220017 | 7.37 | 0.000 | 2.228077 | 3.994597 |

```
. vif
Variable  VIF  1/VIF
hwq  1.77  0.565957
hwq  1.77  0.565957
Mean VIF | 1.77
```


