ANALYSIS OF THE DETERMINANTS OF FERTILITY TRANSITION IN MALAPPURAM DISTRICT

Zabeena Hameed P. “Female education and demographic transition in Kerala with special reference to Malappuram district” Thesis. Department of Economics, Dr. John Matthai Centre, University of Calicut, 2007
ANALYSIS OF THE DETERMINANTS OF FERTILITY TRANSITION IN MALAPPURAM DISTRICT

7.1 Analysis of Individual Factors
7.2 Analysis of the Impact of Age at Marriage, Female Education, Male Education, Female Income and Religion
7.3 Analysis of the Impact of Male and Female Education
7.4 The Complete Model
7.5 The Reduced Model
7.6 Conclusion
CHAPTER VII

ANALYSIS OF THE DETERMINANTS OF FERTILITY TRANSITION IN MALAPPURAM DISTRICT

Fertility transition depends on a number of factors like biological, psychological, physiological, social, economic, cultural and so on, and a combination of more than one factor. Hence it is extremely difficult to compartmentalize various studies emphasizing the factors determining fertility. In this chapter we focus on the socio-economic factors affecting fertility and certain broad agreements on the inter-relationships between fertility and socio-economic and demographic factors are discerned. First we consider the individual influence of various socio-economic factors on children ever born to our samples. Second, we examine influence of the factors, which have significant individual influence on children ever born. Then we analyse the relative influence of male and female education on children ever born. Then we proceed to the complete model and the reduced model of the determinants of fertility transition in Malappuram district.

7.1 ANALYSIS OF INDIVIDUAL FACTORS

In this section, we analyse the individual influence of ten socio-economic factors like age at marriage, number of years of migration of the husband, number of years of female schooling, religion, number of years of male schooling, female employment, family income, place of residence, nature of family and female income on children ever born to our sample population. Here, religion, female employment, place of residence and nature of family are treated as dummy variables. The results of the simple regressions are shown in Table
7.1. The variables that have a significant statistical influence are marked with stars. We proceed by observing the influence of all the ten variables one by one.

Table 7.1
Results of the Simple Regressions

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Variable</th>
<th>Coefficient of the constant</th>
<th>'t' value of the constant</th>
<th>Coefficient of the variable</th>
<th>'t' value of the variable</th>
<th>F</th>
<th>Adjusted R-square d</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age at Marriage*</td>
<td>6.5279</td>
<td>12.443</td>
<td>-0.1967</td>
<td>-6.560</td>
<td>43.03</td>
<td>0.1208</td>
</tr>
<tr>
<td>2</td>
<td>Migration</td>
<td>3.161</td>
<td>27.264</td>
<td>-0.0046</td>
<td>-0.255</td>
<td>0.07</td>
<td>-0.0031</td>
</tr>
<tr>
<td>3</td>
<td>Female Education*</td>
<td>4.866</td>
<td>23.577</td>
<td>-0.2269</td>
<td>-9.347</td>
<td>87.37</td>
<td>0.2201</td>
</tr>
<tr>
<td>4</td>
<td>Religion*</td>
<td>2.625</td>
<td>12.719</td>
<td>0.7098</td>
<td>2.957</td>
<td>8.75</td>
<td>0.0247</td>
</tr>
<tr>
<td>5</td>
<td>Husband’s Education*</td>
<td>4.064</td>
<td>18.644</td>
<td>-0.1209</td>
<td>-4.763</td>
<td>22.69</td>
<td>0.0662</td>
</tr>
<tr>
<td>6</td>
<td>Female Employment</td>
<td>3.204</td>
<td>28.709</td>
<td>-0.5971</td>
<td>-1.616</td>
<td>2.61</td>
<td>0.0052</td>
</tr>
<tr>
<td>7</td>
<td>Family Income</td>
<td>3.176</td>
<td>23.479</td>
<td>-0.0025</td>
<td>-0.317</td>
<td>0.10</td>
<td>-0.0029</td>
</tr>
<tr>
<td>8</td>
<td>Place of Residence</td>
<td>3.408</td>
<td>15.919</td>
<td>-0.3429</td>
<td>-1.390</td>
<td>1.93</td>
<td>0.0030</td>
</tr>
<tr>
<td>9</td>
<td>Nature of Family</td>
<td>3.166</td>
<td>23.438</td>
<td>-0.449</td>
<td>-0.204</td>
<td>0.04</td>
<td>-0.0031</td>
</tr>
<tr>
<td>10</td>
<td>Female Income *</td>
<td>3.2109</td>
<td>29.459</td>
<td>-0.0001</td>
<td>-2.365</td>
<td>5.59</td>
<td>0.0148</td>
</tr>
</tbody>
</table>

1. **Age at Marriage:** It is often felt that the enhancement of age at marriage leads to a reduction in the number of children born. This inverse relationship has been depicted in various studies, namely Davis (1963)\(^1\), Agarwal (1966)\(^2\), Gulati (1969)\(^3\), Cassen (1978)\(^4\), Sathar et al. (1988)\(^5\), Ogawa and Retherford (1993)\(^6\). Length of schooling is associated with the start of reproductive life, that is, the age at marriage and age at child bearing. Late marriage as a result of an increase in the number of years of education helps to ease the population pressure in any community. The association between children ever born and age at marriage is analysed with the help of a simple regression model. The result of our study

271
helps us to infer that age at marriage has a significant negative influence on children ever born, among our samples.

2. Migration: Migration could have positive and negative impact on fertility. Migration should lead to an increase in birth rate due to structural factors (lower age at marriage for girls in migrant households), but should lead to a decline in fertility due to behavioural factors (Physical separation, increased cost of accommodation and education, better information on family planning services etc.). Zachariah et al. (2000) observe that migration has, on the whole a negative impact on fertility. However, from our study we see that the influence of migration is not statistically significant and hence, we conclude that migration is not an important factor affecting fertility of our samples in Malappuram district.

3. Female Education: Education has long been recognized as a crucial factor influencing women’s childbearing pattern. An extensive demographic literature is devoted to examining the role of female education in promoting sustained fertility decline. Studies analysing fertility differentials by educational status of females generally reveal a negative association between fertility and education [Cochrane (1979), Caldwell (1980), Liven (1991), Jejeebhoy (1995) and Ainswork et al. (1996)]. In other words, higher educated mothers are found to concentrate more on improving the quality of their children rather than their number. Our study arrives at the similar conclusion of these studies and female education is an important determinant of fertility among our samples.

4. Religion: Almost all religions preach that children are the blessings of God and they should not be denied. In urban areas, the hold of religion and grip of orthodoxy is very much loosing itself and hence family planning devices are adopted without much hesitation. This is an important reason for low fertility in
urban areas. In many studies, fertility among Muslims has been observed to be higher than other religious groups [(Davis (1951)\textsuperscript{13}, Dandekar (1967)\textsuperscript{14}, Morgan et al. (2002)\textsuperscript{15}, Iyer (2002)\textsuperscript{16}, Bhat and Zavier (2004)\textsuperscript{17}]. However, it is observed that religious differentials in fertility and in the use of family planning methods decline with the increase in education and socio-economic development. The influence of religion on fertility is analysed with the help of a simple regression model where religion is treated as a dummy variable and the value assigned for Muslims is ‘one’ and for non-Muslims is ‘zero’. Our study finds that fertility is relatively higher among Muslims, when compared with non-Muslims. Thus, the fertility of Muslims is statistically and significantly different from that of Non-Muslims.

5. **Husband’s Education:** Assortive matching is common among societies. ie, each partners education has a casual effect on his/her partner’s education. Educated husbands may prefer wives with higher education and vice versa. Hence we consider the influence of husband’s education is number of years on children ever born. Our study shows that husband’s education has significant individual influence and the influence is negative.

6. **Female Employment:** Another important factor which influences fertility is the occupation of the couple, to be more specific; the occupation of females. It is usually seen that those engaged in mental work have less number of children, compared with those who do some sort of physical labour. Women’s work is widely seen an important component of female agency, empowering women in society. It plays a significant role in reducing gender inequality, and is also seen to affect levels of fertility and child mortality. This transmission mechanism becomes easier when women are educated and exposed to mass media. Folb
and Feng and Quanhe (1996) addresses the movement of women into paid employment (non-familial employment) as an important factor that depresses fertility. The influence of female employment on fertility is analysed with the help of a simple regression model where female employment is treated as a dummy variable. The result shows that female employment is not an important variable effecting fertility among our samples of Malappuram District. This can be due to the lowest work participation rate (6.6 per cent), especially of females, of Malappuram district.

7. Family Income: Empirical studies on the relationship between economic status and fertility depict two types of relationships. Demographers like Sinha (1957) and Okpala et al. (1996) find the relationship to be inverse between fertility and income to depict economic status. On the other hand, we find that the United Nations – Government of India Survey of Mysore (1961) established a positive relationship between fertility and economic status of the family. Though we find a negative relationship between income and children ever born in our study, the result is not statistically significant. Hence, we infer that the individual influence of family income on fertility is not significant among our samples of Malappuram district.

8. Place of Residence: Fertility differentials exist by rural-urban residential status. It is generally believed that urbanization is not conducive for fertility. This is on account of the high cost of living in cities, which families with a big size cannot afford. Studies by Cassen (1978), Zeng and James (1989) and Benefo and Schultz (1996) observe that urbanization plays a significant role in depressing fertility. While regressing children ever born on place of residence, values are given in such a way that for residents in urban areas it is ‘zero’ and for
residents in rural areas it is ‘one’. This is based on the general observation that fertility is lower in urban areas. From this study, we find that urbanization is not a significant factor influencing the fertility behaviour among our samples.

9. Nature of Family: Family system also affects fertility behaviour. Fertility differentials exist by type of family structure, ie, joint family or nuclear family. Usually fertility is found to be low in nuclear families than joint families, especially when both husband and wife are employed. This is on account of the fact that there is no elder lady at home to look after the children. On the other hand, in the joint family, there is no such problem because even if both husband and wife are employed, there are many elder ladies who can look after the children and as such the couples are less bothered about the number of children they have. The variable ‘nature of family’ is treated as dummy variable where joint families are coded ‘one’ and nuclear families ‘zero’.

10. Female Income: Socio economic development, especially of females influence fertility behaviour. Educational attainments of persons give new avenues for them to raise their social status, encourage them in non-familial activities, and expose them to various communication media. Fertility is found to be high in societies where woman are confined only to household job when compared with the societies where the woman are expected to participate in all walks of life, along with men. Similarly, educated and employed woman also avoid having big families. Female income is often treated as an indicator of female autonomy. Regression of fertility on female income shows an inverse relationship between these variables and is statistically significant among our samples. But the influence is negligible and this can be on account of low work
participation rate for females in Malappuram, which naturally leads to low female income.

The above analysis of the individual influence of ten socio-economic factors on children ever born shows that five variables have significant influence. They are age at marriage, female education, religion, husband’s education and female income.

7.2 ANALYSIS OF THE IMPACT OF AGE AT MARRIAGE, FEMALE EDUCATION, MALE EDUCATION, FEMALE INCOME AND RELIGION

From the earlier section, we have seen that the age at marriage, female education, husband’s education, religion and female income have a significant influence on fertility. As these variables have an individual influence on children ever born, we also examined their combined influence using the following multiple regression model. Figures given in the parenthesis represents the ‘t’ values.

\[ CEB = f(AAM, FED, HED, RIN, REL) \]  (7.1)

\[ CEB = \alpha_0 + \beta_1 AAM + \beta_2 FED + \beta_3 HED + \beta_4 RIN + \beta_5 REL + U \]  (7.1.1)

\[ CEB = 6.863 - 0.1256 AAM - 0.1933 FED \]
\[ (9.6266) (-3.5179) (-5.9327) \]
\[ - 0.0067 HED + 0.00009 RIN - 0.1047 REL \]
\[ (-0.2309) (1.3255) (-0.4191) \]

\[ R^2 = 0.2585 \]
\[ F = 20.986 \]
where,

\[
\begin{align*}
\text{CEB} & = \text{Children Ever Born} \\
\text{AAM} & = \text{Age at Marriage of females} \\
\text{FED} & = \text{Female Education in number of years} \\
\text{HED} & = \text{Husband’s Education in number of years} \\
\text{RIN} & = \text{Female Income} \\
\text{REL} & = \text{Religion}
\end{align*}
\]

Table 7.2
Analysis of the Impact of AAM, FED, HED, RIN and REL on CEB

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>t Stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>6.863017</td>
<td>9.626643062</td>
</tr>
<tr>
<td>Age at Marriage</td>
<td>-0.12557</td>
<td>-3.517868852</td>
</tr>
<tr>
<td>Female Education</td>
<td>-0.19331</td>
<td>-5.932743621</td>
</tr>
<tr>
<td>Husband’s Education</td>
<td>-0.00668</td>
<td>-0.230925686</td>
</tr>
<tr>
<td>Female Income</td>
<td>0.00009</td>
<td>1.325490344</td>
</tr>
<tr>
<td>Religion</td>
<td>-0.10473</td>
<td>-0.419145252</td>
</tr>
</tbody>
</table>

Equation 7.1.2 regresses CEB on a set of five independent variables viz, AAM, FED, HED, RIN, REL and the result of this multiple regression is represented in Table 7.2. The Table clearly depicts that among these five variables, the most significant variable that influence CEB is female education (FED). Age at marriage is the other significant variable that affects fertility among these five selected variables. Though HED, RIN and REL do not have a significant statistical influence on fertility in this multiple regression, these variables have an individual influence on fertility.
7.3 ANALYSIS OF THE IMPACT OF MALE AND FEMALE EDUCATION

There is nothing new about the belief that the spread of education with its impact on knowledge and outlook is a central force behind demographic transition. Education may inculcate a greater sense of personal responsibility for one’s children and control over the welfare of children. Educational attainment a society is highly associated with the level of socio-economic development. It is argued that the primary determinant of the timing of the onset of fertility transition is the effect of mass education on families. Generally, couples having higher educational achievements depict lower fertility. But whether the influence of male and female education on fertility is similar or not is an important matter of concern. To analyse the relative influence of male and female education on children ever born, we use the following econometric model.

\[ CEB = f(\text{FED, HED}) \]  
\[ CEB = \alpha_0 + \beta_1 \text{FED} + \beta_2 \text{HED} + U \]  
\[ CEB = 4.8311 - 0.2347 \text{FED} + 0.0124 \text{HED} \]  
\[ (21.703) (-7.761) (0.428) \]

\[ F = 43.66 \]
\[ R^2 = 0.2180 \]

where,

\[ \text{FED} = \text{Number of years of female education} \]

and \[ \text{HED} = \text{Number of years of husband’s education}. \]
Table 7.3 presents the result of the multiple regression of female and male education on fertility. The result of this multiple regression model shows that female education is inversely related to fertility and is an important determinant of children ever born. Thus, female education seems indeed to matter more than male education in determining the number of children born to couples among our samples of Malappuram district. This result of our study is in conformity with the findings of Breierova and Duflo (2002) and Aainsworth et al. (1996) in their study also found that female education is a stronger determinant of fertility than male education.

Table 7.3

<table>
<thead>
<tr>
<th>Variables</th>
<th>Co-efficient</th>
<th>‘t’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>4.8311</td>
<td>21.703</td>
</tr>
<tr>
<td>Female Education</td>
<td>-0.2347</td>
<td>-7.761</td>
</tr>
<tr>
<td>Male Education</td>
<td>0.0124</td>
<td>0.428</td>
</tr>
</tbody>
</table>

7.4 THE COMPLETE MODEL

Fertility transition depends on a number of socio factors like education, migration, religion, employment, income, nature of family, age at marriage place of residence, and so on. The fertility transition patterns observed over various regions have differed in terms of the variable that initiated the transition and in the tempo of change in the vital rates. This difference can be attributed to the disparities in economic development in different societies. Thus each socio-economic development pattern shapes and creates an accompanying demographic pattern. Notestien (1953) and Davis (1963) try to justify the
anomalistic pattern seen in fertility transition in terms of disparities in economic development.

To discern the important factors that affect fertility, we build a multiple regression model, including all the variables that seem to be important in determining fertility in Malappuram district. This empirical model of fertility determinants regresses children even born to each woman on a set of ten independent variables. The model can be expressed in the following mathematical form.

\[ CEB = f(MIG, AAM, FED, REL, HED, EMP, FIN, PRE, NFA, RIN) \]  \hspace{1cm} (7.3)

\[ CEB = \alpha_0 + \beta_1 MIG + \beta_2 AAM + \beta_3 FED + \beta_4 REL \]
\[ + \beta_5 HED + \beta_6 EMP + \beta_7 FIN + \beta_8 PRE + \beta_9 NFA + \beta_{10} RIN + U \]  \hspace{1cm} (7.3.1)

\[ CEB = 4.9120 + 0.0084 MIG - 0.1140 AAM - 0.2022 FED \]
\[ (3.7095) \hspace{0.5cm} (0.5323) \hspace{0.5cm} (-3.0972) \hspace{0.5cm} (-6.2187) \]
\[ -0.0983 REL - 0.0276 HED - 2.3712 EMP \]
\[ (-0.3900) \hspace{0.5cm} (-0.9362) \hspace{0.5cm} (-1.635) \]
\[ +0.4807 FIN - 0.3646 PRE - 0.1824 NFA \]
\[ (2.0162) \hspace{0.5cm} (-1.6042) \hspace{0.5cm} (-0.937) \]
\[ +0.7110 RIN \]  \hspace{1cm} (7.3.2)
\[ (1.6962) \]

\[ R^2 = 0.2821 \]
\[ F = 11.6320 \]

where,

\[ MIG = \text{Number of years of Husband's migration} \]
\[ AAM = \text{Age at Marriage of Females} \]
Equation 7.3.2 gives the complete model of determinants of fertility and shows the relative influence of various socio-economic factors in determining fertility among our samples of Malappuram district. The result of the complete model is shown in Table 7.4. Out of the ten independent variables selected, three variables viz, age at marriage, female education and family income are found to influence of fertility and the influence of these variables are statistically significant. Female education and age at marriage have a strong inverse relationship with children ever born to women whereas family income is positively related to children ever born. The relatively low R squared for this model may be due to the inclusion of four dummy variables and due to the influence of exogenous factors on fertility.
Table 7.4
Result of the Complete Model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>t Stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>4.912058</td>
<td>3.709458</td>
</tr>
<tr>
<td>Migration</td>
<td>0.008424</td>
<td>0.532306</td>
</tr>
<tr>
<td>Age at Marriage</td>
<td>-0.11401</td>
<td>-3.09718</td>
</tr>
<tr>
<td>Female Education</td>
<td>-0.20223</td>
<td>-6.21867</td>
</tr>
<tr>
<td>Religion</td>
<td>-0.0983</td>
<td>-0.39003</td>
</tr>
<tr>
<td>Husband’s Education</td>
<td>-0.02762</td>
<td>-0.93624</td>
</tr>
<tr>
<td>Female Employment</td>
<td>-2.3712</td>
<td>-1.63452</td>
</tr>
<tr>
<td>Family Income</td>
<td>0.480683</td>
<td>2.016182</td>
</tr>
<tr>
<td>Place of Residence</td>
<td>-0.36459</td>
<td>-1.60421</td>
</tr>
<tr>
<td>Nature of Family</td>
<td>-0.1824</td>
<td>-0.93701</td>
</tr>
<tr>
<td>Female Income</td>
<td>0.711004</td>
<td>1.6962</td>
</tr>
</tbody>
</table>

7.5 THE REDUCED MODEL

Out of the ten independent variables selected, we have seen that AAM, FED and FIN are the important variables affecting fertility behaviour of our samples. Based on this finding, we formulate the reduced model of determinants of fertility transition among our samples of Malappuram district and the results of this model are presented in Table 7.5. The model can be expressed as follows:

$$ CEB = f(AAM, FED, FIN) $$ (7.4)

$$ CEB = \alpha_0 + \beta_1 AAM + \beta_2 FED + \beta_3 FIN + U $$ (7.4.1)

$$ CEB = 3.9979 - 0.10278 AAM - 0.20563 FED + 0.51377 FIN $$

(3.3574) (-3.4026) (-7.6456) (2.2294) (7.4.2)

$$ R^2 = 0.2654 $$

$$ F = 36.4957 $$
From the above analysis of determinants of fertility, we conclude that female education, age at marriage and family income are the most important variables that affect the fertility behaviour of our samples of Malappuram district. A number of factors like biological, physiological and psychological affect fertility and these factors influence fertility exogenously. This seems to be a reason for low R squared for the models.

### 7.6 CONCLUSION

Out of the ten variables selected, we found that five variables viz, age at marriage, female education, husband’s education, religion and female income exerted an individual influence on children ever born. However, when these five variables were taken together, only two variables viz, age at marriage and female education proved to be statistically significant. Again, when the number of children born was regressed on female and male education, the impact of female education proved to be significant and strong when compared with education of males (husband’s). In the complete model also we find that female education is highly significant. Besides female education, age at marriage and family income also influence fertility significantly. Thus, among all the socio-economic factors considered, female education seemed to be the major determinant of fertility among our samples of Malappuram district.

### Table 7.5

Results of the Reduced Model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>t Stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>3.997933</td>
<td>3.357482</td>
</tr>
<tr>
<td>Age at Marriage</td>
<td>-0.10278</td>
<td>-3.40264</td>
</tr>
<tr>
<td>Female Education</td>
<td>-0.20563</td>
<td>-7.64555</td>
</tr>
<tr>
<td>Family Income</td>
<td>0.513774</td>
<td>2.229412</td>
</tr>
</tbody>
</table>
REFERENCES


17 P.N. Mari Bhat, and A.J. Francis Zavier, (2004). “Religion in Demographic Transition: The case of Indian Muslims”, ed. in Irudaya Rajan and KS James, Demographic Change, Health Inequality and Human Development in India, Centre for Economic and Social Studies, Hyderabad.


27 Ainsworth, op. cit.


29 Kingsley Davis, op. cit.