Demographic Determinants of Women's Fertility Decision

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Abstract **- Malaysia is an interesting country to study despite a dramatic change in demographic and socioeconomic development. The division of socio-economics among the three ethnicities was influenced by the British colonization, until its independence in 1957. This paper develops an empirical model to investigate the principal determinants of fertility in Malaysia employing panel data extracted from census data from Minnesota Population Centre, Integrated Public Use Microdata Series, International, which was provided by Department of Statistics Malaysia. The analyses were based on proxy of four demographical effects: marital status, age, ethnicity and location. The analyses employ binary model using the dependent variable as 0 (no children) and 1 (with children). The results obtained in this study showed that Malaysian women prefer to have children between the age of 30 to 44. As in the case of ethnicity, only two ethnic groups were significant, with higher probability among Malays at 19 percent and second among Indians at 13 percent. The last variable on location was significant, which indicates that urban Malaysians prefer not to have more children at a probability of 8.9 percent. Consequently, these results demostrate that women's preference for children are associated with age, marital status and ethnicity.**

Keywords: fertility, demographic, binary, binary-model

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1. Introduction

According to a United Nation report, since the 1950s the world has experienced profound declines in fertility and an increased postponement of the start of child-bearing, though the level and pace of change in fertility have varied markedly among countries and areas. These are due to the advancement in technological innovation and societal change in which increasing availability of and access to a range of effective contraceptive methods have been critical in reducing fertility, improving reproductive and child health. Therefore, most governments have been involved directly and indirectly in supporting family planning programs (United Nations, Department of Economics and Social Affairs, Population Division). In Malaysia, the division of socio-economics among the three ethnicities was influenced by the British colonization, until the independence in 1957. Historically, Malaysian ethnic demographics were change by the British. The Chinese and Indian we brought to Peninsular Malaysia for the mining industries and rubber plantation. These has contributed to the division of labour, which was divided into Malays into traditional agriculture and some lower to middle level government post, Chinese into business sectors and Indian in rubber plantation and some administration post. The segregation has reinforced cultural and religious distinction in the society. Linear extrapolation of fertility trends of the 1980s led to prediction that the Chinese would attain replacement level fertility in the year 1995 and the Indians in the year 2000, that fertility for these two groups would continue to fall below replacement level, and that the Malay fertility rate is declining at a slower pace so that the ethnic fertility differential would widen (Lim, Jones and Hirshman, 1987).

11. Literature Review

Fifty years ago, Bumpass & Westoff (1970) asked, "Do women limit their fertility in order to have time to pursue their nonfamily-oriented interests, or do women work if their fertility permits them to do so?" Based on the underlying fundamental questions shaped by sociologist, demographers and economists, it was women's labor force behavior that lies at the heart of most explanations for fertility and fertility change (Brewster & Rindfuss, 2000). However, the fundamental question is no longer valid in the current society we live in today, many other explanations need to be explored. Womens' responsibilities are very demanding in today's economy, they need to go to work and do child rearing tasks more or less simultaneously. The "Unified Growth Theory" introduced by Galor and Weil (1999, 2000) combines a microeconomic model of the demand for children with feedbacks from a model of growth based on the "Malthusian" economy of high fertility and small growth in per-capita income to one in which fertility is lower and per-capita incomes grow tremendously. Garlor (2005) characterize the Malthusian stage with little education or human capital, low productivity, and a high gross reproduction rate but low due to high mortality rate that contribute to low population growth. Elgin (2012) then merge the unified growth models and Hansen and Prescott (2002) capture the importance of human capital formation, fertility decline, and the transition from agriculture to industry in transition from stagnation to growth. Other literature which considers fertility and growth looks at the role of children in the labour market. These discussions have aggravated renewed interest in the empirics of the historical fertility transition on when and why it took place, and how fast it is able to create the low fertility we currently observe in most wealthy countries. In recent years, economists have explored more on microeconomics determinants of fertility to provide a better theoretical and empirical explanation for the declining fertility rates. The traditional neoclassical microeconomic theories by Leibenstein (1957) and Becker (1960) explain the concept of economic principle and optimization on deciding family size decisions. In economics, the ultimate goal of a consumer is to maximize total utility of individuals within the society. The term *utility* generally refers to the total satisfaction one receives or gains from consuming a given number of commodities (good or services) in an economy subject to income constraint and relatives price of all goods. Applying this theory to fertility analysis, children are considered as 'consumption good' or 'investment good', so fertility becomes a rational economic response to consumer (household) demand for children relative to other goods.

111. Methodology and Data

The binary outcomes can be viewed as a reflection of the underlying regression, in which the dependent variable is continuous but unobservable. This unobservable variable is known as 'latent variable', y_i^*.

The binary choice model can be constructed as

$$Y_i^* = x_i'\beta + \varepsilon_i \quad \text{with } \varepsilon_i \sim i.i.d, (0,\sigma^2)$$

and

$$y_i = \begin{cases} 0 & Y_i^* \le 0 \\ 1 & Y_i^* > 0 \end{cases} \text{ if}$$

Consequently,

$$P_r [y_i = 1] = P_r [y_i^* > 0\} = P_r [x_i'\beta + \varepsilon_i > 0] = F (x_i'\beta)$$

and $$P_r [y_i = 0] = 1 - F (x_i'\beta) = F (- x_i'\beta)$$

where $F (x_i'\beta)$ denotes the cumulative distribution function (cdf) of ε_i evaluated at $x_i'\beta$. Unlike the linear probability model (LPM) where the corresponding latent variable is not considered, the predicted probabilities are constrained onto [0,1] interval.

In the probit model, ε_i is assumed to follow a standard normal distribution which has mean 0 and variance 1. We therefore, obtain

$P_r [y_i = 1] = \phi (x_i'\beta) = \int_{-\alpha}^{x_i\beta} \phi(t)dt$ where ϕ (.) denotes the probability density function (pdf) of standard normal distribution, $\phi(t) = \frac{1}{\sqrt{2\Pi}}.\exp(-\frac{t^2}{2})$

Marginal effects in the probit model can be computed as;

$$\frac{\partial \Pr(y_i = 1)}{\partial x_{ik}} = \frac{\partial \phi(x_i'\beta)}{\partial (x_i'\beta)} \beta_k = \phi(x_i'\beta)\beta_k \quad ; k = 2, 3,..,K.$$

The marginal effects depend on the level of x_i (individual characteristics) and the signs of the marginal effects are uniquely determined by β_k.

The source of data is from Integrated Public Use Microdata Series (IPUMS) in which the data are provided by participating National Statistical Offices of a country. Census micro data containing information are collected on persons and households. However, for this study only females within the household were analyzed at child-bearing age of 15 to 49 years.

IV. Model Specifications and Variable Definitions

Following the theoretical work of Becker (1960, 1981) and Becker and Lewis (1973), Sah (1991) and Gyimah et.al (2008), so it is possible for this research to come up with an equation for fertility decision making;

$$NCHILD = ß_0 + ß_1SPLOC_{ij} + ß_2MARST_{it} + ß_3URBAN_{ij} + ß_4RELIG_{it} + ß_5AGE_{it} + ß_6ETHN_{ij} + \mu_t$$

Variable definitions:

- NCHILD = 1 with children, 0 otherwise
- SPLOC = 1 if spouse's location in the household, 0 otherwise
- MARST = marital status
- URBAN = 1 if urban, 0 otherwise
- RELIG = religious belief
- AGE = childbearing age category (15-49 years old)
- ETHN = ethnicity

Number of children, where NCHILD is observed as a dummy variable that equals zero or one. The demographic elements used as independent variables are age group of respondent, marital status and ethnicity/race.

V. Result and Discussion

Table 1 presents the marginal effects (ME) of predicted outcome using scale 0 to 1 (binary). The result of the ME for the binary depends on the values of all the other regressors and the regression coefficients. The analyses were based on proxy of three demographic effects; marital status, age, ethnicity and location. For ME for categorical variables show how P (Y=1) is predicted to a change as X_k changes from 0 to 1 holding all other X_s equal (Cameron & Trivedi, 2009). The demographic variables of marginal effects is presented in Table 1. In terms of marital status, the probability is higher for all categories and more than 50 percent women in Malaysia prefer to have children. In the age category of 15 to 29 in Malaysia, there was a higher probability of more likely not to have children of 35.2 percent. At the age of 30 to 34, only 4.1 percent prefer not to have children, while at the age of 35 to 44, shows the women prefer not to have children at 6.9 percent and 9.7 percent respectively. A woman's fertility goals will depend on the stage of her reproductive career, indicated by age and the number of children. Malaysian women would prefer to have children between the age of 30 to 44.

The last variable on location and significant, which indicate urban Malaysians prefer not to have more children at a probability of 8.9 percent. Another study done by Poo & Nai (1994) on fertility intentions behaviour in Peninsular Malaysia found that significant differences occurred among ethnic groups (Malay were about two times more likely than Chinese and Indians to want another chidren) and rural couples wanted more children than urban couples. Consequently, these results demonstrate that women's preference for children are associated with the age, marital status and race.

Table 1: ME Result of Demographic Variables

Effects	**Variables**	**Malaysia**	
		ME	***,**,*****
Demographic	Spouse	-0.349	*******
	Married	0.543	*******
	Divourced	0.533	*******
	Widowed	0.577	*******
	Age 15-19	-0.352	***
	Age 20-24	-0.306	***
	Age 25-29	-0.188	***
	Age 30-34	-0.041	***
	Age 35-39	-0.069	***
	Age 40-44	-0.097	***
	Malay	0.190	***
	Chinese	0.036	**
	Indian	0.130	***
	Urban (Location)	0.089	***

Note: ***=p<1%, **=p<5%, *=p<10%, ME –marginal effects, - (not significant)

V1. Conclusion

The empirical results from this study are very useful as guides in formulating family-oriented policy for Malaysia. Women in Malaysia who typically care for children – those who wish to participate in the labour force must either limit their fertility or make alternative arrangements for the care of their children. Furthermore, a wife's earning did help equalize the distribution of household earnings. Perhaps the most widely used strategy to be adopted is to assist women in accommodating their family duties to the demands of paid employment by relinquishing their responsibility for children during the hours they are engaged in market work. Suggested strategies such as work place reforms will help to relieve women responsibilities by protecting working women and improving their working conditions for example flexible working arrangements especially for women at the age category of 30 to 34. Women at this age are reported to have more children and have to deal with more child rearing activities. Another arrangement would be working at home arrangements on a permanent basis or to complete a task.

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