KOREA JOURNAL OF POPULATION AND DEVELOPMENT
Volume 19, Number 1, July 1990

DETERMINANTS OF FERTILITY CONTROL IN KOREA

SUNG-HO CHUNG*
Yonsei University

The objective of this study is to examine the socioeconomic and intervening determinants of fertility control in Korea. The conceptual framework applied here is based on the synthesis framework of fertility control developed by Esterlin and Crimmins. The data come from the 1974 Korean National Fertility Survey, which was conducted as part of the World Fertility Survey.

The study focuses on the relative importance of the socioeconomic factors and intervening variables in the determination of fertility control. The most interesting finding is that there are only small differentials in fertility control by socioeconomic factors. The analysis emphasizes the importance of examining the determinants of fertility control in terms of the intervening variables, which include the components of natural fertility, desired family size, and costs of fertility control. These intervening variables provide general support for the theoretical predictions. Moreover, most of the coefficients for these variables are statistically significant at the .05 level. The analysis also shows that motivation for fertility control is an important factor in determining use of fertility control.

INTRODUCTION

In recent years the fertility transition has come to be seen as a shift from natural fertility to deliberate limitation of family size. This suggests that new insights into the fertility transition may arise from focusing on the mechanisms underlying the adoption and use of deliberate control.

Most studies of fertility control have focused on individuals' socioeconomic characteristics (Hong 1971; Cho *et al.* 1982; Park *et al.* 1983). Results of these studies have strengthened the view that women and men who belong to certain social and economic status were more likely than their counterparts to use fertility control. Most of these studies, however, tend to ignore the importance of individual reproductive goals, potential reproductivity, and the costs of fertility control. On the contrary, the synthesis framework developed by Easterlin assumes that attitudes to limit family size follow from considerations of potential family size, desired family size, and costs of fertility control. This view, which also deals with the matter from the perspective of the individual and allows hypotheses about variations within cohorts of indi-

viduals in regard to contraceptive behavior, implies that people adopt fertility control in order to achieve certain goals or to accommodate tastes and preferences, for a given value of costs associated with fertility control.

Building on a model suggested by the synthesis framework of fertility determination, this study attempts to examine differences in the use of deliberate fertility control in terms of both socioeconomic factors and intervening variables. This study leads to a detailed analysis of the determinants of fertility control, by presenting an alternative to the traditional analysis of socioeconomic factors affecting the use or non-use of fertility control.

THEORY

The theoretical framework, as the basis for the current study, draws from Esterlin's synthesis framework of fertility determination (Easterlin *et al.* 1980; Esterlin and Crimmins 1981, 1982, 1985). This framework is based on certain concepts found in sociological studies of fertility determination (Freedman 1961-62; Petersen 1969) and linking these concepts to microeconomics of fertility.

These notions can be formalized in terms of three concepts:

Desired family size (Cd): this is defined as the number of surviving children a couple would want if fertility regulations were costless. It reflects the taste, income and price considerations of the usual economic theory of household decision making, including both the economic and noneconomic returns from children as well as their costs. Similarly, it is through tastes or subjective preferences that many attitudinal considerations operate, such as family size preferences and standards of child care and rearing.

Potential family size (Cn): this is the number of surviving children a couple would have if they made no deliberate attempt to limit family size. This depends on a couple's natural fertility and the chances of child survival. Given natural fertility, an increase in infant and child survival prospects would increase the potential family size. Similarly, given survival prospects, the potential family size would very directly with natural fertility.

Costs of fertility control (CR): this combines a couple's attitudes toward and access to fertility control methods and supplies. It includes both subjective disadvantages of fertility control such as distaste for the general notion of family planning and the drawbacks of specific techniques such as abortion, and the economic costs of fertility control, such as the time and money required to get family planning services.

The synthesis framework discusses the relative roles of the three intervening variables in determining fertility control. To do so, the framework first shows how motivation for fertility control is determined. Then, it explores how motivation for fertility control and costs of fertility control relate to the use of deliberate fertility control. According the synthesis framework, whether or not a couple practices fertility control depends not only on the strength of the motivation for control but also on the costs associated with fertility control.

Motivation for fertility control in the synthesis framework is defined as the excess of potential family size over desired family size (Cn − Cd). The larger this excess is, the greater the potential burden of unwanted children, and consequently the greater the household's motivation to limit its fertility. It is important to note here that motivation to fertility control depends upon the relative variation in either potential family size (Cn), desired family size (Cd), or both. Often motivation for fertility control is simply identified with desired family size and it is assumed that only if this decreases will motivation grow. In fact, however, an increase in potential family size can increase motivation and generate a need for fertility control, even if desired family size remains constant (Easterlin and Crimmins 1981, 1985).

In the synthesis framework, the use of fertility control can be represented by the following function:

$$U = \alpha_0 + \alpha_1(Cn - Cd) + \beta CR + \mu \qquad (1)$$

where U = use of fertility control
Cn = potential family size
Cd = desired family size
CR = costs of fertility control
μ = a disturbance term

In the above equation, the WFS (World Fertility Survey) data sets are able to measure directly use of fertility control, desired family size, and costs of fertility control. The appropriate measure for potential family size, however, is problematic. In fact, it is impossible to observe the potential family size regarding the question of how many children a woman would be able to bear throughout her reproductive life without contraceptive use. Although the potential family size can be estimated by using statistical procedure, it is difficult to produce unbiased estimates.

In their exploratory study of the synthesis framework with WFS data, Easterlin and Crimmins (1982) first regressed the number of children ever born (CEB) on the use of fertility control (U) and the determinants of natural fertility (Xi). Then, each woman's natural fertility (N) was obtained by drop-

ping the fertility control variable and substituting the actual values of other variables in the equation. Finally, potential family size was obtained by multiplying natural fertility by child survival rate (CSURV). However, this estimation is expected to give statistically biased results because of the reciprocal effect of children ever born on the use of fertility control (Ahmed 1987). The other problem is simultaneity bias. That is, the use of fertility control as one of the exogeneous variables is partly dependent on natural fertility.

With these shortcomings in mind, Easterlin and Crimmins (1984, 1985) adopted a two-step method to solve the problem of simultaneity bias. In this method, use of fertility control is viewed as a function of the determinants of natural fertility (Xi), desired family size (Cd), and costs of fertility control (CR). Here, the predicted value of use variable ($\hat{U}$) is the instrumental variable which is then used to estimate the number of children ever born. The rest of the procedures are the same as the previous method. Although this method is somewhat innovative, it also leads to a biased estimate of potential family size. As McHenry (1986) indicated, the two-step method overestimates the potential family size of non-regulating couples, and it also underestimates the potential family size of couples who have ever used fertility control.

Thus, it is clear that attempts to estimate the potential family size have failed to produce unbiased estimates. Instead of estimating the potential family size, the current study replaces it by the following function:

$$Cn = \delta_0 + \Sigma \delta_1 X_i + \epsilon \qquad (2)$$

where Xi represents the determinants of natural fertility such variables as age at first marriage, infant and child mortality, fecundity, and pregnancy wastage. By substituting equation (2) into equation (1), equation (1) is reformulated as follows:

$$\begin{aligned} U &= \alpha_0 + \alpha_1(\delta_0 + \delta_1 X_i + \epsilon - Cd) + \beta CR + \mu \\ &= \lambda_0 + \Sigma \lambda_i X_i - \alpha_1 Cd + \beta CR + \eta \end{aligned} \qquad (3)$$

Moreover, the present study attempts to examine the effect of the intervening variables, net of the socioeconomic factors, on the use of deliberate fertility control. Thus, equation (3) is reformulated as follows:

$$U = \lambda_0 + \Sigma \lambda_i X_i - \alpha_1 Cd + \beta CR + \Sigma k_i SES_i + \nu \qquad (4)$$

The above equation expresses use of fertility control (U) as a function of the determinants of natural fertility (Xi), desired family size (Cd), costs of fertility control (CR), and socioeconomic factors (SES). It is hypothesized that the effect of the socioeconomic factors on fertility control would be decreased after control for the intervening variables and that the probability of the use

of fertility control would be greater:

1) the earlier her age at first marriage
2) the higher her fecundity
3) the lower her rate of pregnancy wastage
4) the lower the rate of infant and child mortality
5) the lower her number of desired children, and
6) the lower the costs of fertility regulation

There are several points worth noting about this conceptual framework. First, the specification of intervening variables provides an important analytical model of contraceptive use, which is an alterative to the traditional analysis of socioeconomic factors affecting the use or non-use of contraception. Second, this strategy allows for the possibility that determinants of natural fertility coupled with desired family size and costs of fertility control causally affect the use of fertility control, while the original intermediate variables model (Davis and Blake 1956; Bongaarts 1978; Choi *et al.* 1981) does not allow for any causal relationships among the set of intermediate variables, including contraception. Finally, this approach gives overall insights into the fertility determinants by linking these intervening variables to underlying socioeconomic factors and observed fertility.

DATA AND METHOD

The data for this study come from the 1974 Korean National Fertility Survey (KNFS), which was conducted as part of the World Fertility Survey (WFS). The study population is two groups of currently married women, those aged 15-34, who have been married only once, and who are still married.[1] This age grouping allows for a probable cohort effect in the relationship studied and minimizes the effect of age heaping. The purpose of the restriction in their first marriage is to minimize measurement problems associated with marital disruption. In fact, accurate measurement of variables such as age at marriage and use of fertility control becomes much more problema-

[1]In many studies using the synthesis framework, the study population is restricted to women aged 35-44 who have at least two live births to maximize the likelihood that variables such as breastfeeding in the last closed interval would be observable. These studies have been conducted on data for Columbia, Sri Lanka (Easterlin and Crimmins 1981, 1982, 1985), Keyna, Lesotho (Mhloyi 1984), and Bangladesh (Ahmed 1987). However, this restriction leads to the truncation problem, biasing the sample toward women of higher parity. Therefore, this restriction is not adopted in the current study.

tic for women with multiple marriages. These restrictions reduced the sample size from 5,430 to 4,868 women.

As independent variables, the set of socioeconomic status variables include the wife's age, the education of both wife and husband, the husband's occupation, the wife's work experience before and after marriage, and the place of residence; the intervening variables are age at first marriage, infant and child mortality, pregnancy wastage, fecundity, desired family size, number of contraceptive methods known, and travel time to the nearest family planning outlet. To measure fertility control, the present study employs two indicators: whether the woman has ever used fertility control, including ever-use of any efficient contraceptive method or induced abortion; and 2) whether she is currently using an efficient contraceptive method.

Because of the large number of explanatory variables and the nature of issues represented in the proposed model, this study mainly employs logit regression procedure.

This maximum likelihood techique expresses the probability of women ever using fertility control as a linear function of a constant term and a set of additive parameters indicating the incremental impact of the independent variables on the logarithm of the odds of ever using fertility control. A positive coefficient indicates that the odds are increased for ever-use of fertility control, while a negative coefficient indicates decreased odds for that variable. This technique provides consistent and efficient estimates of the effects of the independent variables on the dichotomous dependent variable.

RESULTS

Ever-use of Fertility Control

Table 1 presents the results of the logistic regression analysis of the determinants of ever-use of fertility control. Model A takes the socioeconomic status variables as the independent variables, while Model B includes both socioeconomic status variables and intervening variables. This specification is not only interesting in itself, but it also helps to test for the joint significance of the intervening variables.

The inverted "U" pattern of ever-use of fertility regulation by age displayed in the tabular analysis is also demonstrated in the multivariate analysis: wife's age is positively to the likelihood of ever-use of fertility regulation among women aged 15-34, while it is negatively associated with that among

TABLE 1. LOGISTIC REGRESSION ANALYSIS OF THE DETERMINANTS OF EVER-USE OF FERTILITY REGULATION AMONG WOMEN AGED 15-34 AND 35-49, RESPECTIVELY.

Explanatory variables	Model A		Model B	
	15-34	35-49	15-34	35-49
Socioeconomic Status variables:				
Wife's age	.179*	−.137*	.229*	−.061*
Wife's education	.015	.195*	−.024	.073
Husband's education	.082*	.032	.091*	.006
Urban residence	.063	−.073	.065	−.030
Non-farm workers[1]	.033	−.010	.122*	−.021
Farm workers[1]	−.053	−.084	−.131*	−.083
Professional[2]	.028	.190	−.024	.045
Sales or service[2]	.074	.094	.059	.105
Manual workers[2]	−.035	.048	−.076	.119
Intervening variables:				
Age at first marriage			−.276*	−.068*
Infant and child mortality			−1.276*	−1.132*
Fecundity			.188	.547*
Pregnancy wastage			−.539*	−.385
Desired number of children			−.163*	−.073
Number of contraceptive methods known			.193*	.233*
Travel time to the F. P. outlet			−.043*	.022
Intercept:	−5.279	5.910	−1.829	2.736
Log likelihood:	1740	1164	1546	1016
Sample size:	2778	2090	2778	2090
Chi-square change:			194	148
Degrees of freedom change:			7	7

*Significant at the .05 lovel.

Note : 1. Dummy variables for wife's pre-marital work experience; women who did not work before marriage as a reference category.

2. Dummy variables for husband's occupation; husbands who are farm workers as a reference category.

women aged 35-49. The result is statistically significant at the .05 level for both age groups.

As expected, the wife's education is positively related to the likelihood of ever-use of fertility regulation for both age groups. The coefficient is, however, statistically significant only for women aged 35-49. The estimated coefficient can also be used to predict change in the probability of ever-use of

fertility regulation for a unit change in the wife's education: if the wife's education is increased by one unit (about 1.8 years), it increases the odds, holding constant the other independent variables in the equation, as follows; new odds = 1.215 × 1.188 (old odds) = 1.443. Thus, P = 1.443/(1 + 1.443) = .591. Here .048 (= .591 − .543) is the corresponding percentage difference. That is, P = .591 represents the increase of 4.8 percentage points in the probability of ever-use of fertility regulation.[2] Thus, a unit increase in wife's education does not make a large difference in the log of odds of every-using fertility regulation even in the age group 35-49.

The husband's education is also positively related to the likelihood of ever-use of fertility regulation for both age groups; the implication is that husbands with higher education are more likely to use contraception than those with lower education or are more likely to encourage their wives to use contraception. The coefficient is, however, statistically significant only among women aged 15-34. In this age group, husband's education may be an important determinant of fertility control, with the wife's education possibly having little independent effect. However, a unit increase in the husaband's education makes a relatively small difference, raising only 2.0 percentage points the probability of ever-use of fertility regulation.

The remaining socioeconomic status variables, including urban residence, the wife's pre-marital work experience, and the husband's occupation, do not appear to be significant factors for the ever-use of fertility regulation. None of the coefficients of these variables are statistically significant at the .05 level for both age groups.

Given the importance of the intervening variables, it is interesting to examine how the above socioeconomic status variables along with the intervening variables affect the deliberate use of fertility regulation. The inclusion of intervening variables gives the net partial effects of other variables, and it is also helpful to examine the statistical significance of the improvement in the fitness to Model A due to the addition of the intervening variables.[3]

As Model B in Table 1 shows, the effects of most of the socioeconomic status variables remain almost the same in terms of their statistical signifi-

[2]The estimated percentage difference is equal to the partial derivative, computed as B × P (1 − P), where B is the logit coefficient of the relevant independent variable and P is the mean of the dependent variable: in this case, .048 = .195 × .543 × (1 − .543).

[3]Model A and Model B can be tested against each other through examination of the number difference between the likelihood ratio values associated with the two models, with degrees of freedom equal to the difference between the number of parameters estimated by the two models. Thus, the test is as follows: −2 (log likelihood without intervening variables − log likelihood with intervening variables). Among women aged 15-34, for example, chi-square equals 194 with 7 degrees of freedom (p = .001).

cances and directions. One exception to this statement is found in the dummy variables for the wife's pre-marital work experience among women aged 15-34; the coefficient for non-farm workers shows a significant and positive effect on the likelihood of ever-use of fertility regulation. This implies that women who worked in a non-farm sector are more likely to use fertility regulation than women who did not work before marriage. In contrast, the coefficient for farm workers shows a significant negative effect on the likelihood of ever-use of fertility regulation.

Like Model A, the wife's age still shows a significant effect on the likelihood of ever-use of fertility regulation, even after controlling for the intervening variables. A similar pattern is also found in the husband's education which is significantly related to the ever-use of fertility regulation among women aged 15-34. Again, none of the coefficients of the remaining socioeconomic status variables such as urban residence and the husband's occupation are statistically significant at the .05 level.

It is also interesting to note the effects of the intervening variables themselves. Unlike the socioeconomic status variables, most of the intervening variables show statistically significant effects of the likelihood of ever-use of fertility regulation.

Among the components of natural fertility, age of first marriage produces a negative coefficient, perhaps implying that increased in age at first marriage reduce marital duration and, hence, decrease the likelihood of ever-use of fertility regulation. The coefficients are statistically significant at the .05 level for both age groups. The differential in the probability of ever use of fertility regulation is more prevalent among women aged 15-34. Among this age group, the probability of ever-using fertility regulation decrease 6.7 percentage points, while it decreases only 1.5 percentage points among women aged 35-49, as age at first marriage increases by one year.

The level of fecundity shows the expected positive sign in both age groups, supporting the hypothesis that high levels of fecundity are positively associated with the use of fertility regulation. The coefficient is, however, significant only for women aged 35-49.[4] This result implies that the level of fecundity at the older ages will be an important determinant of fertility control and actual fertility. In this age group, the probability of ever-using fertility regulation for fecund women is 11.8 percent higher than those who are subfecund.

Corresponding to these expected tendencies are the effects of infant and child mortality and pregnancy wastage, both of which are hypothesized to reduce the probability of ever-use of fertility regulation by creating the desire

[4]Statistically, the nonsignificance of fecundity among women aged 15-34 may be due to the extremely skewed distribution of this variable in this age group.

either to replace a child or to ensure against future foetal mortality. Infant and child mortality supports this hypothesis in both age groups, indicating that increased in infant and child mortality significantly reduce the likelihood of ever-use of fertility regulation. Moreover, if infant and child mortality is increased by one percent, it makes a large difference, decreasing by 31.7 and 24.3 percentage points the probability of ever-use of fertility regulation for women aged 15-34 and 35-49, respectively. The coefficient for pregnancy wastage is also significant and negative among women aged 15-34, implying that rising levels of pregnancy wastage lead to decrease in the ever-use of fertility regulation. Among women aged 35-49, however, pregnancy wastage does not seem to be a significant factor for ever-use of fertility regulation.

As expected, the desired family size produces a negative coefficient, indicating that increases in couple's desired family size decrease the probability of ever-use of fertility regulation. The coefficient is, however, statistically significant at the .05 level only for women aged 15-34. Even among women in this age group, desired family size does not make a large differential in the log of odds of ever-use of fertility regulation: the probability of ever-using fertility regulation decreases only 4.2 percent, as the desired family increases by one. One possible inference from this finding is that Korean couples do not respond markedly to additional increases in desired family size, given the already high levels of fertility control in Korea.

Turning to the variables measuring the costs of fertility control, one finds that the number of contraceptive methods known by respondents has the expected positive coefficient, indicating that increased knowledge of contraception reduces the costs of fertility control and, thereby, increases the propensity to use fertility regulation. The coefficients are statistically significant for both age groups. However, a unit change in this variable does not make a very large difference in the probability of ever-use of fertility regulation. The corresponding percentage difference is only 4.8 and 5.0 for women aged 15-34 and 35-49, respectively.[5] With regard to the travel time to the family planning outlet, the coefficient is significant and negative among women aged 15-24, implying that increased accessibility to the family planning outlet enhances the ever-use of fertility regulation. For women aged 35-49, however, differences in travel time do not seem to be a significant factor in fertility regulation.

[5]It is, however, important to be cautious about the association between desired family size and fertility regulation because those who already used contraceptives would be likely to know more contraceptive methods and, thus, greater knowledge may be an effect rather than cause of greater use of fertility control.

Current Use of Contraception

Unlike ever-use of fertility regulation, the question on current use of contraception was asked only of nonpregnant women who reported themselves to be fecund. For this reason, one of the intervening variables, namely, fecundity, is not considered in the analysis of the determinants of current use of contraception. In addition to the same procedure presented in the previous section, the analysis focuses on several issues related to current use of contraception. These include some measures of motivation for fertility control and sex preferences.

1. Determinants of Current Use of Contraception

Table 2 presents the results of the logistic regression analysis with current use of contraception as a dependent variable. Again, Model A takes the socioeconomic status variables as the independent variables, while Model B includes all of the independent variables in Model A and the intervening variables.

As with ever-use of fertility regulation, the wife's age is positively related to the likelihood of current use of contraception among women aged 15-34, while it is negatively associated with that among women aged 35-49. As noted, this opposing direction reflects the curvilinear relationship between age and current use of contraception.

The most interesting finding is that most of the socioeconomic status variables are not statistically significant in the determination of current use of contraception. Among these variables, urban residence is the only variable that affects the current use of contraception significantly for women aged 35-49.

Contrary to expectation, however, urban residence is negatively associated with the likelihood of current use of contraception among women aged 35-49. One possible explanation for this finding is that urban residents in this age group have generally fewer living children than rural residents and, thus, they are less likely to use contraception. Another possible explanation might be that the family planning program in Korea emphasizes the importance of contraception more for the women in the rural than urban sectors.

Once again, the effects of the socioeconomic status variables on the log odds of current use of contraception remain almost the same, after controlling the intervening variables (see Model B in Table 2). As in the case of Model A, the wife's age shows a significant coefficient for both age groups. Similarly, urban residence still shows a significant and negative effect on the

TABLE 2. LOGISTIC REGRESSION ANALYSIS OF THE DETERMINANTS OF CURRENT USE OF CONTRACEPTION AMONG WOMEN AGED 15-34 AND 35-49, RESPECTIVELY.

Explanatory variables	Model A		Model B	
	15-34	35-49	15-34	35-49
Socioeconomic Status variables:				
Wife's age	.119*	−.050*	.134*	−.056*
Wife's education	.003	.061	−.024	.048
Husband's education	.042	.035	.033	.036
Urban residence	.119	−.152*	.128	−.163*
Non-farm workers[1]	−.073	−.024	−.034	−.018
Farm workers[1]	−.088	−.043	−.122	−.034
Professional[2]	−.001	−.013	−.009	−.043
Sales or service[2]	−.043	.218	.070	.189
Manual workers[2]	.017	.019	−.020	.048
Intervening variables:				
Age at first marriage			−.142*	−.036*
Infant and child mortality			−1.082*	.484
Pregnancy wastage			−.066*	−1.645*
Desired number of children			−.109*	−.103*
Number of contraceptive methods known			.125*	.085*
Travel time to the F. P. outlet			−.018	.011
Intercept:	−4.527	1.395	−2.402	1.930
Log likelihood:	1325	1011	1268	991
Sample size:	2261	1501	2261	1501
Chi-square change			57	20
Degrees freedom change			6	6

*Significant at the .05 level.

Notes : 1. Dummy variables for wife's pre-marital work experience; women who did not work before marriage as a reference category.

2. Dummy variables for husband's occupation; husbands who are farm workers as a reference category.

current use of contraception among women age 35-49. Moreover, the corresponding percentage differences in the probability of current use of contraception are quite similar to those for Model A.

Turning to the results of Model B in Table 2, one finds that most of the intervening variables have statistically significant effects on the current use of contraception, as was the case for the ever-use of fertility regulation.

Age at first marriage produces a negative coefficient in both age groups. The coefficient is, however, statistically significant only for women aged 15-

34. Even in this age group, the probability of current use of contraception decreases only 2.5 percent, as age at first marriage increases by one year. Infant and child mortality is also significantly related to current use of contraception among women aged 15-34. In this age group, a unit increase in infant and child mortality makes a large difference in the odds, representing a 22.8 percentage points decrease in the probability of current use. For women aged 35-49, however, infant and child mortality is not a significant factor for current use of contraception. Pregnancy wastage produces a significant and negative coefficient in both age groups. The effect is particularly strong among women aged 35-49: there, a unit increase in pregnancy wastage makes a large differential in the log odds of current use of contraception. The probability of current use of contraception decreases by 40.4 percentage points among these women.

Desired family size is negatively related to current use of contraception. The coefficients are statistically significant at the .05 level for both age groups. However, a unit increase in desired family size does not make a large difference in the log odds of current use, being around 2.5 percentage points in each age group.

Of the two measures of costs of fertility control, the number of contraceptive methods known by respondents is significantly and positively associated with current use of contraception for both age groups. Like desired family size, the corresponding percentage difference is extremely small, reaching less than 3.0 percent. Travel time to the family planning outlet does not appear to be a significant factor in current use of contraception in either age group.

2. Motivation for Fertility Control

This section investigates the motivation for and the costs of fertility control as determinants of contraceptive use, which is one part of the conceptual framework guiding this study. Special attention is given to the measures of motivation for fertility control and their links to contraceptive use.

As noted earlier, the synthesis framework uses the expected number of surviving children (or potential family size) as a determinant of fertility control (or in calculating motivation for fertilty control). In practice, however, a woman may find it easier to think in terms of the actual number of living children than the expected number of surviving children. Moreover, because the expected number of living children is difficult to measure, the actual number of living children is often used instead; in this case, the measure of motivation for control is a comparison of her personal ideal (or desire) and the actual number of living children. If the actual number of living children equals or exceeds the desired number, motivation to control fertility may be

TABLE 3. PERCENTAGE OF WOMEN WHO WANT NO MORE CHILDREN AND WHOSE NUMBER OF LIVING CHILDREN EQUALS OR EXCEEDS THEIR DESIRED NUMBER OF CHILDREN BY THE NUMBER OF LIVING CHILDREN, FOR CURRENTLY MARRIED, NON-PREGNANT, AND FECUND WOMEN.

Number of living children	N	% Wanting no more	% Living $\geq$ Desired
0	165	10.5	.6
1	483	12.4	4.8
2	708	66.6	42.9
3	824	87.7	75.5
4	715	92.1	92.0
5 +	867	96.3	97.7
ALL	3762	72.6	65.2

presumed; if the desired number exceeds the actual number, motivation is presumed to be absent.

Another measure of motivation to control can be drawn from a direct answer to the question: "Do you want more children?" For this measure, it seems reasonable to suppose that those reporting that they want no more children are thereby motivated to control their fertility. This is one of the most common measures of motivation used in the analysis of contraceptive use.

These are two different ways of dichotomizing the sample into those who have motivation to control fertility and those who do not.

As Table 3 shows, 72.6 percent of exposed women want no more children. This proportion increases sharply from 12.4 to 66.6 percent and again to 87.7 percent when the sizes of their families reach two and three children respectively. After four living children, over 90 percent of women want no more children. The proportion of exposed women whose actual number of living children equals or exceeds their desired number of children is similar to the proportion wanting no more children, although there are some differences between the two measures.

With respect to the consistency of responses from women wanting no more children and their desired family size compared with their actual number of living children, 83.1 percent of all exposed women responded consistently to the questions (Table 5).

This table shows that the consistency between the two measures is considerable. Moreover, when the sex composition of living childen is introduced, the consistency ratio increases to more than 90 percent. It can be

TABLE 4. RELATIONSHIP BETWEEN MOTIVATION FOR FERTILITY CONTROL AND CURRENT USE OF CONTRACEPTION, FOR CURRENTLY MARRIED, NON-PREGNANT, AND FECUND WOMEN.

Measures of motivation for fertility control	% Currently using any efficient contraceptive method
Wanting future births	
Wants more	12.1
Wants no more	38.3
Living vs. Desired children	
Living $\geq$ Desired	42.4
Living $<$ Desired	22.8

TABLE 5. CONSISTENCY OF RESPONSES REGARDING MOTIVATION FOR FERTILITY CONTROL, FOR CURRENTLY MARRIED, NON-PREGNANT AND FECUND WOMEN.

Consistent	83.1%
Want no more and actual $\geq$ desired	59.7
Want more and actual $<$ desired	23.4
Inconsistent	16.9
Want no more and actual $<$ desired	12.9
Want more and actual $\geq$ desired	4.0

concluded, therefore, that the responses on motivation measures are highly consistent and may be interpreted with reasonable confidence.

Turning to the association between motivation for fertility control and contraceptive use, one finds that both measures of motivation are strongly related to current use of contraception (see Table 4): that is, those who reach or exceed their desired number of children are almost twice as likely to be using contraception as those who do not reach it (42.4/22.8); 12.1 percent of women who want additional children are using contraceptive methods compared to 38.3 percent of those who do not want more children.

Similar results are also found in the multivariate analysis. As can be seen in Table 6, both measures of motivation for control are significantly related to current use of contraception. For the first measure (whether the wife has more children than she desires), the coefficient is positive for both age groups. This indicates that the probability of current use is higher among

TABLE 6. LOGISTIC REGRESSION OF CURRENT USE OF CONTRACEPTION ON SPECIFIED MEASURES ON MOTIVATION FOR AND COSTS OF FERTILITY CONTROL, WOMEN AGED 15-34 AND 35-49, RESPECTIVELY.

Explanatory variables	Age group			
	15-34		35-49	
Motivation:				
# Living $\geq$ Desired	.398*		.284*	
Wants no more		.667*		1.834*
Costs of fertility regulation:				
Number of contraceptive methods known	.115*	.100*	.097*	.087*
Travel time to the family planning outlet	−.012	.001	.046	.017
Intercept:	−1.829	−2.110	−1.328	−3.178
Log likelihood:	1309	1167	1003	832
Sample size:	2261	2161	1501	1326

*Significant at the .05 level.

women whose number of living children equals or exceeds their desired number of children than among women whose desired number of children exceeds the number of living children. Specifically, women whose number of living children equals or exceeds their desired number of children are current users of contraception at a rate of 8.4 and 7.0 percentage points higher than their counterparts for ages 15-34 and 35-49, respectively.

The latter measure (whether wife wants more children) also provides a positive sign, implying that the probability of current use is higher among women who want no more children than among women who want more children. The coefficients are statistically significant at the .05 level for both age groups. The large difference in the log odds of current use is noted particularly among women in the age group 35-49. Among these women, the probability of current use for women who want no more children is 42.7 percentage points higher than those who want more.

With regard to the costs of fertility control, the results are similar to those observed in the previous analysis: a couple's known number of contraceptive methods is significantly and positively related to current use, while travel time to the family planning outlet is not significantly associated with current use of contraception. However, the predicted interaction between motivation for fertility control and the costs of fertility control is not confirmed in either age

group[6]: none of the coefficients for interaction terms are statistically significant at the .05 level, and the inclusion of interaction terms does not increase the statistical significance of the baseline model.[7]

CONCLUSIONS

This study focuses on the determinants of fertility control in terms of both socioeconomic and intervening variables. In addition, the analysis examines the possibility of alternative measures of motivation for fertility control and their relations to contraceptive use.

Probably the most important finding in this study is that there are little differentials in fertility control by socioeconomic status variables: that is, most of these variables do not have statistically significant effects on contraceptive use. In addition, the inclusion of the intervening variables does not substantially alter the effects of the few socioeconomic status variables that do influence fertility control. Rather, the multivariate analysis emphasizes the importance in terms of the intervening variables, which include the components of natural fertility, desired family size and costs of fertility control. These intervening variables provide general support for the theoretical predictions. Moreover, most of the coefficients for these variables are statistically significant at the .05 level in both age groups. The test for joint significance indicates that effect of the intervening variables, net of the socioeconomic status variables, is significant even at the .01 level of significance.

From this point of view, the preceding analysis suggests that intervening variables such as age at first marriage, infant and child mortality, pregnancy wastage, desired family size, and knowledge of contraceptive methods can be meaningfully employed in explaining the deliberate use of fertility control.

This study also shows that motivation for fertility control is an important factor in determining current use of contracetion. In particular, the desire for no more children, as one measure of motivation for fertility control, has a noticeably positive effect on current use of contraception.

This study offers a number of advantages over previous studies of fertility control. First, the study gives proper emphasis to a variety of intervening

[6]It seems reasonable to hypothesize that the conversion of a motivation for fertility control into contraceptive use is more easily accomplished when the costs of fertility control are low.

[7]Although the results of logistic regression analysis including interaction terms are not presented here, the likelihood-ratio chi-square test comparing the model including interaction terms with the model of independence yields an extremely small chi-square values in either measures.

variables that turn out to be important determinants of the couple's use of fertility control. Similarly, the study shows greater model specification by linking these intervening variables to fertility control, on the one hand, to socioeconomic factors on the other hand. In this sense, this study achieves a richer and a more detailed explanatory structure than past approaches, which tend to treat all the socioeconomic factors as direct determinants of fertility control. Second, this study provides greater insight into the mechanisms underlying the use of deliberate fertility control by providing proper attention to the motivation for and costs of fertility control. Given the emphasis on the use and spread of fertility control during the demographic transition, the study's special treatment of this matter is particularly advantageous.

REFERENCES

Ahmed, Bashir. 1984. "Determinants of Fertility in Bangladesh: Desired Family Size, Natural Fertility and Contraceptive Use." Unpublished Ph.D. dissertation, Univ. of California, Berkeley.

_____. 1987. "Determinants of Contraceptive Use in Rural Bangladesh: The Demand for Children, Supply of Children, and Costs of Fertility Regulation." *Demography* 24 : 361-373.

Bongaarts, John. 1978. "A Framework for Analyzing the Proximate Determinants of Fertility." *Population and Development Review* 4 : 105-132.

Bourgeois-Pichat, Jean. 1967. "Social and Biological Determinants of Human Fertility in Nonindustrial Societies." *Procceedings of the American Philosophical Society* 3 : 160-163.

Brackett, James W. 1980. "The Role of Family Planning Availability and Accessibility in Family Planning Use in Developing Countries." *World Fertility Conference 1980, Record of Proceedings,* 2 : 13-49.

Bulatao, Rodofo A., and Ronald D. Lee. 1983. *Determinants of Fertility in Developing Countries.* Vol. 1 & 2. New York: Academic Press.

Chen, J. A., I. B. Bendaraf, W. W. Hicks, and S. R. Johnson. 1987. "The Synthesis Framework and Determinants of Fertility in Syria." *Economic Development and Cultural Change* 35 : 145-159.

Cho, Lee-Jay, F. Arnold, and T. H. Kwon. 1982. *The Determinants of Fertility in the Republic of Korea.* Washington, D.C.: National Academy Press.

Choi, B. H., and S. S. Hassan. 1981. "Trends and Factors Accounting for Fertility Changes in Korea." Paper presented at the International Union for the Scientific Study of Population (IUSSP).

Davis, K., and J. Blake. 1956. "Social Structure and Fertility: An Analytic Framework." *Economic Development and Cultural Change* 4 : 205-235.

Easterlin, R. A. 1975. "An Economic Framework for Fertility Analysis." *Studies in Family Planning* 6 : 53-63.

_____. 1978. "The Economics and Sociology of Fertility: A Synthesis." In *Historical Studies of Changing Fertility,* edited by Charles Tilly. Princeton: Princeton

Univ. Press.

_____. 1980. "Toward a More General Economic Model of Fertility Determination: Endogenous Preferences and Natural Fertility." In *Population and Economic Change in Developing Countries,* edited by R. A. Easterlin. Chicago: Univ. of Chicago Press.

_____. 1984. "Modernization and Fertility: A Critical Essay." In *The Determinants of Fertility in Developing Countries,* edited by R. Bulatao and R. Lee. Vol. 2. New York: Academic Press.

_____, and E. M. Crimmins. 1981. "Analysis of WFS Data in a Socioeconomic 'Synthesis' Framework." Paper presented at the IUSSP.

_____, and E. M. Crimmins. 1982. "An Explanatory Study of the Synthesis Framework of Fertility Determination with World Fertility Survey Data." International Statistical Institute, Netherlands. WFS Scientific Reports, No. 40, pp. 1-39.

_____, and E. M. Crimmins. 1985. *The Fertility Revolution: A Supply-Demand Analysis.* Chicago: Univ. of Chicago Press.

Freedman, R. 1961-2. "The Sociology of Human Fertility." *Current Sociology* 10/11 : 35-68.

Hong, S. 1971. *Changing Patterns of Induced Abortion in Seoul.* Seoul: Korea Institute for Family Planning.

Jejeebhoy, Shireen J. 1979. "Factors Affecting the Fertility Transition in Taiwan, 1965-1973." Unpublished Ph.D. dissertation. Univ. of Pennsylvania.

_____. 1984. "The Shift from Natural to Controlled Fertility: A Cross-Sectional Analysis of Ten Indian States." *Studies in Family Planning* 15 : 191-198.

Knodel, J., and V. Prachuabmob. 1973. "Desired Family Size in Thailand: Are the Responses Meaningful?" *Demography* 10 : 619-638.

Lapham, R. J., and W. P. Mauldin. 1985. "Contraceptive Prevalence: The Influence of Organized Family Planning Programs." *Studies in Family Planning* 16 : 117-137.

McHenry, John P. 1985a. "A Critique of the Easterlin Approach to Micro-Level Fertility Analysis." *Population Bulletin of the United Nations,* No. 17, pp. 80-93.

_____, 1985b. "Socioeconomic Development and Fertility Decline: An Empirical Application of the Easterlin Synthesis Approach to World Fertility Survey Data (Columbia, Costa Rica, Sri Lanka, and Tunisia)." United Nations Population Division, pp. 1-115.

_____. 1986. "A Theoretical and Empirical Critique of the Easterlin-Crimmins Synthesis Model of Framework with Applications to Columbia, Costa Rica, Nepal, Sri Lanka, and the United States." Unpublished Ph.D. dissertation. Univ. of Pennsylvania.

Mhloyi, Marvellous. 1984. "Fertility Determinants and Differentials: The Cases of Kenya and Lesotho." Unpublished Ph.D. dissertation, Univ. of Pennsylvania.

Park, C. B., S. H. Han, and M. K. Choe. 1983. "Factors Affecting Contraceptive Use among High-risk Women in Korea." *Contraceptive Prevalence Survey Further Analysis Report.* Westinghouse Health Systems.

Pebly, A. R., and J. W. Brackett. 1982. "The Relationship of Contraceptive Availability to Contraceptive Use." *International Family Planning Perspectives and Digest* 8 : 84-92.

Petersen, W. 1969. *Population.* Toronto: Collier-Macmillan.

Srinibasan, K., S. Jejeebhoy, R. A. Easterlin, and E. M. Crimmins. 1984. "Factors

Affecting Fertility Control in India: A Cross-Sectional study." *Population and Development Review* 10 : 273-296.

Shin, E. H. 1977. "Socioeconomic Development, Infant Mortality and Fertility: A Cross-Sectional, Longitudinal Analysis of 63 Selected Countries." *Journal of Development Studies* 13 : 398-412.

_____, T. H. Kwon, and H. Y. Lee. 1981. "Determinants of Fertility Differentials in Korea." *Sociology and Social Research* 65 : 211-225.

Stoeckel, John. 1975. "Differentials in Fertility, Family Planning Practice, and Family Size Values in Korea, 1965-71." *Studies in Family Planning* 6 : 378-401.

Tsui, A. 1986. "The Rise of Modern Contraception." In *Reproductive Change in Developing Countries,* edited by J. Cleland and J. Hobcraft. New York: Oxford Univ. Press.

_____, D. Hogan, C. Welti-Chaines, and J. Teachman. 1981. "Contraceptive Availability Differentials in Use and Fertility." *Studies in Family Planning* 12 : 381-393.

SUNG-HO CHUNG is a lecturer in the Department of Sociology at Yonsei University. His research interests are in the areas of social demography and urban sociology. He is currently conducting research on the determinants and consequencies of induced abortion in Korea.