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Measurement of the Impact of the National Family Planning Program on Fertility in Korea: 1960~1975

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I. Introduction

At a time when a large part of population policy efforts are being committed to mass family planning programs there is naturally a growing concern about the results of these efforts and, hence, an increased interest in evaluative research.

Program impact should be assessed at various stages of implementation, by measuring changes occurring, for instance, in knowledge of birth control methods, use of contraception, desired family size, etc.

The interest in measuring program impact on fertility also exists independently of policy objectives. Fertility change is a plausible consequence of family planning programs, irrespective of policy aims, and policy makers as well as program administrators may be interested for various reasons in the impact of such programs on fertility.

Measuring the effects of a family planning program on fertility is recognized as a difficult task. If a change in fertility is believed to have occurred during a period of program implementation, the evaluator is expected to determine what part of this change can be attributed to the program. A number of methods have been proposed for measuring the precise impact of family planning programs on fertility. This study aims to test the usefulness of several of these methods in the Korean context. A number of troublesome questions arise, particularly those concerning the relative contribution of program and non-program factors. This analysis, which is guided largely by the methodological issues, will consider the results obtained by applying the following approaches: 1) standardization, 2) projection, 3) couple years of protection, and 4) component projection. Before the application and discussion of these methods, a brief summary of past and current trends in fertility in Korea is presented.

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II. Overview

In 1961, the government of the Republic of Korea issued a statement concerning the importance of a strong family planning program to the achievement of national goals, and in the following year the establishment and operation of a national program under the direction of the Ministry of Health and Social Affairs was included as a component of the First Five Year Economic Development Plan (1962-1966). In 1963, the Prime Minister issued the "Family Planning Encouragement Plan" to promote the program as a priority government project, specifying actions to be taken by the various Ministries and requiring the formulation of long range plans in collaboration with the family planning program. As a result, laws barring the import of contraceptives were repealed and local manufacture of foam tablets, condoms, and later, IUDs was made possible. Since that time the government has taken policy action on many occasions to stimulate family planning, most recently through an executive order in 1973 directing all Ministries to cooperate in family planning promotion and through the enactment in the same year of the Maternal and Child Health Law legalizing induced abortion.

The family planning program is thus a government program, an integral part of overall development planning. While the program involves non governmental agencies in its implementation, their activities are coordinated by the Ministry of Health and Social Affairs where broad planning is also carried out. There is no legal provision specifying the limits and operation of the program. Official policy is expressed through executive decrees, cabinet decisions and budget allocations to the program.

According to census figures, the Korean population in 1960 was approximately 25 million, and have grown at a rate of 2.9 percent per year during the 1955-60 period. The average annual rate of growth between 1960 and 1975 was 2.1 percent, and by the latter year it declined to 1.7 percent. It has been estimated that in the absence of a strong family planning program over the past fifteen years, the Korean population in 1975 might have reached 38 million, more than two and one half million were enumerated in the 1975 census.

The fourth Five-Year Economic Development Plan, begun in 1977, calls for a further reduction in the annual rate of growth of 1.6 percent by 1981, despite the unfavorable demographic situation which emerges as the post Korean War "baby boom" generation enters its reproductive years.

The national family planning program is of course not the only factor affecting fertility and population growth. High age at marriage and an increased incidence of induced abortion, as well as the broad effects of economic development, have also played important roles. It is not possible to measure the relative impact of these factors reducing fertility with precision but some studies have been conducted which give us a rough idea of the relative demographic of program versus other factors. Of the 30 percent reduction in fertility registered over the first ten years of program activity, roughly 12 percent was due to the rising age at marriage, 7 percent to the increase in the use of induced abortion, and the remaining 11 percent to family

planning (Watson, 1971). While these estimates are crude, they do serve to indicate that the family planning program has played a significant role in fertility decline in Korea. The indirect influence of broad social forces has undoubtedly contributed also to the drop in fertility. Development and modernization have had a strong influence, though in different ways which are difficult to analyze. The rising status of women and their greater participation in the labor force has presumably contributed to the rising age at marriage and also to reduced fertility within marriage. The system of required military service for men has likely had similar effects.

The Korean national family planning program has been implemented primarily by three organizations: the Ministry of Health and Social Affairs, the Planned Parenthood Federation of Korea and the Korean Institute for Family Planning. The Ministry is in charge of overall planning and coordination and for the maintenance of the national service network. Until 1970, program evaluation also has been carried out by the Ministry. PPFK, a private, voluntary association established in 1961, has responsibility for the information, and communications support component of the national program, including the nation-wide system of family planning Mothers' Clubs initiated in 1968. It also operates fifteen urban family planning clinics originally established as demonstration sites, and conducts various pilot projects. In the early years of the program, PPFK played an important role in the training of program field staffs and medical professionals. KIFP, a semigovernmental agency, was founded in 1970 and was delegated responsibility for the training of program staffs which had previously been carried out by PPFK, and for research and evaluation. These three organizations work closely together in the implementation of the program under the direction of the Ministry. This arrangement enables the delegation of responsibility to the participating agencies, taking advantage of their particular strengths and minimizing overlapping and duplication while maintaining program integration. The program has also benefited from the activities of universities and research organizations in pilot and research projects.

Most services are provided through the government network of health centers and designated private practitioners. This system was established at the beginning of the program by adding family planning fieldworkers to the staffs of the already existing county-level health centers. The network is operated by the Ministry of Health and Social Affairs in cooperation with the Ministry of Home Affairs, which has authority over provincial and local governments. This Ministry acts through nine provincial and two metropolitan governments, each of which has a family planning unit within its public health and social affairs bureau. Targets for contraceptive acceptors are given to the provinces. From there they are passed on to the counties and townships, where they finally reach the fieldworkers stationed in county health centers and township level subcenters throughout the country. From the beginning, this organization provided a network for routine administration from the national to the local level. The existence of this network enabled the program to get off to a fast start without having to build a new organizational structure. As in many other countries during the early sixties when family planning programs were being initiated, it was administered via the existing health network, though not as an integral of the health programs. More recently there has been a movement toward integration of the family planning and the health program with greater inter-ministry cooperation.

Since its inception, the program has concentrated on the delivery of family planning services in rural areas. Because of the rapid urbanization of the last decade, however, previously existing facilities in the cities are no longer adequate to fill the growing needs there, and expansion of the urban family planning network is taking place.

The implementation of the program depends on family planning fieldworkers. During the initial stage of the program in 1962-63, the government hired and trained about 380 nurse-midwives to work in the existing county and city health centers as family planning workers. In 1964 it was decided that this number was insufficient to meet the goals of the program, and nearly 1,500 lay workers were recruited to work at the town and township levels as assistants to the health center workers. There are currently about 2,500 family planning fieldworkers throughout the country working under the 196 county health centers, averaging one worker for every 1,300 eligible couples in rural areas and one for every 4,500 couples in urban areas.

The fieldworkers receive targets based on the population of the administrative area in which they serve. They fill these targets by recruiting acceptors of program methods through home visits and group meetings. The target system ensures that strong administrative pressure is brought to bear to encourage achievement, so that targets tend to act as a floor below which performance does not fall. However the targets have often tended to act as ceilings above which achievement does not rise. The target setting system tends to limit achievement because fieldworkers, afraid of not meeting future assigned quotas, will report only the required current number of acceptors and save any additional ones for future reporting to meet those assigned goals. Due to this problem, as well as several others associated with the current target setting method, the weighted credit system has been considered as an alternative method and will likely be introduced into the program in the near future.

The fieldworkers distribute oral pills and condoms themselves, and refer potential IUD and sterilization acceptors to designated physicians, who have been trained and authorized by the government. Induced abortion cases have also been referred to designated doctors since the enactment of the Maternal and Child Health Law in 1973. These physicians provide services at their own facilities and are reimbursed by the government on a per case basis for IUD and sterilization acceptors. For each IUD and sterilization referral, the fieldworker also receives a small incentive. IUDs, vasectomy, tubal ligation and condoms are provided to the clients free of charge. Pills are sold at a modest price. Before 1976, all abortions were paid for by the patient. The majority still are, though the government program began providing for a limited number of free abortions in 1976. And mobile units were introduced in 1966 to help deliver services in the remote areas, which were difficult for fieldworkers to cover adequately.

Services are also offered at the twelve urban clinics of PPFK. Originally established in 1968-69 as sites for demonstration projects and medical training, this system was augmented in the early 1970s to help meet the growing need for services in urban areas. The full range of family planning services is offered at these clinics, which are reimbursed through the program for IUDs and sterilizations.

Contraceptives were primarily available via the family planning program when first initiated, but the private sector has become an increasingly important supply source in recent years.

For example, in 1976, of the 7.7 percent of eligible women aged 15 to 44 who used the oral pill, nearly two in five purchased supplies via the commercial sector: Among condom users, the share of the private sector equalled that supplied by the government program (KIFP, 1977). The majority of vasectomies are still received via the government program, rather than through the private sector, though the reverse applies in the case of abortions. Prior to 1975, when female sterilization was officially added to the government program, acceptors most often used the private sector. Since 1975, however, female sterilization acceptors primarily utilize the government program. To encourage the growth of the local commercial sector, legislation was passed in 1968 to make the import of contraceptive materials tax exempt. Pills, condoms, jellies and foams are all manufactured locally and sold at pharmacies.

Acceptors experiencing side effects as a result of contraceptive use are given free medical treatment. Minor complications are dealt with by private physicians, while major cases are referred to provincial or university hospitals.

Contraceptive use increased very rapidly from the start of the program in 1962 through 1966 and more slowly thereafter, with a slight drop in 1968. It is estimated that about 45 percent of married couples aged 15 to 44 are currently using some form of contraception through either government or private channels, numbering 2.2 million users (Korean Institute for Family Planning, 1977). This is a dramatic increase from the estimated 9 percent practice rate in 1964, two years after the government program was initiated (Ross and Smith, 1970).

III. Recent Fertility Trends in Korea

Several recent estimates of the fertility of Korean women, prior to the start of the family planning movement and the increased pace of modernization in Korea, both of which began in the early 1960s, indicate it was very high (Lee, 1971, Cho, 1974, Koh, 1973, Kwon, 1975).

Table 1. Estimated Crude Birth Rates and Total Fertility Rates: 1950~1975

	CBR	TFR
1950~1955*	40	5.6
1955~1960*	45	6.3
1960~1965*	42	6.0
1965~1970*	32	4.6
1970~1975**	29	3.9

* Sources: Kwon, et al. 1975, p. 12:

** Kim, D.Y. 1975, pp. 18~19.

Fertility declined sharply in Korea during the 1960s as shown in Table 1, but remained well above that of developed countries. A central issue in the family planning program is the probability of a substantial further decline in fertility the 1970s and 1980s and what means will be used to realize such a decline.

Age specific fertility rates and age specific marital fertility rates from 1950 to 1975 are

shown in Table 2.

Table 2. Age Specific Fertility Rates and Age Specific Marital Fertility Rates, 1950~1975

	1950~1955	1955~1960	1960~1965	1965~1970	1970~1975
ASFR					
15~19	45	38	20	12	10
20~24	289	308	255	180	146
25~29	287	335	351	309	301
30~34	233	270	274	223	220
35~39	168	194	189	134	88
40~44	83	96	92	59	19
45~49	15	18	17	10	3
ASMFR					
15~19	312	357	356	350	357
20~24	385	440	443	394	346
25~29	320	367	383	346	341
30~34	260	298	295	237	233
35~39	193	221	212	148	99
40~44	102	117	111	71	22
45~49	21	24	22	13	4

Source; Kwon, et al. 1975. p. 16.

Two factors in addition to the national family planning program, the rising age at marriage for both women and men and the increasing use of abortion, have both contributed to the decline in fertility in Korea. Before 1950, the mean age at first marriage for Korean women is estimated to have been between 16 and 18 years. By 1975, it has risen to nearly 23 years as shown in Table 3. Though age at marriage has been rising, marriages still virtually universal in Korea; 98 percent of all women are get married by age 30. The decrease in the proportion of married women would lead to further fertility decline at every age, but there is no evidence that this is likely to occur in the near future.

A rising age at marriage for men is also shown in Table 3. In 1955 it was 24.6 years, and had increased to nearly 27 years by 1975. A cultural factor in the increasing age at marriage is the general feeling that men should not marry until they are financially stable. Since stability is relative, its meaning is likely to change over time and presently explains.

Table 3. Mean Age at First Marriage, 1955~1975

	Male	Female
1955	24.6	20.5
1960	23.6	21.8
1966	26.4	22.7
1970	27.2	23.0
1975	26.9	22.8

Source: Economic Planning Board. 1977. p.25.

the reluctance of men to marry for a few years after finishing military duty at about age 23. The pursuit of financial stability also helps to account for the high and increasing rates of urban migration among young adults, despite growing surpluses of labor in the larger cities. Urban migration affects rural marriage as well, since young men intending to move to cities commonly postpone matrimony.

The incidence of induced abortion has increased substantially since the early 1960s. According to the 1971 Fertility and Abortion Survey, abortion is a widely used means of fertility control in Korea; 29 percent of currently married Korean women aged 20 to 44 have had one or more induced abortions (see in Table 4.) During the 1960s a strong national family planning program developed and a substantial decline in fertility ensued as abortion rose sharply. National prevalence increased from 7 percent in 1964 to 29 percent in 1971. With some allowance for a higher rate of under-reporting in the earlier year, this still represents a significant increase over a relative brief period of time. It is of considerable interest, from several perspectives, that this change took place during the early and expanding years of the national family planning program. The incidence of induced abortion since 1971 seems to have leveled off, largely due to the more effective use of contraception among urban dwellers.

Table 4. Percent of Currently Married Women Aged 20 to 44 Ever Having an Abortion: 1964~1971.

	1964	1965	1966	1967	1968	1971
Urban	15	23	27	28	26	39
Rural	4	5	7	7	10	20
National	7	11	13	14	16	29

Source: Hong and Watson. 1976. p.37.

The causal relationships among the national program, rising levels of induced abortion, and declining fertility are difficult to unravel. There is no doubt that abortion has played an important role in the reduction in fertility of Korean women though it is impossible to calculate the precise impact of abortion on fertility rates because abortion and contraception overlap and their interrelationships with births prevented are complex.

IV. Application of the Methods

STANDARDIZATION METHOD

A logical first step in assessing the impact of a national family planning program on fertility is that of standardization. Such an approach begins with the aggregate (crude) fertility change, and decomposes it to separate distributional effects from actual differences in age-specific marital fertility.

According to the United Nations Expert Group which met in Geneva in 1976 to discuss

methods of measuring the impact of a family planning program on fertility, "The standardization approach as applied to measure programme impact on fertility requires two steps. The first step consists in measuring fertility at two points in time to determine whether any change has occurred during the period under study. The second step consists in trying to account for the observed change, if any, by standardizing for various non-programme components which, depending on the fertility indicator used, may affect observed fertility without reflecting a genuine fertility change. Standardization will thus 'explain' part of the observed change and the residual portion which cannot be accounted for by the standardized components will require an additional analysis. On the basis of reasonable assumptions and satisfactory evidence, all or part of the residual can thus be attributed to the family planning programme. Caution is, however, required in using this method. Factors other than those standardized for can evidently affect observed fertility; however not all of the non-programme factors can easily be taken into account. (United Nations Population Division of the Department of Economic and Social Affairs of the Secretariat, 1976).

In the present case, hypothetical fertility is defined as the number of births that would have occurred in 1975, had the general fertility rate of 1960 applied to the 1975 population. Actual fertility is the observed number of births in the latter year. The difference (hypothetical minus actual) is thus the total number of births averted in 1975 due to changes in 1) age structure, 2) marital distribution, and 3) age-specific marital fertility levels. Standardization yields the relative contribution of each factor, and thus distinguishes between real fertility decline and that resulting from changes in the age and distribution of the population.

Table 5. Data Used in Calculating Hypothetical and Actual Births, 1975

Age group	1960					1975				
	Female (thousand) (1)	Population (% distribution) (2)	ASFR (3)	Married female population (thousand) (4)	ASMFR (5)	Female population (thousand)		ASFR (8)	Married female population (thousand) (9)	ASMFR (10)
						(Actual) (6)	(Based on 1960 age structure) (7)			
15~19	1,153	21.3	34	81	486	2,159	1,724	12	61	425
20~24	1,151	21.3	254	746	392	1,582	1,721	163	669	385
25~29	994	18.4	359	925	386	1,241	1,486	273	1,097	309
30~34	831	15.3	300	762	327	1,095	1,243	152	1,036	161
35~39	710	13.1	230	626	261	1,084	1,062	68	997	74
40~44	572	10.6	114	470	139	930	855	23	789	27
Total	5,411	100.0	216	3,610	324	8,091	8,091	109	4,649	190

Source: Kim, D.Y. 1975, and Moon, et al. 1973.

Table 6 presents hypothetical and actual births for 1975, and Table 7 the number of births averted to women aged 15 to 44. The hypothetical number of 1975 births, based on the general fertility rate of 1960, is 1,743,900, representing an excess of 859,800 over the actual number for that year. These averted births must now be allocated to each of the three effects described above.

Table 6. Hypothetical and Actual Births, 1975

	Hypothetical births based on:			Actual births (6) × (8) (14)
	1960 age structure 1960 ASFR (7) × (3) (11)	1975 age structure 1960 ASFR (6) × (3) (12)	1975 age-marital structure 1960 ASMFR (9) × (5) (13)	
15~19	58,600	73,400	29,600	25,900
20~24	437,100	401,800	262,300	257,900
25~29	533,500	445,500	423,400	338,800
30~34	372,900	328,500	338,800	166,400
35~39	244,300	249,300	260,200	73,700
40~44	97,500	106,000	109,700	21,400
Total	1,743,900	1,604,500	1,424,000	884,100

Changes in the Age Structure of the Female Population

If the age-specific rates of 1960 had not changed, and the age structure of the female population had evolved to its actual 1975 distribution, hypothetical births would number 1,604,500. Thus 139,400 births, or 16 percent of the total number averted, are due to simple change in the age composition of female aged 15 to 44,

Changes in the Marital Distribution of the Female Population

We next allow the age-specific marital fertility rates for 1960 to operate on the age-marital distribution of 1975. This results in 1,424,000 hypothetical births, representing an additional 180,500 births averted (21 percent of the total number) as a consequence of a shifting marital distribution in the 15 to 44 age group.

Changes in Age-Specific Marital Fertility

The remaining number of averted births (those not explained by changes in age or marital distribution) are defined as those resulting from actual declines in age-specific marital fertility. Clearly, this amount is calculated as a residual, and may include other effects (education,

Table 7. Birth Averted, 1975: Distribution by Factor, Within Age Groups

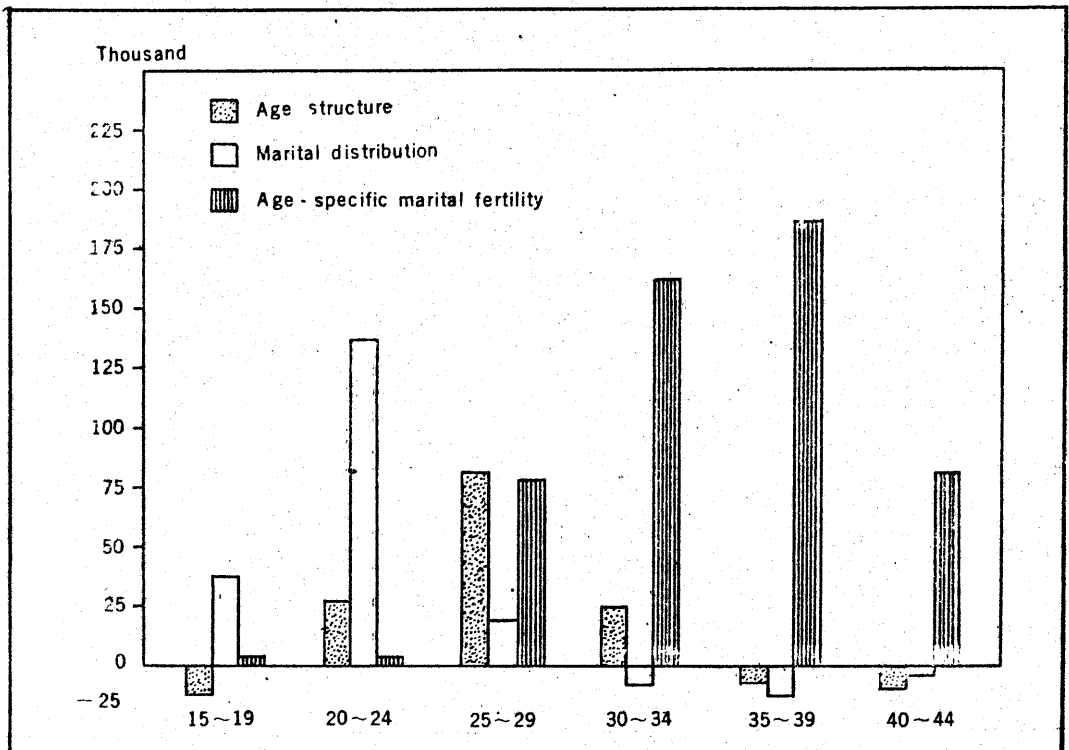
	Age structure		Marital distribution		Age-specific marital fertility		Total	
	Number (11) - (12) (15)	% (16)	Number (12) - (13) (17)	% (18)	Number (13) - (14) (19)	% (20)	Number (11) - (14) (21)	% (22)
15~19	-14,800	-45.2	43,800	133.9	3,700	11.3	32,700	100.0
20~24	35,200	19.7	139,500	77.8	4,400	2.5	179,200	100.0
25~29	88,000	45.2	22,100	11.4	84,600	43.4	194,700	100.0
20~34	44,400	21.5	-10,300	-5.0	172,400	83.5	206,500	100.0
35~39	-5,000	-2.9	-10,900	-6.4	186,500	109.3	170,600	100.0
40~44	-8,500	-11.2	-3,700	-4.8	88,300	116.0	76,100	100.0
Total	139,400	16.2	180,500	21.0	539,900	62.8	859,800	100.0

urbanization) which are undergoing rapid change and are related to the practice of family planning. 539,900 births were averted in 1975 due to declines in age-specific marital fertility, an amount which represents 63 percent of the total difference between actual and hypothetical births.

As Table 7 and Figure 1 show, contribution of the three effects, in both magnitude and proportion, differs within each age group. Decline in marital fertility among women aged 30 to 44, for instance, account for over one-half of the total number of births averted in 1975. Among women aged 15 to 24, however, marital fertility in 1975 is very close to the levels experienced by similarly aged women in 1960; the bulk of the births averted in this age group is due to a 48 percent decrease in the proportion married, a function of the steadily-increasing age at first marriage during the 1960s. In fact, were it not for the effect of the altered marital distribution on the 15 to 19 year old group, their absolute-and proportional-increase in numbers would have resulted in an "excess" of births to this group rather than a modest number averted.

In summary, it may be said that of the 859,000 births averted in 1975 to women aged 15 to 44, 16 percent were due to changes in age composition, 21 percent to change in marital distribution, and the balance, 63 percent, to declines in age-specific marital fertility. It may be presumed that the role of the national family planning program during the fifteen-year period has contributed largely to the last portion of the decline, though the relative effects of program and non-program activities cannot be specifically assessed by the procedure of standardi-

Figure 1. Number of Births Averted, 1975, Due to Changes in Age Structure, Marital Distribution, and Age-Specific Marital Fertility, within Age Groups.



zation.*

PROJECTION METHOD

The projection method or trend analysis, as defined by the same United Nations Expert Group, "... is used to estimate, on the basis of reasonable assumptions, how the fertility of the population under study would have evolved, had the family planning programme not been undertaken. This potential trend in fertility is then compared with the actual trend and an attempt to interpret the difference between the two trends can be made in order to assess the possible effects of the family planning programme. Caution has, of course, to be taken so as not to attribute to the programme a trend difference resulting from erroneous projection assumptions. The method can be applied on the aggregate level to estimate over-all country effects or, if data are available, to specific groups such as acceptors only. In the latter case, however, additional problems arise." (United Nations, Population Division of the Department of Economic and Social Affairs of the Secretariat, 1976)

In 1963, the year before the national family planning programme was introduced in Korea, the crude birth rate was 41 per thousand population. This rate had dropped to 26 per thousand by 1975, for an average annual decline of 3.0 percent over the twelve year period of programme activity. The total number of births occurring between 1963 and 1975 was 12,675,000. (Table 8)

Table 8. Total Population, Crude Birth Rate and Number of Births: 1963~1975

	Actual			Projected: Modest reduction			Projected: Constant CBR		
	Population (Dec. 1) (thousand)	CBR	Births (thousand)	Population (Dec. 1) (thousand)	CBR	Births (thousand)	Population (Dec. 1) (thousand)	CBR	Births (thousand)
1963	27,521	41	1,111	27,521	41	1,111	27,521	41	1,111
1964	28,272	39	1,096	28,285	39	1,106	28,319	40	1,117
1965	28,999	37	1,069	29,047	39	1,107	29,112	40	1,149
1966	29,697	36	1,045	29,800	38	1,107	29,927	40	1,181
1967	30,371	34	1,022	30,554	37	1,112	30,765	40	1,214
1968	31,010	32	991	31,305	36	1,115	31,627	40	1,248
1969	31,616	30	956	32,051	36	1,113	32,512	40	1,283
1970	32,180	29	922	32,784	35	1,110	33,422	40	1,319
1971	33,768	28	906	33,550	33	1,105	34,358	40	1,356
1972	33,341	27	898	34,319	33	1,115	35,389	40	1,395
1973	33,896	27	890	35,088	32	1,129	36,451	40	1,437
1974	34,445	27	885	35,868	32	1,144	37,544	40	1,480
1975	34,986	26	884	36,665	32	1,168	38,671	40	1,524
Total			12,675			14,542			16,814

Source: Smith, 1960. pp. 9~22.

* The projection approach offers a rough estimate of the number of births averted by the national program. Table 8 shows that program activity averted 284,000 births during 1975 (1,168,000 minus 884,000), which amounts to 53 percent of the 539,900 births averted in that year as a result of reductions in age-specific marital fertility (Table 7). Thus we may tentatively state that program and non-program factors are almost equal in their contributions to the decline in age-specific marital fertility.

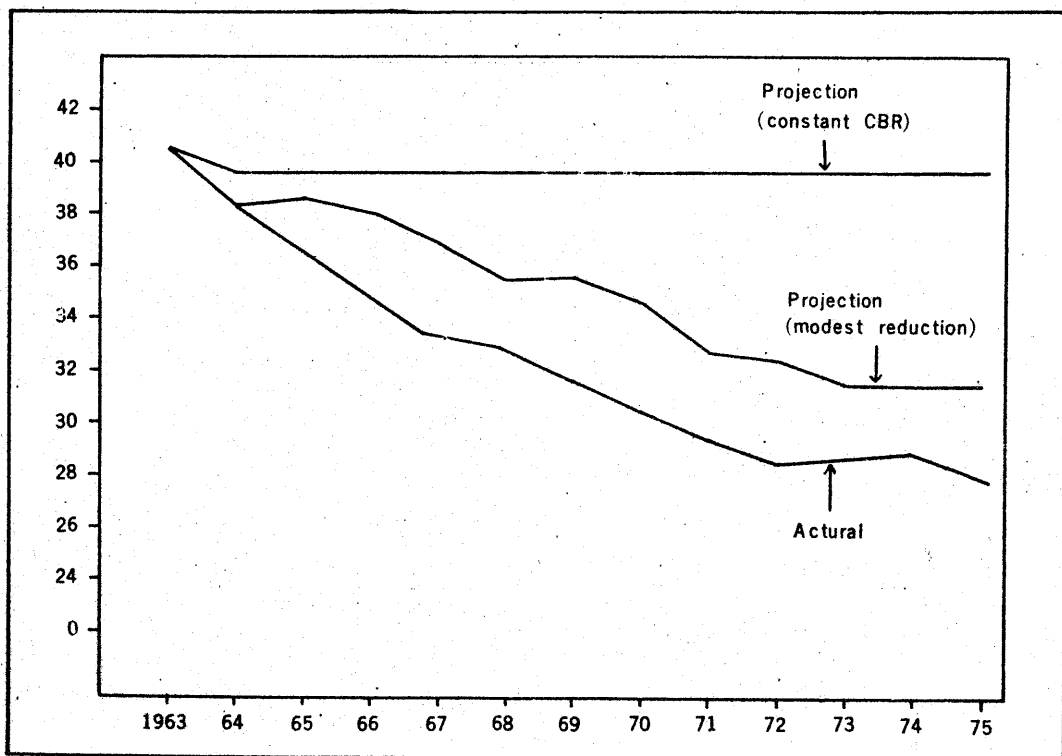
The results of this approach show that the national family planning program has been responsible for a 1.2 percent average annual decline in the crude birth rate in its twelve years of operation. This represents about forty percent of the overall mean annual decline during this period.

The findings further indicate that of 1,867,000 births were averted between 1963 and 1975 as a result of program activity.

To measure the role of non-program factors in the fertility decline of the period, a second projection was made under the assumption that the crude birth rate stabilized at 40 per thousand in 1964. Under such conditions, the projected number of births would have been 16,814,000, or 4,319,000 more than actually occurred during the period. Thus, approximately 45 percent (1,867,000 ÷ 4,139,000) of the total number of births averted between 1963 and 1975 may be credited to the national family planning programme; the remaining 55 percent are due to such non-programme factors as a changing age and marital distribution, the increasing use of induced abortion, expanding educational opportunity, and smaller family size values resulting from social and economic development.

In appraising the validity of the results obtained by the projection approach, two factors must be considered. The crude birth rate is a rough indicator of the actual fertility behavior of the population at risk; its change over time varies with the relative proportion of women in the childbearing years. Second, the number and proportion of births averted during the period due to program activity depends on the assumptions made in the projections as well as the accuracy of the observed data.

Figure 2. Actual and Projected Crude Birth Rates: 1963~1975



The crude birth rate declined rather rapidly during the years immediately preceding program implementation. This is largely due to the artificially high levels of fertility which existed in the years following the Korean War, and which were returning to a "normal" level in the early 1960s. For this reason, an ordinary projection of pre-program fertility trends is unsatisfactory. Instead, a high (traditional) fertility projection (Smith 1970) is utilized, assuming "modest" reductions from 1960 levels continuing throughout the period. The appropriateness of this projection is enhanced by the fact that the crude birth rates generated for 1960-64 are nearly identical to those which in fact did occur.

Following this projection, the crude birth rate decreased to 32 per thousand by 1975, yielding an annual rate of decline of approximately 1.8 percent. A total of 14,542,000 births are projected between 1963 and 1975 (Smith, 1970). (See Figure 2)

COUPLE YEARS OF PROTECTION (CYP)

The United Nations Expert Group defined couple years protection (CYP) index as "... an estimate of the protection against pregnancy resulting from the differential use of various methods of birth control. It is used to produce a measure of programme achievement in a period, by assessing the joint impact of methods adopted, taking into account the length of time a couple is likely to be protected by each method. The CYP index can also account for protection resulting from past distribution as well as the protection derived in the period from current distribution. From this prevalence measure, one can estimate the number of births averted on the basis of a simple translation equation of the form $1 \text{ CYP} = \underline{n}$ births averted, \underline{n} varying with the fertility levels prevailing in each country. The sources of data, the quality of data, the assumptions involved in the determination of both terms of this equation define this method as very simple, but somewhat crude, whose interpretation is difficult and reliability uncertain. Although this method has been recommended or used for various administrative purposes, its conclusion requires independent verification." (United Nations, Population Division of the Department of Economic and Social Affairs of the Secretariat, 1976).

This approach, as well as the one which follows, enables the direct estimation of program impact on fertility from reported data on annual numbers of acceptors by method. The first step is to calculate, annually for each method, the number of couples effectively practicing contraception and thus removed from the risk of pregnancy during each year. In the second step, empirically-derived rates of potential fertility are applied to the calculated couple years of protection to yield the number of births averted by method and year.

The methods included are those distributed by the national family planning program between 1960 and 1975: IUD, oral pill, condom, and sterilization (male and female).^{*} Annual achievement levels of these four methods are shown in Table 9. (Because abortion was not available through the national program until 1976, it is not included. However, it was extensively used through the private sector with a significant effect. In terms of births averted, it will be shown that abortion has almost the same effect as did all program methods combined.)

^{*} Sterilizations through 1969 were all vasectomies.

Table 9. Program Achievement by Method, 1960~1975

	Program achievement			
	IUD (1st insertions)	Oral pill (Cycles)	Comdom (Dozen)	Sterilization (Male & Female)
1960				
1961				
1962			708,000	2,940
1963	1,000		1,560,000	19,600
1964	111,000		1,860,000	25,480
1965	226,000		2,292,000	12,740
1966	380,000		2,028,000	19,600
1967	305,000		1,824,000	16,600
1968	237,000	312,000	1,596,000	15,680
1969	229,000	1,092,000	1,776,000	14,700
1970	224,000	2,052,000	1,956,000	17,640
1971	213,000	2,400,000	1,932,000	19,600
1972	224,000	2,568,000	1,884,000	23,520
1973	250,000	2,808,000	2,124,000	28,420
1974	279,000	2,904,000	2,088,000	38,220
1975	281,000	2,880,000	2,364,000	55,860
Total	2,960,000	17,016,000	25,992,000	313,600

Source; Ministry of Health, 1976. pp.2~5.

IUD

IUDs were the first means of contraception made available to Korean women through the national family planning program. The IUD program effectively commenced in 1964, and since 1968 first insertions have averaged a quarter million per year.

The use of an IUD is eventually terminated by expulsion, removal, or pregnancy in situ. The rate of retention is a function of these factors over time, and may be expressed as

$$Y_t = ae^{-rt}$$

where Y_t is the IUD retention rate t months after insertion. This equation may be converted to couple years of protection per IUD insertion:

$$CYP_n = \int_0^t ae^{-rt}$$

where a = a constant to indicate the proportion of successful insertions, to allow for immediate expulsions

e = natural logarithm (2.718)

r = a constant that measures the annual rate of decline

t = months following insertion

Using calculated IUD retention rates from 1971 survey data, which are assumed to summarize the experience of the period, values for a and r were determined to be .7838 and .0372 res-

pectively. Thus CYP is derived as follows:

$$CYP_n = \int_0^t .7838e^{-.0372t}$$

Using these parameters, we have calculated cumulative CYP per insertion and rate of protection by time in years since insertion (Table 10). Annual levels of CYP are thus determined according to the equation:

$$CYP_n = (.8L_n \times E_1) + (.8L_{n-1} \times E_2) + (.8L_{n-2} \times E_3) + \dots + (.8L_{n-m} + 1 \times E_m)$$

Table 10. Couple-Years Protection and Protection Rate Per Insertion by Number of Years Since Insertion

Year	1	2	3	4	5	6	7
CYP/insertion	.638	1.052	1.322	1.497	1.613	1.687	1.735
Protection rate (E)	.35	.51	.30	.23	.14	.09	.07

where n=the year for which CYP is to be calculated

L=the reported yearly number of first insertions

E=the applicable yearly protection rate

m=the number of years over which insertions have occurred

A correction factor of .8 is incorporated in the equation to account for over-reporting of insertions, and the annual rate of protection is assumed to reach zero seven years from the date of insertion. The 1971 continuation rate of the IUD, representing an average during this period, was used.

Oral Pill

Oral pills were added to the national family planning program in 1968. Yearly distribution levels have climbed steadily, reaching nearly three million cycles during 1975.

Annual levels of CYP from oral pill use are calculated by multiplying the reported number of cycles distributed by a correction factor of .85 (to account for the over-reporting of effective distribution) and dividing by 13, the number of cycles used per acceptor over a twelve month period. The equation is

$$CYP_n = \frac{.85P_n}{13}$$

where P_n =reported number of oral pill cycles distributed in year n.

Condom

Condoms were made available to the Korean program beginning in 1962. From a low of 1.6 million dozen distributed in 1968 (the year oral pills were introduced), reported annual

achievement levels have increased steadily to 2.4 million dozen distributed in 1975.

In the calculation of CYP provided by the condom, we have assumed that one dozen units per month (144 per year) are required to yield one couple-year of protection. We have further applied a correction factor of .75 to account for over-reporting of effective distribution. Annual CYP is thus given by the equation

$$CYP_n = \frac{.75C_n}{12}$$

where C_n = reported distribution of condoms in year n (in dozens).

Sterilization

Vasectomies were first performed as part of the Korean program in 1962 (female sterilizations began in 1970). Annual acceptors remained relatively constant through 1971, after which time marked yearly increases have been recorded as a result of the promotion of this method in the national program.

The procedure for calculating CYP in a given year resulting from all previous sterilizations utilizes the equation

$$CYP_n = S_n + S_{n-1}(.9^1) + S_{n-2}(.9^2) + \dots + S_{n-m}(.9^m)$$

where n = the year for which CYP is to be calculated

S = the yearly number of sterilizations

m = the number of years over which sterilizations have occurred.

An annual attrition rate of ten percent, beginning with the year following sterilization, is assumed, to allow for events which might have occurred in the absence of the operation. Such events include divorce, widowhood, onset of natural sterility, or death, and act to reduce the demographic effectiveness of sterilization.

Results

Table II shows the couple years protection resulting from program activity, by method and year, between 1960 and 1975. To calculate the number of births averted, we have assumed a period-and method-specific pattern of potential fertility over the fifteen year period (Table 12). These rates were estimated from observed age-specific marital fertility rates, weighted according to the observed age distribution, by year, of users of each specific method, and inflated by 20 percent to account for a higher level of fertility among acceptors

Overall, potential fertility has declined over the period, reflecting the trend in period fertility rates since the beginning of the national family planning program. The relative mean age of users of each method is illustrated by comparing method-specific potential fertility in any given year; condom users, the youngest group, show the highest rates, while the older contraceptively sterilized population has the lowest potential fertility for each year.

The number of births averted, by method and year, are presented in Table 13. During the period, 682,491 births have been averted through use of IUDs, 231,053 by oral pills, 438,295 by the condom, and 207,257 as a result of male and female sterilizations, for a total of

1,559,095 births averted as a directed result of program activity between 1962 and 1975. To this amount must be added an additional number of "future" averted births in the years following 1975, due to the detrimental effectiveness of IUD insertions occurring during the 1962-75 period. For the purposes of estimation, CYP from an IUD insertion is assumed to reach zero after six years; a sterilization is similarly "effective" for fourteen years. Further,

Table 11. Couple Years of Protection by Method and Year, 1960~1975

	IUD	Oral pill	Condom	Sterilization
1960				
1961				
1962			44,250	2,940
1963	280		97,500	22,246
1964	31,488		116,250	45,501
1965	108,816		143,250	53,691
1966	226,320		126,750	67,922
1967	317,024		114,000	80,730
1968	338,688	20,400	99,750	88,336
1969	339,735	71,400	111,000	94,203
1970	336,096	134,169	122,250	102,424
1971	325,608	156,923	120,750	111,782
1972	317,096	167,908	117,750	124,122
1973	315,224	183,600	132,750	140,111
1974	329,712	189,877	130,500	164,337
1975	348,536	188,308	147,750	203,763

Table 12. Potential Fertility Rates of Users by Method and Year, 1960~1975

	IUD	Oral pill	Condom	Sterilization
1960				
1961				
1962			339	193
1963	284		323	181
1964	270		307	175
1965	256		277	150
1966	265		299	186
1967	226		263	151
1968	236	252	282	171
1969	220	244	282	167
1970	193	218	251	156
1971	215	202	286	177
1972	193	233	266	170
1973	180	213	246	161
1974	164	193	226	147
1975	151	174	206	134

Table 13. Number of Births Averted by Method and Year, 1960~1975

	IUD	Oral pill	Condom	Sterilization	Total
1960					
1961					
1962			15,010	567	15,577
1963	79		31,532	4,029	35,640
1964	8,514		35,700	7,963	52,177
1965	27,900		39,637	8,064	75,601
1966	59,862		37,949	12,654	110,465
1967	71,521		30,028	12,223	113,772
1968	79,964	5,145	28,159	15,097	128,365
1969	74,810	17,450	31,324	15,722	139,306
1970	65,001	29,289	30,636	15,958	140,884
1971	69,843	31,683	34,510	19,774	155,810
1972	61,295	39,039	31,322	21,088	152,744
1973	56,866	39,033	32,603	22,530	151,032
1974	54,172	36,705	29,493	24,223	144,593
1975	52,664	32,709	30,392	27,365	143,130
Total	682,491	231,053	438,295	207,257	1,559,095

method-specific potential fertility rates are assumed to remain constant at 1975 levels. Table 14 shows an additional 263,910 births which will be averted in future years as a result of pre-1976 program activity.

A final point of interest using the CYP approach is the calculation of the number of births averted per single application of each method. The number of IUDs inserted is equal to the reported number times the correction factor ($2,960,000 \times .80 = 2,368,000$)

Table 14. Delayed Effects of IUD Insertions and Sterilizations Previous to 1976

	IUD		Sterilization		Total(IUD+Ster.)
	CYP	Births averted	CYP	Births averted	Births averted
1976	282,808	42,732	183,385	24,629	67,361
1977	177,080	26,757	164,443	22,085	48,842
1978	113,496	17,149	143,963	19,334	36,483
1979	65,560	9,906	124,331	16,698	26,604
1980	35,856	5,418	109,266	14,674	20,092
1981	15,736	2,378	94,306	12,665	15,043
1982			80,840	10,857	10,857
1983			69,528	9,338	9,338
1984			59,548	7,997	7,997
1985			49,901	6,702	6,702
1986			40,928	5,497	5,497
1987			31,993	4,297	4,297
1988			22,943	3,081	3,081
1989			12,778	1,716	1,716
Total					
1976~89		104,340		159,570	263,910
1960~75		682,491		207,257	
1960~89		786,831		366,827	

For both the oral pill and the condom, calculated CYP is equal to the total number of effective person-years of use. The number of sterilization is given in Table 9.

IUD	$\frac{786,831 \text{ births averted}}{2,368,000 \text{ 1st insertions}} = .33 \text{ births averted per 1st insertion}$
Oral Pill	$\frac{231,053 \text{ births averted}}{1,112,586 \text{ person-years use}} = .21 \text{ births averted per person-year of use(13 cycles)}$
Codnom	$\frac{438,295 \text{ births averted}}{1,624,500 \text{ person-years use}} = .27 \text{ births averted per person-year of use(12 dozen)}$
Sterilization	$\frac{366,827 \text{ births averted}}{313,600 \text{ sterilization}} = 1.17 \text{ births averted per sterilization}$

COMPONENT PROJECTION METHOD

Using a definition from the same United Nations Expert Group, the component projection approach is also based on data about birth control practice. The number of acceptors of a given method, the duration of use and the effectiveness of the contraception must be taken into account, either explicitly or implicitly. In addition, the fertility of these acceptors, had the family planning programme not been undertaken (potential fertility) must be estimated for the period of time under analysis. These data allow the evaluator to obtain an estimate of the number of births averted over a given time period. These estimates are usually worked out by five-year age groups on an annual basis. The summation of births averted for all ages of the women's reproductive span and for all 21-month periods studied provides the total number births averted during the period under study. This approach is not without difficulties, both for estimating the number of continuing users and their potential fertility. The timing of adoption in relation to the women's reproductive cycle; the switching of family planning methods, and the use of abortion are factors which raise a number of additional problems." (United Nations, Population Division of the Department of Economic and Social Affairs of the Secretariat, 1976).

As with the previous techniques, the component projection approach provides an estimate of births averted during a given period of time. Unlike standardization projection, however, it utilizes data on program acceptors, by method, and thus measures program impact directly rather than as a residual.

The procedure is to estimate the potential age-specific marital fertility of program acceptors. The number of births they would have had in the absence of the program are considered to be the number of births averted by program activity. Using available data on program acceptors and continuation rates, by method, between 1960 and 1975, the procedure developed by Lee and Isbister (1966) enables us to calculate the number of births averted by age group and year according to the

$$A_{i,t} = Q_{i,t} \times g_i$$

formula where $A_{i,t}$ is the number of births averted by the program to age group i in year t , $Q_{i,t}$ is the number of acceptors belonging to age group i who were practicing totally efficient contraception in year $t-1$, and g_i is the potential fertility of users in age group i .

Potential fertility rates (g_i) were estimated on an annual basis by inflating period age-

specific marital fertility rates by 20 percent, to account for the higher fertility of acceptors than the married population as a whole (Table 15).

Q_i values were obtained from service statistics of the national family planning program. Since 1962, age-and method-specific records have been kept of all acceptors, thus affording a relatively direct calculation of this factor (Table 16). As the method requires the number of acceptors who were practicing contraception in year $t-1$, the five-year age group were classified as 14-19 through 39-43.

The calculation of the number of births averted over the period, by method, age group, and year, is simple and straight forward once the appropriate values for Q and g have been determined. Table 17 shows that a total of 1,656,114 births were averted by all methods between 1960 and 1975. The calculated number averted by each method is slightly higher than the corresponding figure obtained through the couple year protection approach (See Table 13). Although the age specificity of the present procedure is likely to enhance the validity of its results, the crude estimation of g_i values common to all users within a given age group and year based on period marital fertility rates may have the opposite effect. Despite the differing methodological techniques used in these two approaches, the results by both method and year are in relatively close agreement.

An estimate of the relative contributions of program and non-program factors may be made when the latter is calculated as a residual of the total number of births averted. This is presented by age group and year in Table 18. As the family planning program did not encompass those under age 20 during the period, all of the births averted to women at ages 15-19 are due to non-program factors. A very small proportion (7%) of the births averted to women at ages 20-24 was due to program activity, though a majority (57%) to women at ages 25-29 were due to the program. This proportion declines at age above 30, and results

Table 15. Age-Specific Marital Fertility and Potential Fertility (g_i)* by Year, 1969-1975

Year	Age group											
	15-19		20-24		25-29		30-34		35-39		40-44	
	ASMFR	g_i	ASMFR	g_i	ASMFR	g_i	ASMFR	g_i	ASMFR	g_i	ASMFR	g_i
1960	486	583	392	470	386	463	327	392	261	313	139	167
1961	482	578	393	472	373	448	312	374	247	296	128	154
1962	478	574	395	474	359	431	297	356	232	278	116	139
1963	474	569	396	475	345	414	282	338	218	262	105	126
1964	470	564	398	478	331	397	267	320	203	244	93	112
1965	466	559	375	450	317	380	242	290	167	200	70	84
1966	462	554	403	484	358	430	235	382	200	240	93	112
1967	458	550	350	420	302	362	240	288	148	178	62	74
1968	454	545	393	472	363	436	221	265	175	210	59	71
1969	450	540	374	449	344	413	264	317	120	144	63	76
1970	446	535	355	426	336	403	212	254	118	142	56	67
1971	442	530	376	451	371	445	253	304	139	167	49	59
1972	438	526	378	454	356	427	230	276	123	148	44	53
1973	434	521	380	456	340	408	207	248	107	128	38	46
1974	430	516	383	460	326	390	184	221	90	108	33	40
1975	425	510	385	462	309	371	161	193	74	89	27	32

* $g_i = \text{ASMFR} \times 1.2$

Source: Moon, et. al. 1973, and Kim, D.Y. 1975.

Table 16. Q Values by Age Group, Year, and Method

Year	Age group				
	19~23	24~28	29~33	34~38	39~43
<i>IUD</i>					
1960					
1961					
1962					
1963	4	35	88	104	49
1964	504	4,377	10,139	10,958	5,519
1965	1,959	16,866	35,800	35,039	19,152
1966	4,753	34,174	73,102	73,780	40,511
1967	6,976	45,968	98,277	109,373	56,430
1968	7,451	46,738	100,252	118,202	66,044
1969	7,474	44,166	96,145	119,926	72,024
1970	7,730	41,340	90,074	119,986	76,966
1971	7,489	37,446	82,704	117,219	80,751
1972	7,927	38,369	78,006	109,715	83,079
1973	8,196	40,033	75,339	104,024	87,632
1974	9,891	42,863	80,120	108,146	88,692
1975	12,547	46,355	86,785	112,926	89,923
<i>Oral pill</i>					
1960					
1961					
1962					
1963					
1964					
1965					
1966					
1967					
1968		3,590	7,243	7,058	2,509
1969		12,566	25,348	24,704	8,782
1970		23,614	47,630	46,422	16,503
1971	2,982	29,345	51,785	46,763	29,048
1972	3,192	31,399	55,410	50,036	27,873
1973	3,488	34,333	60,588	54,713	30,478
1974	3,608	35,507	62,660	56,583	31,519
1975	3,578	35,214	62,141	56,116	31,259

Table 16. Q Values by Age Group, Year, and Method (Cont'd)

Year	Age group				
	19~23	24~28	29~33	34~38	39~43
<i>Condom</i>					
1960					
1961					
1962	2,390	9,823	16,682	11,284	4,071
1963	5,265	21,645	36,758	24,862	8,970
1964	6,278	25,807	43,826	29,644	10,695
1965	7,735	31,802	54,005	36,529	13,179
1966	6,845	38,138	47,785	32,321	11,661
1967	6,156	25,308	42,978	29,070	10,488
1968	5,387	22,144	37,606	25,436	9,177
1969	5,994	24,642	41,847	28,305	10,212
1970	6,601	27,140	46,088	31,174	11,247
1971	6,520	26,807	45,523	30,791	11,109
1972	6,359	26,140	44,392	30,026	10,833
1973	7,168	29,471	50,047	33,851	12,213
1974	7,047	28,971	49,199	33,277	12,006
1975	7,979	32,800	55,702	37,676	13,593
<i>Sterilization</i>					
1960					
1961					
1962		26	174	814	1,926
1963		22	1,313	6,919	13,992
1964		637	3,822	14,333	26,709
1965		1,235	5,691	17,396	29,369
1966		2,106	8,762	22,550	34,504
1967		3,148	12,110	27,529	37,943
1968	177	4,240	15,105	30,741	38,073
1969	377	5,275	18,181	33,348	37,022
1970	615	7,272	22,533	35,848	36,156
1971		6,707	23,027	45,831	36,217
1972		9,061	28,424	50,393	36,244
1973		12,050	34,888	57,025	36,148
1974	164	15,448	43,056	64,420	41,249
1975	1,223	20,784	55,627	75,800	50,329

Table 17. Number of Brith Averted by Age Group, Method, and Year, 1960~1975

Year	IUD	Oral pill	Condom	Sterilization	Total
<i>Ages (20~24)</i>					
1960					
1961					
1962			1,128		1,128
1963	2		2,496		2,498
1964	239		2,982		3,221
1965	936		3,697		4,633
1966	2,139		3,089		5,219
1967	3,376		2,979		6,355
1968	3,129	74	2,262		5,466
1969	3,528	178	2,829		6,535
1970	3,471	276	2,964		6,711
1971	3,190	0	2,778	1,270	7,238
1972	3,575	0	2,868	1,439	7,882
1973	3,721	0	3,254	1,584	8,559
1974	4,510	75	3,213	1,645	9,443
1975	5,772	563	3,670	1,646	11,651
Total	37,588	1,166	40,201	7,584	86,539
<i>Ages (25~29)</i>					
1960					
1961					
1962		12	4,401		4,413
1963	15	9	9,329		9,353
1964	1,812	264	10,684		12,760
1965	6,696	489	12,625		19,810
1966	12,986	800	14,492		28,278
1967	19,766	1,354	10,882		32,002
1968	16,920	1,535	8,016	1,565	28,036
1969	19,256	2,300	10,744	5,479	37,779
1970	17,073	3,003	11,209	9,753	41,038
1971	15,090	2,703	10,803	11,826	40,422
1972	17,074	4,032	11,894	13,973	46,973
1973	17,094	5,145	12,584	14,660	49,483
1974	17,488	6,303	11,820	14,487	50,098
1975	18,078	8,106	12,792	13,733	52,709
Total	179,348	36,055	152,275	85,476	453,154

Table 17. Number of Birth Averted by Age Group, Method, and Year, 1960~1975 (Cont'd)

Year	IUD	Oral pill	Condom	Sterilization	Total
<i>Ages (30~34)</i>					
1960					
1961					
1962		65	6,239		6,304
1963	31	467	13,086		13,584
1964	3,427	1,292	14,813		19,532
1965	11,456	1,821	17,282		30,559
1966	21,200	2,541	13,858		37,599
1967	27,714	3,415	12,120		43,249
1968	28,873	4,350	10,831	1,919	45,973
1969	25,478	4,818	11,089	6,717	48,102
1970	28,553	7,143	14,610	15,099	65,405
1971	21,007	5,849	11,563	13,153	51,572
1972	23,714	8,641	13,495	16,845	62,695
1973	20,794	9,629	13,813	16,722	60,958
1974	19,870	10,678	12,201	15,540	58,289
1975	19,179	12,294	12,310	13,733	57,516
Total	251,296	73,003	177,310	99,728	601,337
<i>Ages (35~39)</i>					
1960					
1961					
1962		241	3,340		3,581
1963	29	1,923	6,912		8,864
1964	2,871	3,755	7,767		14,293
1965	8,550	4,245	8,913		21,708
1966	14,756	4,510	6,464		25,730
1967	26,250	6,607	6,977		39,834
1968	21,040	5,472	4,528	1,482	32,522
1969	25,184	7,003	5,944	5,188	43,319
1970	25,798	5,162	4,489	6,685	42,134
1971	16,645	6,508	4,372	6,640	34,164
1972	18,322	8,416	5,014	8,356	40,108
1973	15,396	8,440	5,010	8,098	36,944
1974	13,843	8,246	4,259	7,243	33,591
1975	12,196	8,186	4,069	6,061	30,521
Total	200,880	78,714	78,058	49,753	407,405

Table 17. Number of Birth Averted by Age Group, Method, and Year, 1960~1975 (Cont'd)

Year	IUD	Oral pill	Condom	Sterilization	Total
<i>Ages (40~44)</i>					
1960					
1961					
1962		297	621		924
1963	7	1,945	1,247		3,199
1964	697	3,365	1,348		5,407
1965	2,145	3,289	1,476		6,910
1966	3,403	2,898	980		7,281
1967	6,320	4,250	1,175		11,745
1968	4,887	2,817	679	178	8,561
1969	5,114	2,629	725	624	9,092
1970	5,849	2,748	854	1,254	10,705
1971	5,410	2,427	744	1,745	10,326
1972	4,902	2,138	639	1,645	9,324
1973	4,644	1,816	647	1,615	8,822
1974	4,080	1,897	552	1,450	7,979
1975	3,597	2,013	544	1,250	7,404
Total	51,052	34,629	12,237	9,761	107,679

Table 18. Number and Percent of Births Averted by Program and Non-Program Factors, by Age Group, 1960~1975

Year	Hypothetical births based on 1960 ASFR (1)	Actual births (2)	Total births averted (3)	Program factor (4)	Non-program factor (5)	% Program factor (6)	% Non-program factor (7)
			(1)-(2)		(3)-(4)	(4) ÷ (3) × 100	(5) ÷ (3) × 100
<i>Ages (15~19)</i>							
1960	38,437	38,437	—	—	—	—	—
1961	37,876	36,762	1,114	—	1,114	—	100.0
1962	38,726	35,309	3,417	—	3,417	—	—
1963	39,984	35,280	4,704	—	4,704	—	—
1964	42,007	34,594	7,413	—	7,413	—	—
1965	43,826	34,803	9,023	—	9,023	—	—
1966	44,472	32,700	11,772	—	11,772	—	—
1967	46,410	32,760	13,650	—	13,650	—	—
1968	47,702	30,856	16,846	—	16,846	—	—
1969	49,504	30,576	18,928	—	18,928	—	—
1970	54,672	30,552	24,120	—	24,120	—	—
1971	59,041	31,257	27,784	—	27,784	—	—
1972	61,659	29,016	32,643	—	32,643	—	—
1973	67,184	29,640	37,544	—	37,544	—	—
1974	71,723	27,424	44,299	—	44,299	—	—
1975	73,661	25,998	47,663	—	47,663	—	—
Total	816,884	515,964	300,920	—	300,920	—	100.0

Table 18. Number and Percent of Births Averted by Program and Non-Program Factors,
by Age Group, 1960~1975 (Cont'd)

	Hypothetical Births Based on 1960 ASFR (1)	Actual Births (2)	Total Births Averted (3) (1)-(2)	Program Factor (4)	Non- Program Factor (5) (3)-(4)	% Program Factor (6) (4) ÷ (3) × 100	% Non-program Factor (7) (5) ÷ (3) × 100
<i>Ages (20~24)</i>							
1960	286,385	286,385	—	—	—	—	—
1961	294,513	278,280	16,233	—	16,233	—	100.0
1962	296,418	263,742	32,676	1,128	31,548	3.5	96.5
1963	292,229	243,906	48,323	2,498	45,825	5.2	94.8
1964	287,528	224,136	63,392	3,221	60,171	5.1	94.9
1965	282,194	207,757	74,437	4,633	69,804	6.2	93.8
1966	278,003	219,995	58,008	5,219	52,789	9.0	91.0
1967	284,353	194,793	89,560	6,355	83,205	7.1	92.9
1968	293,624	226,576	67,048	5,466	61,582	8.2	91.8
1969	308,483	225,897	82,586	6,535	76,051	7.5	92.5
1970	321,691	224,171	97,520	6,711	90,809	6.9	93.1
1971	326,771	241,862	84,909	7,238	77,671	8.5	91.5
1972	341,122	244,426	96,696	7,882	88,814	8.2	91.8
1973	350,901	241,763	109,138	8,559	100,579	7.8	92.2
1974	364,363	242,431	121,932	9,443	112,489	7.7	92.3
1975	402,590	258,355	144,235	11,651	132,584	8.1	91.9
Total	5,011,168	3,824,475	1,186,693	86,539	1,100,154	7.3	92.7
<i>Ages (25~29)</i>							
1960	350,025	350,025	—	—	—	—	—
1961	360,795	347,730	13,065	—	13,065	—	100.0
1962	374,617	346,442	28,175	4,413	23,762	15.7	84.3
1963	385,028	341,055	43,973	9,353	34,620	21.3	78.7
1964	392,208	332,120	60,088	12,760	47,328	21.2	78.8
1965	396,336	321,264	75,072	19,810	55,261	26.4	73.6
1966	407,465	372,280	35,185	28,278	6,907	80.4	19.6
1967	410,158	315,330	94,828	32,002	62,826	33.7	66.3
1968	404,234	374,958	29,276	28,036	1,240	95.8	4.2
1969	397,952	349,178	48,774	37,779	10,995	77.5	22.5
1970	390,413	336,038	54,375	41,038	13,337	75.5	24.5
1971	385,028	365,723	19,305	40,442	-21,117	—	—
1972	394,182	355,752	38,430	46,973	-8,485	—	—
1973	407,106	348,138	58,968	49,483	9,485	83.9	16.1
1974	427,928	345,680	82,248	50,098	32,150	60.1	39.9
1975	446,776	339,749	107,027	52,709	54,318	49.2	50.8
Total	6,833,251	5,541,462	788,789	453,154	335,635	57.4	42.6

Table 18. Number and Percent of Births Averted by program and Non-Program Factors, by Age Group, 1960~1975 (Cont'd)

	Hypothetical births based on 1960 ASFR (1)	Actual births (2)	Total births averted (3) (1)-(2)	Program factor (4)	Non- program factor (5) (3)-(4)	% Program factor (6) (4) ÷ (3) × 100	% Non-program factor (7) (5) ÷ (3) × 100
<i>Ages (30~34)</i>							
1960	242,100	242,100	—	—	—	—	—
1961	248,550	237,780	10,770	—	10,770	—	100.0
1962	257,550	234,371	23,179	6,304	16,875	27.2	72.8
1963	266,250	229,863	36,387	13,584	22,803	37.0	63.0
1964	285,450	224,106	61,344	19,532	41,812	31.8	68.2
1965	294,300	212,185	82,115	30,559	51,556	37.2	62.8
1966	305,550	212,877	92,673	37,599	55,074	40.6	59.4
1967	313,950	225,089	88,861	43,249	45,612	48.7	51.3
1968	319,950	213,486	106,464	45,973	60,491	43.2	56.8
1969	323,250	259,160	64,090	48,102	15,988	75.1	24.9
1970	323,250	211,190	112,060	65,405	46,655	58.4	41.6
1971	332,550	259,389	73,161	51,572	21,589	70.5	29.5
1972	334,950	238,931	96,019	62,695	33,324	66.8	33.2
1973	330,450	212,590	117,860	60,958	56,902	51.7	48.3
1974	325,500	187,705	137,795	58,289	79,506	44.8	55.2
1975	319,500	161,880	157,620	57,516	100,104	36.5	63.5
Total	4,823,100	3,562,702	1,260,398	601,337	659,061	47.7	52.3
<i>Ages (35~39)</i>							
1960	162,495	162,495	—	—	—	—	—
1961	164,910	157,740	7,170	—	7,170	—	100.0
1962	166,750	151,525	15,225	3,581	11,644	23.5	76.5
1963	169,625	146,763	22,862	8,864	13,998	38.8	61.2
1964	176,640	144,384	32,256	14,393	17,863	44.6	55.4
1965	180,550	116,965	63,585	21,708	41,877	58.4	41.6
1966	185,380	143,468	41,912	25,730	16,182	61.4	38.6
1967	192,050	110,220	81,830	39,834	41,996	48.7	51.3
1968	198,490	134,628	63,862	32,522	31,340	50.9	41.9
1969	203,780	94,802	108,978	43,319	65,659	39.8	60.2
1970	212,865	97,178	115,687	42,134	74,553	36.4	63.6
1971	219,650	118,420	101,230	34,165	67,065	33.7	66.3
1972	228,160	109,120	119,040	40,108	78,932	33.7	66.3
1973	234,715	99,888	134,827	36,944	97,883	27.4	72.6
1974	239,315	85,321	153,994	33,591	120,403	21.8	78.2
1975	241,960	71,536	170,424	30,512	139,912	17.9	82.1
Total	3,177,335	1,944,453	1,232,882	407,405	825,477	33.0	67.0

Table 18. Number and Percent of Births Averted by Program and Non-Program Factors,
by Age Group, 1960~1975 (Cont'd)

	Hypothetical births based on 1960 ASFR (1)	Actual births (2)	Total births averted (3) (1)-(2)	Program factor (4)	Non- program factor (5) (3)-(4)	% Program factor (6) (4)÷(3)×100	% Non-program factor (7) (5)÷(3)×100
<i>Ages (40~44)</i>							
1960	64,125	64,125	—	—	—	—	—
1961	66,177	60,953	5,224	—	5,224	—	100.0
1962	68,628	57,792	10,836	924	9,912	8.5	91.5
1963	72,447	55,289	17,158	3,199	13,959	18.6	81.4
1964	75,354	51,558	23,796	5,407	18,389	22.7	77.3
1965	77,976	39,672	38,304	6,910	31,394	18.0	82.0
1966	79,173	54,171	25,002	7,281	17,721	29.1	70.9
1967	80,028	336,504	43,524	11,745	31,779	27.0	73.0
1968	81,396	34,986	46,410	8,561	37,849	18.4	81.4
1969	84,759	39,406	45,353	9,092	36,261	20.0	80.0
1970	86,640	35,720	50,920	10,705	40,215	21.0	79.0
1971	89,034	32,021	57,013	10,326	46,687	18.1	81.9
1972	92,340	29,970	62,370	9,324	53,046	14.9	85.1
1973	95,589	26,832	68,757	8,822	59,935	12.8	87.2
1974	98,097	24,094	74,003	7,979	66,024	10.8	89.2
1975	102,600	20,700	81,900	7,404	74,496	9.0	91.0
Total	1,114,363	663,793	650,570	107,679	542,891	16.1	83.4
<i>Ages (15~44)</i>							
1960	1,143,567	1,143,569	—	—	—	—	—
1961	1,172,821	1,119,245	53,576	—	53,576	—	100.0
1962	1,202,689	1,089,181	113,508	16,350	97,158	14.4	85.6
1963	1,225,563	1,052,156	173,407	37,498	135,909	21.6	78.4
1964	1,259,187	1,010,898	248,289	55,313	192,976	22.3	77.7
1965	1,275,182	932,646	342,536	83,620	258,916	24.4	75.6
1966	1,300,043	1,035,491	264,552	104,107	160,445	39.4	60.6
1967	1,326,949	914,696	412,253	133,185	279,068	32.3	67.7
1968	1,345,396	1,015,019	329,906	120,558	209,348	36.5	63.5
1969	1,367,728	999,019	368,709	144,827	223,882	39.3	60.7
1970	1,389,531	934,849	454,682	165,993	288,689	36.5	63.5
1971	1,412,074	1,048,672	363,402	143,723	219,679	39.5	60.5
1972	1,452,413	1,007,215	445,198	166,982	278,216	37.5	62.5
1973	1,485,945	958,851	527,094	164,766	362,328	31.3	68.7
1974	1,526,926	912,655	614,271	159,400	454,871	25.9	74.1
1975	1,587,087	878,218	708,869	159,792	549,077	22.4	77.6
Total	21,473,101	16,052,849	5,420,252	1,656,114	3,764,138	30.6	69.4

in an estimated aggregate of 31 percent of the births averted during the period to women 15 to 44 as resulting from program activity.

A major source of the difference between this figure and the 45 percent estimate derived from the projection approach is the means of projecting hypothetical births. The former method assumed a constant CBR of 40 after 1964, and the present approach employs age-specific fertility rates existing in 1960. In view of the changing age distribution over the fifteen-year period, the authors would tend to place greater confidence in the more conservative estimate of 31 percent obtained by the present approach, though the relatively close agreement in the absolute number of births averted as a result of program activity is of greater significance to the present research.

Conclusion

According to the different methods used in measuring the impact of the national family planning program on fertility decline, the following numbers of births averted have been obtained:

Method	Number of births averted (thousand)		Total
	Program factor	Non-program factor	
Standardization			
1975	NA	NA	860
Projection			
1960~1975	1,867	2,272	4,139
1975	284	356	640
Couple Years Protection			
1960~1975	1,559	NA	NA
1975	143	NA	NA
Comonent Projection			
1960~1975	1,656	3,764	5,420
1975	160	549	709

Despite the differences in the estimates resulting from the various approaches, particularly in the magnitude of non-program factors, it is evident that family planning has played an important role in reducing fertility in Korea over the past fifteen years.

Of the methods utilized, only the Couple Years Protection and Component Projection approaches measure the direct effects of program achievement; their close agreement in the number of births averted yields a measure of confidence in their respective estimates.

In addition, induced abortion has played a major role in the reduction of fertility levels between 1960 and 1975. Thought to be used mainly in cases of contraceptive failure rather than as a planned alternative to contraception, abortion are estimated to have numbered approximately 4.3 million during the period (Hong and Watson 1974, p.60; Song and Han 1974, p. 162). By the conservative estimate of three abortions needed to prevent one birth, this non-program factor alone accounted for close to one and a half million births averted between 1960 and 1975, nearly the same amount as resulting from all program methods combined.

In a period of declining fertility such as Korea has experienced since 1960, there exists an

interrelationship between program efforts and the overall process of social and economic modernization in which each serves to stimulate the other. As an example, the extensive information, education and communication activities of the national program have undoubtedly fostered behavioral change with respect to fertility and contraception. This, in turn, has affected not only program achievement, but also non-program services in the commercial section as well as smaller family size ideals. It is, thus, difficult to isolate the respective contributions of program and non-program factors in the measurement of fertility decline.

A program-related finding of this research is that the "effectiveness", in terms of births prevented per application of each contraceptive method, of the national program is declining due to a rising age pattern—and consequent reduced potential fertility—of acceptors. In the formulation of future program goals, the inherent cost-benefit advantages of a younger population should be considered, even if it means significant shifts in the distribution of method-specific targets. The average cost per birth averted by the national family planning program between 1960 and 1975 was close to 37 dollars*; this figure may be expected to increase in real terms in future years if the potential fertility of acceptors continues to decline at a faster rate than that of the eligible female population (Korean Institute for Family Planning, 1976). As the proportional input of donor funds to family planning activities in Korea continues to decline, this will add to the increasing burden on government funds, if the population growth rate goals of the Fourth Five Year Plan are to be met.

References

- Adil, Epver. "Measurement of Family Planning Progress in Pakistan." *Pakistan. Demography* 5: 1968. 659-665.
- Bean, Lee and William Seltzer. "Couple Years of Protection and Births Prevented: A Methodological Examination." *Demography* 5: 1968. 947-959.
- Bogue, Donald. *Family Planning Improvement through Evaluation*. Chicago: Community and Family Study Center, University of Chicago. 1970.
- Chandresekeran, C. and Albert Herhalin (eds.). *Measuring the Effects of Family Planning Program on Fertility*. Dolhain, Belgium: International Union for the Scientific Study of Population. 1975.
- Cho, Lee-Jay, *Estimates of Current Fertility for the Republic of Korea and Its Geographical Subdivisions: 1959-1970*. Seoul: Yonsei University Press. 1974.
- _____ and Man Jun Habm. "Recent Changes in Fertility Rates of the Korean Population." *Demography* 5: 1968. 690-698.
- _____ and Robert Retherford. "Comparative Analysis of Recent Fertility Trends in East Asia." *Proceedings of the International Population Conference 1973*. Liege: International Union for the Scientific Study of Population. 1973. pp. 163-181.
- Economic Planning Board, Republic of Korea. *Preliminary Goal of the Population Program in the Republic of Korea*. Seoul: Government Printing Office. 1977.
- Freedman, Ronald. "Comment on Social and Economic Factors in Hong Kong's Fertility Decline" by Sui-Ying Wat and R.W. Hodge. *Population Studies* 27: 1973. 589-595.
- _____ and L. Adlakha. "Recent Fertility Declines in Hong Kong: The Role of the Changing Age Structure." *Population Studies* 2: 1968. 181-198.

* Based on 1975 prices.

- Han, Kee Chun. *Cost-Benefit Analysis in the Korean Family Planning Program*. Seoul. Korean Institute for Family Planning. 1975.
- Han, Seung Hyun. "A Study on Couple Years of Protection through IUD and Oral Pill Program in Korea." *Family Planning Quarterly* Vol. 6: pp. 80-87. 1973.
- "Calculation of the Couple Years of Protection for the Korean Family Planning Program." *Journal of Family Planning Studies* Vol. 2, 1975. pp. 24-39.
- Hong, Sung-Bong and Walter Watson. *The Increasing Utilization of Induced Abortion in Korea*. Seoul. Korea University Press. 1976.
- Jemai, Yolande and Hedi Jemai. *Methods of Measuring the Impact of Family Planning Programmes on Fertility: The Case of Tunisia*. United Nations Expert Group Meeting on Methods of Measuring the Impact of Family Planning Programmes on Fertility, Geneva, April 20-28, 1976.
- Kim, Dae Young. *Population Projection in Korea: 1960-2040*. Seoul. Korean Development Institute. (in Korean) 1975.
- Kim, Eung Suk and Kap Suk Koh. "Analysis of the Demographic Characteristics of IUD and Vasectomy Acceptor." *Annual Report of Family Planning*. Vol. I. Seoul: National Family Planning Center. (in Korean) 1971. pp. 195-211.
- Kim, Taik Il, et al. *The Korean National Family Planning Program*. New York. The Population Council. 1972.
- Kitagawa, Evelyn. "Components of a Difference Between Rates." *Journal of the American Statistical Association* 50: 1955. p.p. 1168-1194.
- Koh, Kap Suk. "Some Aspects of the Recent Fertility Decline." *Family Planning Quarterly* Vol. 6. 1973. p.p. 63-73.
- Korean Institute for Family Planning. Unpublished Tabulations from the Korean Institute for Family Planning. Seoul. 1976.
- Korean Institute for Family Planning. Unpublished Preliminary Tabulations from the 1976 Family Planning Evaluation Survey. Seoul. 1977. Mimeo.
- Kwon, Tai Hwan, et. al. *The Population of Korea*. Seoul. Population and Development Studies Center, Seoul National University. 1975.
- Lee, Byung Moo. "The Impact of Marital Age Distribution, Induced Abortion, and Family Planning Program on Fertility." *Annual Report of Family Planning*. Vol. I. Seoul. National Family Planning Center. (in Korean) 1971. pp. 142-183.
- and John Isbister. "The Impact of Birth Control Programs on Fertility," Bernard Berelson, et. al., (eds.), *Family Planning and Population Programmes*. Chicago. University of Chicago Press. 1966. pp. 737-758.
- Mauldin, W. Parker. "Births Averted by Family Planning Programs." *Studies in Family Planning*. Vol. 1. No. 33. 1968. p.p. 1-7.
- Ministry of Health and Social Affairs, Republic of Korea. *Report on Contraceptive Target Achievements by Methods and Year*. Seoul. 1976.
- Moon, Hyun-Sang, et. al. *Fertility and Family Planning: An Interim Report on the 1971 Fertility-Abortion Survey*. Seoul. Korean Institute for Family Planning. 1973.
- Ross, John A. and David Smith. "Korea: Trends in Four National KAP Surveys, 1964-1967." *Population and Family Planning in the Republic of Korea*. Vol. 1, Seoul: The Ministry of Health and Social Affairs, 1970. pp. 225-231.
- Sivin, Irving. "Fertility Decline and Contraceptive Use. In the International Postpartum Family Planning Program." *Studies in Family Planning* Vol. 2. No. 12. 1971. p.p. 248-256.

- Smith, David. "Population Projections for the Republic of Korea, 1960-2001." Seoul. The Population Council. 1970. Mimeo.
- Song, Kun Yong and Seung Hyun Han. 1973 *Family Planning and Fertility Survey: A Comprehensive Report*. Seoul. Korean Institute for Family Planning. 1974.
- Srinivasan, K. *Methods of Measuring the Impact of Family Planning Programmes on Fertility: The Case of Karnataka State, India*. United Nations Expert Group Meeting on Methods of Measuring the Impact of Family Planning Programmes on Fertility, Geneva, April 20-28, 1976.
- Taucher, Erica. 1976. *Methods of Measuring the Impact of Family Planning Programmes on Fertility: The Case of Chile*. United Nations Expert Group Meeting on Methods of Measuring the Impact of Family Planning Programmes on Fertility, Geneva, April 20-28, 1976.
- United Nations, Economic Commission for Asia and the Far East. *Asian Population Studies Number 4. Report of the Expert Group on Assessment of Acceptance and Use-Effectiveness of Family Planning Methods*, Bangkok, June 11-21, 1968.
- United Nations, Population Division of the Department of Economic and Social Affairs of the Secretariat. *Methods of Measuring the Impact of Family Planning Programmes on Fertility: Problems and Issues*. United Nations Expert Group Meeting on Methods of Measuring the Impact of Family Planning Programmes on Fertility, Geneva, April 20-28, 1976.
- Venkatacharya, K. "A Model to Estimate Births Averted Due to IUCDS and Sterilizations." *Demography* 8, 1971. p.p. 491-505.
- Watson, Walter. "Demographic Problems Confronting Korean Family Planning." Seoul. Korean Institute for Family Planning. 1971. Mimeo.
- Wishik, Samuel. "Indexes for Measurement of Amount of Contraceptive Practice." Unpublished paper presented at meeting of Expert Group on Assessment of Acceptance and Use-Effectiveness of Family Planning Methods, United Nations Economic Commission for Asia and the Far East, Bangkok, June 11-21, 1968.
- Wolfers, David. "An Evaluation Criterion for a National Family Planning Program." *American Journal of Public Health* 58. No. 1968. p.p. 1447-1451.

政府의 家族計劃事業이 韓國의 出産力에 미친 影響의 測定: 1960~1975

高 甲 錫·더글라스 니콜스

本研究은 1960年에서 1975년까지 政府家族計劃事業이 韓國의 出産力에 미친 影響을 測定하고자 試圖되었다. 여기에 使用된 方法은 1) 標準化方法, 2) 推計法, 3) 避妊年數法, 4) 組成方法이다.

1. 標準化方法

標準化方法은 일정한 期間동안의 變化를 알기 위해 두 時點에서 出産力을 測定하고 여기에 影響을 주는 非事業要因들을 出産力指標에 의해 標準化함으로써 事業效果를 算出한다. 本研究에서 고려되었던 要因은 1) 女子人口의 年齡構造의 變化, 2) 女子年齡層의 婚姻年齡別 結婚狀態分布의 變化, 3) 年齡別 配偶出生率의 變化이었다.

女子人口의 年齡構造의 變化

1960년의 年齡別出産力은 변하지 않고 女性年齡構造만 1975년까지 變하여 왔다면 出産假定數는 1,604,500名이 될 것이다. 그러므로 全體出生防止數의 16「퍼센트」인 139,400名은 15歲에서 44歲까지 女性の 年齡構造의 變化의 結果라 할 수 있다.

女子年齡層의 婚姻年齡別 結婚狀態分布의 變化

1960년의 年齡別 配偶出生率을 1975년의 年齡別 結婚狀態分布에 適用하였던바 1,424,000名의 假定出生兒數가 180,500名의 出生防止兒數를 포함한 것으로 나타났는데 이는 15歲에서 44歲까지의 結婚分布의 變化結果이다.

年齡別 配偶出生率의 變化

1975년에는 年齡別 配偶出生率의 減少로 539,900件의 出生이 防止되었는데 이는 實際出生數와 假出生數의 全體差異 中 63「퍼센트」를 차지한다.

그러므로 1975년에 出生이 防止된 859,000名중에서 16「퍼센트」는 年齡構造의 變化때문이고, 63「퍼센트」는 年齡別 出生率의 減少때문이다. 그리고 지난 15年間의 國家的인 家族計劃事業이 出生率減少에 크게 기여했다고 할 수 있지만 事業의 相對인 效果나 非事業效果는 標準化方法에 의해서는 자세히 밝혀질 수 없다.

2. 推 計 法

推計法 혹은 推移法은 家族計劃事業이 遂行되지 않았더라면 出産率이 어떻게 增加하였을 것인가 하는 假定에서 算出된 豫想出産力을 實際出産力과 比較하여 家族計劃事業의 效果를 밝힌다.

1963년의 粗出生率은 41 이었는데 1975년의 粗出生率은 21 이었다. 그리고 1963년과 1975년 사이의 總出生兒數는 2,675,000 이었으며 推計法에 의한 政府家族計劃事業에 의한 出生防止兒數는 1,867,000 이었다. 이때 1964년이후의 粗出産力이 固定되었다고 假定하면 그동안의 實際出産力보다 4,319,000 名이 더 推計되므로 政府家族計劃事業은 그동안의 出生防止에 45「퍼센트」공헌한 셈이고 $(1,867,000 \div 4,319,000)$ 나머지 55「퍼센트」는 非事業效果에 의한 것으로 推計된다.

3. 避 妊 年 數 法

避妊年數法은 夫婦가 各方法에 의해 避妊된 期間을 計算하여 그 總效果를 알므로써 그 期間의 事業效果를 算出하는 方法이다. 이때 事業效果는 現在 普及된 方法의 效果와 함께 過去에 普及된 方法의 效果를 모두 고려한다. n 이 各나라의 出産力水準이라 할 때 $1 \text{ CYP} = n$ 出生防止兒數라는 公式에 의해 出生防止兒數를 計算할 수 있다.

이 方法에 의하면 그동안의 出生防止兒數는 「무우프」로 인한 것이 682,491, 먹는 避妊藥으로 인한 것이 231,053, 「콘돔」이 438,295, 男性과 女性不妊으로 인한 것이 207,257 로써 總 1,559,095 의 出生防止가 이루어졌다.

그다음 各方法 한件當의 出生防止兒數를 各方法에 따라 出生防止兒數를 使用者數로 나누어 計算하였더니, 子宮內裝置는 한 件當 0.33 의 出生防止를 하는 것으로 나타났고 먹는 避妊藥은 0.21 (13 cycle 의 1年間使用), 「콘돔」은 0.27 (12打의 1年間使用), 不妊手術은 1.17 로 나타났다.

4. 組 成 方 法

組成方法도 産兒制限 實踐에 관한 資料에 의해 計算된다. 各避妊方法의 受容者數, 使用期間, 避妊效率 등이 使用되며 더 나아가 家族計劃事業이 遂行되지 않았다고 할 때에 그 受容者들의 出産力이 推計된다. 그리하여 一定期間의 出生防止兒數를 計算할 수 있다. 이 推計는 보통 每年의 5 歲間隔의 年齡集團으로 計算된다. 모든 女性의 可妊期間의 出生防止兒數와 12 個月間의 出生防止兒數를 總計하면 그 期間의 總出生防止兒數가 나온다. 그러나 이 方法은 標準化方法이나 推計法과는 달리 方法別 實施者數를 이용하여 보다 直接的으로 家族計劃事業의 效果를 測定할 수 있다.

計算方法은 우선 實施者의 暫在的인 年齡別 配偶出産力을 産出한다. 家族計劃事業이 不在했다고 假定할 때의 剩餘出生兒數가 家族計劃事業으로 인한 出生防止兒數이다. 非事業效果의 測定은 總出生防止兒數 中 事業效果를 뺀 나머지가이다. 지금까지는 政府家族計劃事業이 20 歲 이하의 可妊女性 中 政府事業受容者가 거의 없었기 때문에 15 歲에서 19 歲까지의 出生防止兒數는 非事業效果에 의한 것이라 할 수 있다. 20 歲에서 44 歲까지의 出生防止兒數는 전체의 7「퍼센트」가 事業要因이고, 25 歲에서 29 歲까지의 出生防止兒數는 全體의 57「퍼센트」인 바 이는 直接的인 事業效果에 의한 것이다. 이 比率는 30 歲에서 34 歲까지는 비슷하나, 35 歲以後에는 減少하는 趨勢이고 全體적으로 보아 15 歲에서 44 歲까지의 總出生防止兒數 中 約 31「퍼센트」가 事業效果에 의한 것이라고 보여진다(表18參照).

위의 數値와 推計法의 45「퍼센트」와의 差異는 대부분이 出産力測定의 方法論的 差異에서 惹起

된다. 推計法에서는 1964년 이후 계속해서 出生率을 40으로 假定하였고 지금의 方法인 組成方法에서는 1960년의 年齡別 出生率을 使用하였던 것이다. 과거 15年 사이의 年齡分布의 變化를 勘案하여 筆者들은 組成方法에서 얻어진 31「퍼센트」의 작은 값을 더 信賴할 수 있다고 생각한다. 왜냐 하면 現在の 研究에 事業活動으로 인한 出生防止兒數의 絕對값의 一致가 보다 意味가 있기 때문이다.

以上에서 네가지 相異한 方法으로 政府家族計劃事業의 效果를 測定하였는데 避妊年數法과 助成方法에 의한 出生防止兒數가 대단히 近接하고 있다. 그러나 非事業效果에 대해서는 各方法들이 상당한 差異를 보이고 있다.

그리고 그동안의 人工妊娠中絶件數가 430萬으로 推算되는데, 3件이 1名의 出生防止를 가져온다고 할 때, 이는 約 150萬件의 出生防止를 가져온 셈으로 그동안의 모든 事業效果와 거의 비슷한 數字이다.

그간 우리나라는 急激한 近代化를 推進하여 非事業效果가 크게 作用하고 있어 이를 事業效果와 分離測定하기가 대단히 곤란하다.

그리고 本研究에서 家族計劃事業과 關聯되어 밝혀진 것은 各 避妊方法의 效率性이 實踐者의 年齡의 上昇과 潜在出産力의 減少로 떨어지고 있다는 것이다. 그러므로 앞으로의 事業目標은 年齡을 낮출 필요가 있을 것이다.

끝으로 出生防止兒 1人當의 費用은 1960年에서 1975년까지 平均하여 約 37「달러」(1975年 經常價格)이었는데, 앞으로 可妊女性數 보다 그들의 潜在出産力이 더 빨리 減少한다면 이 費用은 더 增加할 것으로 보인다.