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ON AN ESTIMATION OF EFFECTS OF
FERTILITY CONTROL IN JAPAN

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FOREWORD

Fertility of post-war Japan have shown drastic decline, but it can be said that the major role played in the fertility decline is, by the changes in fertility rates themselves, and not so much by the changes in population structure as well as marriage and mortality.

There are two ways in Japan to regulate fertility. The one is contraception, the other is induced abortion. Many information and statistics concerning fertility control have been reported in Japan, but there are few papers to analyze or discuss the share of effects in both ways.

It is our intention to estimate the proportion between both ways to reduce fertility among the potential fecundity.

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On an Estimation of Effects of Fertility Control in Japan

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I. Foreword

The purpose of this report is firstly to estimate the basic fecundity, using the quotation of certain specific data and their application to the national scale, and secondly to analyze the quantity of controlled effect toward basic fecundity and the share that contraception and induced abortion would contribute.

II. The data used for the estimation

a) Specific data

The writer had executed the sampling survey (N=3,405) toward the married employees of Nippon Telephone & Telegraph Corporation in the autumn, 1966, and adopted its data about specific fecundity rate into the process of calculation of this report.

When these data are extendedly applied on a national scale, the criticism against the disregard of deviation and restriction caused from profession and standard of living will be inevitable. But the writer presupposed, for the present, that the constitutional abilities of fecundity among couples in Japan are entirely the same throughout whole social classes.

Due to the restriction of the data, the period taken here is limited to the years of Census after 1955 on. The materials for 1970 has been projected from the tendency of fecundity rate until 1965, with due regard on the transitions of age structure and age specific contraception practising rate, with a revision of some degree.

The number of early foetal death before 4 months pregnant and the number of pregnancies at present are omitted from the number of pregnancies used for the calculation of the fecundity rate, for the purpose of adapting them to the calculation of the latter half. "Specific fecundity rate" is calculated by dividing the number of pregnancies each year by the number of couples, that is an yearly probability of fecundity per a couple.

b) The official data

The number of couples (1) (see Table 1) is the number of married female population appeared on the Census of each year. However, "Prompt Report of the Basic Findings, 1970 Census" (1% sample tabulation) is used as the materials of 1970 for the present.

The contraception currently practising rate (2) is based on the result of "National Survey of Family Planning" arranged by The Population Problems Research Council in the Mainichi

Newspapers. The data of the 1959's survey, however, are substituted for the materials of 1960, and the data of 1970's survey, for the materials of 1971. And the number of ever practised are involved into the number of never practised group, for they do not take part in the fecundity control of that year, and also the unknown cases of the practising situation are regarded as the never practised group. As the practising rate in the age total column has been revised by the national scale age structure, it does not coincide with the original result (cf. Table 2). The figures of (3) and (4) mean not only the numbers of couples but also the years of practised or never practised.

In this estimation, the fecundity of the couples, only whose wives are under 50 years old, are considered as the object, and the pregnancy of the wives over 50 years old and the ex-marital pregnancy are omitted. Accordingly, in (19) and (20), the number of the wives over 50 years old is omitted from the numbers based on the Vital Statistics and Eugenic Protection Statistics. It is also for the purpose to include the still-birth after 4 months pregnant and to avoid the overestimation caused by multiple birth, that the number of deliveries, not the number of live birth, was adopted in (19). Further, this has been revised to be the number of deliveries between in-

marital couples by multiplying the total number of deliveries by the rate of legitimate children. While, the number of induced abortion after 4 months pregnant is omitted from (20) (because it has been already involved in (19)). As for the original numbers of those, see the Table 2.

Effects of abstinence and sterilization are involved in the effects of fecundity control by contraception, (17), (18) and (25).

III. The result of estimation

See Table 1.

IV. Comments.

a) Practice of contraception

The number of couples of reproductive age (1) is increasing year after year and will exceed 180 millions in 1970. But as the contraception currently practising rate (2) increases also, the number of couples practising (= the number of year practising) (3) increases extraordinary by its multiplying effects, and exceeds double of 1955 in 1970.

Contraception currently practising couples are not necessarily continuing the practice from the beginning to the end of that year. Now, to divide one year of a certain couple

practising into practised period and not practised period (interruption of the practice), and accumulate severally, then to divide the number of pregnancies occurred in each period by them, the specific fecundity rate comes to be alike (5) and (6). It is natural, of course, the rate during practised period (5) is lower than the rate during not practised period (natural uncontrolled fecundity). The rate of relative fecundity control (Decrease rate) (8) by the practice of contraception in this same couples indicates that the lower the number is, the higher the effect of contraception becomes. It reduced year after year, from 60% in 1955 to 35% in 1970, which indicates the situation of controlling fecundity in about 1/3 of what would be, by the development of mastering the technique (quality), not only by the spread of the contraception practice rate (quantity). The facts that the fecundity rate during practised period (5) does not reach 0, however, and that the rate of fecundity control (8) has not exceeded the line of 1/3 by now, indicate the limitation of the effect of traditional methods like condom and safe-period. From the aspect of the age, the higher the age becomes, the severer the decrease rate (8) may become, and the difference between young age becomes larger year after year. In 1970, the decrease rate of wives of less than 25 years old remained 59%, on the other hand, in the age

group with wives over 35 years old, who practise contraception regularly and strictly, the rate is 6%, that is, the reduction of the number which may possibly occur in not-practised situation into 1/18 of them only, by the practice of contraception.

In comparison with the fecundity rate of practising couples during the not-practised period (6), the fecundity rate of not-practising couples is lower, which seems to show a strange pattern at a glance, but in reality, it is natural because the couples with originally high fecundity have to practise to control, while the couples with low fecundity, who have less necessity to practise do not practise indeed. Consequently, even the couples with medium fecundity, not to say of the couples of high fecundity, come to belong the practising group, together with the yearly increase of the contraception practising rate, and the couples with low fecundity only would remain as a never practised group.

b) Basic fecundity

On probation, all the couples may not practise artificial control, setting the fecundity free. Supposing that the married period of certain group of couples (taking a certain year, the number of couples = the number of years) Y , the number of fecundity during that period C , the contraception practising period y_1 , the number of fecundity during that

period c_1 , the contraception not-practised period by ever practised couples y_2 , the number of fecundity during that period c_2 , the married period of contraception never practised couples y_3 , and the number of fecundity during that period c_3 :

$$Y = y_1 + y_2 + y_3 \quad C = c_1 + c_2 + c_3$$

The fecundity rate per year for each period is:

$$c_1/y_1, c_2/y_2, c_3/y_3$$

If a contraception ever practised couples might not have practised contraception at all, the uncontrolled fecundity rate of all couples, including never practised couples, is:

$$\left[c_2/y_2 \times (y_1 + y_2) + c_3 \right] / Y$$

This rate of original fecundity, or the fecundity rate what should be, is called to be basic fecundity (12), which reached 0.286 in 1970. If all of them have not practised, they will be pregnant once in each 3.5 years. It means that the wives get married at the age of 24 (which is the mean age for first marriage in Japan), and the hypothetical marriage cohort accumulates the age specific fecundity rate in (12) every year, they will be pregnant 6.7 times in their lives.

The number of basic fecundity in the national scale, calculated by the adoption of this fecundity rate system is (3) x

$(6) + (4) \times (7) = (11)$ and it is estimated to be 5,300,000 in 1970.

But in reality, as a part of the couples are practising contraception, the theoretical number of fecundity after control according to the fecundity rate during practised period (5) shall be $(3) \times (5) + (4) \times (7) = (15)$ and reaches 2,900,000 in 1970.

This number of fecundity after control (15) is, on the contrary to the increase of the number of basic fecundity (11), decreasing year after year. The decrease is particularly conspicuous in aged group. The decrease rate of the number of theoretical fecundity after the control (15) toward the number of basic pregnancies (11) goes down from 82% in 1955 to 56 % in 1970. It means, in 1970, the number of pregnancies, what should originally be, is kept down nearly to a half by contraception.

As a result, on the contrary to the basic fecundity rate (12), 0.286 in 1970, the theoretical fecundity rate (16) becomes 0.160. It means that if the wives get married at the age of 24, the accumulated number of pregnancies through their lives in the hypothetical marriage cohort is estimated to be 3.6 times. The difference in actual number (18) between number of basic fecundity (11) and number of theoretical fecundity after control (15) is equal to the number of pregnancies, not

actually conceived, as a result of contraception. But the former (11) is increasing year after year, while the latter (15) is decreasing, so that the difference (18) has increased rapidly, from 700,000 in 1955 to 2,300,000 in 1970, which is three times more than 1955. Looking from the age of wives, it increases in the age group of 25-34, which is the peak for childbirth, corresponds with the curve of contraception currently practising rate (2).

On the other hand, the total number of reported delivery (including foetal death) (19) and reported induced abortion (20), that means number of reported pregnancies (21) is less in comparison with the number of theoretical fecundities (15). The difference (22) between theoretical fecundity (15) and reported pregnancy (21) is assumed to be illegal or unreported abortion. Though the number of this is decreasing year after year, a little under 200,000 still remain in 1970. It is frequent in the wives over 35 years old.

This number is a number of unreported abortion between married couples, so it may be far more in number when that of ex-marital couples is involved. As only to the married couples, the number of abortion (23) and its ratio to the number of reported is less than what is generally talked about. The illegal or unreported abortion also seem to be reducing

together with the decrease of reported abortion year after year. However, it is a decrease among to wives of 25-34 years old who occupy the main stream of the number of couples, and among the aged wives over 35, the illegal abortion has increased, in spite of the increase of the contraception currently practising rate (2) and its comparative effects (8). It has reached nearly double of the reported abortion since 1965, and shows the strong desire for the absolutely low fertility of this age.

On the other hand, the contradiction that the number of illegal abortion (22) of young wives under 25 years old shows (-), that is the number of reported pregnancies is larger than the number of theoretical fecundity, poses the question if the abortion between the couples of ex-marital relation (particularly an unmarried maiden) is involved in this reported abortion of young generation, rather than the reason that the specific fecundity rate, (5) - (7), does not fit to the national scale.

Judging from the share of controlled fecundity by contraception (18), theoretical abortion (including illegal abortion) (23), and the number of delivery (including foetal death) (19) in the possible number of basic fecundity (11), the effect of contraception (25) rose from 18% in 1955 to

44% in 1970, while the rate of contribution by abortion (26) decreased from 37% to 17%. Looking birateral ratio (28) of the contraception rate (25) to abortion rate (26), 3:7 in 1955 became to be half and half in 1960, and reversely to 7:3 in 1965 at last. The decline of fertility in Japan, which was thought to have been chiefly due to the abortion in the past, is actually due to the popularization of the family planning recently. However, the fact that the ratio (28) remains 7:3 in 1970, unchanged from 1965, shows the limitation of the effect of traditional methods which do not depend on oral pill or IUD.

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Table 1. Possible Effects of Fertility Control, '55, '60, '65, '70

| Year | Age of Wives | (1) No. of couples (,000) | (2) Contracep- tion current- ly practis- ing rate (%) | (3) No. of couples not practis- ing (,000) (1)x(2)÷100 | (4) No. of couples not practis- ing (,000) (1) - (3) | (5) Rate of fecundity per year | | |
|------|--------------|---------------------------------|--|---|---|--------------------------------|------------------------------|--------------------------------------|
| | | | | | | (6) <u>Couples practised</u> | | (7) Couples never practised |
| | | | | | | During practised | During not prac- tised | |
| 1955 | ~24 | 1,443 | 33.1 | 478 | 965 | 0.521 | 0.771 | 0.481 |
| | 25~34 | 5,747 | 43.0 | 2,471 | 3,276 | 0.331 | 0.539 | 0.391 |
| | 35~49 | 6,181 | 25.8 | 1,595 | 4,586 | 0.080 | 0.147 | 0.107 |
| | total | 13,371 | 34.0 | 4,544 | 8,827 | 0.262 | 0.425 | 0.253 |
| 1960 | ~24 | 1,369 | 39.9 | 546 | 823 | 0.480 | 0.739 | 0.469 |
| | 25~34 | 6,385 | 49.0 | 3,129 | 3,257 | 0.224 | 0.527 | 0.385 |
| | 35~49 | 7,018 | 37.5 | 2,632 | 4,386 | 0.041 | 0.138 | 0.105 |
| | total | 14,773 | 42.7 | 6,307 | 8,466 | 0.169 | 0.383 | 0.248 |
| 1965 | ~24 | 1,507 | 47.2 | 711 | 796 | 0.435 | 0.715 | 0.453 |
| | 25~34 | 6,971 | 62.0 | 4,322 | 2,649 | 0.186 | 0.508 | 0.367 |
| | 35~49 | 8,156 | 44.4 | 3,621 | 4,535 | 0.015 | 0.135 | 0.103 |
| | total | 16,634 | 52.0 | 8,654 | 7,980 | 0.135 | 0.383 | 0.226 |
| 1970 | ~24 | 1,572 | 55.3 | 869 | 703 | 0.441 | 0.745 | 0.466 |
| | 25~34 | 7,389 | 65.6 | 4,847 | 2,542 | 0.172 | 0.493 | 0.361 |
| | 35~49 | 9,448 | 43.5 | 4,110 | 5,338 | 0.005 | 0.091 | 0.085 |
| | total | 18,409 | 53.4 | 9,826 | 8,583 | 0.126 | 0.363 | 0.198 |

| (8) Decrease rate of fecundity by cont- reception (%) (5)/(6)x 100 | (9) Basic Fecundity | | | (11) total (,000) (9)+(10) | (12) Rate of basic fecundity per couple (11)/(1) | (13) Theoretical fecundity controlled | | | (16) Rate of control- led fe- cundity per couple (,000) (16)/(1) |
|--|--|--|-------------------------------------|-------------------------------------|---|---|---|--------------------------------------|--|
| | (9) Couples practis- ing (,000) (3)x(6) | (10) Couples not practis- ing (,000) (4)x(7) | (11) total (,000) (9)+(10) | | | (13) Couples practis- ing (,000) (3)x(5) | (14) Couples not practis- ing (,000) (4)x(7) or (10)=(14) | (15) total (,000) (13)+(14) | |
| 67.6 | 369 | 464 | 833 | 0.578 | 249 | 464 | 713 | 0.494 | |
| 61.4 | 1,331 | 1,280 | 2,610 | 0.454 | 818 | 1,281 | 2,098 | 0.365 | |
| 54.4 | 234 | 491 | 725 | 0.116 | 128 | 491 | 618 | 0.100 | |
| 61.6 | 1,935 | 2,236 | 4,167 | 0.312 | 1,194 | 2,235 | 3,429 | 0.256 | |
| 65.0 | 403 | 386 | 790 | 0.575 | 262 | 386 | 648 | 0.473 | |
| 42.5 | 1,649 | 1,254 | 2,903 | 0.456 | 701 | 1,254 | 1,955 | 0.306 | |
| 29.7 | 363 | 461 | 824 | 0.120 | 108 | 461 | 569 | 0.081 | |
| 44.1 | 2,415 | 2,101 | 4,516 | 0.306 | 1,071 | 2,101 | 3,171 | 0.215 | |
| 60.9 | 508 | 361 | 869 | 0.577 | 309 | 361 | 670 | 0.445 | |
| 36.6 | 2,196 | 972 | 3,168 | 0.452 | 804 | 972 | 1,776 | 0.255 | |
| 11.4 | 612 | 467 | 1,079 | 0.131 | 54 | 467 | 521 | 0.064 | |
| 35.2 | 3,315 | 1,801 | 5,116 | 0.308 | 1,168 | 1,801 | 2,967 | 0.178 | |
| 59.2 | 623 | 328 | 951 | 0.605 | 383 | 328 | 711 | 0.452 | |
| 34.9 | 2,409 | 918 | 3,327 | 0.450 | 834 | 918 | 1,752 | 0.237 | |
| 5.6 | 538 | 454 | 992 | 0.105 | 21 | 454 | 475 | 0.050 | |
| 34.7 | 3,570 | 1,700 | 5,270 | 0.286 | 1,238 | 1,700 | 2,938 | 0.160 | |

| (17) Rate of controlled to basic fecundity % (15)/(11)x100 or (16)/(12)x100 | (18) No. of controlled pregnancy (,000) (11)-(15) | (19) No. of reported pregnancy | | (21) total (19)+(20) | (22) No. of illegal abortion estimated (,000) (15)-(21) | (23) Theoretical No. of abortion (,000) (20)+(22) or (15)-(19) |
|---|---|--|---|----------------------------|---|---|
| | | (19) Delivery (+foetal death) (,000) | (20) Induced Abortion (before 3 month) (,000) | | | |
| 85.6 | 119 | 533 | 170 | 703 | 10 | 180 |
| 80.4 | 512 | 1,152 | 581 | 1,733 | 365 | 945 |
| 85.2 | 107 | 185 | 322 | 506 | 112 | 434 |
| 82.3 | 738 | 1,870 | 1,072 | 1,942 | 487 | 1,559 |
| 82.0 | 142 | 509 | 162 | 671 | (-) 23 | 139 |
| 67.3 | 948 | 1,144 | 548 | 1,692 | 263 | 811 |
| 69.1 | 255 | 100 | 278 | 378 | 191 | 469 |
| 70.2 | 1,345 | 1,752 | 988 | 2,740 | 431 | 1,419 |
| 77.1 | 199 | 581 | 139 | 720 | (-) 50 | 89 |
| 56.1 | 1,392 | 1,271 | 444 | 1,715 | 61 | 505 |
| 48.3 | 558 | 101 | 211 | 312 | 209 | 420 |
| 58.0 | 2,149 | 1,953 | 795 | 2,747 | 220 | 1,015 |
| 74.8 | 240 | 580 | 142 | 722 | (-) 11 | 131 |
| 52.7 | 1,575 | 1,362 | 366 | 1,728 | 24 | 390 |
| 47.9 | 517 | 105 | 189 | 294 | 181 | 370 |
| 55.7 | 2,332 | 2,047 | 697 | 2,744 | 194 | 891 |

| (24) Ratio of theo. abortion to reported (23)/(20) | (25) (26) (27) Percent distribution of basic fecundity Contraception Abortion Delivery | | | (28) Ratio of Contraception effect to abortion (25):(26) |
|--|--|--------------------|----------------|---|
| | (18)/(11)x 100 | (23)/(11) x 100 | (19)/(11)x 100 | |
| 1.06 | 14.3 | 21.7 | 64.0 | 4:6 |
| 1.63 | 19.6 | 36.2 | 44.2 | 4:6 |
| 1.35 | 14.7 | 59.9 | 25.4 | 2:8 |
| 1.45 | 17.7 | 37.4 | 44.9 | 3:7 |
| 0.86 | 17.9 | 17.6 | 64.5 | 5:5 |
| 1.48 | 32.7 | 27.9 | 39.4 | 5:5 |
| 1.69 | 31.0 | 56.9 | 12.1 | 4:6 |
| 1.44 | 29.8 | 31.4 | 38.8 | 5:5 |
| 0.64 | 22.9 | 10.2 | 66.9 | 7:3 |
| 1.14 | 43.9 | 15.9 | 40.2 | 7:3 |
| 1.99 | 51.7 | 38.9 | 9.4 | 6:4 |
| 1.28 | 42.0 | 19.8 | 38.2 | 7:3 |
| 0.92 | 25.2 | 13.8 | 61.0 | 6:4 |
| 1.07 | 47.3 | 11.7 | 40.9 | 8:2 |
| 1.96 | 52.1 | 37.3 | 10.6 | 6:4 |
| 1.28 | 44.3 | 16.9 | 38.8 | 7:3 |

Table 2 Official Number (,000) and Rate (%)

| Year | Live births | Live births, age of mother 50 & over | Rate of legitimate children | Foetal deaths (after 4 month) | Induced Abortion | Sterilization | Rate of contraception currently practising |
|------|-------------|--------------------------------------|-----------------------------|-------------------------------|------------------|---------------|--|
| 1955 | 1,730.7 | 0.1 | 98.3 | 183.3 | 1,170.1 | 43.0 | 33.6 |
| 1960 | 1,606.0 | 0.1 | 98.8 | 179.3 | 1,063.3 | 38.7 | 42.5 2) |
| 1965 | 1,828.7 | 0.0 | 99.0 | 161.6 | 843.2 | 27.0 | 51.9 |
| 1970 | 1,934.2 | 0.0 | 99.1 1) | 135.1 | 732.0 | 15.8 | 52.6 3) |

(Notes) Substitute 1) 1969, 2) 1959, 3) 1971

