EFFECTS OF NUPTIALITY AND FAMILY PLANNING ON FERTILITY

By

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1. Introduction

Population growth has become such high in many developing countries. Great efforts are highly required to reduce fertility level to balance with the mortality decline. Egypt is one of these countries suffering from the thigh population growth and trying to slow down fertility level. Consequently there is a great interest to know how to achieve this goal

It is generally accepted that socioeconomic development leads to fertility decline. However socioeconomic variables exert their influence on fertility through other variables which are called the intermediate variables. It is a matter of fact that a change of the intermediate variables necessarily causes a change in fertility. This is not the case with soicoeconomic variables such as education, income,etc. It is known that the relationship between fertility and socioeconomic development is complicated and differs in different

ttings and at different times. On the contrary, the lationship between fertility and intermediate variable es not change from time to time or from place to place. ıe effect of soicoeconomic variables on fertility depends ı their effect on the intermediate variables.

David and Blake enumerated about eleven intermediate ariables which are usually classified into four subgroups

a) Factors governing the formation and dissolution of
   1- Age of entry into sexual unions
   2- Proporation of female never entering sexual unions.
   3- Length of reproductive period spent after or between unions because of divorce separation, desertion or death of husband.

b) Factors affecting the exposure to entercourse within unions.
   4- Voluntary abstinence.
   5- Involuntary abstinence due to importence, illness, or temporary separation.
   6- Coital ferquency.

c) Factors affecting exposure to conception
   7- Fecundity and sterility as affected by voluntary causes.
   8- Fecundity and sterility as affected involunary causes.

9- Use of contraception.

d) Factors affecting gestation.

10- Foetal mortality from involuntary causes.

11- Induced abortions.

It is apparent that these variables are classified according to the stage of the reproduction process within which they act. not all these variables can be controlled or oriented by a population policy. Therefore this paper will concentrate on marriage and marital fertility control. factors.

It is known that fertility change in response to a change of an intermediate variable varies among variables. The objective of this paper is to assess the effect of the different variables. What is the effect of raising the minimum age of marriage from 16 to 17 or 18 on fertility assuming all other variables remain constant What is the answer of these questions and others are important for formulating an effective population policy.

2- Methodology

The effect of each intermediate variable can be studied by using some demographic models or by investigating empirical data.Demographic models can be used to simulate a real situation or unreal situation. Models are very

useful to represent cases which were never observed but expected in the future. Consequently models are widely used to investigate the relationship between variables.

For the assesment of the effect of nuptiality change on fertility nuptiality models recently developed by Coale are extremely useful. It was observed that the first marriage frequencies conform to a curve of the same shape in different populations if these frequencies are adjusted to have the same minimum age at marriage, the same pace at which marriage occurs, and the same proporation of the ever-married at high ages. Then it was found that these frequencies

g(a) can be calculated from the following analytical expression:

$$g(a) = \frac{.19465c}{k} \exp \frac{-174(a-a_0-6.0.k)}{k} - \exp \frac{-.2881(a-a_0-6.6k}{k}$$

where

a_0 = age at which first marriage began

k = a measure for the duration of the age span within the majority of marriages occurs.

C = The proportion of survivors in the cohort who, at advanced ages, have married at sometime.

It is clear the proportion ever married G(a), can be obtained by the integration of g(x),

$$G(a) = \int_{a_0}^{a} g(x)\,dx$$

Assuming that divorce and death rates are constant the proportions of currently married can be derived from the proportions ever married. However for the analytical purpose the present study this difference can be neglected.

On the other hand, it was pointed out that marital fertility rates can be presented by the following model

$$f(a) = M\, n(a)\, e^{m\, V(a)}$$

N(a) = natural marital fertility rates (table 1)

M = scaler represents the reduction of fertility at all ages.

V(a) = standard age-pattern of deviations represents the tendency of old women to effect larger reduction.(table 1)

M = The degree to Which V(a) applies

It is apperant that f(a) = n(a) when M = 1 and m = 0

Table 1. natural fertility rates and standard age-pattern of deviations

Age	n(a)	V(a)
15-19	.4112	-.000
20-24	.4694	-.069
25-29	.4418	-.314
30-34	.3988	-.678
35-39	.3226	-1.040
40-44	.1668	-1.390
45-49	.0252	-1.608

These nuptiality models and marital fertility models will be used to assess the effects of the change of each parameter on fertility.

3- Effects of Nuptiality Change

3.1 Minimum age of marriage, a_0.

There is a call to raise the minimum Age of marriage for the reduction of fertility. But what is the effect of raising the age by one or two years. Table 2 presents three nuptiality

Models with different minimum age of marriage. Applying one schedule of marital fertility rates to these models gives different levels of fertility.

$$T F R = 5 \Sigma G(a) n(a)$$

Table 2. Three nuptiality models with a_0 = 16,17,18 and k = .5

a_0	16	17	18
Age k	.5	.5	.5
15-19	.0877	.0345	.0089
20-24	.6518	.5387	.4111
25-29	.9317	.9043	.8663
30-344	.9892	.9835	.9759
35-39	.9987	.9979	.9968
40-44	1.0000	1.0000	1.0000
45-49	1.0000	1.0000	1.0000
$5\Sigma n(a)G(a)$	8.3118	7.8619	7.4105
%	100	95	89

These results point out that fertility will decline slightly in response of raising the minimum age of marriage.

3.2 Pace of marriage k.

The pace of marriage,k, may change, that is the span within the majority of marriage occurs may be shorter or longer. In fact the singulate mean age of marriage is determined by a_0 and k,

$$SMAN = a_0 \quad 11.4 \quad k$$

It is obvious that high singulate mean age at marriage results from lower pace of marriage if a_0 is constant. To show the effect of the change of the marriage pace on

fertility table 3 presents three nuptiality models of different k,s, and the total fertility rates obtained by applying one schedule of marital fertility rates.

Table 3. Three nuptiality models with k=4,.5,.6 and a_0=16

age	a_0 / $\frac{k}{m}$	16 / $\overset{.4}{20.56}$	16 / $\overset{.5}{21.70}$	16 / $\overset{.6}{22.84}$
15-19		.1374	.0877	.0578
20-29		:7786	.6519	.5356
25-29		.9732	.9317	.8833
30-34		.9974	.9892	.9722
35-39		1.0000	.9987	.9956
40-44		1.0000	1.0000	1.0000
45-49		1.0000	1.0000	1.0000
5	G(a) n(a)	8.8215	8.3118	7.8727
%		100	94	89

It is obvious that the change of pace of marriage has also small effect on fertility level.

3.3 Ultimate Praportion ever married

It is know that prevalence of celibacy placed an important Part in reduction of fertility in many developed countries. This relation is selfevident because celibacy cuts off a Part of the population from the reproductive Process. This can be shown by introducting the ultimate

Proportion ever married, e, into the fertility-nuptiality TFR = $C \Sigma G(a)$. It is obvious from this model that the smaller c than one is the lower fertility is.

4- Effects of Birth Control

The effect of birth control on fertility is selfevident because through birth control we may suspend or stop our participation in the reproductive process. the two factors, M and $\exp(m V(a))$ in the marital fertility model.

$$f(a) = M\, n(a) \exp (m V(a))$$

represent the impact of birth control on the nutural fertility function n(a). The scaler factor M stands for the effects of birth control at all ages. The smaller M than one the lower the total fertility is.

The factor $\exp (m V(a))$ expresses the higher tendency of older Women to practice birth control. The large value of m means larger reduction of fertility at high ages as can be seen in table 4.

Table 4 . Marital fertility models with m=0,1,2

m / age	0.0	1.0	2.0
15-19	.4112	.4112	.4112
20-24	.4694	.4381	.4089
25-29	.3227	.3227	.2358
30-34	.3988	.2024	.1028
35-39	.3226	.1140	.0403
45-45	.0252	.0050	.0010
TFR	11.1790	7.6745	6.0515

5- Conclusion

- Nuptiality and birth control are the most effective intermediate variables.
- Slowing down the tempo of marriage or riasing the minimum age of marriage lead to small reduction in fertility level.
- Prevalence of celibancy has a significant influence on fertilily. However the increase of celibacy is not culturally acceptable and has undesired social effects
- Prevalence of contraceptive use is the most influential factor for reducing fertility level.