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CONTRIBUTIONS OF THE PROXIMATE DETERMINANTS TO FERTILITY TRANSITION IN EGYPT*

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ABSTRACT

Egypt is in still undergoing its fertility transition from high levels to low levels. Exploring the trends of fertility during the first half of the nineties clearly shows that there is evidence for fertility increase in some regions of Egypt. This study used Bongaarts's indices of the proximate determinants of fertility and a method that was proposed by Zaky in 1997 to decompose fertility changes. This included analysing the relative contributions of three proximate determinants (marriage, contraceptive use and postpartum insusceptibility) to fertility transition on a regional level in Egypt during the period 1980-1995. The data came from the 1980 Egypt Fertility Survey, 1988, 1992 and 1995 Egypt Demographic and Health Surveys. Contraception had proven to be the most important factor to reduce fertility. However, regions vary in the extent to which changes in contraceptive use inhibited fertility. The reducing effect of contraception was diminishing. Marriage had significant effects that changed across regions. The study projected some increase in fertility rates in the regions in the near future, similar to the increase that occurred for the Urban Governorates and urban Upper Egypt. The study then concluded with some policy implications.

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1 INTRODUCTION

Fertility transition varies widely in different populations. The onset of the fertility transition in some African countries has been slow and limited (Shapiro, 1996). Even in cases of fertility decline, the results have been debated (Blanc and Rutstein, 1994). Among neighbouring countries, the level of fertility at onset and the speed of decline dramatically may diverge (Yaakoubd, 1998). Like many other developing countries, Egypt is in still undergoing its fertility transition from high levels to low levels.

During the period 1980-1995, four major fertility surveys were conducted in Egypt, namely 1980 Egyptian Fertility Survey, and 1988, 1992, and 1995 Egypt Demographic and Health Surveys. According to these four surveys and some earlier estimates of fertility, fertility in Egypt has been declining since the early 1960s. Total fertility rate (*TFR*) had been as high as 5.28 live births per woman in her reproductive age in 1980, and as low as 3.63 in 1995. A decline of almost 46 percent in 15 years, or about 3 percent annually. This decline has not been uniform across regions in Egypt during the period 1980-1995. Rural Lower Egypt exhibited the fastest decline. Rural Upper Egypt passed through the slowest fertility transition. Nevertheless, there remains a demographic puzzle that started to evolve very recently. Exploring the trends of fertility during the first half of the nineties clearly shows that there is evidence for fertility increase in some regions of Egypt. This increase is associated with a plateau in contraceptive use, and even a decline in some cases. In order to determine the extent of this puzzle, we first review the context of fertility transition on both national and regional levels, putting it in historical perspective, during the 1980-1995 period. This is followed by analysing the proximate causes of fertility by calculating Bongaarts's indices (1982) and decomposing fertility change by the method proposed by Zaky (1997), using data from the four surveys conducted during the period 1980-1995.

2 THE CONTEXT OF EGYPT'S FERTILITY TRANSITION

Trends in total fertility

In 1995, the total fertility rate of Egypt was estimated at 3.63. This is one of the lowest rates in Africa, with the exception of some countries such as Tunisia (3.4). At the regional level, total fertility rate was lowest in the urban Lower Egypt in 1995 (2.66), followed by the Urban Governorates (2.82). The highest level was achieved in

rural Upper Egypt (5.19), which was even higher than historical levels of some regions in 1980 and all regions in 1988. The fastest decline was estimated for rural Lower Egypt, about 74 percent during the period 1980-1995, as shown in Table 1. The slowest decline during the same period was achieved in rural Upper Egypt, almost 22 percent. If one looks at the period 1992-1995, one can easily observe that in fact fertility rose in the Urban Governorates from 2.69 to 2.82, and in urban Upper Egypt from 3.58 to 3.8. On the other hand, the fertility decline in rural Lower Egypt during the same period (0.78) was fastest than any annual decline for the same region, or any other region, during the whole period 1980-1995. This clearly supports the notion that fertility transition differs among the five regions in Egypt. Although fertility levels are declining for some regions, the curve for other regions is going upward.

Marriage patterns

In 1995, 65 percent of women aged 25-49 years were married, as noted in Table (1). This percentage did not experience significant changes during the period 1980-1995, although median age at first marriage slightly increased. On the other hand looking at regions of Egypt raises some interesting points. Marriage patterns are clearly different among regions. Proportion married in 1995 was lowest in the Urban Governorates (63 percent) and Lower Egypt (64 percent) while highest in rural Upper Egypt (70 percent). Proportion married in the Urban Governorates went up from 59 percent in 1980 to about 63 percent in 1995. In rural Lower Egypt, the situation was completely the opposite, the proportion married decreased gradually from 67 percent in 1980 to 64 percent in 1995. In addition, rural Lower Egypt showed only a decline of about 0.4 percent in proportion married during the period 1992-1995. Proportion married in the other three regions exhibited fluctuation with time. However, the striking finding was that two of the five regions, namely urban Upper Egypt and urban Lower Egypt experienced some increase in proportion married during the nineties. Looking at median age at first marriage during the period 1988-1995 showed that there was tendency for late marriage in the Urban Governorates and Lower Egypt. While in Upper Egypt, there was tendency back towards early marriage.

Table (1): Proximate Determinants of Fertility in Egypt, 1980-1995

Region	1980	1988	1992	1995
Urban Governorates				
-Total fertility rate (live births/woman 15-49)	3.84	3.01	2.69	2.82
-Proportion married (women, 15-49) (%)	59	59	64	63
-Median age at first marriage in years (women, 25-49)	**	21.1	21.1	21.5
-Contraceptive prevalence rate (%)	44	56	59	58
-Median duration of postpartum insusceptibility (months)	6.7	5.0	4.5	3.7
Urban Lower Egypt				
-Total fertility rate (live births/woman 15-49)	4.28	3.81	2.80	2.66
-Proportion married (women, 15-49) (%)	61	65	63	64
-Median age at first marriage in years (women, 25-49)	**	20.5	20.8	21.2
-Contraceptive prevalence rate (%)	43	55	60	59
-Median duration of postpartum insusceptibility (months)	6.8	4.7	4.5	3.8
Rural Lower Egypt				
-Total fertility rate (live births/woman 15-49)	6.00	4.73	4.10	3.45
-Proportion married (women, 15-49) (%)	67	66	64	64
-Median age at first marriage in years (women, 25-49)	**	17.6	18.5	18.6
-Contraceptive prevalence rate (%)	18	37	51	54
-Median duration of postpartum insusceptibility (months)	9.8	7.2	6.1	5.2
Urban Upper Egypt				
-Total fertility rate (live births/woman 15-49)	5.87	4.17	3.58	3.80
-Proportion married (women, 15-49) (%)	67	64	62	66
-Median age at first marriage in years (women, 25-49)	**	18.8	20.5	19.8
-Contraceptive prevalence rate (%)	25	42	48	50
-Median duration of postpartum insusceptibility (months)	8.6	6.3	5.8	4.4
Rural Upper Egypt				
-Total fertility rate (live births/woman 15-49)	6.31	6.15	5.97	5.19
-Proportion married (women, 15-49) (%)	74	72	73	70
-Median age at first marriage in years (women, 25-49)	**	16.4	17.2	16.9
-Contraceptive prevalence rate (%)	4	12	24	24
-Median duration of postpartum insusceptibility (months)	10.7	9.7	8.8	9.8
Egypt				
-Total fertility rate (live births/woman 15-49)	5.28	4.41	3.93	3.63
-Proportion married (women, 15-49) (%)	65	65	65	65
-Median age at first marriage in years (women, 25-49)	**	18.5	19.2	19.3
-Contraceptive prevalence rate (%)	24	38	47	48
-Median duration of postpartum insusceptibility (months)	8.9	7.2	6.1	5.6

Sources: Hallouda et al (1983), Sayed et al (1989), El-Zanaty et al (1993 and 1996), and special tabulations.

Trends in contraceptive use

The use of contraception is the most frequently cited factor in fertility decline (Guilkey and Jayne, 1997; Lindstrom, 1998). Egypt achieved great progress in increasing contraceptive prevalence during the period 1980-1995. Use of contraceptive methods among currently married women increased from 24 percent in 1980 to 48 percent in 1995, 100 percent increase in 15 years, as observed in Table (1). This increase had been mainly achieved during the period 1980-1992 since in the three-year period 1992-1995, contraceptive prevalence rate increased only one percent from 47 percent to 48 percent, a clear indication for a plateau stage. This inflection in the curve was reflected in the five regions of Egypt. All five regions experienced varying progress in contraceptive use during the period 1980-1995. The highest rates in 1995 were prevalent in the Urban Governorates and urban Lower Egypt (58 and 59 percent respectively), while the lowest rate was exhibited in rural Upper Egypt (24 percent). However during the period 1992-1995, contraceptive use dropped by one percent in Urban Governorates and urban Lower Egypt at 58 percent and 59 percent respectively in 1995. The use rate leveled off in Rural Upper Egypt at 24 percent. Rural Lower Egypt and urban Upper Egypt were the only ones that experienced increase in the rate to 54 percent and 50 percent respectively in 1995. The method mix among current users in Egypt had changed dramatically since 1980. More than two thirds of current users used pills in 1980. In 1995, around two thirds of current users relied on the IUD, three times the percentage who were using the pill (Zanaty et al, 1996).

Postpartum insusceptibility

The differences in the median duration of postpartum insusceptibility, resulting from women being either amenorrheic or abstaining, reflect the difference in the length of both breastfeeding and postpartum abstinence. It is clear that Egypt is going through a period of declining median of postpartum insusceptibility. The median was almost 9 months in 1980. In 1995, the duration declined one-third to almost 6 months, as shown in Table (1). On a regional level, currently married women in the rural parts of Egypt were immune for a longer duration than their counterparts in urban areas. Across time, the median duration decreased in all regions except rural Upper Egypt. Rural Lower Egypt exhibited the most change during the period 1980-1995. The median duration of insusceptibility in rural Lower Egypt

decreased from 9.8 months in 1980 to 5.2 months in 1995. On the other hand, rural Upper Egypt experienced some increase during the three-year period 1992-1995 from 8.8 months to 9.8 months.

3 SPECIFICATION AND ESTIMATION OF BONGAARTS'S INDICES

Following Bongaarts (1982), we begin with the identity,

$$TFR=\frac{TFR}{TM}\times\frac{TM}{TN}\times\frac{TN}{TFC}\times TFC, \qquad (1)$$

where TM is the total marital fertility rate, TN is the total natural marital fertility rate, and TFC is the total fecundity rate. Equation (1) can be further decomposed to give

$$TFR=C_m\times C_c\times C_a\times C_i\times TFC, \qquad (2)$$

where C_m ($=TFR/TM$) is an index of marriage, C_c an index of contraception, C_a an index of induced abortion, and C_i ($=TN/TFC$) an index of postpartum insusceptibility. Consider that $C_c\times C_a = TM/TN$. Each index takes on a value between zero, in case of low fertility, and one, in case of high fertility.

The index of marriage C_m is defined as

$$C_m=\sum\frac{mf(a)\times m(a)}{\sum mf(a)}$$

where $mf(a)$ is the age-specific marital fertility rate at age a and $m(a)$ is the proportion of women of age a who are married. The index of marriage is calculated using age-specific marital fertility and marriage rates estimated from each of the four surveys. The calculated indices of marriage by year and region are available in Table (2).

According to Bongaarts, the index of contraception (C_c) is given as

$$C_c=1-1.08\sum u_m e_m$$

where u_m is the proportion of married women of reproductive age who use contraceptive method m, and e_m is the use-effectiveness rate for method m. The number 1.08 is a sterility correction factor. The index of contraception is calculated using the proportion of married women of reproductive age who use a specific

contraceptive method estimated from each of the four surveys. Use-effectiveness rates are taken to be the same as those used by Bongaarts. They are 1.0 for sterilization, 0.90 for the Pill, 0.95 for IUD, and 0.70 for other methods. The calculated indices of contraception by year and region are available in Table (2).

The third index in Bongaarts's equation, which is the index of induced abortion (C_a), is assumed equal one. Abortion is very rare in Egypt and it is thought to be less important in determining fertility levels in Egypt and other Islamic countries (Hussein and Shawky, 1995). In addition, abortion rates cannot be estimated from the surveys.

The third ratio in equation (1) is the index of postpartum insusceptibility (C_i), which is the ratio of the total natural marital fertility rate (*TN*) to the total fecundity rate (*TFC*). Any difference between these two rates is the result of the effects of both breastfeeding and postpartum abstinence. According to Bongaarts, the index is

$$C_i = \frac{20}{18.5 + d}$$

where d is the mean duration in months of postpartum insusceptibility. In calculating C_i, the median duration rather than mean duration is used since the median is robust to outliers. The duration considers both breastfeeding and abstinence as reported in the surveys. The calculated index of postpartum insusceptibility is available in Table (2).

Before going into the decomposition of fertility change on a regional level, the literature on Egyptian fertility includes some previous work on the same topic such as Osheba (1992) and Hussein and Shawky (1995). They mainly analysed the decomposition of fertility change in only two successive surveys. Some discrepancy exists between our indices and theirs. We use median and not mean duration of postpartum insusceptibility. Osheba only included the effect of breastfeeding with no postpartum abstinence. We use the method use-effectiveness as reported by Bongaarts. Hussein and Shawky used use-effectiveness derived from data collected in 1992 EDHS. When marital fertility rates were calculated in this study, the rate for the age group 15-19 was estimated as equal to three-quarters the rate of the age group 20-24, as suggested by Bongaarts.

Given the calculated indices and the application of the indices to a *TFC* of 15.3, which was suggested by Bongaarts, produced the implied *TFRs* shown in Table (2). Comparison of actual *TFR* and implied *TFR* shows that the proximate

determinants result in fertility estimates that are close, with acceptable differences below two standard errors in almost all instances, to the actual *TFR*. Comparing the difference with that of other studies (Haughton, 1997) supports our indices and calculations.

Table (2): The indices of marriage, contraception, and postpartum insusceptibility, 1980-1995

Region	Year	C_m	C_c	C_i	*TFR*	Implied *TFR*	% Difference
Urban Governorates	1980	0.561	0.575	0.794	3.84	3.92	2.05
	1988	0.476	0.450	0.851	3.01	2.79	-7.34
	1992	0.498	0.422	0.870	2.69	2.80	3.99
	1995	0.531	0.429	0.901	2.82	3.14	11.36
Urban Lower Egypt	1980	0.579	0.581	0.791	4.28	4.07	-4.88
	1988	0.587	0.460	0.862	3.81	3.56	-6.53
	1992	0.504	0.404	0.870	2.80	2.71	-3.20
	1995	0.493	0.422	0.901	2.66	2.87	7.82
Rural Lower Egypt	1980	0.725	0.822	0.707	6.00	6.45	7.44
	1988	0.677	0.646	0.778	4.73	5.21	10.06
	1992	0.624	0.499	0.813	4.10	3.87	-5.53
	1995	0.607	0.470	0.843	3.45	3.68	6.66
Urban Upper Egypt	1980	0.715	0.756	0.738	5.87	6.10	3.98
	1988	0.602	0.592	0.806	4.17	4.39	5.39
	1992	0.595	0.530	0.823	3.58	3.97	10.92
	1995	0.619	0.511	0.873	3.80	4.22	11.18
Rural Upper Egypt	1980	0.691	0.959	0.685	6.31	6.95	10.07
	1988	0.741	0.888	0.709	6.15	7.14	16.06
	1992	0.754	0.763	0.733	5.97	6.45	8.07
	1995	0.724	0.761	0.707	5.19	5.96	14.83
Egypt	1980	0.677	0.764	0.730	5.28	5.78	9.41
	1988	0.617	0.628	0.778	4.41	4.61	4.59
	1992	0.607	0.537	0.816	3.93	4.07	3.55
	1995	0.611	0.531	0.830	3.63	4.12	13.50

4 DECOMPOSITION OF FERTILITY CHANGE DURING 1980-1995

The purpose of this decomposition is to help identify the factors that have the greatest impact on fertility, and whether this impact changes with time during the period 1980-1995. To do that, the indices need to be independent of one another. The

assumption of independence is not plausible in Bongaarts's decomposition model of fertility change (Rainis, 1992; Haughton, 1997). Accordingly, Kim and Strobino (1984) presented their method that distributes the interaction equally among the proximate determinants of fertility. Their method of decomposition is a more sophisticated approach. Zaky (1997) presented a simpler method for the decomposition of changes in fertility rates. According to this method, the proportional effects of the indices are almost equal to those by Kim and Strobino. However, it should be noted that the latter method does not produce meaningful absolute effects, due to its logarithmic nature.

According to Zaky, the proportional effect of marriage on the change of total fertility rates between period *1* and *2* is

$$\frac{\log \frac{C_{m2}}{C_{m1}}}{\log TFR_2 - \log TFR_1},$$

the proportional effect of contraception is

$$\frac{\log \frac{C_{c2}}{C_{c1}}}{\log TFR_2 - \log TFR_1},$$

and the proportional effect of postpartum insusceptibility is

$$\frac{\log \frac{C_{i2}}{C_{i1}}}{\log TFR_2 - \log TFR_1}$$

The proportional effects of these three indices are presented in Table (3) for the five regions and Egypt. These decomposition results are standardized to add to 100 percent. The magnitude of the proportional effect illustrates the percentage change in fertility which due to a specific proximate determinant.

During the whole period 1980-1995, contraception was the most important factor that lead to the decline in fertility in Egypt. Its effect was more than three times the effect of marriage as a second determinant that lead to the decline of *TFR* from 5.28 in 1980 to 3.63 in 1995. It is clear that postpartum insusceptibility was pushing the other direction. On the regional level, similar findings were found with varying proportional effects, with the exception of the Urban Governorates. Other factors, not accounted for among the three proximate determinants, were more influential in reducing fertility than marriage in the Urban Governorates.

Table (3): The proportional effects of the proximate determinants of fertility

Region	Proportional effects of				
	Marriage	Contraception	Postpartum Insusceptibility	Other factors	Total
Urban Governorates					
1980-1988	-67.47	-100.65	28.47	39.65	100.00
1988-1992	40.20	-57.16	19.65	-102.69	100.00
1992-1995	135.95	34.86	74.18	-144.99	100.00
1980-1995	**-17.80**	**-94.88**	**40.95**	**-28.27**	**100.00**
Urban Lower Egypt					
1980-1988	11.80	-200.75	73.89	15.06	100.00
1988-1992	-49.49	-42.15	3.00	-11.36	100.00
1992-1995	-43.02	84.98	68.26	-210.22	100.00
1980-1995	**-33.81**	**-67.23**	**27.38**	**-26.34**	**100.00**
Rural Lower Egypt					
1980-1988	-28.80	-101.31	40.24	-10.13	100.00
1988-1992	-57.03	-180.63	30.79	106.88	100.00
1992-1995	-16.00	-34.69	20.99	-70.30	100.00
1980-1995	**-32.10**	**-101.02**	**31.79**	**1.32**	**100.00**
Urban Upper Egypt					
1980-1988	-50.31	-71.51	25.78	-3.95	100.00
1988-1992	-7.67	-72.52	13.68	-33.50	100.00
1992-1995	66.31	-61.21	98.90	-3.99	100.00
1980-1995	**-33.16**	**-90.07**	**38.63**	**-15.41**	**100.00**
Rural Upper Egypt					
1980-1988	272.01	-299.49	134.08	-206.60	100.00
1988-1992	58.55	-510.73	112.07	240.12	100.00
1992-1995	-29.00	-1.87	-25.79	-43.33	100.00
1980-1995	**23.87**	**-118.35**	**16.18**	**-21.70**	**100.00**
Egypt					
1980-1988	-51.54	-108.87	35.37	25.05	100.00
1988-1992	-14.18	-135.85	41.38	8.64	100.00
1992-1995	8.27	-14.15	21.42	-115.54	100.00
1980-1995	**-27.38**	**-97.09**	**34.26**	**-9.79**	**100.00**

During the first period 1980-1988, contraception surpassed all other determinants in all regions. Marriage on the other hand, decreased fertility in only the Urban Governorates, rural Lower Egypt, and urban Upper Egypt. But for urban Lower Egypt and rural Upper Egypt, marriage resisted the reduction due to contraception. Postpartum insusceptibility across all regions increased fertility.

During the second period 1988-1992, contraception again was the most influential factor in reducing fertility, except for two regions. Its influence and its direction clearly changed between rural and urban regions in Egypt. The proportional effect of contraception leveled off in urban Upper Egypt around –72 percent. In urban

Lower Egypt, the reduction power on fertility (-42.15) decreased when compared to its influence in the period 1980-1988 (-200.75 percent), and the effect of marriage (-49.49 percent) surpassed that of contraception during the period 1988-1992. Even in the Urban Governorates, the other factors were more effective (-102.69 percent) than contraception (-57.16 percent). For the rural areas, contraception became more influential during the period 1988-1992 than in the preceding period. Marriage assisted in reducing fertility in three regions, namely urban Lower Egypt, rural Lower Egypt, and urban Upper Egypt. However, one should notice the decline in marriage effect in urban Upper Egypt from –50.31 percent during the period 1980-1988 to –7.67 percent in the period 1988-1992. Strangely enough, both the Urban Governorates and rural Upper Egypt, with their different fertility levels and different stages of fertility transition, agreed in the direction of the effect of marriage in reducing fertility. The influence of marriage was positive in both regions. However, the stage of fertility transition clearly explains this influence of marriage. The Urban Governorates clearly passed through its fertility decline, and has started to regain its fertility and marriage patterns. On the other side, rural Lower Egypt, which started its fertility transition and decline later, is on the other side of the transition. Postpartum insusceptibility remained to be positive in its effects on fertility change.

The results of the period 1992-1995 supported those of the previous periods. The influence of contraception continued its downward trend in Egypt (-14.15 percent). Even, it worked against reducing fertility in urban Lower Egypt and Urban Governorates. In the former region, it was more positive (84.98 percent) than postpartum insusceptibility (68.26 percent). In rural Upper Egypt, its proportional impact was almost negligible (-1.87 percent). The negative effect of marriage on fertility seized to exist in Egypt (8.27 percent). In the Urban Governorates, marriage was the most influential determinant (135.95 percent) among those that increased fertility. In urban Upper Egypt, marriage was second (66.31 percent) after postpartum insusceptibility (98.90 percent). In both regions of Lower Egypt, the effect of marriage is still negative but with declining proportional effects. For the first time, the proportional effect of marriage in rural Upper Egypt became negative (-29.00 percent). This finding quite supports the location of rural Upper Egypt among the other regions in their fertility transition. It is clear that during 1992-1995, the other factors were getting very influential in reducing fertility, except for urban Upper Egypt (3.99 percent). For postpartum insusceptibility, its positive effect increased

dramatically specially in the Urban Governorates (74.18 percent) and urban Upper Egypt (98.90 percent). These two regions were the ones that experienced fertility increase during the period 1992-1995. On the other hand and for the first time, a negative effect was observed in rural Upper Egypt (-25.79 percent). This region had the biggest decline in fertility levels during the 1990s.

5 CONCLUDING REMARKS

Using data from four major surveys in Egypt during 1980-1995, we have observed that the negative change in total fertility rate in Egypt had been decreasing with time. Even some regions, namely Urban Governorates and urban Upper Egypt experienced some increase in their fertility levels during the 1990s. Applying the method of decomposition by Zaky shows that mainly changes in marriage patterns and slowing of contraception use were the main causes of such outcome. Postpartum insusceptibility had its share as well. Factors not included in the decomposition are getting important. Further investigation is needed to identify these factors and their influences on fertility change.

It is not unreasonable to expect some increase in fertility rates in Egypt and across the regions in the near future. However, it is unlikely for the increase to be equivalent to the historical levels. This projection will be put for testing when the 1999 Egypt Demographic and Health Survey is conducted, and its data is available for analysis. Given the findings, family planning programme needs to find new clients among those with unmet need or those who discontinue use of contraception. Overall, 30 percent of users in Egypt discontinued using a method within 12 months of starting using it (El-Zanaty et al, 1996). Among never users, 58 percent intended to use sometime in the future. In addition, only 68 percent of the demand for contraception was satisfied in Egypt, and about 20 percent of currently married women had unmet need to use (Harbison, 1995). This calls for more user-oriented focus to family planning, emphasizing on improving the supply of effective contraceptive methods. The promotion of prolonged breastfeeding, whether as a contraceptive method or as a mean of improving infant health, will also increase the duration of postpartum ammenhorea. Consequently, the positive effect of postpartum insusceptibility on increasing fertility will decline, or at least limit further reduction of the period when women are immune.

On the other hand, the sensitivity of fertility rates to variations in available family resources needs to be studied more carefully. Some advocate that Egypt's demographic transition has been driven by the social effects of the economic policies rather than by the population policy and family planning programme (Fargues, 1997). These social effects and possibly some economic improvements may explain the changing in marriage patterns and slowing of contraception use. Yet, this has to be tested within a different context than the current one in this study.

REFERENCES

Blanc, A. and Rutstein, S. 1994. The demographic transition in Southern Africa: Yet another look at the evidence from Botswana and Zimbabwe. *Demography* 31: 209-215.

Bongaarts, J. 1982. The fertility-inhibiting effects of the intermediate fertility variables. *Studies in Family Planning* 13(6/7): 179-189.

El-Zanaty, F., Sayed, H., Zaky, H., and Way, A. 1993. *Egypt Demographic and Health Survey 1992*. Calverton, Maryland, U.S.A.: National Population Council and Macro International Inc.

El-Zanaty, F., Hussein E., Shawky, G., Way, A., and Kishor, S. 1996. *Egypt Demographic and Health Survey 1995*. Calverton, Maryland, U.S.A.: National Population Council and Macro International Inc.

Fargues, P. 1997. State policies and the birth rate in Egypt: From socialism to liberalism. *Population and Development Review* 23(1):115-138.

Guilkey, D. and Jayne, S. 1997. Fertility transition in Zimbabwe: Determinants of contraceptive use and method choice. *Population Studies* 51: 173-189.

Hallouda, A., Amin, S., and Farid, S. 1983. *The Egyptian Fertility Survey*. Cairo:Central Agency for Public Mobilization and Statistics.

Harbison, S. 1995. Unmet need for family planning: Challenges for the future. In *Perspectives on Fertility and Family Planning in Egypt: Results of Further Analysis of the 1992 Egypt Demographic and Health Survey*, ed. M. Mahran et al., 81-101. Calverton, Maryland:National Population Council (Egypt) and Macro International Inc.

Haughton, J. 1997. Falling fertility in Vietnam. *Population Studies* 51: 203-211.

Hussein E. M. and G. A. Shawky. 1995. Fertility Levels and Determinants in Egypt. In *Perspectives on Fertility and Family Planning in Egypt: Results of Further Analysis of the 1992 Egypt Demographic and Health Survey*, ed. M. Mahran et al., 31-53. Calverton, Maryland:National Population Council (Egypt) and Macro International Inc.

Kim Y. and Strobino, D. 1984. Decomposition of the difference between two rates with hierarchical factors. *Demography* 21(3): 361-372.

Lindstrom, D. 1998. The role of contraceptive supply and demand in Mexican fertility decline: Evidence from a microdemographic study. *Population Studies* 52: 255-274.

Osheba, I. 1992. *The proximate determinants of fertility change in the regions of Egypt (1980-1988)*. Cairo Demographic Centre Working Paper No. 26. Cairo, Egypt:Cairo Demographic Centre.

Rainis, K. 1992. The impact of the proximate determinants of fertility: evaluating Bongaarts's and Hobcraft and Little's methods of estimation. *Population Studies* 46: 309-326.

Sayed, H.A.A., Osman, M, El-Zanaty, F., and Way, A.A. 1989. *Egypt Demographic and Health Survey 1988*. Columbia, Maryland, U.S.A.: National Population Council and Macro International Inc.

Shapiro, D. 1996. Fertility decline in Kinshasa. *Population Studies* 50: 89-103.

Yaakoubd, A. 1998. Pathways of fertility transition and its determinants in the North African Arab countries. Paper presented for: Workshop on "New Demography in the Arab Region". Social Research Center, The American University in Cairo. 26-29 July.

Zaky, H. 1997. Decomposition of changes in fertility rates: Methods with an application to Egypt. *The Egyptian Population and Family Planning Review* 30(1/2).