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Decomposition of Fertility Levels and Trends In Upper Egypt during the Period 1992-2003

By

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Introduction: Upper Egypt has different demographic and socioeconomic characteristics from the rest of Egypt and they have strong impacts on population dynamics in the region in general and on fertility in particular. The region is recently paid a special concern by the government and national policy makers to improve such characteristics for the aim of meeting the socioeconomic development. Since reproduction of a given population plays a crucial role in development of the society and influences its progress in all fields, its high level in Upper Egypt represents a challenge to the fulfillment of the objective of achieving a replacement rate of 2.1 children per woman for the whole country. TFR is 3.2 children per woman in Lower Egypt while it is 4.2 children per woman in Upper Egypt according to EDHS2000 and is three children per woman in Lower Egypt compared with 3.8 children per woman in Upper Egypt according to EDHS 2003. Age at first marriage is 20 years in Lower Egypt while it is 18.7 years in Upper Egypt and contraceptive prevalence rate is 65% in Lower Egypt while it is still 49% in Upper Egypt.

Recent trends and components of the change in fertility in Egypt during 1992-2000 indicate that contraception plays the largest role in reducing fertility. Engelhrdt (2004). Recent stalling fertility in Egypt as a start for future concerns to reduce fertility is discussed by United Nations Population Division (2002). Taking into consideration these findings, it is critically important to study and analyze level, trends, determinants as well as differentials of fertility in Upper Egypt to enable both the national and local decision makers to narrow the gap between Lower and Upper Egypt which may help to achieve the replacement level or at least to reach a rate near to it.

Objectives and Data Sources: The main objective of this study is to analyze the determinants of marital fertility in Upper Egypt with sub-objectives indicated as follows:

- To analyze the trend and the pattern of marital fertility in Upper Egypt and in all Egypt during 1992-2003,
- To determine how much of the increased total fertility rate in all Egypt is due to the higher fertility in Upper Egypt and,
- To recommend interventions to reduce fertility in Upper Egypt.

Data derived from Egypt Demographic and Health Surveys of 1992, 1995, 2000 and Egypt Interim Demographic and Health Survey 2003 are employed to achieve the objectives of the study.

Methodology of the Study: Bongaarts and Potter aggregate fertility model developed in 1983 is used to estimate the Total Marital Fertility Rate TMFR during the period
1992-2003. That model is also used to analyze the proximate determinants of marital fertility and to decompose the change in marital fertility in Upper Egypt during the period under consideration. The model specifies three principal proximate inhibitors of marital fertility: contraception, induced abortion, and postpartum infecundability. According to this model is:

Total Marital Fertility Rate (TMFR) = $C_c * \quad C_a * \quad C_i * TF$

Bongaarts and Potter (1983) stated that as a population moves through the transition from natural to controlled fertility, there is by definition, an increase in deliberate marital fertility control. They emphasized that this control is exerted primarily through a rise in contraceptive use. Accompanying the transition in the deliberate control of marital fertility there are transitions in the other principal proximate determinants, marriage and postpartum infecundability. They mentioned that as a consequence of these trends in the proximate determinants, important changes take place in the level of natural marital fertility, marital fertility and overall fertility.

In addition, any change in a fertility level is necessarily caused by a change in one or more of the proximate determinants. They developed a model which relates fertility to the proximate variables: marriage, contraception, induced abortion and postpartum infecundability. According to that model, the four principal proximate determinants are considered inhibitors of fertility. Fertility is lower than its maximum value because of delayed marriage and marital disruption, contraception and induced abortion and because of postpartum infecundity induced by breastfeeding or abstinence. The model illustrated four types of fertility levels from which the impact of proximate variables could be derived. With the inhibiting effects of all proximate determinants present, a population's actual level of fertility is estimated by Total Fertility Rate. If the fertility–inhibiting effect of delayed marriage and marital disruption is removed with out other changes in fertility behavior, fertility will increase to Total Marital Fertility Rate. If all practice of contraception and induced abortion is also eliminated, fertility level will rise further to a level measured by Total Natural Fertility Rate. Removing lactation practice and postpartum abstinence, further increase in the Total Fecundity Rate will be reached. The model also assumes that TFR of most populations falls within the range from 13 to 17 births per woman.

Descriptive and linear regression analysis will be used to study direct determinants of the number of Children Ever Born (CEB) as stated by Bongaarts 1976. Direct determinants of the number of children ever born are current age of woman, age at first marriage, duration of marriage and contraceptive use. On the other hand indirect determinants include husband's education, wife's education, wife's work and place of residence.

Organization of the Study: The research is divided into four sections. The first includes introduction, objectives and data sources, methodology, and

organization of the study. Analysis of Total Marital Fertility Rate in Egypt and in Upper Egypt will be presented in the second section. Analysis of the determinants of fertility as measured by number of children ever born (CEB) in Upper Egypt will be presented in section three. Section four includes conclusions and recommendations.

II) Levels and Trends of Marital Fertility Rates in Upper Egypt 1992 -2003

2.1 Trend of TMFR in Egypt and in Upper Egypt 1992-2003:

In this section the estimated indices of contraception, postpartum amenorrhea and total fecundity are used to estimate Total Marital Fertility Rates TMFR. These indices are estimated for Egypt and Upper Egypt by urban and rural areas during the period 1992-2003. The difference in TMFR between urban and rural areas is analyzed.

Compared to urban areas, there is always one more child per woman in rural areas except in the year 1992 where the corresponding difference is 2 children table (1). However, the decrease in TMFR in rural areas is greater than that in urban areas by more than one child per woman during the period between 1992-3003. TMFR declined by 0.1 in urban areas compared to 1.3 in rural areas. Moreover, the decline in TMFR level in Upper Egypt is similar to that at the national level by nearly one child while the corresponding decline in rural Upper Egypt is higher than that of total Egypt. This indicates that the decline in TMFR in Upper Egypt is mostly affected by the decline in rural areas. Nevertheless, the difference between urban and rural areas in TMFR decreased from almost two children per married woman in1992 to about one child in 1995 but kept constant in 2003 the same level of 2000. There is still a difference of 0.7 children per woman less in urban areas than in rural areas. These results may be explained by the differential effects of the determinants of TMFR between urban and rural areas which will be discussed in the next section.

Table (1) Trend of TMFR in Egypt and in Upper Egypt 1992-2003

	1992	1995	2000	2003
Egypt	6.3	5.7	5.8	5.4
Upper Egypt	7.1	6.6	6.5	6.2
Urban Upper	5.8	5.9	6	5.7
Rural Upper	7.7	7	6.8	6.4

2.2Change in TMFR in Upper Egypt between 1992 and 2003:

The change in TMFR is measured by the proportional change in the indices of contraceptive use, postpartum amenorrhea, other proximate (TF) and interaction among them. Bongaarts (1993). Accordingly, decomposition of the change in TMFR is done for Egypt and Upper Egypt; and for urban and rural areas in Upper Egypt during the period 1992 and 2003. Compared to the proportional decrease in TMFR in Egypt, the corresponding decrease in Upper Egypt is 1%

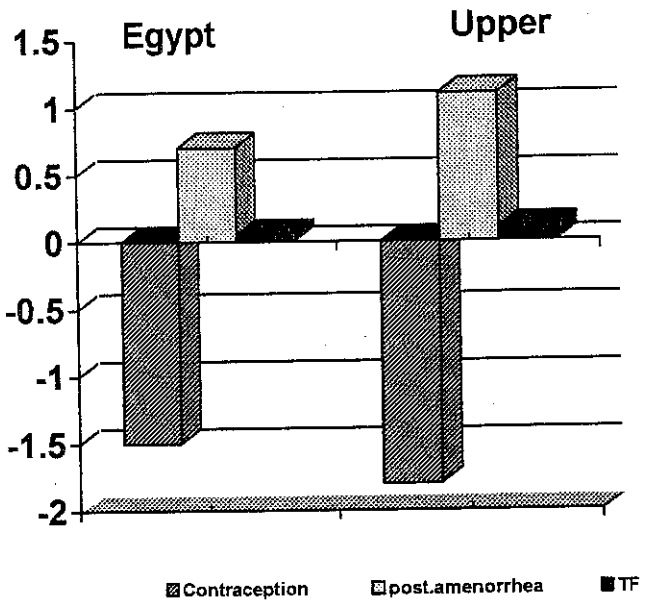
less. In absolute term a similar decline exists in both levels during the same period

The effect of the determinants in Upper Egypt and in Egypt is the same i.e. contraceptive use has the effect of highest decrease while postpartum amenorrhea has the effect of highest increase. However, the decreasing effect of contraception in TMFR in Upper Egypt is greater than that in total Egypt by about 2% and the increasing effect of postpartum amenorrhea is greater by almost 4% which leads to the lower drop in TMFR in Upper than in total Egypt. Comparison of the absolute change in TMFR between Egypt and Upper Egypt, nearly two children are avoided due to contraception use in Upper Egypt and one and half children in total Egypt. An increase in TMFR of about 1.1 children is attributed to a decrease in breastfeeding period in Upper Egypt compared to an increase of about 0.1 children in total Egypt. Other proximate determinants have approximately similar increasing effect. Based on previous analysis a decrease of postpartum amenorrhea due to a decrease in the breastfeeding period in Upper Egypt demolishes the decreasing effect of contraceptive use, table (2) and figure (1).

Table (2) Decomposition of the Change in TMFR in Egypt and Upper Egypt 1992-2003

Determinant	% Of change in TMFR		Distribution of % Change in TMFR		Absolute Change in TMFR	
	Egypt	Upper	Egypt	Upper	Egypt	*Upper*
Contraceptive practice(Pc)	-24	-26	-171	-200	-1.5	*-1.8*
Duration of postpartum in fecund.(Pi)	12	16	85	123	0.75	*1.1*
Other approximate determinates(TF)	1	1.5	7	11.5	0.05	*0.1*
Interaction	-3	-4.5	-21	-34.5	-0.2	*-0.3*
Total	*-14*	*-13*	*-100.0*	*-100.0*	*-0.9*	*-0.9*

Figure (1) Absolute Change in TMFR by some Determinants in Egypt and Upper Egypt between1992-2003



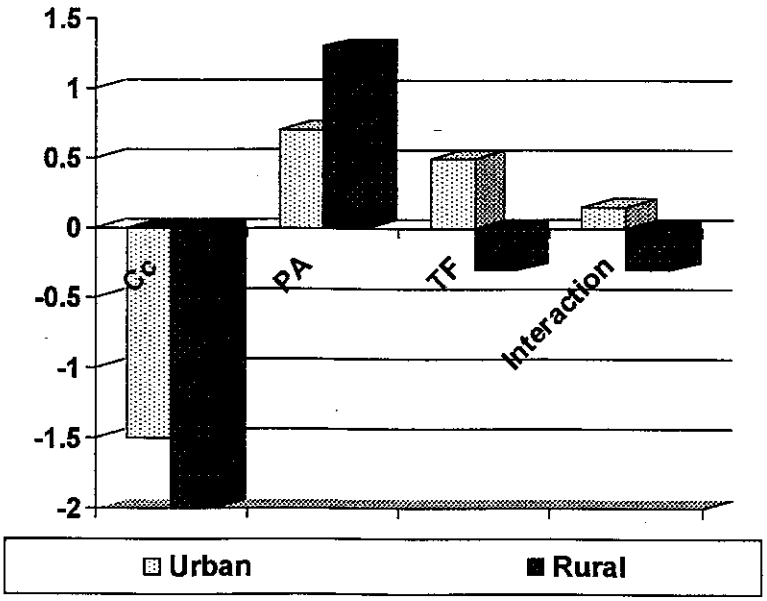
Concentrating on Upper Egypt, the analysis indicates that the proportional decline in TMFR in rural areas is much greater than the corresponding decline in urban areas by about 15%. The decreasing effect of contraceptive use in rural areas is greater than the that in urban areas by about 3% while the increasing effect of postpartum amenorrhea is greater than that of urban areas by 3%. However, TF has an increasing effect of about 10% in TMFR in urban areas and a decreasing effect of about 4% in rural areas. It is quite clear that the increasing effect of postpartum amenorrhea and TF in TMFR is greater than the decreasing effect of contraceptive use in urban areas. The increasing effect of postpartum amenorrhea represents about 60% of the decreasing effect of contraception use. In addition, the increasing effect of TF is about 40% of the decreasing effect of contraception use. Consequently, the increasing effect of both determinants is more than 100% of the decreasing effect of contraceptive use. Contrarily, the decreasing effect of contraceptive use and TF in TMFR is greater than the increasing effect of postpartum amenorrhea in rural areas. The decreasing effect of the referred determinants is about 176% of the increasing effect of postpartum amenorrhea. Nevertheless, about 65% of decreasing effect of contraception is compensated by the increasing effect of postpartum amenorrhea as an outcome of decreasing breastfeeding period. Analyzing the absolute change in TMFR during the same period, there is a decline of about 0.1 children per married woman in urban areas compared to a reduction of 1.3 children per married woman in rural areas. Two children decrease due to contraceptive use was recorded in rural areas compared to 1.1 children per married woman in urban areas. An increase of about 1.3 children in rural areas is caused by a decrease of the breastfeeding period compared to almost 0.7 children per married woman in urban areas. A drop of 0.3 children per married woman is attributed to TF in rural areas. An increase of nearly o.5 children per married woman has been affected by the last

mentioned variable. Pending on such findings, there is an immanent need to increase contraceptive use in urban and rural areas of Upper Egypt. The results may refer to a need to improve reproductive heath care in rural Upper Egypt since TF decreases. Figure (2) shows absolute change in TMFR in Upper Egypt between 1992 and 2003 by proximate determinants and Place of residence. Table (3).

Table (3) Decomposition of the Change in TMFR in Upper Egypt by U/R 1992-2003

Determinants	Per. Of change in TMFR		Dist of Per. Change in TMFR		*Absolute Change in TMFR*	
	Urban	Rural	Urban	Rural	Urban	*Rural*
Contraceptive practice(Pc)	-23	-26	-1150	-153	1.15	*-2*
Duration of postpartum infecund.(Pi)	14	17	700	100	0.7	*1.3*
Other proximate determinates(TF)	10	-4	500	-23.5	0.5	*-0.3*
Interaction	-3	-4	150	-23.5	0.15	*-.3*
Total	*-2*	*-17*	*-100*	*-100*	*-0.1*	*-1.3*

Figure (2) Absolute Change in TMFR in Upper Egypt between 1992 and 2003 by Proximate Determinants and Place of Residence



The decompositions of the differences in the total marital fertility rate between urban and rural areas in Upper Egypt for the years 1992, 1995, 2000 and 2003 are estimated based on the following equations:

proportional difference in TM between urban and rural areas

$$P_f = TMFR_u / TMFR_r - 1$$

proportional difference in TMFR due to a change in the index of marriage.

$$P_m = C_{mu} / C_{mr} - 1$$

Proportional difference in TMFR due to a change in the index of Contraception.

$$P_c = C_{cu} / C_{cr} - 1$$

Proportional difference in TMFR due to a change in the index of postpartum infecundability.

$$P_i = C_{iu} / C_{ir} - 1$$

Proportional change in TMFR due to changes in the TF.
(Urban and rural areas are denoted by u and r respectively)

$$Pr = TF_u / TF_r - 1$$

The difference in TMFR in1992 constitutes 25% less in urban areas than in rural areas. This difference can be decomposed into a decrease of 30.3% in urban than in rural areas due to a higher contraceptive use in urban areas, an increase of 10% in rural than in urban areas is due to a longer duration of amenorrhea in rural areas than in urban areas and a decline of about 5% is due to the interaction between the two determinants. To analyze the absolute difference there is a difference of almost 2 children per woman less in urban areas than in rural areas .Such difference is attributed mainly to a decline of 2.3 children in urban areas than in rural areas due to contraceptive use. The longer duration of amenorrhea in rural areas causes a difference of more than 0.75 children per woman more in rural than in urban areas. Generally, the difference in TMFR due to the decreasing effect of contraception is greater than the difference between urban and rural areas. However, 33% of the decreasing effect of contraception in urban areas is eliminated by the increasing effect of duration of amenorrhea in rural areas.

In Upper Egypt 1995, decomposition of the difference in TMFR between urban and rural areas indicates a proportional difference of 14.5% lower in rural areas than in urban areas. That difference can be decomposed into, a decline of 33% due to longer contraceptive use in urban areas; an increase of 22.5% is due to shorter duration of amenorrhea in rural areas besides a drop of 8% due to interaction.

Regards the absolute change there is a difference of one child per woman less in urban than in rural areas. This difference is mainly attributed to contraceptive use in urban areas where it causes a difference of 2.3 children per woman less in urban areas than in rural areas. However, both duration of amenorrhea and TF cause a difference of almost two children per woman more in urban areas while a reduction of about 0.67 children is attributed to interaction in urban areas. Consequently, the decreasing effect of contraception in reducing the difference in TMFR between urban and rural areas is greater than that difference. A great part

of the decreasing effect of contraception is eliminated by the increasing effect of duration of amenorrhea.

In 2000, decomposition of the difference in TMFR between urban and rural Upper Egypt indicates a proportional difference of 10.0% less in urban than in rural areas. That difference can be decomposed into 25% decrease in urban areas due to greater contraceptive use, 9% increase in urban areas due to a shorter duration of amenorrhea in urban than in rural areas, 9% increase due to higher TF in urban areas and about 3% decrease due to interaction. Analyzing the absolute change, there is about one child per woman greater in rural areas than in urban areas. Such difference is mainly attributed to contraceptive use where it causes a reduction in TMFR by 1.75 children per woman in urban residence, i.e, a reduction due to contraception use in urban areas is about two times the difference in marital fertility between urban and rural areas. Duration of amenorrhea caused an increase in TMFR by about 0.67 children in urban than in rural areas. More than 0.67 children in urban than in rural areas is due to higher TF in urban areas is indicated. Based on the previous analysis about 71% of the decreasing effect of contraception in urban areas are eliminated by the increasing effect of both duration of amenorrhea and TF.

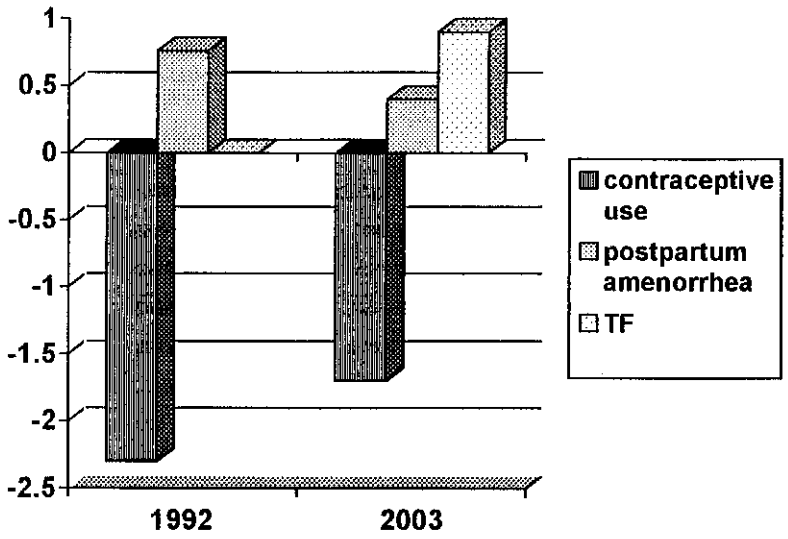
In Upper Egypt 2003, the analysis indicates a proportional difference of 11% for the total and 27% less in urban areas due to contraceptive use compared to 7% more due to duration of amenorrhea, 14% more due to other proximate determinants of urban areas, while interaction causes a reduction of 5%.

The analysis of the absolute difference indicates that there is a more child in rural areas than in urban areas. The increasing effect of the duration of amenorrhea and TF in rural areas is less than the decreasing effect of contraception use in urban areas by about two fifths child while interaction factor decreases TMFR by one-third child. Generally, 50% from the decreasing effect of contraceptives in urban areas is offset by the increasing effect of TF in urban areas and the increasing effect of the duration of amenorrhea in rural areas. Figure (3) and Table (4).

Table (4) Decompositions of Differences in TMFR between Urban And Rural in Upper Egypt during 1992-2003

Determinants	% Of change in TMFR	Distribution of % Change in TMFR	Absolute change in TMFR
1992			
Contraceptive practice(Pc)	-30.3	-121	-2.3
Duration of postpartum infecund.(Pi)	10	40	0.76
Other proximate determinates(TF)	0	0	0
Interaction	-4.7	-19	-0.4
Total	-25	-100.0	-1.9
1995			
Contraceptive practice(Pc)	-33	-228	-2.3
Duration of postpartum infecund.(Pi)	22.5	155	1.6
Other proximate determinates(TF)	4	28	0.3
Interaction	-8	-55	-0.6
Total	-14.5	-100.0	-1.0
2000			
Contraceptive practice(Pc)	-25	-250	-1.75
Duration of postpartum infecund.(Pi)	9	90	0.63
Other proximate determinates(TF)	9	90	0.63
Interaction	-3	-30	-0.21
Total	-10	-100.0	-0.7
2003			
Contraceptive practice(Pc)	-27	-245	-1.7
Duration of postpartum infecund.(Pi)	7	63.5	0.4
Other proximate determinates(TF)	14	127	0.9
Interaction	-5	-45.5	-0.3
Total	-11	-100.0	-0.7

Figure (3) Difference of TMFR between Urban and Rural Upper Egypt by Proximate Determinants in 1992 and 2003



2.3 Trends of the Determinants of the Absolute Difference in TMFR between Urban and Rural Upper Egypt during 1992-2003

The gap in TMFR is narrowed between urban and rural areas by about one child per woman between 1992 and 1995 (from about two children to one child per woman). However, this drop didn't continue after 1995 where the difference decreased by almost 0.30 children in 2000 and kept constant in 2003. That constant decline can be attributed to the stable decrease caused mainly by contraceptive use in urban areas between 2000 and 2003. While the most decreasing effect in the difference in TMFR between urban and rural areas in Upper Egypt that is due to contraception, occurred between 1995-2000 since a drop of almost 0.67 children contributed by contraception but this decreasing effect remains stable between 2000-2003. The increasing effect of duration of amenorrhea goes up in 1995 consequently, the decreasing effect of contraceptive becomes less in reducing TMFR where an increase in the difference by about one child per woman due to reducing breastfeeding period took place between 1992and 1995.The increasing effect of duration of amenorrhea becomes smaller between 1995 -2003 where it goes down by more than 1.3 children per woman. The highest increasing effect of TF in the difference in TMFR between urban and rural areas of Upper Egypt reaches about one child in 2003. Table (5)

Table (5) Trends of the Determinants of the Absolute Difference in TMFR by U/R 1992-2003

Determinants	92	95	2000	003
Contraceptive practice (Pc)	-2.3	-2.3	-1.75	-1.7
Duration of postpartum in fecund. (Pi)	0.76	1.7	0.62	0.4
Other proximate determinants (TF)	-0.001	0.3	0.63	0.9
Interaction	-0.25	-0.7	0.2	-0.3
Total	-1.9	-1.0	-0.7	-0.7

Based on the whole analysis processed in this section it can be concluded that the main determinants of fertility that should be monopolized to achieve the replacement rate in Upper Egypt, are contraceptive use and duration of amenorrhea. In fact, there is a critical need to increase contraception in both urban and rural areas where it has been proved that the decreasing effect of contraception in urban Upper is always offset by the increasing effect of TF. Duration of amenorrhea should be increased by motivating the expansion of breastfeeding period in urban and in rural areas or at least holding it stable because the increasing effect of this variable always demolishes the decreasing effect of contraceptive use in both areas. Assuming the index of postpartum amenorrhea (Ci) is constant, TMFR drops to 5 children per married woman instead of 5.7 in urban areas and to 5.5 children instead of 6.4 in rural areas in 2003.

III) Determinants of Fertility in Upper Egypt

3.1 Direct Determinants of the Number of Children Ever Born in Upper Egypt 2000

Percentage distributions of ever married women and currently married women by number of CEB, age group, and by place of residence in Upper Egypt 2000 indicate that the level of fertility among teenagers is high where women begin their childbearing period very early at 15 years old in both urban and rural areas. About half of the married women aged between 15-19 years old have one child in urban areas and more than half of women in the same age group have at least one child in rural areas. The effect of urbanization, availability and accessibility of reproductive health care services in urban areas than in rural areas may be a convenient explanation. The proportion of currently married women aged 45-49 years with ten children or more constitute 10% in urban areas while the corresponding value in rural areas is 24%. Furthermore, women in their middle ages in both urban and rural areas experience large families; where 17 to 18 % of married women aged 25-29 years old in urban areas have at least 4 children compared to 38% in rural areas. About 9% of currently married women aged 30-34 years old in urban areas have 6-7 children while about 14% of women in the same age group have more than 7children in rural areas. Tables, (6A) and (6B).

In Upper Egypt, the analysis of mean number of CEB by age of mother indicates that the older the age at first marriage is the less the mean umber of CEB. However, it can be shown that even with the older ages at first marriage in rural areas, women tend to have more than two children. Women who marry before

15 years old have more than 7 children either in urban areas or in rural areas where the completed family size for a woman who marries younger than 15 years old in rural areas is about 8 children compared to 7 children in urban areas. Moreover, a woman who married from 15 to 19 years old in urban areas has fewer children by one child compared to her counter part in rural areas. The most significant difference between urban and rural areas regards the completed family size occurred among women who marry at ages 20-24 years old. A rural woman who married at these ages had a larger completed family size than an urban woman by more than two children. A woman who married at 30 years old or above had 2.7 children in rural areas compared to 1.5 children in urban Upper Egypt. Based on previous analysis, even with later marriage after 30 years old, a woman in rural Upper tends to have more than two children that indicate that even AAFM will be raised to 30 years old it seems to be difficult for rural Upper Egypt to reach the replacement rate of 2.1children per woman by 2017. Table (7).

Table (6A) Percentage Distribution of Ever Married Women by Number of Children Ever Born, Current Mother's Age and Place of Residence in Upper Egypt 2000

CEB / age	0	1	2	3	4	5	6	7	8	9	10+	Total
Urban												
15-19	47	47	4	0	2.	0	0	0	0	0	0	100
20-24	24.	42	20	10	3.0	1	0	0	0	0	0	100
25-29	11.	25	33	14	10	4.3	2.3	0.4	0	0	0	100
30-34	4.6	7.7	18.	31	19	11	5.3	3.	0	0.4	0	100
35-39	4.1	5.	15	19	20	11	10	8	5.1	1.7	1.7	100
40-44	3.5	4.2	11	18	14	12	11	11	5.9	3.9	5.5	100
45-49	4.7	3.4	11	11	9.5	11	12	13	8.8	6.8	8.8	100
Rural												
15-19	52	37	10	.6	0.2	0.2	0	0	0	0	0	100
20-24	18	31	29	14	5.4	2.4	0	0.2	0	0	0	100
25-29	6.9	10	20	26	19	12.	4.5	1.5	0.	0.1	0	100
30-34	5.1	3.4	7.3	17	18	21.	14.	8.2	3.3	2.2	0.5	100
35-39	2.3	2.3	3.9	6.6	12	17	16.	17	8.2	8.7	6.	100
40-44	4.2	2.3	3.8	3.4	7.7	9.6	12	18	13.	11	15	100
45-49	2.9	3.9	3.3	5	5	7.9	12.	12	13	14.	21.	100

Table (6B) Percentage Distribution of Currently Married Women by Number of Children Ever Born, Current Mother's Age and Place of Residence in Upper Egypt 2000

CEB / Age	0	1	2	3	4	5	6	7	8	9	10+	Total
Urban												
15-19	46	48	4.0	0	2.0	0	0	0	0	0	0	100
20-24	25	42	19	11	3	0	0	0	0	0	0	100
25-29	11	24.	33	14	10.	5	2.4	0.4	0.2	0	0	100
30-34	3.3	7.4	17	32	20	11.	6	3.2	0	0	0	100
35-39	4.4	3.6	15	20	20.	11	10	7.2	5.5	1.6	1.7	100
40-44	3.5	2.2	12	18	14	12	12	11	5.4	3.6	6.3	100
45-49	3.4	1.7	11	11	10	12	13	12	7.6	8.6	9.7	100
Rural												
15-19	51	37	10.	1.4	0.4	0.2	0	0	0	0	0	100
20-24	17	31	29	15	5	3	0	0.	0	0	0	100
25-29	6.5	9.6	19	26	20	12	4.5	1.8	0.3	0.3	0	100
30-34	4.7	2.8	6.5	16.	20	21	15.	8	3.5	2	0.5	100
35-39	2.1	1.6	3.5	6.1	11.	17	17	18	8.5	8.6	6.6	100
40-44	3.6	1.2	2.8	2.8	7.0	8.6	15	12	15	11	21	100
45-49	2.2	2.4	2.2	4.4	3.4	7.4	13	12	14	15	24	100

Table (7) Mean Number of CEB by Current Age of Mother, AAFM and Place of Residence in Upper Egypt 2000

Current Age / AAFM	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Urban							
-15	1.33	3.0	3.33	5.0	6.0	7.0	7.12
15-19	0.48	1.67	2.85	4.0	5.41	5.5	6.0
20-24	0	0.64	1.66	3.1	3.3	4.5	4.3
25-25	0	0	0.67	1.6	2.6	3.3	3.4
30+	0	0	0	0.5	1.1	2.0	1.5
Rural							
-15	1.22	3.0	4.18	5.3	7.0	7.34	7.7
15-19	0.54	1.74	3.4	4.7	6.0	6.78	7.0
20-24	0	0.78	2.04	3.23	4.7	5.5	6.4
25-29	0	0	0.57	1.61	3.0	4.5	3.8
30+	0	0	0	1.3	1.2	0.83	2.6

Table (8) Mean Number of CEB by Duration of Marriage And Place of Residence, 2000

Place of Residence / Duration of marriage	**Urban**	**Rural**
0-4	**0.91**	0.92
5-9	**2.33**	2.56
10-14	**3.31**	4.08
15-19	**04.16**	5.13
20-24	**05.05**	6.39
25-29	**5.7**	7.15
30+	6.56	7.66

In Upper Egypt, the analysis of the mean number of CEB by duration of marriage (DM) shows that duration of marriage affects positively the mean number of CEB in both urban and rural areas. The difference of the mean number of CEB between women living in urban and rural areas reaches 0.2 children among women with 5-9 years of marriage; it increases to about one child among women with 10-14 or 15-19 years of marriage. Such difference reaches more than one child among women with 20-24 years of marriage. The highest difference more than two children is experienced by women with 25-29 years of marriage. It decreases to one child among women with 30 years of marriage or more which means that women in Upper Egypt continues to have children even after 30 years of marriage, table (8).

In Upper Egypt, the analysis of mean number of CEB by contraceptive use and place of residence indicates that women do not use contraception before having at least two and three children in urban and rural areas respectively. Moreover, women living in urban or rural areas and using any method, have about four and five children respectively. It is also indicated that, even with contraception use, there is still a difference of about 1.2 children between urban and rural women in Upper Egypt. This may imply that contraception is used for limitation not for spacing. Contraception should be motivated to be used after the first child to expand the space between the first and the second child, table (9).

Table (9) Mean Number of CEB by Contraceptive Use and Place of residence in Upper 2000

Place of residence / Contraceptive Use	Urban	Rural
No method	**2.24**	3.14
Any method	3.92	5.07

3.2 Indirect Determinants of Number of Children Ever Born in Upper Egypt 2000

In Upper Egypt, the analysis of mean number of CEB by level of education for both wife and husband and by place of residence indicates that, the higher the wife's level of education, the fewer the mean number of CEB. Evidently, a woman with no education has about 0.5 children more than a woman with some primary or completed primary in urban areas. Such difference increases to more than one child between uneducated women and those with primary or completed primary in rural areas. Compared to women with primary education, women who completed preparatory education have less than a child in rural areas and about a child in urban areas. It is also indicated that wives with primary and preparatory education in rural areas have fewer children than those who lives in urban areas. Compared to women with preparatory education women with secondary education, have less children by more than 0.8 children in urban areas and 0.4 children in rural areas. Nevertheless, a woman with higher education in rural areas has fewer children than that in urban areas by more than one third of child. Moreover, a woman living in rural areas has fewer children than woman

with secondary education by 0.4 children. It is also indicated that woman with higher education in urban areas has fewer children than that with secondary by only 0.1 children. Consequently, higher education for wives contributed lower fertility in rural areas than in urban areas of Upper Egypt.

On the other hand, husband's level of education does not positively affect the mean number of the CEB. A wife to uneducated or with primary education has equal number of children in urban or rural areas. Also, Wives to husbands with higher and with preparatory or secondary level of education in rural areas have almost equal mean number of CEB. General important remarks are indicated. Such remarks are: primary education for wives reduces the fertility by more than half child per woman in urban areas and fifth child in rural areas. In the mean time, that level of education for husbands only reduces fertility by less than 0.1 children in both urban and rural areas. The second remark is that, raising wife's level of education from preparatory to higher levels reduces the mean number of CEB by about one child in rural areas while similar rising of husband education makes no difference. The third remark is that while increasing wife's level of education from preparatory to secondary reduces more than 0.4 children per woman compared to only 0.2 children in case of husband in rural areas, table (10).

Table (10) Mean Number of CEB by Education level of Wife and Husband and Place of Residence in Upper Egypt 2000

Education level	Wife		Husband	
	Urban	Rural	Urban	Rural
No education	4.79	4.7	4.75	5.0
Some primary	4.28	4.53	3.97	4.7
primary	4.26	3.48	4.7	4.9
preparatory	3.11	2.69	3.6	3.1
Secondary	2.27	2.26	2.8	2.9
Higher	2.18	1.86	2.5	3.1

Regarding mother's type of work the analysis of CEB indicates that, a woman who works for cash has fewer children than that who does not work for cash by about one child in urban areas compared to about 0.4 children in rural areas. Working women for cash have about one-and tenth children less in urban areas than in rural areas. This difference decreases to about .67 children in case of woman who does not work for cash, table (11).

Table (11) Mean Number of CEB by Mother's Type of Work and Place of Residence in Upper Egypt 2000

Place of residence / Mother's work	Urban	Rural
Work for cash	2.71	3.84
Not work for cash	3.69	4.27

Analysis of the mean number of CEB by woman's current work status and place of residence indicates that mother work reduces fertility by nearly one child in urban areas and only one third of a child in rural areas. Moreover, a working woman has fewer children than a non- working woman by about one child in urban areas. The corresponding value in rural areas is almost one tenth of a child. Non working women in rural areas have more children than those in urban areas, by almost 0.67 children. Even in case of work, there is a difference of 1.3 children between women living in urban areas and those living in rural areas. This indicates that work of woman has a small effect in reducing fertility in rural areas than in urban areas, table (12).

Table (12) Mean Number of CEB by Woman's Current Work Status and Place of Residence in Upper 2000

Place of residence / Mother's work	Urban	Rural
No Work	3.7	4.3
work	2.7	4.02

3.3 Determinants of the Number of Children Ever Born in Upper Egypt, 2000

Linear regression analysis is used to examine the effect of each direct and indirect variable stated by Bonggarts 1976 on the number of children ever born in urban and rural areas separately. Definition of the variables used in the regression analysis is presented in table (13).

Table (13) Definition of the variables Affect number of CEB in Upper Egypt 2000

Variable Name	Variable category
Dependent variable : Children Ever Born(CEB)	Number of children ever born
Independent variables: Age of mother(AM)	In single year
Age At First Marriage (AAFM)	In single year
Duration of Marriage (DM)	7 categories were identified: (5-9)=1,Otherwise0 (10-14)=1,Otherwise0 (15-19)=1,Otherwise0 (20-24)=1,Otherwise0 (25-29)=1,Otherwise0 (30+)=1,Otherwise0 (0-4)=reference category
Contraceptive use (CU)	It represented by dummy variable as: 1=ever use 0=never use
Woman's education (WE)	Two categories were identified: 1=Secondary +,0=>Secondary
Husband's education (HE)	Two categories were identified: 1=Secondary +,0=>Secondary
Woman's work (WW)	1=work for cash 0=not work for cash

The regression equation takes the form:
$Y=A- B_1 X_1+ B_2 X_2- B_3 X_3+ B_4 X_4+ B_5 X_5+ B_6 X_6 + X_7 B_7$
Where
Y= CEB. (Dependent Variable).
A=Constant.
X_i= the explanatory variables
B_i= the regression coefficients (I=the number of the explanatory variables
$Y=A- B_1 AM + B_2 AAFM + B_3 DM + B_4 CU + B_5 WE + B_6 HE + B_7 WW$
The estimated equation for urban areas is:
CEB= .529 AM -.349 AAFM + .211 CU -.131 WE -0.049 WW
The estimated equation for rural areas is:
CEB= .645AM -.273AAFM + .185CU -.062 WE -.022WW

The stated variables explain 56 % of the variations in the number of children ever born in urban areas. The corresponding value in rural areas is 61.4%. There is a positive and statistically significant effect of mother's age on the number of children ever born. Regarding the standardized coefficient, an increase in woman's age by one year causes an increase of CEB by about half child in urban areas compared to about two thirds child in rural areas. (B=0.529 in urban, B=0.649 in rural). Higher rates of contraceptive use in urban areas, where more availability and accessibility of reproductive health care services may explain such finding.

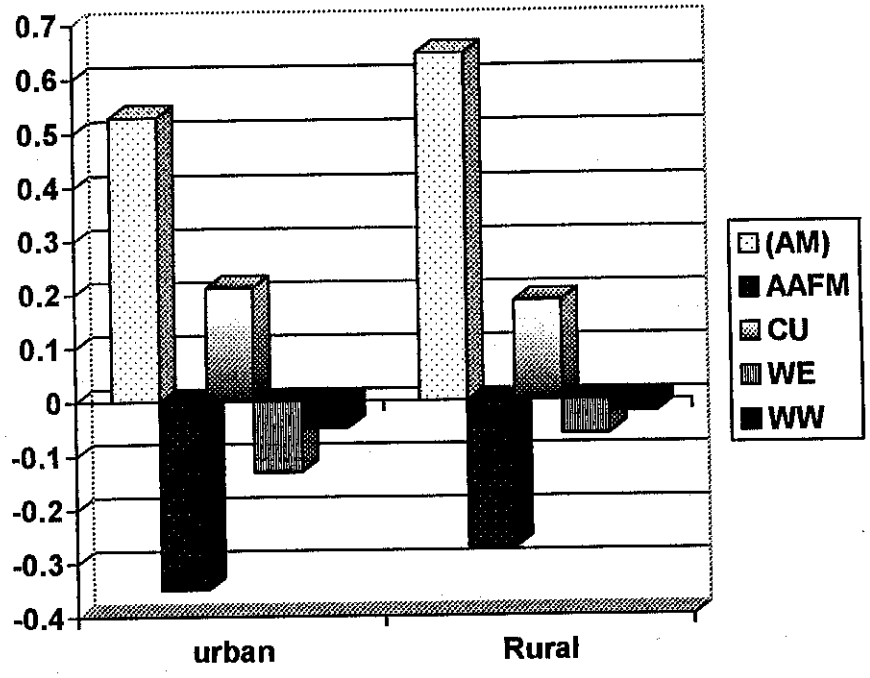
The findings prove a significant negative effect of AAFM on CEB. Evidently, an increase in woman's age at first marriage by one year reduces CEB by more than one third of a child in urban areas nearly to one-third child in rural areas. (B=-0.349 in urban, -0.273 in rural). The difference can be attributed to the older age at first marriage in urban areas than in rural areas.

Surprisingly, there is a positive and significant effect of contraceptive use on CEB. Such finding can be explained by that women start to use contraceptives after having the desired number of children which the fact that is most likely to be large. It does not seem to be logic to state that one percent rise in the contraceptive use leads to a corresponding rise of about one fifth of a child either in urban areas or in rural areas. The results prove a negative and statistically significant effect of woman's education on the number of CEB. If the woman's level of education increases from under secondary education to secondary or above, the mean number of CEB will decrease by more than one tenth of a child in urban areas and less than one tenth of a child in rural areas. (B=0.131 and .062 in urban and rural areas). The results of the analysis indicate a negative and statistically significant effect of woman's work and mean number of the CEB in urban and in rural areas. Working woman has fewer children than that who does not work by about one tenth of a child in urban areas (B=.049). In rural areas, a working woman has slightly fewer children compared to a non-working woman by only 0.02 children (B=-0.022). This finding can be explained by the fact that most of women in rural areas work in agriculture with their husbands i.e. in most cases they do not work for cash. It can be stated that woman's work has a very weak effect on CEB in rural areas, table (14) and figure (4).

Table (14) Regression Result of Direct and Indirect Determinants of CEB in Upper Egypt by Place of Residence 2000

Variable	Urban				Rural			
	Unsandardized Coefficient		Standardized Coefficient	Sig	Unstandardized Coefficient		Standardized Coefficient	Sig
	B	SE	B		B	SE		
Constant	1.737	.266		.000	.838	.212		.000
(AM)	.179	.026	.529	.000	.209	.020	.645	.000
AAFM	-.223	.027	-.349	.000	-.230	.022	-.273	.000
CU	1.268	.096	.211	.000	1.154	.065	.185	.000
WE	-.609	.100	-.131	.000	-.412	.085	-.062	.000
WW	-.311	.109	-.049	.004	-.278	.136	-.022	.039
R. Square	55.7%				61.4%			

Figure (4) Determinants of the Number of CEB in Upper Egypt, 2000



IV) Main Findings and Recommendations:

Main findings:

Comparison between Upper and total Egypt indicates: Keeping the duration of breastfeeding Ci constant at both total and Upper Egypt as it is in 1992, about half child could be avoided in both total and Upper Egypt. Reaching the same index of contraceptive use Cc in Upper Egypt as it is for total Egypt in 2003, almost one child per woman could be avoided in Upper Egypt. It is also indicated that the decline in fertility level in Upper Egypt is greater than that for all Egypt by more than one child per woman. Percent of married women plays a great role in reducing fertility in Upper Egypt, a reduction of more than 0.67 children was contributed by a decrease in proportional of married women. However, duration of amenorrhea plays the worst part in Upper Egypt, an increase of nearly a child per woman is attributed to this factor compared to one fifth of a child for total Egypt.

Comparison between Urban and Rural areas in Upper Egypt indicates that: While the proportion of married women in Urban areas kept constant during the period 1992-2003, It declined in rural areas. It is also indicated that the decline in fertility is greater in rural areas than in urban areas. This decline is caused by higher rates of contraceptive use in rural areas. The decline in fertility due to the effect of lower proportion of married women in urban areas is greater than rural areas. The increase in fertility due to the effect of longer duration of amenorrhea and shorter duration of breastfeeding in rural areas is greater than that of urban areas.

The decline in fertility due to the effect of contraception in urban areas is greater than that in rural areas. The increase in fertility due to the effect of reducing the duration of breastfeeding Ci is eliminated by the negative effect of decrease in proportion of married women 15-49 Cm in urban areas.

Assuming Cc in rural areas reached the same that of urban areas of 0.41 in 2003 TMFR would be dropped to 4.7 children instead of 6.4 children and TFR would drop to 3.2 children in rural areas of upper. Assuming Ci in urban areas reached the same of rural areas in 2003 TFR would drop to 2.7children per women and TMFR would drop to5.3 children per woman in urban areas. Assuming Ci in rural areas reached the same of urban areas 0.935 TM would increase to 6.8, assuming TF was14.8and Cc was 0.41TM would reach about 5.0children per woman but if it's assumed that Cc is as it is 0.56 and TF was the same of urban areas TMFR would go up to almost 7.0children per woman in rural areas

Determinants of the number of the children ever born indicates: There is a positive and statistically significant effect of mother's age on the number CEB where an increase in woman's age by one year increases the number of CEB by about half child in urban areas and about two thirds child in rural areas. The findings prove a significant negative effect of age at first marriage on CEB. Evidently, an increase of woman's age at marriage by one year reduces CEB by more than 0.4 children in urban areas and nearly one third of a child in rural areas. No significant effect of duration of marriage on number of CEB in urban areas or in rural areas of Upper Egypt is indicated. There's a positive and significant effect of contraceptive use on the number of CEB. Contraceptives are used for limitation not for spacing. A strong negative and statistically significant effect of woman's education on CEB is also indicated. Increasing woman's level of education from less than secondary to secondary or above, will reduce the number of CEB by more than tenth child in urban areas and less than that in rural. No significant effect of husband's education on the number of CEB is indicated. There's a strong negative and statistically significant effect of woman's work on CEB in both urban and rural areas, however it is stronger in urban areas.

Recommendations:

- To increase age at first marriage especially in rural areas is recommended; it will reduce the proportion of married women and consequently reduce fertility in these areas.
- To provide variety of highly effective and low price contraceptives in rural areas to mothers who reduce the duration

of breastfeeding in Upper Egypt is also recommended to reduce the probability of conceiving among them.

- To encourage females especially in rural Upper Egypt to reach higher levels of education and activate laws that eliminate school drop out and child labor.
- To offer suitable work opportunities, and provide females in rural Upper Egypt with small mortgages to start small projects.

REFERENCES

Bongaarts, J., (1976)."Intermediate Fertility Variables and Marital Fertility" Population Studies, (30) 2.

Bongaarts,J., (1978) "A Framework for Analyzing the Proximate Determinants of Fertility" Population and Developing Review" 4(1).

Bongaarts, J., and Potter, R., (1983)."Fertility,Biology and Behavior, An analysis of the Proximate Determinants, Academic Press New York.

Cairo Demographic Center (2003)," Population of Egypt in the 20th century ", Cairo

Davis, K.and Blake, J., (1956). "Social Structure and Fertility: An analytical Framework, in Economic Development and cultural Change" Vol.4. Academic Press, New York.

El-Zanaty, F, Hussien A. A. Sayed, Hassan H. M. Zaky and Ann A.Way. (1993). "Egypt Demographic and Health Survey (1992)" National Population Council, Cairo. Egypt. Macro International Inc, Calverton USA.

El-Zanaty,F. (1994). "Audience Segmentation", State Information Service. Cairo.

El-Zanaty,F., Enas M. Hussein, Gihan Shawky, Ann. A.Way, and Sunita Kishor. (1996). "Egypt Demographic and Health Survey (1995)" Ministry of Health and National Population Council, Cairo. Egypt. Macro International Inc, Calverton USA.

El-Zanaty,F and Ann.A. Way. (2001). "Egypt Demographic and Health Survey (2000)" Calverton USA.Ministry of Health and National Population Council, Cairo, Egypt and ORC.

El-Zanaty,F and Associates, and ORC Macro (2004). "Egypt Interim Demographic and Health Survey (2003)" Ministry of Health and National Population Council, Cairo..

Engehardt, H., (2004) "Récent Trends and Components of Change in Fertility in Egypt" Cairo Demographic Center.

Hassan, Shafick S., (2000). "Determinants of Fertility and Child Mortality in Egypt" Cairo Demographic Center, Research Monograph Series NO .23.

Hassan, Shafick S., (2003). "Factors Affecting Fertility Decline in Upper Egypt" Cairo Demographic Center, Research Monograph Series NO.32.

Henry S.Shryock, Jacob S. Siegel and Associates. (1976)."The Methods and Materials of Demography". Academic Press, INC.

Kan,(1994). Trends and Determinants of fertility in Pakistan 1976-1990" Cairo Demographic Center

Nagiub, M., Abedl -Rahman,A., (2003) "Determinants of Family Planning practice in Egypt" 2000 CDC Cairo 2003.

Nashar, Mona A., (2002)."Demographic and Socioeconomic Factors and the Effect on Fertility in Egypt". Cairo Demographic Center, Research Monograph Series NO. 23.

Sayed, H., etal. (1989). "Egypt Demographic and Health survey 1988" Cairo.

Youssef, Mahmoud M., (2004)"Level, Trends and determinants of Fertility in Egypt" Research paper Cairo Demographic Center (2004).