Towards Smaller Family Size in Egypt, Morocco and Turkey: Overall Change over Time or Socio-economic Compositional Effect?

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Abstract

The whole region of the South and East Mediterranean exhibits a profound fertility transition with marked differences in the pace of fertility declines among the countries. The authors choose three representative countries: Egypt, Morocco and Turkey. Determinants of the propensity towards smaller family size are investigated as scrutinizing the development in the pattern of third births, which represents the critical step in the transitional process for these countries. The authors are particularly interested in verifying whether the decline of higher-order births is significantly driven by an overall societal change over time or by compositional change over different socio-economic segments of the female population. Evidence is found that overall societal changes have mainly driven the decline in large family size, though, to a much lesser extent, compositional changes are important too.

Keywords

South and East Mediterranean region, progression to third child, event history analysis, socio-economic compositional effect

1. Fertility developments in Egypt, Morocco and Turkey

The widespread image of fertility in the Mediterranean region is that it is highly polarized between the Northern and Southern shores. While lowest-low fertility levels have been characterizing the countries of the Northern shore since the 1990s, a high fertility was characterizing the South and East Mediterranean countries. However, a closer look at the present picture reveals a significantly different image. The fertility levels of Northern and Southern countries have been converging due to the ongoing rapid fertility transition in the latter region since the 1960s (Mencarini and Salvini 2003). Nevertheless, within this generally converging pattern, differences and divergences still persist among the South and East Mediterranean countries, as highlighted in previous comparative studies (Courbage 1999; Di Comite and Moretti 1999; Tabutin and Schoumaker 2005).

Bearing in mind these previous observations, the aim of this study is to investigate the differences characterizing the South and East shores of the Mediterranean basin. For this reason, three countries of this area were selected to represent different fertility transition patterns: Egypt, Morocco and Turkey. The patterns differ in more than one respect: the onset of fertility transition in these countries started at different times; it followed different paths at different paces; and it currently displays different magnitudes of fertility decline (Figure 1).

In Egypt, fertility started to decline in the 1960s. After an initial fast decline between 1960 and 1970, the pace of the decline almost stalled, with fertility remaining around 5.5 children per woman until the beginning of 1980s. After this, the decline trend regained momentum: the Total Fertility Rate (TFR) fell from 6 to 4 children per woman in a decade. However, it stagnated again in the 1990s; the discontinuous nature of the trend has recently been the subject of much discussion in the literature (Eltigani 2003; Engelhardt 2004; Giusti and Vignoli 2006; Vignoli 2006). The TFR nowadays is above 3 children per woman.

In Turkey, the trend in fertility decline was rapid and almost stable from the 1950s to 1980s (Duben and Behar 1991). During the 1950s and 1960s, social and economic modernization spread to rural and undeveloped areas and fertility started to decline in the whole country (Akin and Bertran 1996). The pace of decline reached its zenith in the 1970s, and then it slowed down after the 1980s. According to the latest estimates, the TFR is around two children per woman (Hancıoğlu et al. 2004; Yavuz 2006).

Among the three countries chosen, the fertility transition began the latest in Morocco. In fact, at the beginning of the 1970s the fertility level was still as high as 7 children per woman. Having started late, the decline in fertility in Morocco has nonetheless been continuous and swift since then (Deane Abernety 2002; D'Addato 2006). In particular, the 1980s saw a substantial change in reproductive behaviour. The TFR is now at the level of 2.5 children per woman. The reasons of Morocco's fertility decline outpaces Egypt's has in fact been extensively debated in the literature (e.g. Courbage 1994; Eltigani 2000).

Although they have different magnitudes of fertility decline, the three countries under investigation are all moving towards a modern parity-specific fertility limit (Mencarini and Salvini 2003). In other words, the "two-child norm" spreads among different segments of the society and the third child represents the pivotal point in the fertility transition. Thereby, the propensity to experience a third birth might be considered as a "critical" indicator that marks the advanced stage of fertility transition. The present study, therefore, focuses on the mechanisms behind the propensity to establish smaller family size in Egypt, Morocco and Turkey, examining the progression to third-order fertility. Has this behaviour in these countries essentially been

driven by some particular population subgroups with higher socio-economic standards? In other words, does it appear as a result of compositional changes? Or alternatively, has it been an attribute of all the socio-economic segments of the population – can it be said to be due to an overall social change over time in these countries?

The paper is organized as follows. In Section 2, the theoretical premises of the study are discussed and the research hypotheses stated. Section 3 deals with the explanation of the data and methods used in the empirical part of the study. In Section 4, the childbearing patterns of the three countries are analyzed in order to show that the transition from second to third birth constitutes the crucial step in their fertility decline. The determinants of the progression to the third child are then scrutinized through hazard models in Section 5. Finally, Section 6 is devoted to a discussion and concluding remarks.

FIGURE 1 - Fertility trends in Egypt, Morocco and Turkey, 1950-2000.
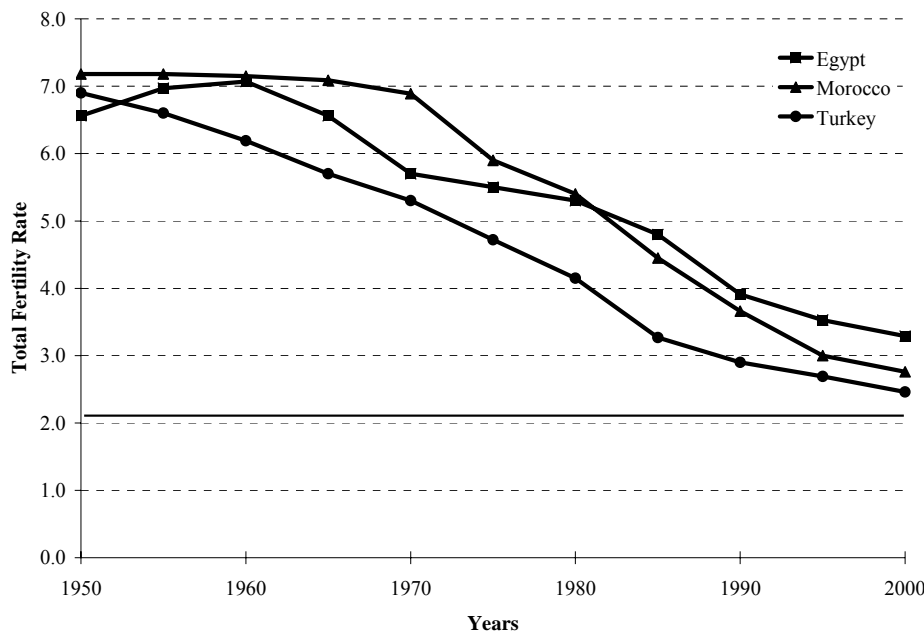
Source: United Nations, 2006.

2. Premises and research hypotheses

2.1 The social and economic factors **of** *fertility developments in Egypt, Morocco and Turkey.*

The connection between socio-economic development and fertility decline has been examined extensively in the demographic literature (e.g. Notestein 1953; Easterlin 1975; Easterlin and Crimmins 1987; Becker 1991). As for the area under investigation, the authors have illustrated changes in selected macro social and economic indicators that might have influenced the pace of fertility decline between 1980 and 2000 (Table 1); being these decades the critical era in terms of convergence towards modern family regulation in Egypt, Morocco and Turkey.

In the process of modernization, major factors resulting in a decrease in the demand for children can be seen to be: increasing per capita income, urbanization, women's education, and women's

labour force participation. The subjective preferences about child quality rise with increasing income at the expense of the number of children. The data presented in Table 1 show that the gross domestic product per capita (GDP) has substantially increased, especially in Egypt and Turkey, during the time considered by this study. In Morocco, the increase in GDP was relatively slow in 1990-2000 compared to 1980-1990.

TABLE 1 - Comparison of selected social and economic factors in 1980, 1990 and 2000, Egypt, Morocco and Turkey.

Factors	1980		
	Egypt	Morocco	Turkey
Real GDP per capita ($PPP)	2,109	2,589	3,657
Life expectancy at birth (years)	56.5	55.7	59.5
Infant mortality rate (per 1,000 live births)	107.0	90.0	93.0
Urban population (%)	43.8	41.3	43.8
Female adult literacy (%)	24.7	15.5	53.8
Women in the labour force (%)	26.5	33.5	35.5
	1990		
Real GDP per capita ($PPP)	2,689	3,096	4,830
Life expectancy at birth (years)	63.9	65.5	66.1
Infant mortality rate (per 1,000 live births)	65.0	57.0	54.0
Urban population (%)	43.4	48.4	59.2
Female adult literacy (%)	33.6	24.9	66.4
Women in the labour force (%)	27.0	34.6	34.6
	2000		
Real GDP per capita ($PPP)	3,253	3,195	5,731
Life expectancy at birth (years)	67.6	67.8	68.6
Infant mortality rate (per 1,000 live births)	46.0	46.0	45.0
Urban population (%)	42.1	55.5	64.7
Female adult literacy (%)	43.8	36.1	76.5
Women in the labour force (%)	30.4	34.7	37.6

Source: United Nations, 2005. For the contraceptive usage: U.S. Census Bureau, 2006.
Note: GDP per capita at purchasing power parity (PPP) is estimated based on the purchasing power of currencies rather than current exchange rates. For further information see UNDP, 2006.
Life expectancy and infant mortality refers to periods 1980-1985, 1990-1995 and 1995-2000.
Urban population refers to the mid-year population in urban areas, estimated by Population Division of the United Nations Secretariat. "Urban" is defined according to the national census definition incorporated in the latest available census. For further information see UNDP, 2006.

As empirical studies have shown, the socio-economic development has a stronger impact in urban areas than in rural areas (e.g. Bulatao and Lee 1983). Urbanization usually covers the rising income level, opportunity of education and employment, cultural diversity, openness to change, and family planning program efforts. Thus urban settings facilitate the transition to modern family limitation (Rodriguez and Cleland 1981). The overall societal change towards urbanization – the increase in the proportion of urban population – gives a good indication of decreasing demand for children. Approximately 44 percent of the whole population in Egypt and Turkey were living in urban areas in 1980, while this proportion was around 41 percent in Morocco. Between 1980 and 1990, the urban percentage of the population increased around 35 in Turkey and 17 in Morocco, whereas in Egypt the distribution of population between urban and rural showed no change. Thereafter, during 1990-2000, the proportion of urban population increased by 9 percent in Turkey and 15 percent in Morocco, while in Egypt it decreased by 3 percent.

Rising women's educational levels may largely lead to a decline in demand for children: not only since it may increase the opportunity cost of children, resulting in a delayed entry into

motherhood, but also because it empowers women, raising their status in family and society (Jejeebhoy 1998). More than half of the women were literate[1] in Turkey in 1980, while in Egypt and Morocco these proportions were considerably lower. However, the level of female literacy was higher in Egypt (25 percent) than in Morocco (15 percent). From 1980 to 1990, this indicator increased 60 percent in Morocco, 26 percent in Egypt, and 24 percent in Turkey. In Morocco and Egypt the share proceeded to rise rapidly from 1990 to 2000 as well. As these figures show, the increase in female adult literacy and the decrease in fertility level are highly concomitant in Morocco and Turkey. In Egypt the female adult literacy has also risen but corresponding fertility decline is less significant in this country. On the contrary, comparing the proportions of women in the labour force in 1980 and 2000, it appears that in Egypt there has been a considerable rise of 15 percent, while in the other two countries these proportions have not changed since 1980.

High mortality would lead to a decrease in the supply of children due to so called "replacement" effect mechanism: parents replace children who have died in order to achieve their desired surviving number of children (Scrimshaw 1978). The improvement of health conditions thereby makes it easier for parents to achieve their number of desired surviving children with a lower number of births. In the case of this study, the estimated life expectancy at birth increased by 12 years in Morocco, 11 years in Egypt, and 9 years in Turkey from 1980 to 2000. Likewise, important improvements in infant mortality rates occurred in all the countries over time. Improvements in both indicators in each of the countries suggest that the fertility decline parallels the developments in socio-economic and health conditions.

2.2 Is there a space for diffusion?

As previously discussed the roles of changes in material conditions and in the social division of labour and resources that are associated with modernization are considered as potent forces driving the fertility decline. Nevertheless, the elaborations concerning the effect of socio-economic change on reproductive behaviour have been subject to several criticisms, too. Since the 1970s, the absence of a clear link between development indicators and onset and pace of fertility decline has been questioned by many studies, based on historical experience of developed countries and ongoing transitions in contemporary developing countries (Watkins 1986; Cleland and Wilson 1987; Watkins 1987). Among several additional factors, the role of diffusion and social interaction processes in fertility declines is widely accepted (e.g. Bongaarts and Watkins 1996; Caldwell 2001; Casterline 2001; Bongaarts 2006).

Social interaction can inhibit fertility change before a transition onset since it can be the source of resistance to the adoption of the birth control behaviour. But once the trendsetters (generally people having higher socio-economic standards) adopt innovative behaviour; the same factor can instead become a powerful force that accelerates the pace of transition in the rest of the population. Diffusion does not only refer to the spread of new technology and information, such as family planning practices, but also to the introduction of new preferences about childbearing. People may begin to imitate those people who already began to limit family size without experiencing a real change in their socio-economic circumstances. Once this process has largely run its course, the decline of large families in the advanced transitional stage becomes less closely tied to socio-economic development. In this sense, late in the transition, the propensity towards smaller families for the lowest socio-economic groups becomes faster than it was.

The two sets of explanations – the role of socio-economic development and the diffusion process in accounting for fertility declines – should, in fact, be considered complementary and not competing (Montgomery and Casterline 1996). For this reason, the research hypotheses in

this study take both aspects into account. In line with previous theoretical considerations, sharing the view that individual and socio-economic characteristics differentiate women's reproductive behaviour the authors expect a higher probability of limiting family size among the more advanced socio-economic segments of the female population. They also wish to see to what extent these determinants differ in each country-specific setting. However, the propensity towards modern family limitation in the countries under study may not be solely attributable to the trendsetters, characterized by an urban background and higher educational attainment. In fact, fertility control is expected to be behaviour in diffusion, which has been adhered to by all segments of the population during the last two decades of the twentieth century.

3. Data and model specification

The study is based on recent retrospective survey data available in Egypt, Morocco and Turkey: Egypt Demographic and Health Survey (EDHS) 2000, Morocco Demographic and Health Survey (MDHS) 2003/04, and Turkey Demographic and Health Survey (TDHS) 2003. The 2000 EDHS, 2003/04 MDHS and 2003 TDHS, consist respectively of nationally representative samples of 15,573, 9,765 and 8,075 ever-married women aged 15-49. The comparable information across countries is collected through Demographic and Health Surveys by means of similar questionnaires and survey procedures followed in each country. These surveys provide information on background characteristics of women interviewed and include a wide range of questions on their reproductive histories. However, most of the other socio-economic characteristics (i.e. migration and employment histories) and also information on the proximate determinants of fertility (i.e. breastfeeding and contraceptive usage) have only been collected for the time of interview. This information cannot be used in conjunction with birth order because of the risk of performing an anticipatory analysis (Hoem and Kreyenfeld 2006[a], 2006[b]).

The empirical part of the work is carried out using event history techniques. The samples are analyzed separately for the three countries. For each country, the observation starts from 1981; cases are then right-censored at 2000 to allow a correct comparison in the same time span (1981-2000).

Firstly, the analysis examines the timing of childbearing patterns in the three countries. Two fertility summary measures from the Kaplan-Meier survival curves are estimated: a) the cumulative proportions of women of a given parity having a subsequent birth within 60 months of the previous birth, which is a measure of the *quantum* of fertility; b) the median[2] length of the interval – in months – after which 50 percent of mothers had a subsequent child, which is a measure of the *tempo* of fertility.

Then the analysis focuses on the determinants of the progression to the third birth, since, as already mentioned, the declining tendency to have a third child is the crucial indicator that marks the transition to more modern fertility behaviour. Multiplicative intensity-regression models are thus estimated to measure the third-birth intensities for Egypt, Morocco and Turkey[3]. Woman's third-birth risk is defined as the probability of experiencing third birth within the next month; given her individual characteristics and that she has delivered a second birth by the beginning of the life segment. The baseline hazard (basic time factor) is the duration in months elapsed from the second birth (starting eight months after it). The baseline hazard is a piecewise constant function (i.e. the basic time factor is defined as a categorical variable), where the risks are assumed to be constant within each time interval but may vary across such intervals.

Because getting married remains the predominant social norm throughout these countries, and given that practically all births occur within marital unions, this study focuses on women

currently married at the survey date. The analysis is therefore carried out on 9,662 Egyptian women, 6,172 Moroccan women and 5,429 Turkish women currently married[4], aged 15-49, who gave birth to a second child.

The selection of the socio-economic variables was obviously conditioned by the availability of comparable data for the three countries under investigation. In this respect, *education of women*[5] and *childhood place of residence* are two basic variables reflecting the individuals' socio-economic profile. The partner's characteristics are also believed to influence the likelihood to give birth to a third child. Therefore, the authors used a variable reflecting *partner's educational attainment* in the analysis. Moreover, four *time periods* of equal length are included in the model (1981-1985, 1986-1990, 1991-1995 and 1996-2000), aiming at capturing the change over time of third-birth likelihood[6]. The *survival status of first child* in the analysis is also introduced in order to catch the "replacement" effect due to the loss of a child. The remaining two covariates, namely the *age at first union* and the *length of previous birth interval*, can be seen as demographic control variables.

TABLE 2 - Transition to third birth: exposure (in person-months) and events in the study populations; Egypt.

Covariates	Egypt			
	Exposures		Events	
	Abs. val.	%	Abs. val.	%
Period				
1981-1985	82,456	22.3	2,435	31.6
1986-1990	67,185	18.2	1,687	21.9
1991-1995	91,445	24.8	1,673	21.7
1996-2000	128,068	34.7	1,901	24.7
Age at marriage				
≤19	179,505	48.6	4,726	61.4
20-22	93,312	25.3	1,727	22.4
23-25	54,027	14.6	805	10.5
≥26	42,310	11.5	438	5.7
Previous birth interval				
Less than 2 years	167,688	45.4	4,033	52.4
2 years and more	201,466	54.6	3,663	47.6
Childhood place of residence				
Rural	189,454	51.3	4,789	62.2
Urban	179,700	48.7	2,907	37.8
Woman's educational level				
No education/primary incomplete	193,508	52.4	5,182	67.3
Primary complete/secondary incomplete	45,862	12.4	892	11.6
Secondary complete/higher	129,784	35.2	1,622	21.1
Husband's educational level				
No education/primary incomplete	152,003	41.2	3,989	51.8
Primary complete/secondary incomplete	62,126	16.8	1,379	17.9
Secondary complete/higher	155,025	42.0	2,328	30.2
Survival status of first child				
Alive at 2nd birth	337,346	91.4	6,606	85.8
Died before 3rd conception	31,808	8.6	1,090	14.2
Total	369,154		7,696	

Source: Own elaborations on EDHS, 2000

The overall compositions of the study populations are presented in Table 2 to 4, which contains occurrences (third births) and exposure times (of two-child mothers) by each of the variables used in the modelling procedure. Particularly noticeable are: the low number of women having experienced the loss of the first child in the Turkish sample; the lower proportion of Moroccan

respondents having spent their childhood in urban areas; the higher proportion of highly educated women in Egypt. The composition of educational groups is actually very divergent in the three settings. On the whole, the general structure implies high polarization among women in Egypt. In Morocco it is interesting to point out the small proportion of two-child highly educated mothers, which is consistent with the fairly low proportion of highly educated women in the whole population (Azelmat et al. 2005). Finally, in Turkey, women are generally to be found in the middle level of schooling.

TABLE 3 - Transition to third birth: exposure (in person-months) and events in the study populations; Morocco

Covariates	Morocco			
	Exposures		Events	
	Abs. val.	%	Abs. val.	%
Period				
1981-1985	44,498	20.5	1,270	26.1
1986-1990	36,315	16.7	914	18.7
1991-1995	47,499	21.8	916	36.4
1996-2000	89,271	41.0	1,775	36.4
Age at marriage				
≤19	117,592	54.0	2,928	60.1
20-22	49,191	22.6	1,103	22.6
23-25	28,065	12.9	516	10.6
≥26	22,735	10.4	328	6.7
Previous birth interval				
Less than 2 years	75,029	34.5	2,270	46.6
2 years and more	142,554	65.5	2,605	53.4
Childhood place of residence				
Rural	137,045	63.0	3,586	73.6
Urban	80,538	37.0	1,289	26.4
Woman's educational level				
No education/primary incomplete	180,233	82.8	4,389	90.0
Primary complete/secondary incomplete	26,073	12.0	373	7.7
Secondary complete/higher	11,277	5.2	113	2.3
Husband's educational level				
No education/primary incomplete	162,679	74.8	4,044	83.0
Primary complete/secondary incomplete	30,128	13.8	504	10.3
Secondary complete/higher	24,776	11.4	327	6.7
Survival status of first child				
Alive at 2nd birth	196,756	90.4	4,217	86.5
Died before 3rd conception	20,827	9.6	658	13.5
Total	217,583		4,875	

Source: Own elaborations on MDHS, 2003/04

TABLE 4 - Transition to third birth: exposure (in person-months) and events in the study populations; Turkey

Covariates	Turkey			
	Exposures		Events	
	Abs. val.	%	Abs. val.	%
Period				
1981-1985	18,096	8.0	293	14.3
1986-1990	43,646	19.3	509	24.8
1991-1995	68,994	30.5	584	28.5
1996-2000	95,875	42.31	663	32.31
Age at marriage				
≤19	134,147	59.2	1,452	70.9
20-22	60,480	26.7	415	20.3
23-25	23,579	10.4	138	6.7
≥26	8,405	3.7	44	2.2
Previous birth interval				
Less than 2 years	83,989	37.1	1,120	54.7
2 years and more	142,622	62.9	929	45.3
Childhood place of residence				
Rural	99,308	43.8	632	30.8
Urban	127,303	56.2	1,417	69.2
Woman's educational level				
No education/primary incomplete	39,574	17.5	764	37.3
Primary complete/secondary incomplete	153,696	67.8	1,199	58.5
Secondary complete/higher	33,341	14.7	86	4.2
Husband's educational level				
No education/primary incomplete	10,783	4.8	223	10.9
Primary complete/secondary incomplete	146,751	64.8	1,472	71.8
Secondary complete/higher	69,077	30.5	354	17.3
Survival status of first child				
Alive at 2nd birth	215,842	95.2	1,761	85.9
Died before 3rd conception	10,769	4.8	288	14.1
Total	226,611		2,049	

Source: Own elaborations on TDHS, 2003

4. A first glance at childbearing patterns: limiting and spacing of births

In this section the fertility differentials in the three countries under study are examined from a birth-order perspective. Firstly, *quantum* differences of fertility are investigated. Figure 2 presents the cumulative proportions of ever-married women at each parity who progressed to the next parity within five years after a preceding birth, from marriage up to parity six.

The proportions of the surveyed Egyptian, Moroccan and Turkish women who reached the first parity within the first five years of marriage are very high and they do not show large differences between the three countries (Figure 2): 94 percent in Egypt, 90 percent in Morocco, and 92 percent in Turkey. This is in line with the fact that childbearing represents the main purpose of marriage in Muslim societies (Fargues 1988, 2003). Nevertheless, after the first parity, different patterns can already be observed in the three countries in the proportion of ever-married women reaching the succeeding parities. Specifically, the proportion of Egyptian women who went on to have a second birth within five years is quite high: 91 percent. By contrast, among the Moroccan women, the proportion of women progressing to the second birth within five years was 82 percent, and in Turkey it is considerably lower, around 76 percent.

The decline of the proportion of Turkish mothers is clearly visible at the progression from second to third birth, while the majority of their Egyptian and Moroccan counterparts proceed to higher-order parity. Namely, in Turkey the proportion of two-child women reaching third parity

within five years is 52 percent, whereas in Egypt and in Morocco the values are considerably higher: 78 percent and 74 percent, respectively. In the time-span between the marriage and the transition to parity four, the emerging Turkish fertility pattern seems to become similar to a typical low-fertility pattern of a developed setting (e.g. Andersson, 2000). From the transition to fifth - and more clearly to sixth - parity the proportion of women reaching higher order births nearly converges with the Egyptian and Moroccan counterparts. This peculiar parity progression pattern of Turkey suggests the presence of two different population sub-groups in the country – one more "modern" and one more "traditional" – with different reproductive behaviours[7]. As concerns Egypt and Morocco, the trends are slightly similar; however, at each subsequent parity Moroccan women are less likely to go on to have another child than their Egyptian counterparts.

FIGURE 2 - Cumulative proportion of women reaching the next parity within 60 months after a preceding birth, 1981-2000.
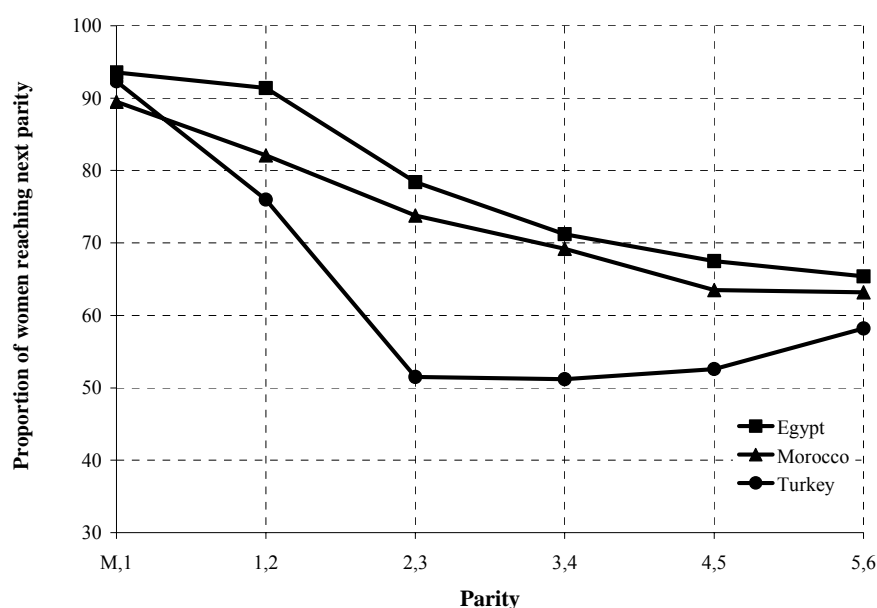
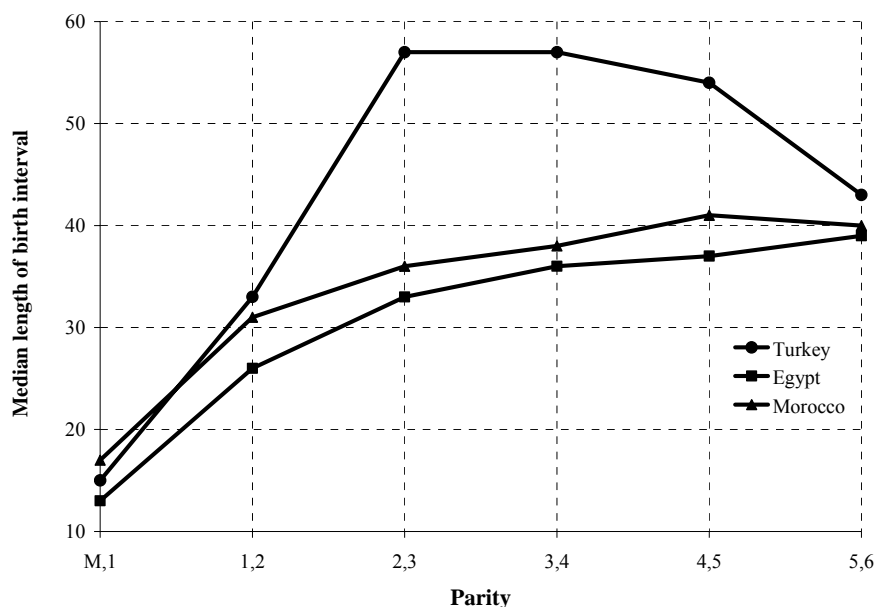*Source: Own elaborations on EDHS, 2000; MDHS, 2003/04; TDHS, 2003.*
Note: Kaplan-Meier survival curves estimates.

The second summary measure is the median length of the interval, which indicates the *tempo* of the fertility patterns (Figure 3). As expected, the median length of the interval between marriages and first birth is quite short and slightly similar in all three countries: around 13 months in Egypt, 15 months in Turkey, and 17 months in Morocco. This finding is confirmed by the direct estimates of the median age at first marriage and the median age at first birth of women aged 25-49 (Table 5).

Following the first birth, Figure 3 shows that the speed of childbearing is the fastest in Egypt (the median ranges between 13 and 39 months for all the intervals), whereas the median length of the birth interval ranges between 17 and 40 months in Morocco, and 15 and 57 months in Turkey. The results also indicate that, until parity two, the spacing of childbearing is very similar in Morocco and Turkey. By contrast, from the second to the sixth parity, the *tempo* becomes much slower in Turkey than in Egypt and Morocco: this not only means that a smaller proportion of Turkish women carry on to higher order parity, they also do so more slowly.

To sum up, a smaller proportion of Turkish women progress to higher parity, and the duration of birth interval in this country is longer than in Egypt and Morocco. This brief look at the general childbearing patterns has also indicated that third birth represents the critical component of fertility change that differentiates the three considered countries.

FIGURE 3 - Median length of birth intervals (in months), where 50 percent of mothers had a subsequent child, according to parity order, 1981-2000.

Source: Own elaborations on EDHS, 2000; MDHS, 2003/04; TDHS, 2003.
Note: Kaplan-Meier survival curves estimates.

TABLE 5 - Median ages at marriage and at first birth in Egypt, Morocco and Turkey.

	Egypt (2000)	Morocco (2003/04)	Turkey (2003)
Median age at marriage (25-49)	19.5	21.4	20.0
Median age at first birth (25-49)	21.6	23.9	21.8

Source: El-Zanaty and Way, 2001; Hacettepe University, 2004; Azelmat et al., 2005.
Note: Median ages estimated from ever-married women.

## 5. Third-birth developments in Egypt, Morocco and Turkey

The analysis of the determinants of third-birth intensities was performed in two steps. The authors first estimated the purely demographic models that present relative risks of having the third birth for the period variable. This first step demonstrates period trends in the third-birth development after controlling for the effect of compositional changes among the women over age at first marriage and by the length of previous birth interval. In the second step, some selected socio-economic variables were added to the models that provide information on how women's socio-economic characteristics affect their propensity of giving birth to the third child. The addition of these variables might also result in modifications in the effect of the calendar period factor; the modified outcome (if any) should then be interpreted as an effect of the

additional control of the compositional changes, from one period to another, over different socio-economic segments of the female population.

Figure 4 presents the third-child intensities by the gross effect of the calendar period for the three countries separately, showing the third-birth intensities in 1986-1990, 1991-1995 and 1996-2000 relative to the corresponding intensity in 1981-1985. These risks are obtained from the estimation of a separate model for each country without including any of the socio-economic variables. Therefore, they reflect overall change effect. The results show that third-birth risks decreased with a very similar pattern for all the countries during the 1980s. However, in the 1990s, birth risks declined to different extents in Egypt, Morocco and Turkey. In the former two countries the relative decline is moderately stronger than in Turkey, where the relative decline levels off; note that fertility was already at lower levels at the end of the period.

In order to disentangle to which extent the fertility decline is driven by the populations' compositional changes a number of socio-economic variables were added to the model. Figure 5 displays the third-child intensities over time, after controlling for these additional socio-economic factors. The introduction of the explanatory socio-economic covariates controls our model for compositional change. The covariates modifies the effect of the *calendar period* (or overall change) only a little (see Figure 4): and the basic pattern, except for Morocco, still remains. The change in third-order fertility developments differ among the countries: the modification over time is actually the weakest in Egypt, while it shows some differential effect in Turkey and, to a larger extent, a change occurs in Morocco.

FIGURE 4 - Relative risks of the progression to the third birth by calendar period, 1981-2000 (for each country given relative to that in 1981-1985), standardized for the duration in months since the second birth, demographic control variables (age of women at marriage, length of previous birth interval and survival status of first child).

Source: Own elaborations on EDHS, 2000; MDHS, 2003/04; TDHS, 2003.

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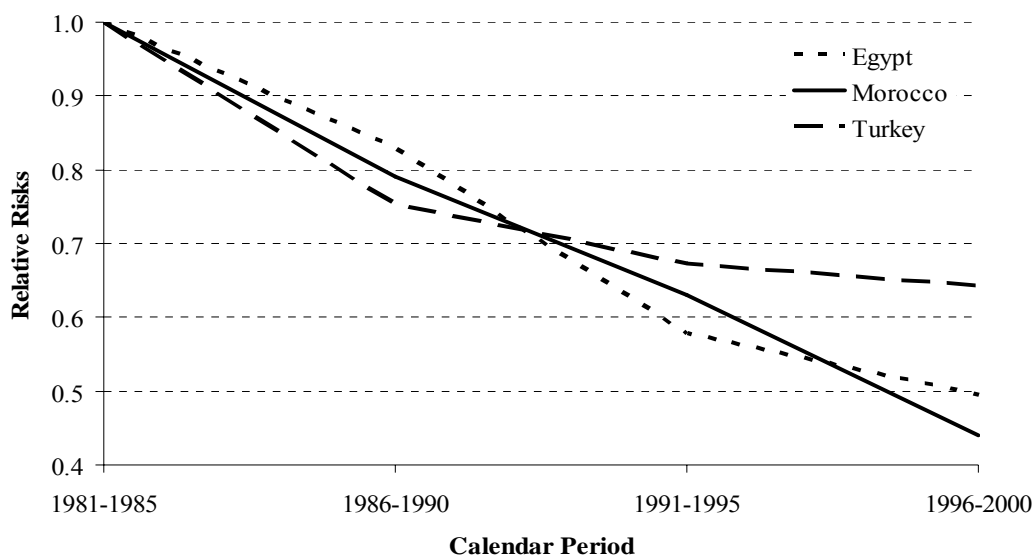
FIGURE 5 - Relative risks of the progression to the third birth by calendar period, 1981-2000 (for each country given relative to that in 1981-1985), standardized for the duration in months since the second birth, demographic control variables (age of women at marriage, length of previous birth interval and survival status of first child) and for the socio-economic variables (childhood place of residence, women and husbands' educational levels).
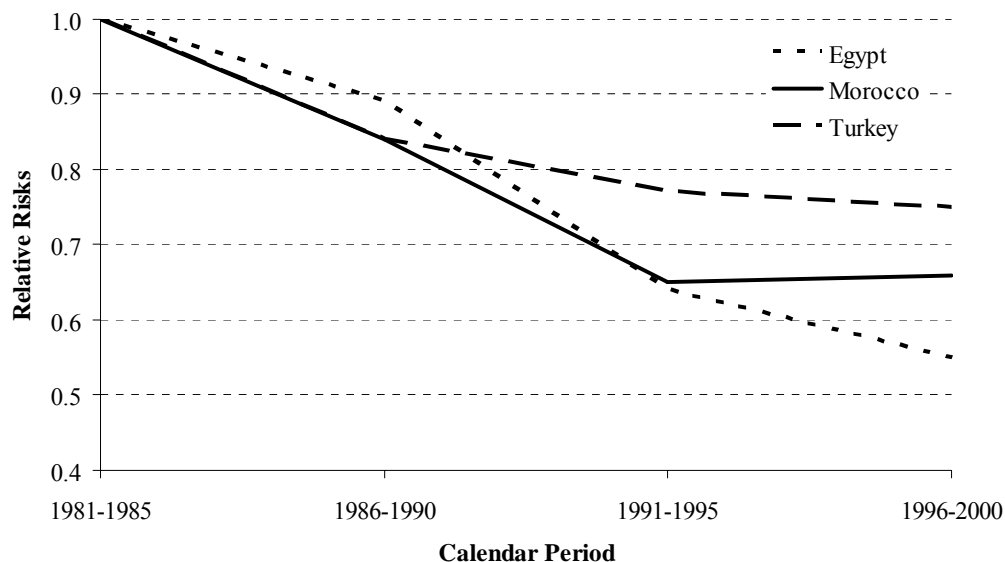
Source: Own elaborations on EDHS, 2000; MDHS, 2003/04; TDHS, 2003.

Table 6 presents the relative risks of third-child developments for two-child mothers according to childhood place of residence and spouses' educational level, standardized for the effect of calendar period, women's age at marriage, length of previous birth interval, and survival status of first child. Consistently with the existing literature in this topic, the *childhood place of residence* also turns out to be an important predictor of the fertility decrease: those who were brought up in a rural context experience a higher transition rate from second to third child. *Women's education* also appears to be a crucial factor in the course of third-order fertility reduction, net of the other observed variables. The impact of the educational attainment among women appears particularly strong in Turkey, where women with secondary and higher educational level reduce their third-child intensity by about 70 percent in comparison with those women without (or with primary incomplete) schooling. Finally, although weaker than that of wife's educational background, the impact of *husband's education* is found to have a significant influence on the propensity of giving birth to the third child in Turkey and Morocco. On the other hand, no significant effect of husband's educational level can be observed in Egypt.

TABLE 6 - Relative risks and significance level of third-child intensities for two-child mothers by selected socio-economic characteristics of the women, standardized for the duration in months since the second birth, demographic control variables (age of women at marriage, length of previous birth interval and survival status of first child) and calendar period.

Covariates	Egypt		Morocco		Turkey	
	Relative risk	p-value	Relative risk	p-value	Relative risk	p-value
Childhood place of residence						
Rural	1		1		1	
Urban	0.80	0.000	0.72	0.000	0.81	0.000
Woman's educational level						
No education/primary incomplete	1		1		1	
Primary complete/secondary incomplete	0.82	0.000	0.87	0.024	0.55	0.000
Secondary complete/higher	0.65	0.000	0.74	0.007	0.28	0.000
Husband's educational level						
No education/primary incomplete	1		1		1	
Primary complete/secondary incomplete	1.01	0.670	0.82	0.000	0.76	0.000
Secondary complete/higher	1.03	0.449	0.78	0.000	0.62	0.000

Source: Own elaborations on EDHS, 2000; MDHS, 2003/04; TDHS, 2003.

6. Concluding remarks

Within the context of the well-known pattern of convergent fertility decline involving the South and East Mediterranean shores, each of the selected countries faces a different phase of the fertility transition: in Egypt the fertility is still above three children per woman; in Morocco the fertility is between three and two children per woman; and in Turkey the norm is currently around two children per woman.

The study's outcomes illustrate that different individual socio-economic profiles significantly determine women's reproductive behaviours. The results can thus be seen as supportive of the general idea that the segments of the population that have been more integrated into modernization trends are also characterized by a stronger preference towards smaller family size.

The analyses also show that the extent of the contribution of socio-economic factors is different in each country-specific context. In Turkey, which already showed significantly lower fertility rates in the 1980s, the findings reveal that there is a more selected group of women proceeding to higher-order births. The emerging fertility pattern seems quite similar to a typical low-fertility pattern of a developed setting in Turkey. It might be the case that due to the existence of a larger, more modern, secularized and urban sector, the individual socio-economic determinants in this country may have strengthened their influence on the pace of fertility decline. On the other hand, the development towards the decline of large families is less evident in Morocco and much less prevalent in Egypt.

In response to the authors' main research question, the results highlight presence of a noticeable overall change over time of the third-birth intensity, even after controlling for compositional

changes over different socio-economic population strata. The authors thus believe that a diffusion process of parity-specific family limitation behaviour might have been particularly relevant during the 1980s and 1990s in the countries under study. The persistent effect of an overall change over time is consistent with the advanced stage of demographic transition in these countries. It has also been demonstrated here that part of the decline in third-birth risks, although quite a small part, is due to compositional changes. During the 1990s, especially in Morocco but also in Turkey, the compositional change effect seems to be gained influence.

On the whole, this analysis provides evidence for a progressive decline (at different paces) of third-birth likelihood in the last decade of the twentieth century in each of the countries. With the transition to third child being an indicator that marks the end of fertility transition, it can be expected that a more modern parity-specific fertility regulation, characterized by the "two-child norm", will prevail in the long run.

Acknowledgments

Notes

[1] Note that female adult literacy is taken as a proxy for female education in this section.

[2] Median duration estimation includes both closed and open birth intervals by the time of survey.

[3] Beside the mechanisms governing women's choices at the individual level, the socio-cultural contextual factors may also represent a key interpretative issue. In fact, the macro impact of community factors and the different opportunities that the area of residence offers could also lead to a better understanding of the choices' determinants. However, a multilevel approach allowing the simultaneous inclusion in a single statistical model of both the micro (individual level) and macro (contextual level) components cannot be performed in this study, due to the lack of information on internal migration histories.

[4] In the three countries considered, divorce is still an issue far from being of major importance, so that it may not cause a large problem in the empirical analysis.

[5] The inclusion of the highest level of education ever reached is justified by the assumption that individuals have already concluded their educational path at the time of second birth.

[6] The choice of these categorizations is due to the fact that common periods could not be identified representing relevant socio-economic and political events in each of the countries under investigation.

[7] This may reflect the two distinguished fertility developments followed by women according to their mother-tongue; namely, between "Turkish" and "Kurdish" speaking women (Yavuz, 2006).

References

Akin A. and Bertan M. (1996). "Contraception, Abortion and Maternal Health Services in Turkey," in *Results of Further Analysis of the 1993 Turkish DHS*, Ankara and Calverton: Ministry of Health, General Directorate of Mother and Child Health and Family Planning, Hacettepe University and Macro International Inc,

Andersson G. (2000). "The impact of labour-force participation on childbearing behaviour: pro-cyclical fertility in Sweden during the 1980s and the 1990s." *European Journal of Population* 16(4): 293-333.

Azelmat M., Ayad M., and Abdelmoneim A (2005). *Enquête sur la Population et la Santé Familiale (EPSF) 2003/04*. Calverton : Ministère de la Santé Publique (Maroc), Macro International Inc, Ligue des États Arabes.

Becker J.S. (1991). *A Treatise on the Family*. Cambridge: Harvard University Press.

Bongaarts J. (2006). "The Causes of "Stalling Fertility" *Studies in Family Planning* 37(1): 1-16.

Bongaarts J. and Watkins S.C. (1996). "Social interactions and contemporary fertility transitions." *Population and Development Review* 22(4): 639-682.

Bulatao R., Lee R. (1983). *Determinants of fertility in developing countries*. New York: Academic Press.

Caldwell J.C. (2001). "The globalization of fertility behavior." in *Global Fertility Transition. Population and Development Review, supplement to 27*, edited by Bulatao R.A. and Casterline J.B. New York: Population Council.

Casterline J.B. (2001). "Diffusion processes and fertility transition: introduction" in *Diffusion processes and fertility transition Selected Perspectives*, edited by Casterline J.B. Washington: National Academy Press,.

Cleland J., Wilson C. (1987). "Demand theories of the fertility transition: An iconoclastic view" *Population Studies* 41(1): 5–30.

Courbage Y. (1994). "Demographic change in the Arab world: The impact of migration, education and taxes in Egypt and Morocco." *Middle East Report* 24(5): 19-22.

Courbage Y. (1999). *New Demographic Scenarios in the Mediterranean Region*. Chaier 142, Ined/Puf.

D'Addato A.V. (2006). " Progression to third birth in Morocco in the context of fertility transition." *Demographic Research* 15(19): 517-536.
[http://www.demographic-research.org/volumes/vol15/19/15-19.pdf].

Deane Abernethy V. (2002). "Fertility decline; no mystery", *Ethics in Science and Environmental Politics*, 1-11.
[http://www.int-res.com/articles/ esep/2002/article1.pdf]

Di Comite L., Moretti E. (1999). *Geopolitica del Mediterraneo*. Roma: Carocci

Duben A., and Behar C. (1991). *İstanbul Households Marriage, Family and Fertility 1880-1940*. Cambridge: Cambridge University Press.

Easterlin R.A. (1975). "An economic framework for fertility analysis." *Studies in Family Planning* 6(3): 54-63.

Easterlin R.A., Crimmins E.E. (1987). *The Fertility Revolution A Supply-Demand Analysis*. Chicago and London: The University of Chicago Press.

Eltigani E.E. (2000). "Changes in family-building patterns in Egypt and Morocco: a comparative analysis." *International Family Planning Perspectives* 26(2): 73-78.

Eltigani E.E. (2003). "Stalled Fertility Decline in Egypt, Why?" *Population and Environment* 25(1): 41-59.

El-Zanaty F., and Way A. (2001). *Egypt Demographic and Health Survey 2000*, Calverton, Maryland: Ministry of Health and Population (Egypt), National Population Council and ORC Macro,.

Engelhardt H. (2004). Egypt's Stalled Fertility Decline and Possible Role of Tempo Distortions. *Population Network Newsletter*, (36).

Fargues Ph. (1988). " Baisse de la fécondité arabe.' *Population* 43(6) : 975-1004.

Fargues Ph. (2003). "Women in Arab countries: challenging the patriarchal system." *Population et Sociétés* 387.

Giusti C., Vignoli D. (2006). " Determinants of contraceptive use in Egypt: a multilevel approach" *Statistical Methods & Applications* 15(1): 89-106.

Hacettepe University (2004). *Turkey Demographic and Health Survey 2003*. Ankara: Hacettepe University Institute of Population Studies, Ministry of Health General Directorate of Mother and Child Health and Family Planning, State Planning Organization and European Union..

Hancıoğlu A., Ergöçmen B., Ünalan T. (2004). "The Population of Turkey at the Turn of 21st Century Past Trends Current Situation and Future Prospects" in *Population Challenges, International Migration and Reproductive Health in Turkey and the European Union Issues and Policy Implications*. İstanbul: Turkish Family Health and Planning Foundation,

Hoem J.M., Kreyenfeld M. (2006a). "Anticipatory analysis and its alternatives in life-course research Part 1: Education and first childbearing" *Demographic Research* 15(16): 461 - 484. [http://www.demographic-research.org/Volumes/Vol15/16/15-16.pdf].

Hoem J.M., Kreyenfeld M. (2006b). "Anticipatory analysis and its alternatives in life-course research Part 2: Marriage and first birth." *Demographic Research* 15(17): 485-498. [http://www.demographic-research.org/Volumes/Vol15/17/15-17.pdf].

Jejeebhoy S.J. (1998). *Women's Education, Autonomy, And Reproductive Behavior*. New York: Oxford University Press.

Mencarini L., and Salvini S. (2003). "Mediterranean fertility: toward a South-North convergence." *Popolazione e Storia* (2): 69-95.

Montgomery M.R. and Casterline J.B. (1996) Social learning, social influence, and new models of fertility, in *Fertility in the United States: New Patterns, New Theories, Population and Development Review, supplement to volume 22*, edited by Casterline J.B., Lee R.D., Foote K.A. New York: Population Council.

Notestein F.W. (1953) "Economic problems of population change", in *Proceedings of the Eight International Conference of Agricultural Economists*, London: Oxford University Press

Rodriguez G., and Cleland J. (1981). "The effects of socioeconomic characteristics on fertility in 20 countries." *International Family Planning Perspectives* 7(3): 93-101.

Scrimshaw S. (1978). "Infant Mortality and Behavior in the Regulation of Family Size", *Population and Development Review*, 4(5), p. 383-403.

Tabutin D., and Schoumaker B. (2005) "The Demography of the Arab World and the Middle East from the 1950s to the 2000s. A Survey of Changes and a Statistical Assessment." *Population* (5-6): 505-616.

UNDP (2006) Human Development Index Trends, [http://hdr.undp.org/statistics/data/pdf/hdr05_table_2.pdf, accessed 26.10.2006].

United Nations (2005). *PRED Bank 4.0: Population, Resources, Environment and Development Bank, Population Division of the Department of Economic and Social Affairs*, New York: United Nations.

U.S. Census Bureau (2006). [http://www.census.gov/ipc/www/idbprint.html, accessed 26.10.2006].

Vignoli D. (2006). "Fertility change in Egypt: from second to third birth." *Demographic Research* 15(18): 499-516
(http://www.demographic-research.org/volumes/vol15/18/15-18.pdf).

Watkins S.C. (1986). "Conclusions." in *The Decline of Fertility in Europe*, edited by Coale A.J. and Watkins S.C Princeton University Press, Princeton.

Watkins S.C. (1987). "The fertility transition: Europe and the Third World compared." *Sociological Forum* 2(4): 645–673.

Yavuz S. (2006). "Completing the fertility transition: Third birth developments by language groups in Turkey." *Demographic Research* 15(15): 435-460.
 (http://www.demographic-research.org/volumes/vol15/15/15-15.pdf).