

**The Impact of Family Planning on Women's  
Educational Advancement in Tehran, Iran**

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## **The Impact of Family Planning on Women's Educational Advancement in Tehran, Iran**

Amir Erfani\*

### ABSTRACT

The literature documenting drastic fertility declines in developing countries has largely focused on investigating the determinants of contraceptive use and the role contraceptives have played in declining fertility rates. In contrast, there has been limited research on the impact of family planning use on women's social status. Using retrospective data from the 2009 Tehran Fertility Survey, this study examined the impact of contraceptive use on women's educational advancement as an indicator of women's empowerment. Multinomial logistic analyses indicated that compared with contraceptive nonusers, women using modern contraceptives before a first birth were more likely to experience a one to two year increase in education level after marriage, when controlling for other factors. Women in the most recent marriage cohorts were more likely to continue their education after marriage, especially those who were using modern contraceptives as opposed to traditional methods. Findings of this research clearly indicate that family planning use after marriage enables women to improve their education by freeing them from reproductive activities.

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## INTRODUCTION

Over the last quarter century, many developing countries, including Iran, have undergone a drastic fertility decline after wide adoption of family planning. The literature documenting this demographic shift has largely focused on investigating the determinants of contraceptive use and the role contraceptives have played in declining fertility rates. , In contrast, there has been less research examining the impact of family planning use on women's lives. .The research that has been carried out in this area has concentrated on the role of contraceptive use in improving maternal health and welfare and child survival, and in preventing HIV infection (For example, see Conde-Agudelo et al., 2012; Ringheim et al., 2011; Smith et al., 2009; Robinson and Ross, 2007; Joshi and Schultz, 2007; Benagiano, 1996 ). Beyond these well documented health benefits of family planning, little empirical knowledge is available regarding whether and to what extent contraceptive use is an essential ingredient for a more socially rewarding life for women in developing countries. In addition to its health benefits, the use of available effective contraceptive methods has the potential to enable a woman to be better poised to take on non-reproductive roles outside the home, including furthering her education (Cleland et al. 2006). As noted by others (Ulin et al., 1994), a new research agenda is needed to investigate the impact of family planning programs on women in developing nations beyond their physical health and that of their children.

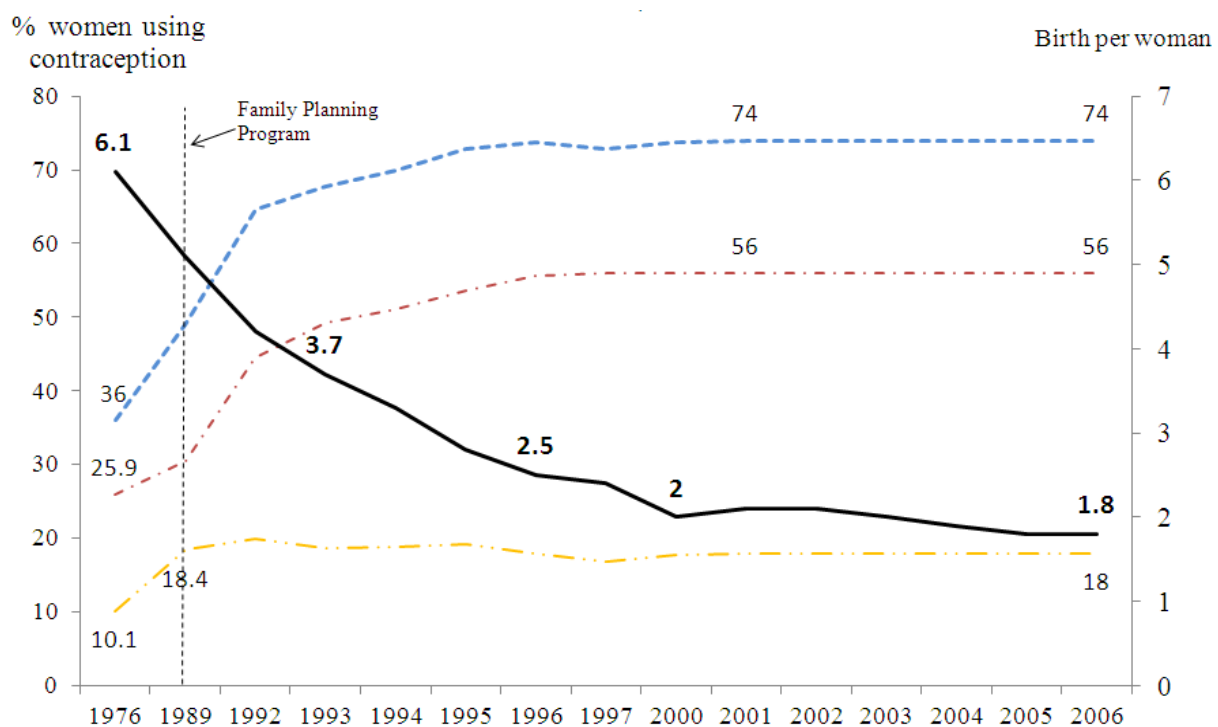
This study aims to examine the net impact of contraceptive use on women's educational advancement after marriage in Tehran, the capital city of Iran, where fertility has declined rapidly over a short period of time and family planning is widely used, with little unmet need. The study also examines whether the impact of family planning on changes in women's schooling level after marriage varies among different marriage cohorts of women who had been exposed to different levels of access to family planning services over the last three decades.

## RESEARCH SETTINGS

The Islamic Republic of Iran has experienced perhaps the most rapid and far-reaching fertility decline demographers have ever witnessed. After the 1979 Islamic Revolution, the total fertility rate which rose slightly to 7.0 children during 1980–84, dropped by more than 5 children to below replacement-level fertility (1.8 children) in 2006. This was accompanied by a rise in contraceptive use among married women; from 37% in 1972 to 65% in 1992 and 74% in 2000 (see Figure 1). This is a remarkable fertility transition, given that the government in Iran never resorted to coercive measures that have been employed elsewhere (e.g., in China). Although the rapid decline

in fertility had started in the mid 1980s, the widespread use of contraceptive methods provided by the first post-revolution, nation-wide family planning program implemented in 1989, contributed to 63 percent of the reduction in observed fertility (Erfani and McQuillan, 2008). Currently, the total fertility rate in 24 out of 30 provinces of Iran has reached below the replacement level of 2.1 (Statistical Center of Iran, 2008). Tehran, the capital city of Iran, has one of the lowest fertility levels in the country. The total fertility rate is estimated at 1.56 children per woman for the city of Tehran, containing about one-tenth of the country's population (Erfani, 2010).

**Figure 1: Contraceptive Prevalence rate & Total Fertility rate, 1976-2006, Iran**



Source: Contraceptive prevalence rates for 1979 (Aghajanian, 1994), for 1989-1997 (Abbasi-Shavazi et al, 2009:95), for 2000 (Erfani and McQuillan, 2008), for 2001-2006 (PRB, 2006). Total Fertility Rate for 2000 (Erfani and McQuillan, 2008), for 1997-1999 and 2001-2005 (Abbasi et al., 2009) and for 2006 (Statistical Center of Iran, 2008).

The remarkable decline in fertility was accompanied by substantial changes in a number of women's socio-demographic characteristics. Over the past three decades, women's age at marriage increased by three years, from 20 years in 1976 to 23 in 2006. Also, the gender gap in the average age at marriage dropped by 1.4 years in the same period, from 4.4 years in 1976 to 3 in 2006 (Statistical Center of Iran, 2011).

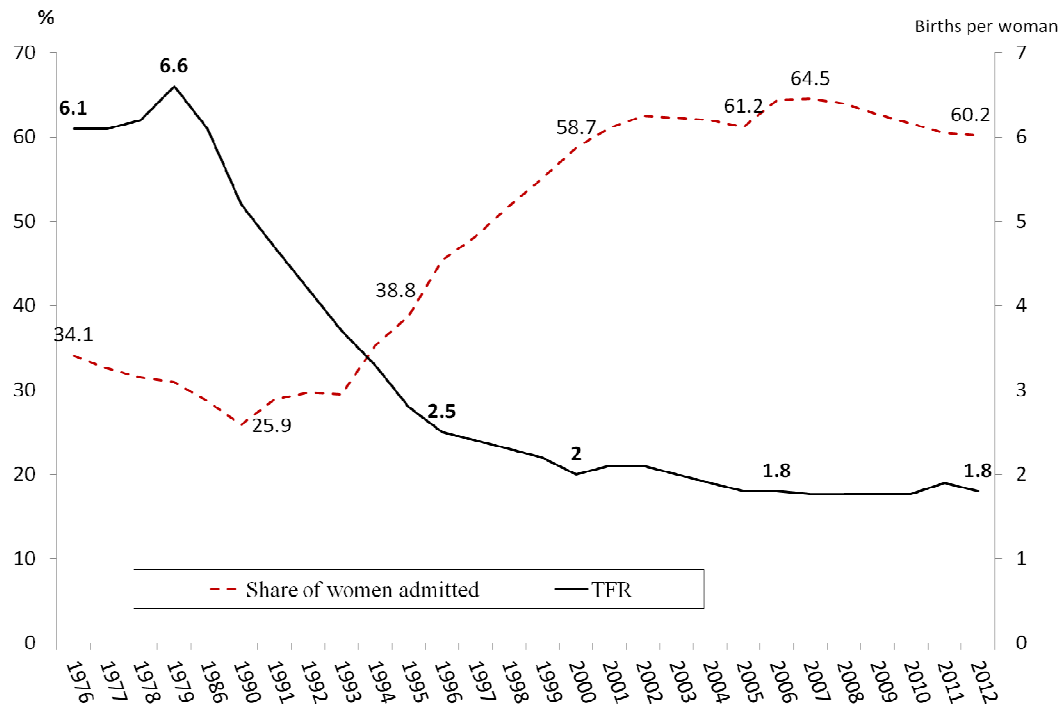
Along with a declining trend in fertility, the literacy rates of men and women significantly improved, and the gender gap in education narrowed. The female literacy rate rose from 34 percent in 1976 to 80 percent in 2006, and the gender gap in literacy rates shrunk considerably from 28% in 1976 to 8% in 2006 (Figure 2). Moreover, women's educational attainment at post-secondary level has been remarkable over the past decade. Similar to the patterns observed in OECD countries, including the US, United Kingdom and Canada (OECD, 2011; AUCC, 2011:12; Buchmann et al., 2008:325), women's admission<sup>1</sup> in post-secondary institutions (i.e., colleges and universities) surpassed men in 1998 in Iran (see Figure 3). In subsequent years, women maintained a majority on Iranian campuses, reflecting a striking reversal of a gender gap in the proportion of students admitted to colleges and universities that once favored males. Women's share of admissions reached its climax (64.5 percent) in 2007, but it has declined slightly since 2008, following a decision of the government to cap the share of women's admission to public post-secondary institutions at varying degrees in certain fields of study (Pour-Abbas, 2007).

The striking change in female educational attainment was an important factor in bringing about advancements in the status of women within the family and the society. It is argued that the increased level of female education after the Islamic Revolution elevated the desire and expectation of women to participate in socio-economic activities outside of the home (Shadi-Talab, 2005). Increased educational levels also changed the perceptions of women regarding their familial and social gender roles (Hoodfar, 1996:34-35). Recent evidence indicates that the majority (73%) of women of reproductive age prefer that their daughters continue their education rather than marry early, and they are strongly in favor of the employment of women outside of the home (Abbasi-Shavazi et al, 2003). Such a liberal view about female gender roles is prevalent among Iranian girls who "gradually observe and practice democracy within the family", an institution in which "the patriarchal system is diminishing" (Shaditalab, 2005: 47, 53).

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<sup>1</sup> Iranian students with a high school diploma can enter into a post-secondary institution, if they pass successfully a very competitive "entrance examination". Students passing the exam will be admitted to public colleges and universities, with no tuition.

**Figure 3: The Share of Women Admitted in Pos-secondary Institutions & Total fertility rates, 1976-2012, Iran**



*Source:* for the total fertility rates before 2007 as to Figure 1 and for 2007-2012 (UN, 2011; PRB, 2011 & 2012); data for the share of admissions was extracted from Statistical Center of Iran (2011) for 1976-1993, IRPHE (2007) for 1994-2007 and NEAO (2012) for 2008-2012.

The considerable increase in education, however, has not translated into a similar rate of increase in women's labor force participation over the past three decades (Rezai-Rashti, 2011). After the 1979 Islamic Revolution, the female employment rate dropped from 13 percent in 1976 to its lowest level at 8 percent in 1986, and then rose slightly and reached 12.4 percent in 2006. During the same period, the gender gap in employment rates narrowed slightly from 51.4% in 1976 to 46% in 2006 (Statistical Center of Iran, 2011). There are varying reasons for the low rate of women's labor force participation in Iran. As Rezai-Rashti (2011:93) argues, one cannot attribute women's low employment rate in Iran simply to the persistence of a patriarchal culture restricting women's labor force participation. Among other contributing factors are the nature of Iran's oil-based economy and its young population age structure. The oil-based economy does not require a labor intensive industrial and service work force but rather it is a male and capital intensive enterprise (Moghadam, 2000). Furthermore, it is very difficult for such an economy to provide

enough jobs for a large number of individuals under the age of 30 who make up about two-thirds of the country's population (Statistical Center of Iran, 2008).

In the face of limited female employment opportunities in Iran, there is a strong tendency among Iranian women to seek upward social mobility within the family and the society largely through obtaining a higher level of education. This has particularly become a major goal of recent generations of women who continue their education even after marriage. While not an automatic pathway to enter the labor market, a university degree for a woman is advantageous because it boosts her likelihood of getting married to a man from a higher socioeconomic stratum, bringing more prestige for her within the family and the society at large. It also increases her chance of finding a possible job opportunity before or after marriage. Furthermore, many employed Iranian women, especially those working in the public sector are inclined to continue their education while working, largely for the purpose of income and job promotions. Thus, family planning can help women meet these goals.

Some observers (Abbasi-Shavazi et al., 2009) argue that contrary to the western style of family formation, where young women often get married and start a family after completing their education and securing a job, in Iran, many continue their education after marriage by delaying childbearing using contraception. However, no hard evidence has been yet provided for women's educational advancement *after* marriage. Also, no systematic study has yet examined the impact of family planning programs on women's educational attainment *after* marriage. Clearly, educational advancement, as an indicator of women's empowerment, can be obtained easier when women are free from childbearing by using contraception to prevent an unplanned pregnancy. This study aims to address this gap in the literature by analyzing the impact of family planning use on women's educational advancement after marriage.

## BACKGROUND AND HYPOTHESES

Education is a critical resource for women's empowerment, enabling women "to make strategic life choices" (Malhotra et al, 2002; Kabeer, 2001). The introduction of modern family planning methods in the United States and Western Europe in the mid-twentieth century initially aimed to liberate women from unintended pregnancies and enable them to pursue education and to participate in economic activities. In developing countries, organized family planning programs initially sought to slow down rapid population growth. Regardless of its aims, the empirical research on contraceptive effects has largely focused on the impact of contraceptive use, particularly the pill, on



women's education and career choices in the United States rather than in developing countries (Cleland et al. 2006).

The marked changes in the education and employment patterns of American women in the late 1960s and early 1970s were attributed to the "progression toward near-perfect control over childbearing" by improved access to contraception (especially the pill), though a direct causation could not be established. Further, it was shown that the delayed childbearing enabled women to take advantage of educational opportunities and made participation in the labor force easier (Birdsall and Chester, 1987). Relying on the timing of changes that began in the American society during the late 1960's and early 1970's, Goldin and Katz (2000) also suggested that the pill significantly increased American women's age at marriage and their participation in professional education and training such as law and medicine. Other scholars showed positive effects of using pills and delaying first birth, respectively, on the intensity of women's labor force participation and wage growth in the United States (Bailey, 2006; Herr, 2012).

Turning to developing countries, to date, there has been a dearth of empirical evidence regarding the causal impact of family planning use on women's educational advancement. Studies documenting the trends and patterns of fertility declines in developing countries have noted advancement in women's education along with the declining trends of fertility. For instance, in China and some countries in East Asia, such as Singapore and South Korea, where the fertility transition has completed and fertility levels reached to the lowest levels, women's educational levels have increased in the past two decades. Yet, it is not clear whether these advancements in women's education are the result of family planning programs or "a continuation of prior government mandated policies requiring greater representation of women in schools" (Malhortara, 2009: 11). In Columbia, Miller (2010) found that female teenagers who had access to family planning obtained more years of schooling and were more likely to work in the formal sector. Moreover, some of the women who participated in the Women's Studies Project, a five-year qualitative and quantitative research initiative conducted by Family Health International in ten diverse developing countries (Barnett et al., 1999; Williamson, 1998), expressed that family planning allowed them to pursue an education by avoiding an unwanted or mistimed pregnancy. These observations from developing countries are informative, though they hardly indicate a causal effect of family planning on women's educational attainment.

The empirical investigation illustrated in this study is based on a theoretical framework conceptualized by Malhotra (2009). In her paper, she theorized that recent fertility declines observed in middle-income developing countries have the potential to result in “positive and transformative shifts” in several aspects of women’s lives, including gender systems, women’s well-being and empowerment at the individual and societal levels. She argues that the reduction in fertility that leads to these positive transformations in women’s lives depends on contextual factors and the availability and use of effective family planning services. Drawing on decades of literature in developed countries and observations from developing countries, she argues that increasing the use of effective contraceptives enables women to regulate the timing and number of their births which allows women “to balance and appropriately time the fulfillment of their sexual, reproductive, and non-reproductive needs and aspirations” (p. 5). Therefore, the availability and use of effective family planning enables a woman to plan her births and hence to spend a larger portion of her lifetime engaging in non-reproductive activities, such as education. This study intends to empirically test this hypothesis in the urban context of Tehran in Iran.

Specifically, this study examines the hypothesis that women who used contraception after marriage to delay childbearing were more likely to pursue their education, compared with those who did not use effective contraceptive methods. Given the dynamics of family planning after the revolution in Iran, the proposed study also examines the assumption that the positive impact of contraceptive use on women’s educational attainment has been increasing from older to younger cohorts of women over the last three decades, with increasing access to and use of effective modern contraception.

#### DATA AND METHODS

The main source of data was the Tehran Survey of Fertility, conducted by the author in August 2009 in the nation’s capital. Modeled on a standard Demographic and Health Survey, the study questionnaire was designed to collect a wide range of data, including complete histories of live births and contraceptive use, as well as data on socioeconomic and demographic characteristics of women and their husbands. Thirty trained and experienced female interviewers collected the data during face-to-face interviews with a representative sample of 2,934 married women aged 15–49

residing in Tehran's 22 residential districts<sup>2</sup>, for a response rate of 98%. The sample was selected based on a three-stage stratified cluster random sampling design. The details of the sampling design and survey methods have been described elsewhere (Erfani, 2011). The analytical sample in this study includes 2,870 women who married on or before August 2008 so that there has been at least one year between their marriage and the interview (August 2009) to improve their education.

The dependent variable is women's educational advancement that means additional years of schooling undertaken by a woman from the time of marriage up to the interview. Longitudinal or retrospective data are required to assess change in women's educational levels after marriage. Unlike the standard Demographic and Health Surveys which do not collect retrospective data on women's educational levels at different time points, the Tehran Survey of Fertility has collected rich retrospective data on both birth and contraceptive histories as well as on the education trajectories of husbands and wives.

The education levels of husbands and wives were measured at two time points: at the time of marriage and at the time of the interview. This allows us to construct an outcome variable, "educational advancement" from marriage to the time of the interview (i.e., August 2009). The dependent variable labeled "years of women's 'educational advancement'" is constructed by subtracting the women's number of years of schooling at the time of the interview from the number of years of education at the time of marriage. The value of the dependent variable ranges from zero to 13 years, in which zero means "no educational advancement." As shown later in the Findings section of this paper, women with one to two years of educational advancement are qualitatively different from those with three or more years of progression in schooling. Therefore, the values of the outcome variable were grouped into three categories, representing the level of educational advancement: '1-2 years', '3 or more years', and 'no educational advancement.' However, due to data limitations for multivariate cohort analyses, a binary outcome was developed by collapsing the two categories '1-2 years' and '3 or more years' into a new category, labeled 'advancement' versus 'no advancement'. Three multivariate binary logistic models were developed for three marriage cohorts of women. The collapse of the two categories in these models may make it difficult to show separately the effect of contraceptive use on the two levels of educational development across

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<sup>2</sup> People residing in the 22 residential districts of Tehran differ socioeconomically. The districts in the northern part of the city largely contain better-off households, while women in the southern and moderate districts are mainly of low and moderate socioeconomic status, respectively.

marriage cohorts. However, given the fact that the advancement of schooling by three or more years is mostly observed among the oldest cohort of women (this will be shown later in Findings section), the results of the model related to the oldest cohort (i.e., before 1990) will largely represent 3 or more years of educational advancement, while the results of the other two models, specially the one associated with the most recent cohort (i.e., 2000-2008) mainly represent the 1-2 years of educational advancement.

The temporal order of independent and dependent variables is one of the prerequisites of a causal explanation. Thus, the current study chose theoretically relevant explanatory variables that measured women's characteristics for the time *before* the occurrence of any progress in women's educational level. Based on the study hypotheses, stated before, the key explanatory variable consists of 'contraceptive use before the pregnancy of the first birth'<sup>3</sup>. The impact of family planning use before a first birth on the outcome variable was controlled for confounding factors, including age at marriage, spousal age difference, employment status, years of education at marriage, residential districts and marriage cohorts. To avoid a multicollinearity problem, women's age and husband's education at marriage were excluded from multivariate analyses.

Based on the first study hypothesis, we expect that women who have used a modern contraceptive method before the first birth and hence delayed childbearing longer are more likely to have advanced their educational level. To examine the second hypothesis, multivariate analyses were conducted separately for three marriage cohorts of women: 1) those who married before 1990, when no official family planning program was in place; cohort 1990-99; and cohort 2000-2008. The cohort analytical strategy allows us to examine the relative impact of contraceptive use before a first birth on women's educational advancement over time. Along with a rise in contraceptive use, especially before a first birth, and the length of a first birth interval (Erfani, 2010), and the establishment of pervasive small family size norms among recent cohorts of women, our general expectation is that the use of family planning before a first birth holds a stronger impact on women's educational advancement among the recent cohorts of women.

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<sup>3</sup> For those women who had no live birth and were not pregnant at the time of the interview, information on their current contraceptive use at the time of the interview was utilized. Also, for women who were pregnant with their first child at the time of the interview, information on contraceptive use before the current pregnancy was used.

The gross and net effects of the selected explanatory variables on the outcome variable will be examined by employing binary and multinomial logistic regression models. Where the dependent variables held more than two nominal categories, multinomial logistic regression analyses were applied, and binary logistic regression models were used in the case of a dummy outcome variable. Univariate analyses examined the gross (unadjusted) effect of each covariate on educational advancement, whereas the net (adjusted) effects of one explanatory variable on the dependent variable were examined by multivariate analyses.

## FINDINGS

Table 1 illustrates the socioeconomic and demographic characteristics of married women living in the city of Tehran. The percent distributions of the sample by the selected characteristics indicate that the majority (65 percent) used a contraceptive method before becoming pregnant with their first child. . The use of traditional methods (largely withdrawal) before the first birth was almost two times greater than the use of modern contraceptives (40 percent vs. 24 percent). Other findings in Table 1 show that one quarter resided in better-off communities located in the northern districts of Tehran while the others lived in the central or southern districts. The majority of women at the time of the interview were in their mid reproductive years (ages 30-39), and about half of the women (45 percent) were under the age of 20 at the time they married. It is notable that a significant proportion of women (15 percent) married at the age of 25 or higher. The sample was evenly divided between the three categories of spousal age differences. While 33 percent of women had less than four years age difference with their husbands, 35 percent married a man who was seven or more years older than his wife. The study sample also was evenly divided between the three marriage cohorts that represent three groups of married women with diverse life-course experiences related to family formation and childbearing, including contraceptive use.

**Table 1: Percent distribution of married women by years of educational advancement , according to selected socioeconomic and demographic covariates: Tehran, Iran 2009**

Covariates	Years of Educational Advancement			Sample	
	None	1-2 years	3+ years	N	%
<b>Contraceptive method used before pregnancy of the 1<sup>st</sup> birth</b>					
None	87.1	5.2	7.7	1019	35.5
Any modern	80.8	12.7	6.5	693	24.1
Any traditional	84.4	7.9	7.7	1158	40.4
<b>Employment status before 1<sup>st</sup> birth</b>					
Unemployed	86.4	6.5	7.1	2430	84.7
Employed	74.1	16.8	9.1	440	15.3
<b>Years of schooling at marriage</b>					
< 12	85.0	6.0	9.0	1157	40.3
12	88.6	5.1	6.3	1193	41.6
> 12	73.8	19.8	6.3	520	18.1
<b>Husband years of schooling at marriage</b>					
< 12	90.4	3.6	6.0	1151	40.1
12	85.3	7.5	7.2	1051	36.6
> 12	73.1	16.9	10.0	668	23.3
<b>Age</b>					
15-29	85.6	10.0	4.4	699	24.4
30-39	83.5	9.0	7.5	1190	41.5
40-49	84.9	5.7	9.4	981	34.1
<b>Age at marriage</b>					
<20	84.0	6.7	9.3	1282	44.7
20-24	84.3	8.9	6.8	1152	40.1
25+	86.5	10.1	3.4	436	15.2
<b>Spousal age difference(years)</b>					
<4	85.8	8.5	5.7	953	33.2
4-6	82.9	9.4	7.7	919	32.0
7+	84.7	6.6	8.7	998	34.8
<b>Residential district</b>					
Northern	78.6	11.5	9.9	730	25.4
Central	85.1	8.3	6.6	1260	43.9
Southern	88.5	5.0	6.5	880	30.7
<b>Marriage cohorts</b>					
<1990	83.9	5.5	10.6	989	34.5
1990-1999	84.3	8.7	7.0	1015	35.4
2000-2008	85.3	10.5	4.2	866	30.2
<b>Total</b>	<b>84.5</b>	<b>8.1</b>	<b>7.4</b>	<b>2870</b>	<b>100.0</b>

Notes: Chi-square tests for bivariate relationships between all covariates and years of educational advancement in Table 1 were statistically significant at P-value = 0.01.

Generally, 98 percent of married women were literate (data not shown). At the time of their marriage, 40 percent of women had less than 12 years of schooling, a similar proportion (42 percent) had completed high school, and about one-fifth of women had some post-secondary education. A relatively similar pattern of educational levels was observed for their husbands. Moreover, data on women's educational advancement indicate that the education level of the majority of women (85 percent) did not change from marriage to the time of interview, whereas eight percent of women completed one to two years of schooling after marriage, and another seven percent improved their schooling by three or more years. Despite overall high levels of educational attainment, the majority (85 percent) of women in the sample were unemployed.

Socioeconomic and demographic differentials in the level of educational advancement among married women in Tehran are also presented in Table 1. The results show that women who had either some postsecondary education or less than a high school diploma at the time of marriage were more likely to experience an educational advancement, compared to those with a high school diploma. However, the proportion of women who attained an educational advancement was greater among those with postsecondary schooling at marriage rather than those with less than a high school diploma at marriage. That is, one-fourth of women with some postsecondary education at the time of marriage improved their education after marriage, largely by one to two years, whereas about one-sixth of women with less than a high school diploma at marriage obtained an educational advancement after marriage, largely by more than two years.

Other findings indicate that the proportion of women with one to two years of educational advancement was greater among those who were employed and had a husband with some postsecondary education, married at age 25 or older, had less than 7 years of spousal age difference, and resided in the northern districts. Interestingly, women with three or more years of educational advancement mostly married before age 20 with a less educated husband, and had seven or more years of spousal age difference.

#### *Cohort Variations in Educational Advancement*

Further results indicate significant cohort differentials in women's educational advancement levels and socio-demographic characteristics. Table 1 shows that when moving from older to younger marriage cohorts of women, an educational advancement of one to two years rises from 5.5 percent among women who married before 1990 to 10.5 percent among those who married in 2000-2008. In contrast, the proportion of women with three or more years of schooling advancement dropped

by 63 percent when moving from older to younger marriage cohorts (from 10.6 percent before 1990 to 4.2 percent in 2000-2008). The cohort variations in the selected socio-demographic variables in Table 2 provide us with further insights on why the level of educational advancement is different among older and the most recent marriage cohorts of women.

Table 2 illustrates that the use of contraceptives during the period after marriage and before the pregnancy of the first birth increased from 45 percent among women who married before 1990 to 67 and 84 percent among the 1990-99 and 2000-2008 marriage cohorts, respectively. Though the use of traditional contraceptive methods (mainly withdrawal) was systematically greater than that of modern methods, the pace of increase in the use of modern versus traditional methods differed significantly across the marriage cohorts. That is, the use of traditional methods before the pregnancy of the first child increased sharply from 29 percent in the oldest cohort to 43 percent in the 1990-99 cohort, whereas a sharp increase in the use of modern methods occurred after 1990, from 22 percent among women in the 1990-99 cohort to 37 percent among those who married during 2000-2008.

Along with increasing contraceptive use before the first birth, the median length of the first birth interval (i.e., duration from marriage to first birth) increased from 18 months among older cohorts of women to more than three years among the most recent marriage cohort. Similarly, the mean age at first marriage and mean years of schooling increased by 21 percent and 31 percent, respectively, from the oldest cohort to the most recent marriage cohort of women (see Table 2).

**Table 2: Percent distribution of contraceptive use before first birth, median first birth interval in month, mean age at marriage, and mean years of schooling at marriage among married women of reproductive ages by marriage cohorts: Tehran, Iran 2009 (n = 2870)**

Marriage Cohorts	Percent of contraceptive use before first birth			Median first birth interval in months	Mean age at first marriage	Mean years of schooling at marriage
	None	Modern methods	Traditional methods			
Before 1990	55	16	29	18.0	17.9	8.5
1990- 999	33	22	45	23.0	20.8	10.8
2000-2008	16	37	47	28.0	22.6	12.3



The cohort results clearly show that despite similar percentages of women (about 15%) with some years of educational advancement across the three marriage cohorts, as illustrated in Table 1, women with 1-2 years of educational advancement are qualitatively different from those obtaining three or more years of educational advancement. That is, the proportion of women with more than two years of educational advancement is greater among the older cohort (before 1990) of women who were less likely to use contraceptive methods before a first birth and hence began childbearing soon after marriage, and mostly married early before the age of 20, with incomplete secondary education. In contrast, women with one to two years of educational advancement are mostly from younger cohorts of women who largely married after the age of 20, with some post-secondary education, and delayed childbearing for more than three years by using contraceptive methods. Variations in the levels of educational advancement in the study sample and over the cohorts will be further examined by analyzing the net effects of the covariates on changes in women's schooling.

#### *Multivariate Analyses*

Table 3 presents both the 'univariate' estimates for categories of a given covariate and 'multivariate' estimates or net effects for categories of a given variable, after controlling for the effects of other variables. The results show that the use of modern or traditional contraceptive methods before the first birth played a significant role in the advancement of women's education by one to two years. After controls in the second model, the use of a traditional method had no effect on the likelihood of educational advancement by one to two years, but relative to women who were not using any method before the first birth, those who were using a modern method were 84 percent more likely to advance their education by one to two years rather than no advancement. In contrast, among women with more than two years of educational advancement, family planning use before the pregnancy of the first birth had no significant effect.

**Table 3: Relative risk ratios from multinomial logistic regression model assessing associations between selected covariates and advancement in women's education by "1-2" and "3+ years" in relative to "no educational advancement" among currently married women in Tehran, Iran 2009 (n = 2870)**

	1-2 years		3+ years			
	Univariate	Multivariate		Univariate	Multivariate	
		Model I	Model II		Model I	Model II
<b>Contraceptive method used before pregnancy of the 1<sup>st</sup> birth</b>						
None	1.00	-	1.00	1.00	-	1.00
Any modern	2.63***	-	1.84**	0.91	-	1.22
Any traditional	1.58**	-	1.29	1.04	-	1.34+
<b>Employment status before 1<sup>st</sup> birth</b>						
Unemployed	1.00	1.00	1.00	1.00	1.00	1.00
Employed	3.00***	1.74**	1.73**	1.50*	2.10***	2.11***
<b>Years of schooling at marriage</b>						
< 12	1.00	1.00	1.00	1.00	1.00	1.00
12	0.82	0.70+	0.65*	0.67**	0.67*	0.65*
> 12	3.83***	2.87***	2.56***	0.81	0.88	0.84
<b>Age at marriage</b>						
< 20	1.00	1.00	1.00	1.00	1.00	1.00
20-24	1.33+	0.72+	0.73	0.73*	0.87	0.87
25+	1.46*	0.43***	0.44**	0.36***	0.39**	0.40**
<b>Spousal age difference(years)</b>						
<4	1.00	1.00	1.00	1.00	1.00	1.00
4-6	1.14	1.17	1.19	1.41+	1.24	1.27
7+	0.79	0.84	0.87	1.56**	1.24	1.26
<b>Residential district</b>						
Northern	2.59***	1.86**	1.75**	1.71**	1.74**	1.71**
Central	1.73**	1.55*	1.49*	1.06	1.10	1.08
Southern	1.00	1.00	1.00	1.00	1.00	1.00
<b>Marriage cohorts</b>						
< 1990	1.00	1.00	1.00	1.00	1.00	1.00
1990-1999	1.58**	1.41+	1.32	0.66**	0.76	0.73+
2000-2008	1.89***	1.47+	1.27	0.39***	0.49**	0.46***

Notes: (ref.) = reference category. + p< 0.10, \*p≤0.05, \*\*p≤0.01, \*\*\*p≤0.001.

The findings related to the control variables show socioeconomic characteristics of women with different levels of educational advancement. There are systematic effects related to women's employment before a first birth, with greater likelihood of educational advancement among employed than unemployed women. The net effects of employment status in the full model indicate that compared with unemployed women, those who were employed before their first birth were 1.7 and 2.1 times more likely to obtain an additional one to two years or more than two years of schooling, respectively, rather than no advancement.

The direction of the effect of women's education level at marriage on the probability of having an educational advancement differed among the two groups of women with different levels of educational advancement. In contrast with women whose schooling at marriage was less than a high school diploma and consistent with bivariate results, those with some postsecondary education at the time of marriage were 2.6 times more likely to improve their education by one to two years after marriage, while the likelihood of improving education levels by more than two years was greater among women with incomplete secondary schooling at marriage. There are also differences according to respondents' residential district. The net effect of residential district in the full model indicates that compared with women living in the southern districts, those who resided in the northern districts of Tehran were 1.8 times more likely to improve their education by one to two years or more than two years, rather than no advancement.

Regarding the effect of age at marriage, the univariate results show that compared to women who married before the age of 20, those who married after the age of 20 were *more* likely to obtain a one to two year educational advancement, and *less* likely to advance their education by three or more years. However, after controlling for other covariates, age at marriage was inversely associated with both levels of educational advancement. That is, compared with women who married before the age of 20 those who married at the age of 25 or above were 56 and 60 percent *less* likely to attain one to two or more than two years of educational advancement, respectively, rather than no advancement. Furthermore, the net effect of spousal age difference on women's educational advancement was not significant, though univariate analyses indicated that relative to women with less than four years of spousal age difference those with four to six years and those with seven or more years of a spousal age gap were 41 and 56 percent more likely to improve their education by three or more years, respectively, rather than no advancement.

The pattern of educational advancement is different among marriage cohorts of women. The univariate results show that the more recent marriage cohorts of women (i.e., 1990-1999 and 2000-2008) were more likely to obtain one to two years of educational advancement, whereas women who married before 1990 were more likely to improve their education by three or more years. Even after controlling for different variables, the same pattern of educational advancement by marriage cohorts remained. Nevertheless, cohort differentials in educational advancement by one to two years reduced after controlling for the effect of contraceptive use (1.41 and 1.47 in Model I vs. 1.32 and 1.27 in Model II), whereas the corresponding cohort differentials did not change significantly among women with three or more years of educational advancement. Cohort variations in women's educational advancement are further examined subsequently.

The results in Table 4 show that the (gross and net) effect of contraceptive use before the first birth on women's educational advancement was only significant among women who married after 1990, with greater effects among women in the 2000-2008 marriage cohort. In particular, multivariate results, associated with the most recent marriage cohort (i.e., 2000-2008), show that relative to women who did not use any contraceptive methods before the first birth, those who used a modern or a traditional contraceptive method were 3.0 and 2.0 times more likely to improve their education. It is notable that the net effect of *modern* contraceptive methods on women's educational advancement was significant only among women in the 2000-2008 marriage cohort.

Among control variables in Table 4, the multivariate results on women's schooling at marriage show that women with some postsecondary education in the 1990-99 and 2000-2008 marriage cohorts were 1.9 and 2.5 times more likely, respectively, to have an educational advancement, compared to those with incomplete secondary education at marriage. In contrast, among women in the oldest marriage cohort (i.e., before 1990) those with incomplete secondary education at marriage were more likely to experience an educational advancement. Moreover, the net effect of employment status on educational advancement was greatest among the oldest cohort of women, where employed rather than unemployed women were 4.8 times more likely to attain an educational advancement, after controlling for other variables. A similar but weaker effect existed among the 1990-1999 cohort of women, but not among the most recent cohort. Similarly, the effect of residential districts on women's educational advancement was not significant among the most recent marriage cohort of women. Other results in Table 4 are either non-significant or consistent with the results that were found among all women in the sample.

**Table 4: Odds ratios for logistic regression models predicting advancement over no advancement in women's education during the period from marriage to the date of interview (August 2009) among currently married women in different marriage cohorts: Tehran, Iran 2009**

Covariates	Marriage Cohorts					
	Before 1990		1990-1999		2000-2008	
	Univariate	Multivariate	Univariate	Multivariate	Univariate	Multivariate
<b>Contraceptive method used before pregnancy of the 1<sup>st</sup> birth</b>						
None	1.00	1.00	1.00	1.00	1.00	1.00
Any modern	1.34	1.35	1.66*	1.31	3.71***	2.96**
Any traditional	1.04	1.05	1.67**	1.55*	2.29**	2.00+
<b>Employment status before 1<sup>st</sup> birth</b>						
Unemployed	1.00	1.00	1.00	1.00	1.00	1.00
Employed	3.72***	4.77***	2.39***	1.75*	1.71**	1.15
<b>Years of schooling at marriage</b>						
< 12	1.00	1.00	1.00	1.00	1.00	1.00
12	0.73+	0.46***	0.79	0.61*	1.00	0.93
> 12	2.34*	0.87	2.66***	1.86*	2.60***	2.49**
<b>Age at marriage</b>						
< 20	1.00	1.00	1.00	1.00	1.00	1.00
20-24	0.76	0.74	1.11	0.89	1.27	0.72
25+	0.40	0.30	0.90	0.45*	1.08	0.49*
<b>Spousal age difference(years)</b>						
< 4	1.00	1.00	1.00	1.00	1.00	1.00
4-6	1.42	1.38	1.46	1.55+	0.95	0.92
7+	1.33	1.26	1.18	1.17	0.77	0.81
<b>Residential district</b>						
Northern	1.00	1.00	1.00	1.00	1.00	1.00
Central	0.73	0.70	0.56**	0.64*	0.67	0.86
Southern	0.52**	0.46**	0.37***	0.47**	0.57*	0.96
<b>Number of women</b>	<b>989</b>		<b>1015</b>		<b>866</b>	

Notes: (ref.) = reference category. +p < 0.10, \*p≤0.05, \*\*p≤0.01, \*\*\*p≤0.001.

## DISCUSSION AND CONCLUSIONS

This research investigated the gross and net impacts of family planning use on the level of women's educational advancement after marriage in a representative sample of married women aged 15-49 living in the city of Tehran. This study attempted to find out whether contraceptive use before a first birth frees a woman from reproductive activities by delaying childbearing, and hence allows her to continue her education after marriage. A cohort approach was utilized to compare the impact of family planning across different marriage cohorts of women who were exposed to different degrees of contraceptive availability and hence had different patterns of use.

The descriptive results show that 15 percent of married women continued their education after marriage, out of which eight percent advanced their schooling by one to two years and another seven percent attained three or more years of educational advancement. Women who had some postsecondary schooling or less than a high school diploma at the time of marriage were more likely to improve their education after marriage. Woman with some postsecondary education at marriage were more likely to advance their education by one to two years, whereas those with less than a high school diploma at marriage largely attained more than two years of educational advancement. These results clearly suggest that a sizable proportion of women who married before completing their secondary or post-secondary education could pursue their education after marriage.

Multivariate analyses showed that contraceptive use before the first birth was strongly associated with one to two years of educational advancement, whereas it had no significant effect on women's educational advancement by more than two years. The differing effect of family planning can be due to the fact that, according to the cohort descriptive results, women with more than two years of educational advancement married early (before the age of 20), with some incomplete secondary education, and entered into motherhood soon after marriage. They are largely women of the oldest cohort who did not delay childbearing long after marriage. Based on the authors' observations, these women most likely improved their education after reaching their desired number of children that made them free from childbearing activities. In contrast, women with one to two years of educational advancement are largely women from the most recent cohorts who married later (after the age of 20) and delayed the first birth by using contraceptives (largely modern methods), which facilitated the advancement of their education. The evidence from this paper suggests that spacing of the first birth by using contraception has been common among the most recent marriage cohort (i.e., 2000-2008) and those with 1-2 years of educational advancement, whereas a strong speculation is that the a proportion of women in the older cohorts most likely used long-term or permanent contraceptive methods after achieving their desired number of children in order to pursue their incomplete education. This speculation is consistent with the fact that the 1989 family planning program affected the childbearing behavior of all women who had married at different calendar years and had different number of children at the time the program was implement. Therefore, the oldest cohort of women (i.e., before 1990) accessed freely available contraceptive methods after 1989, when they had already given birth to a number of children, including their first birth.

Other multivariate results showed that women who were employed rather than unemployed at the time of marriage and those who had higher levels of schooling at marriage were more likely to attain an educational advancement. The stronger tendency of employed married women for improving their education can be attributed to the fact that higher levels of schooling are associated with greater job and income promotions. Moreover, the strong, positive impact of their husbands' post-secondary education in bivariate results suggests the existence of strong male support for women's educational advancement among families with educated husbands.

The results across marriage cohorts showed that the use of contraceptive methods before the first birth and the proportion of women with one to two years of educational advancement increased from the older to the younger marriage cohorts of women. These results are consistent with recent evidence indicating an increase in first birth intervals along with an increase in the proportion of contraceptive users before the first birth in Iran (Erfani, 2010). Also, multivariate cohort analyses revealed an increasing positive impact of modern contraceptive use on women's educational advancement, when moving from the oldest to the youngest cohort of women. This is consistent with our understanding that women of the older cohort, who married before 1990, did not have wide access to freely available contraceptive methods due to the lack of an official family planning program from 1979 to 1989, though some contraceptive methods were available to urban women through pharmacies during that period. Furthermore, the growth of religious fervor, promoted by the new government after the 1979 Islamic Revolution, encouraged early marriage and childbearing, and the government designed policies offering financial support for larger families (Erfani and Yuksel-Kaptanoglu, 2012: 22).

Other multivariate cohort results indicated that being employed at marriage and living in northern residential districts was associated with the greater likelihood of women's educational advancement across all three marriage cohorts. However, the effect of employment status and residential districts became weaker or non-significant, when moving from the older to the younger cohorts of women. These findings suggest an emerging universality in women's educational advancement after marriage among recent cohorts of women regardless of their employment status and place of residence. The greater likelihood of enhanced schooling among employed women who married before 1990 may be explained by the fact that it was more common for employed rather than unemployed women, with incomplete or lower levels of education to raise the level of their education for income and job promotions. Yet, among recent cohorts it is very common that a woman after marriage, especially before entering into the stage of motherhood, seeks higher levels

of education regardless of her employment status. As discussed earlier in this paper, Iranian young women seek upward social mobility within the family and the society by enhancing their education, which may also increase their chances of finding a possible job after marriage.

This study faced an important limitation. The data regarding education trajectories did not include dates of when schooling after marriage took place, including in relation to childbearing. . Clearly, a more precise measurement of when such schooling took place would have provided more insights into the findings. Nevertheless, they do provide important evidence on the link between education and family planning use.

Fertility control and maternal and child health conventionally have been the prime objectives of family planning programs in developing countries. However, the findings of this study highlight that contraception can play a significant role in improving women's schooling after marriage. Therefore, the provision of family planning services must be seen as an integral element of development policies designed to promote women's social and economic status in society.



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