

**Women's education, employment status and the choice of  
birth control method: An investigation for  
the case of Turkey**

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## **ABSTRACT**

In this study we investigate whether women's education, labor market status and their status within the household have any impact on their choice of a birth control method in Turkey. We use the 2013 round of Demographic Health Survey (DHS) dataset which includes information about women's education levels and occupation types as well as other socioeconomic status indicators. The DHS also reports whether women use relatively more effective modern (i.e. IUD, pill, etc.) or traditional (i.e. withdrawal) methods. In the empirical analysis, we apply multivariate logistic estimation techniques and control for women's other indicators of socioeconomic status such as age, ethnicity, and wealth. We find that woman's education level and urban residence are the leading determinants that explain the choice of modern contraceptive methods. We also observe that women who are unemployed, inactive or unpaid family workers are less likely to use modern contraceptive methods compared to wage-earner women.

*Keywords:* Human capital theory; fertility; contraceptive choice; women's socioeconomic status; logit estimation; Turkey

*JEL codes:*J13; J21; J24

## **1 Introduction**

In the present study we explore the impact of a woman's socioeconomic status implied by her education level, employment and occupation type as well as her status within the household on her choice of a contraceptive method, modern or traditional, to delay fertility in Turkey. The decline in fertility rates in the last few decades across countries, developed and developing alike, has been associated with economic development and improvements in education and health services, as well as family planning program opportunities. In fact, the

negative association between fertility and women's education levels has been well established for the developed as well as developing economies (John Cleland and German Rodriguez 1988; T. Paul Schultz 1993; Teresa C. Martin 1995; David Lam and Suzanne Duryea 1999; Mustafa S. Akin 2005; Mehmet A. Dinçer, Neeraj Kaushal and Michael Grossman 2014). In addition, in the developed and industrialized world in particular, the sharp decrease in fertility rates has occurred along with an increase in women's labor force participation rate<sup>1</sup> (e.g. see Henriette Engelhardt, Tomas Kögel and Alexia Prskawetz 2004, among many others). Although fertility and women's labor force participation are surely negatively associated, the direction of causality remains debatable. That is, while childbearing reduces a woman's labor force participation only in the short term, presumably until the child reaches school age if not sooner, over the long term the negative causality running from a woman's labor force participation to fertility may be stronger as her decision to join or remain in the labor force may very well delay or inhibit her fertility (Karin L. Brewster and Ronald R. Rindfuss 2000).

Theoretically, the argument that women's labor force participation has a negative impact on fertility is well-founded. The theoretical foundations of this negative relationship go back to the discussions on the optimal allocation of time and the trade-offs relating to non-market activities such as childbearing and child care (Jacob Mincer 1962; Gary S. Becker 1965, 1992; James Heckman 1974). First of all, due to foregone wages, women's participation in the labor force raises the opportunity cost of childbearing and child care: Every hour the mother spends

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<sup>1</sup> Though no similar clearcut negative relationship can be observed in individual developing economies (e.g. J. Mayone Stycos and Rober H. Weller 1967; Benjamin S.Cheng 1999). In fact, as Stycos and Weller (1967) suggest, "a certain level of development may be necessary before a relationship between fertility and female employment can emerge". Nevertheless, using data from the 1980's for a large group of less developed countries, Singh (1994) finds that women's labor force participation has a negative and significant effect on total fertility rate at 5 percent significance level.

in childcare will “cost” her the foregone market wage (Diane J. Macunovich 1996; Brewster and Rindfuss 2000). Secondly, in accordance with the role incompatibility hypothesis, as women are the primary caretakers of children, a trade-off emerges for women between waged market work and child care activities. Essentially, time spent at market work reduces the time and energy on child rearing as most market work cannot be jointly performed with child care tasks. Nevertheless, through a change in the work life, and a transformation of the social organization of childcare, the degree of the negative relationship between fertility and women’s labor force participation is expected to diminish, and the role incompatibility faced by women with respect to work and family responsibilities is expected to decrease (Evelyn Lehrer and Marc Narlove 1986; Ronald R. Rindfuss and Karin L. Brewster 1996).

Furthermore, especially for educated women in a career path, time spent out of the labor force particularly at the early stages of career due to childbirth would negatively affect their career prospects and opportunities to advance human capital accumulation (Koray Tanfer, Lisa A. Cubbins and Karin L. Brewster 1992; Nabanita D. Gupta and Nina Smith 2002; Catalina Amuedo-Dorantes and Jean Kimmel 2005). According to traditional human capital theory, if a woman stays out of the labor force during the childbearing period, she loses the opportunity to accumulate job training and experience, and she may be subject to atrophy and even depreciation (Gupta and Smith 2002). In that respect, women with higher accumulated human capital face greater opportunity costs of childbearing and child care (Becker 1992; Brewster and Rindfuss 2000), therefore have a higher tendency to delay fertility with greater labor market attachment (Lehrer and Nerlove 1986). In the same vein, Elizabeth Caucutt, Nezh Guner and John Knowles (2002) show that the timing of fertility is strongly linked to human capital accumulation; higher income families have lower fertility rates and higher-wage women delay having children longer than lower-wage women. Moreover, in the context of an overlapping generations model, Masako Kimura and Daishin Yasui (2007) argue that since

there is a trade-off between education to accumulate skills and child rearing as they are both time sensitive activities, a skilled worker would choose to have fewer children than an unskilled one, and thus a rise in the fraction of skilled workers would lead to a decrease in the average fertility rate. Accordingly, as Tanfer et al. (1992) suggest, for employed women, particularly for those who have regular full-time jobs with long-term career prospects, the opportunity cost of an unintended or mistimed birth is higher than it is for those who are not in the labor force. Consequently, women who have higher human capital and are employed - especially in professional positions- are expected to prefer a more effective contraceptive method to successfully delay fertility than women who are not as educated or do not work at all.

In a comprehensive review of the reproductive health literature on the efficacy of most commonly used contraceptive methods, Diana Mansour, Pirjo Inki and Kristina Gemzell-Danielsson (2010) report the contraceptive efficacy in descending order as follows: (1) female sterilization and long-acting hormonal contraceptives; (2) intra-uterine device (IUD)'s with surface area larger than 300 mm<sup>2</sup>; (3) IUD's with surface area smaller than 300 mm<sup>2</sup> and short-acting hormonal contraceptives (injectables, oral contraceptives, the patch and vaginal ring); and (4) barrier methods/natural methods. Haishan Fu, Jacqueline E. Darroch, Taylor Haas and Nalini Ranjit (1999) rank the efficacy of contraceptive methods by failure rates and find that while the implant and the injectables have the lowest failure rates followed by the pill, the diaphragm, the cervical cap, and the condom, the highest failure rates were reported by periodic abstinence, withdrawal and spermicides. In a study conducted among French women C. Moreau, J. Trussell, G. Rodriguez, N. Bajos, and J. Bouyer (2007) conclude that the IUD has the highest effectiveness, followed by the pill, the condom, the fertility awareness methods (periodic abstinence or safe period by temperature), withdrawal and spermicides. Hence in the literature, the general consensus is that the more effective methods are the

modern ones involving some degree of invasive or medical procedure while the less effective methods are the natural or coitus-dependent traditional ones.

In the light of these arguments, we build a model of the determinants of the choice of contraceptive methods among married women in Turkey. We conduct our analyses by using 2013 round of Demographic Health Survey (DHS) data set. The data set we use is the latest available that provides a rich set of information regarding women's preferences with respect to the method of contraceptive use as well as the women's and the husbands' demographic and socioeconomic status indicators. We apply multivariate logistic regression estimation techniques in order to examine the association between the likelihood of using modern birth control methods and a rich set of control variables such as the woman's age, education level, occupation type, and household structure including woman's empowerment within the household, as well as the husband's socioeconomic status indicators. To our knowledge, this is the first attempt to examine the factors that affect the likelihood of the choice of modern birth control methods by utilizing the most recent round of DHS. In addition, this is the first study that takes woman's occupation type as well as her empowerment within the household into consideration in order to explain the odds of using modern contraceptive methods in Turkey.

Our results reveal that a woman's age, ethnicity, urban residence, education level, and whether she has at least one son, or not, are the most consistent and persistent determinants of her decision to use modern contraceptive methods, regardless of the other factors. Similar to the implications prevalent in the developing country literature, a woman's labor market status and occupation type do not have a statistically significant effect on her choice of contraceptive methods; nevertheless, our outcomes allude that unemployed or inactive women are less likely to use modern birth control methods compared to wage-earner women; and that

women in higher-status jobs like government services are more likely to use modern and effective birth control methods than wage-earner women, as implied by human capital theory.

## **2 Women's Socioeconomic Status and Patterns of Birth Control Use**

In the previous section, we have established that according to human capital theory, as women invest more into their human capital through higher time spent in schooling and as they are employed in wage-paid jobs in greater proportions, the fertility behavior of their household changes and couples tend to prefer having fewer children, which reduces the average fertility rate. In that respect, increased participation of women in schooling and higher-paid jobs raises the value of women's time and thus the opportunity cost of raising children also rises. Additionally, according to Ram D. Singh (1994), increased education and literacy of women have the following further effects on fertility: First of all, as women become more educated, they become more exposed to information available on family planning and contraceptive use, and they become more able to effectively use and process this information to their advantage. Secondly, more educated women would have higher exposure and access to information about available health services which reduces the number of risky pregnancies and infant mortality, which in turn decreases the average births per woman.

Especially in the context of developing economies, a large number of studies explore the relationship between women's changing socioeconomic status as well as their involvement in household decisionmaking process and their use of birth control methods to regulate fertility. Women's socioeconomic status is essentially approximated by education level and work status, and the general consensus in these studies is that after controlling for other factors, women's education is positively related to the use of contraceptives and even small improvements in educational attainment raise the probability of contraceptive use in a host of developing countries ranging from the Sub-Saharan African countries to India, Turkey, Oman

and Egypt (e.g. Pavalavalli Govindasamy and Anju Malhotra 1996; Martha Ainswoth, Kathleen Beegle and Andrew Nyamete 1996; Elizabeth Chacko 2001; Asya Al Riyami, Mustafa Afifi and Ruth M. Mabry 2004; Özlem Alpu and Hatice Fidan 2006; Nuray Bozkurt et al. 2007). In particular, both women's and their husbands' education levels significantly increase the use of contraceptives, and the impact of women's education on the likelihood of using contraceptives is stronger than that of the husbands' (for example İsmet Koç (2000) for the case of Turkey, Anna Moursund and Øystein Kravdal (2003) for the case of India). Furthermore, Koç (2000) finds that women with secondary and higher education are more likely to choose a modern method over a traditional method in birth control compared to women with lower education levels. Also Bozkurt et al. (2007) report that in Turkey, unsafe or ineffective birth control methods are most commonly practiced by women with low educational status. More interestingly, Moursund and Kravdal (2003) find that in the case of India, a woman's probability of using contraceptives is not only influenced by her own education level, but also by the average education level of other women in her community. This particular study argues that by using a purely individual-level approach and only considering the woman's own education level in reproductive behavior, the total impact of investments in schooling would be substantially underestimated.

The effect of women's work status on contraceptive use is more mixed and inconsistent in developing countries (e.g. David Shapiro and B. Oleko Tambashe 1994; Anastasia J. Gage 1995; Govindasamy and Malhotra 1996; Dennis P. Hogan, Betemariam Behanu and Assefa Hailemariam 1999). For example for the case of African countries, having a cash employment does not necessarily lead to women's empowerment and thus contribute to women's choice of use of contraceptives as higher level of education does; what really matters is who controls the money she earns (Hogan et al. 1999). On the other hand, for the case of India, Moursund and Kravdal (2003) establish that although having employment with cash earnings increases



the woman's probability of using contraceptives, having a higher-status occupation does not necessarily stimulate more contraceptive use, as implied by the human capital theory. Nevertheless, Koç (2000) shows that women who work in the non-agricultural sector in Turkey are more likely to use modern contraception methods than those who work in the agricultural sector or those who are not in the labor force.

In a broader context, women's contraceptive use is also associated with women's empowerment, defined as "the expansion of freedom of choice and action to shape one's life" (Mai Do and Nami Kurimoto 2012). Among the diverse dimensions of women's empowerment, one that stands out in related studies is the participation of women in the decisionmaking process within the family concerning household economy and family size, and the healthy communication between the wife and the husband regarding these issues, including the use of contraceptives. Other dimensions of women's empowerment may include whether the women need permission to go out of the house, economic security and the ability to make purchases on their own, coercion or control of women by their spouses or families, women's political and legal awareness, and their participation in public protests and political campaigning (Sidney Ruth Schuler and Syed M. Hashemi 1994; Do and Kurimoto 2012). In that sense, one would expect that women with greater role in household decisionmaking (including budget decisions) and freedom of movement would also have a greater control over reproduction and are more likely to use contraceptives (Govindasamy and Malhotra 1996).

### **3 Trends in Women's Education, Employment and Fertility in Turkey**

Similar to the general trend elsewhere in the world, fertility rates in Turkey have been steadily declining in the past few decades and the total fertility rate (births per woman) has decreased from 6.4 in 1960 to 4.4 in 1980 and to 2.07 in 2015 (World Bank, World Development

Indicators). However in the same time period, although we do not observe any increase in women's overall labor force participation as we do in the advanced economies,<sup>2</sup> the occupational as well as educational composition of women's employment has shown drastic changes. These changes closely follow the change in women's education level, as well. In the general women's population (above the age of 15), the share of women with education below elementary school level has decreased from about 40 percent in 1990 to 24 percent in 2016, while the share of high school graduates has increased from 7 percent to 15 percent. In the same time period, the share of women with at least a university degree has increased from only 2 percent to 13 percent. The improvements in women's educational attainment in the recent decades in Turkey can be attributed to the campaigns, crucial measures taken and policy changes intended to involve more girls in school life under the equal opportunity principle, particularly the 8-year-compulsory schooling law that was introduced in 1997.

<Figure 1> here

While women's labor force participation rate was at 46.2 percent in 1980 mainly thanks to women employed in agriculture as unpaid family workers, with the implementation of export-led industrialization policies and the subsequent exit of labor from agriculture, in 1990 women's labor force participation has dropped to 34.2 percent in 1990, to 26.6 percent in 2000, and has only slightly increased to 32.4 percent as of 2016. As Ipek Ilkcaracan (2012) states, in the period following the policy shifts after 1980, the unpaid women family workers who exited agriculture have not been fully absorbed into the urban non-agricultural employment, although the export-led growth strategy has to some degree led to the feminization of manufacturing employment particularly in the labor-intensive, low-technology industries such as textiles, apparel, leather products, and food processing (for

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<sup>2</sup> Meltem Dayıođlu and Murat G. Kırdar (2010) point out that although women's participation declines overall, among the young urban women in Turkey, the participation rate is increasing.

example see Nilüfer Çağatay and Günseli Berik 1991; Şule Özler 2000). Similarly, Meltem Dayıoğlu and Murat G. Kırdar (2010) attribute the fall in women’s labor force participation chiefly to urbanization. Together with this structural transformation, we observe that among the women who are employed, progressively more hold regular, waged and salaried jobs, and less are employed as unpaid family workers. In fact, while the share of employed women with a regular paid work was around 20 percent in the 1990’s, and the share of unpaid women family workers was upwards of 60 percent, gradually this composition has changed and as of 2016, we see a reversal in these shares: 64 percent of employed women now hold salaried and waged jobs,<sup>3</sup> and only 26 percent of employed women are unpaid family workers (TurkSTAT database).

<Figure 2> here

In addition to the occupational composition shifts, educational composition of women’s employment also exhibits a notable transformation in the last few decades in Turkey. In that sense, women employed with below elementary school degree (illiterate and never completed elementary school) has declined from 48.4 percent in 1990 to 25.5 percent in 2000 and to 13.9 percent in 2016. At the other extreme, the share of university graduates in women’s employment has increased from only 4.6 percent in 1990 to 27.5 percent in 2016.

<Figure 3> here

Since 1988 when the first Population and Health Survey of Turkey (TPHS)<sup>4</sup> has been conducted, the use of modern birth control methods has been steadily increasing among the surveyed married women in Turkey (Table 1). While the current use of modern contraceptive

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<sup>3</sup> In 2009, the small share of temporary and casual workers have been merged with regular waged and salaried workers in the statistics.

<sup>4</sup> Subsequent surveys were named Demographic and Health Surveys (DHS).

methods such as the pill, IUD, sterilization and condoms remained at 31 percent of surveyed married women in 1988, this rate has increased to 47.4 percent in 2013 (the year of the latest available survey). Among the available modern methods, the most preferred method has been the use of IUD by 16.8 percent, followed by the male condom by 15.8 percent. It is notable that female sterilization is used by 9.4 percent of currently married women, while only 4.6 percent of them use the pill. Considering the age distribution of married women, modern methods were preferred at most by women in the 35-39 age group by 59 percent. However looking into the individual birth control methods, both traditional and modern, withdrawal still appears to be the most prevalent method adopted by all age groups of married women, ranging from 23 percent of married women aged 45-49 to 28 percent of those aged 15-19. The use of modern birth control methods also vary by region and women's education levels: In the rural region, 40 percent of married women prefer modern methods, while this rate increases to 49.3 in the urban region. Regarding education levels, married women with high school degrees or higher choose modern birth control methods at 54 percent, while only 36 percent of uneducated women use modern methods, suggesting that more educated women prefer to use more effective methods of birth control than uneducated women.

<Table 1> here

#### **4 Data and Descriptive Statistics**

For this study, we use the 2013 round of DHS for Turkey, prepared by Hacettepe University, Institute of Population Studies. The results of the survey have been revealed every five years since 1993 and the 2013 version is the latest version. Overall, DHS data set has questions related to health and reproductive issues of women at the age of fertility (between 15 and 49 years old) as well as the health and nutritional status of their children under 5 years old. The data set contains several questions regarding women's current pregnancy statuses, last

menstrual cycles and choice of birth control methods. It also includes information about both the woman's and the husband's demographic and socioeconomic status indicators. For instance, we can observe couples' employment statuses, types of occupation and education levels. We can also observe the wealth index category that the household corresponds to. Finally, DHS data set contains information about the region where the couple lives and their ethnicities as well as the women's empowerment issues such as having an arranged marriage or having a husband with a controlling behavior. Therefore, DHS data set presents a good setting to explore the determinants of the choice of birth control methods in Turkey.

At the start of the analysis we recode the entire data. 2013 round of DHS data set includes 9,746 observations of women 15-49 years old. Following the developing country literature we restrict our sample to currently married women, only. There are two main reasons for this restriction. First, according to 2013 round of DHS, 68 percent of women at the age of fertility are married. When we categorize the women into sub-groups with respect to age, the shares of women who are married are found to be 7.1, 46.3, 78.1, 89.1, 89.3, 91.0 and 86.3 for age groups 15-19, 20-24, 25-29, 30-34, 35-39, 40-44 and 45-49, respectively.<sup>5</sup> These ratios indicate that the prevalence of marriage increases as women get older, and being married is common among adult population in Turkey. Secondly, due to traditional, cultural and/or religious norms,<sup>6</sup> single and widowed/divorced women tend not to reveal that they are sexually active.

Next, we drop the married women who state that they are pregnant or suspect pregnancy from our data set. Hence we are left with 6,374 observations of women between 16 and 49 years

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<sup>5</sup> Source: Turkey DHS, Main Report. 2013.

<sup>6</sup> 98 per cent of people living in Turkey are of Muslim faith (Turkey DHS Main Report, 2013)

old.<sup>7</sup> Approximately 21.5 percent of these women in our sample report that they do not use any birth control methods. Therefore, we end up with 4,886 observations of currently married, non-pregnant women aged 16-49 who report that they are using either traditional or modern birth control methods.

#### **4.1 Model's Variables**

The dependent variable in the empirical model represents the odds of choosing a modern method over a traditional method by married women. Modern contraceptive methods include the IUD, the pill, male condom, female sterilization, or other modern methods, which involve medical or invasive procedures. The traditional contraceptive methods category is comprised of periodic abstinence, withdrawal, or other traditional or coitus-dependent methods. The dependent variable takes on the value 1 if the married woman was using a modern method, and 0 if she was using a traditional method at the time of the survey.

The set of independent variables denote the individual and household characteristics of married women. Woman's age, ethnicity, education level, employment status and occupation type can be considered among the individual characteristics; while region of residence, number of children below 5 years old, whether the woman has at least one son or not, husband's education level and employment status and household wealth can be considered among the household characteristics. Additionally, we consider several indicators concerning the woman's empowerment within the household such as whether the marriage was an arranged marriage or not, and whether the husband has a controlling attitude towards his wife or not.

##### *Woman's individual characteristics*

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<sup>7</sup> We have 290 observations of 15-year-old women in the DHS data set. When we restrict our sample to married and non-pregnant women, the 15-year-old women are dropped from the sample.

In the model, the married woman's age is included as a continuous explanatory variable. In the DHS data set, information on the mother tongue of the woman is available. Accordingly in our model, married woman's ethnicity is defined as the mother tongue of the woman, following Pinar Mine Gunes (2015). In the survey, four ethnicity groups are defined: Turkish, Kurdish, Arabic, and other. Four dummy variables are created based on these ethnicity groups: For example, the variable 'Turkish' takes on the value 1 if the mother tongue of the married woman is Turkish, and 0 otherwise. The remaining ethnicity dummy variables are defined in the similar fashion.

The married woman's education level is considered to be one of the crucial components of her socioeconomic status and is widely used in the reproductive health literature as a determinant of contraceptive use. In the survey, women's completed years of schooling data are available and we use the level of education directly as a continuous explanatory variable. Another important component of the woman's socioeconomic status is her employment status, i.e. whether she is employed, unemployed or inactive (out of the labor force). If the married woman is employed, we also take her occupational type into account (i.e. employer, regular wage-earner, government worker, unpaid family worker, regular/irregular self-employed, seasonal/temporal worker). We attribute importance to this explanatory variable as it reflects the woman's labor market attachment, and is expected to influence her contraceptive choice.

#### *Woman's household characteristics*

Among the woman's household characteristics, we firstly consider the region of residence, whether urban or rural. We create a dummy variable for the region of residence such that the variable value is equal to 1 if the household resides in an urban area, and 0 if in a rural area. The next variable we consider to represent the household structure is the number of children under 5 years old. We use this information directly from the survey as a continuous variable. Another piece of information with respect to the household structure which is crucial to

predict the woman's behavior of contraceptive use is whether she has a son, or not. Although some sections of the society have overcome the prejudice of having at least one son in the family, nevertheless in relatively more traditional families this still remains as an important issue in Turkey. Hence if a woman already has a son, she may be more likely to use effective birth control methods to avoid pregnancy regardless of the other factors. We create a dummy variable such that if the family has at least one son, the variable value is 1, and is 0 otherwise.

Husband's education level and employment status are also among the critical indicators of a woman's socioeconomic status. Therefore, we include husband's education level as a continuous variable, and we create dummy variables to represent husband's employment status, identified as employed, unemployed, and inactive: The variable 'employed' takes on the value 1 if the husband is employed, and 0 if he is unemployed or inactive. Other dummy variables for husband's employment statuses are defined in the similar way.

Household wealth can also be considered as an essential determinant of socioeconomic status. Although no household income or consumption information is provided in the DHS data set, we are able to observe a wealth index variable, which is constructed by using Principal Components Analysis following Deon Filmer and Lant H. Pritchett (2001) based on the household's asset holdings (i.e., whether the household owns a car, has access to clean water, toilet facility, electricity, etc.). The wealth index ranges from 1 to 5 (a discrete variable) and each wealth index proxies for a corresponding income quantile.

To approximate for the woman's status within the family, independent of the other socioeconomic factors, we refer to two sets of data provided in the DHS: Whether the husband demonstrates any controlling behavior or not, and the woman's contribution in the decision to marry. Husband's controlling behavior includes preventing the woman from seeing her female friends, limiting contact with her family, insisting on knowing, distrusting



the woman with money and accusing her with being unfaithful. We create a dummy variable and assign the value 1 to the variable if the husband frequently demonstrates any one of these controlling attitudes towards the woman, and 0 otherwise. Lastly, the contribution in the decision to marry variable includes information about whether the marriage was an arranged marriage by the family (with or without consent of the woman) or whether the woman took the decision herself together with her partner. We create a dummy variable which takes on the value of 1 if the woman's marriage was an arranged marriage and 0 otherwise.

## **4.2 Summary of Descriptive Statistics**

In Table 2, we present the descriptive statistics of explanatory variables differentiated with respect to the currently married, non-pregnant women's choice of contraceptive method, traditional or modern. Among the women who currently use any contraceptive method, on average, modern method users are slightly older than traditional method users. Women using modern methods are more educated compared to those using traditional methods and similarly, husbands of women choosing modern methods are more educated compared to the husbands of women choosing traditional methods. Also, married women using modern methods have a fewer number of children under the age of 5, however this differentiation among the two groups of women is not statistically significant.

<Table 2> here

Married women residing in the urban areas are more likely to use modern methods than married women residing in rural areas. Among the Turkish, Kurdish and Arabic ethnicities, married women of Turkish ethnicity have the highest likelihood of choosing modern methods. With respect to the household structure, we observe that women with at least one son have a higher likelihood of using modern contraceptive methods than women with no sons, and the differentiation among different method users is statistically significant. Furthermore, women with husbands with controlling attitudes and women who had arranged marriages have a

lower probability of using modern methods than those with husbands without a controlling behavior and those who married with own decision, nevertheless the differentiation is not statistically significant. Although the outcomes are not statistically significant nonetheless the data signals that women who are relatively more empowered within the household tend to choose modern methods over the traditional methods.

Employed married women have a higher rate of modern contraceptive use over unemployed and inactive married women, however the differentiation is not statistically significant between different method users. Among the employed married women, government workers have the highest and the unpaid family workers have the lowest likelihood to choose modern contraceptive methods, and these outcomes are statistically significant. This particular statistical outcome concurs with the previously mentioned human capital theory that women with higher labor market attachment and professional career paths are more likely to use more effective birth control methods to defer fertility. Women working in the government sector are more likely to hold permanent and higher status jobs, and are more likely to have opportunities to advance in their careers. Hence, their opportunity costs with respect to time, foregone wages and career progress are much higher compared to those with no jobs or those with low wages and no career prospects. Considering the husbands' work status, the likelihood of married women using modern contraceptive methods is highest when they have employed husbands, and the differentiation between using traditional and modern methods is statistically significant for women whose husbands are employed. The statistical significance disappears for the cases of unemployed and inactive husbands. Finally, the odds of women using modern contraceptive methods show a monotonic increasing pattern with increasing household wealth, and for each wealth bracket, the differentiation between women using traditional methods and women using modern methods is statistically significant.

## 5 Model and Empirical Results

We estimate the coefficients of the following equation using a binary multivariate logistic regression:

$$Y_i = \alpha_0 + \alpha_1 AGE_i + \alpha_2 URBAN_i + ETH'_i \alpha_3 + HST'_i \alpha_4 + EMW'_i \alpha_5 + EDUC'_i \alpha_6 + EMP'_i \alpha_7 + \alpha_8 W_i + \varepsilon_i \quad (1)$$

In the equation  $Y_i$  indicates married and non-pregnant woman  $i$ 's use of modern birth control methods (1 if the woman uses modern methods, 0 if she uses traditional methods). The variable  $AGE_i$  shows woman  $i$ 's completed age at the time of the survey.  $URBAN_i$  is the dummy variable that refers to woman  $i$ 's type of residence. The vector  $ETH_i$  consists of ethnicity dummies which are defined based on the woman's mother tongue (Turkish, Kurdish, Arabic and other ethnicities). In the econometric model we define the 'Turkish' category as the omitted category since we want to observe the variation in the use of modern birth control methods in other ethnicity groups, which make 18.4 percent of our sample, compared to women of Turkish background. The vector  $HST_i$  consists of variables related to the structure and size of the household, namely, the number of children under 5 years old and the presence of at least one son in the household. Next, the vector  $EMW_i$  includes dummy variables regarding to the woman's empowerment within the household; such as whether the woman had an arranged marriage (1 if the woman had an arranged marriage, 0 otherwise) and whether the woman has a husband with a controlling attitude (1 if the husband has a controlling attitude towards the wife, 0 otherwise), or not. The vector  $EDUC_i$  involves woman's and her husband's average years of schooling, each; as well as interaction of woman's years of schooling with the empowerment variables defined previously. We include the interaction variables in order to detect the combined effect of a woman's level of education and her empowerment within the household on her probability of using modern birth control methods. The vector  $EMP_i$  consists of dummy variables that represent the

woman's both employment status and occupation type as well the husband's employment status. For women, the omitted category is the wage-earner (1 if the woman is employed and wage-earner, 0 if she is unemployed, inactive, or employed and has another occupation). The categorical variable  $W_i$  pertaining to woman  $i$  is the wealth index which ranges from 1 to 5. Finally, the vector  $\varepsilon_i$  for each woman  $i$  embodies the unobserved factors such as the woman's subjective beliefs and personal desires regarding fertility.

To start with, we gradually include the obviously exogenous factors into our model such as the woman's age, type of residence and her ethnicity. Later we successively incorporate the other control variables into our regression in order to see how the impact of each variable changes when we control for other factors that may affect the woman's likelihood of using modern birth control methods. Table 3 presents the odds ratios and 95 percent confidence intervals obtained from logit estimations. Calculated standard errors are robust for each model.<sup>8</sup> We did not detect any perfect relationship between the control variables; however, we should note that, two or more control variables may have a joint impact on the woman's probability of using modern birth control methods. For example, the likelihood of belonging to a higher wealth bracket might be higher for a woman with more years of schooling and a husband with higher education level than a woman with lower years of schooling and a less educated husband. Therefore, our results do not necessarily provide a causal relationship between the odds of using modern birth control methods and the explanatory variables. Rather, we show the controlled associations between each independent variable and the dependent variable throughout the study.<sup>9</sup>

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<sup>8</sup> We did not present coefficients and robust standard errors. They are available upon request.

<sup>9</sup> We check for the possible high correlation between women's education levels and employment statuses and we find that the correlation is not as high as we expected (almost equal to zero). In addition, we calculate the Variance Inflation Factor (VIF) of each education and employment variable and find that the VIFs are less than

<Table 3> here

Starting with the most explicitly exogenous factors, we observe that the odds of using modern birth control methods significantly increase as the woman gets older. Table 3 shows that married and non-pregnant women are more likely (about 1.3 percent to 1.5 percent) to use modern contraceptive methods as they get older. We also observe that a woman has 41.3 percent higher likelihood to use modern birth control methods if she lives in an urban area compared to a woman living in a rural area. The odds ratio decreases as we include other control variables (30.6 percent in column 13); however the statistically significant positive effect remains intact. Therefore, we can deduce that since the women residing in urban areas are more likely to be aware of and cognizant about the advantages and effectiveness of modern contraceptive methods thanks to more widespread opportunities to access information about health care in urban areas, their odds of choosing modern methods over traditional methods are higher than women residing in rural areas.

Regarding the ethnicity variables, we observe that women of Kurdish ethnicity are significantly less likely to use modern birth control methods compared to women of Turkish ethnicity (odds ratios  $< 1$  in columns 5 – 13). The statistically significant negative effect remains valid even when we include woman's other socioeconomic and demographic factors. Hence, we infer that women of Kurdish ethnicity for the most part prefer traditional methods in order to prevent pregnancy regardless of other factors. The odds of using modern birth

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the threshold level of 10 for those variables (VIFs are generally between 1 and 2). Therefore, there is no risk of multicollinearity in the regressions when we include both the women's education levels and employment statuses. The same results are also valid for husbands.

control methods are also less for women of Arabic ethnicity compared to women of Turkish ethnicity (except for models 6 and 7<sup>10</sup>); however the outcomes are not statistically significant.

The size and the structure of the household are also considered to be determining factors in the woman's decision to use modern birth control methods, and we obtain the following results with respect to these control factors: First, as we expect, the likelihood of using modern birth control methods increases with the number of children under 5 years old in the household (by 5.5 percent to 6.9 percent). But, contrary to our expectations; having a larger number of young children in the household does not have any statistically significant impact on the woman's decision to use modern contraceptive methods. Secondly, we observe that women with at least one son have a greater likelihood of using modern contraceptive methods, and the effect is statistically significant at 5 percent significance level. This is not surprising since traditionally, families in Turkey have a higher preference towards having a son rather than a daughter. Therefore, it is expected that after giving birth to a son, women would want to avoid pregnancy and prefer using modern contraceptive methods.

Regarding the woman's empowerment within the household, logit estimation results are in line with the descriptive statistics outcomes. In Table 2, we observed that having an arranged marriage or having a husband with a controlling attitude did not show a statistically significant variation between traditional and modern birth control users (p-value > 0.05). Similarly, logit regression results do not provide a statistically significant association between the choice of modern birth control methods and having an arranged marriage or having a husband with a controlling attitude, except in column 5. In column 5, we observe that if the

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<sup>10</sup> Arabic women make up only 2.1 percent of our sample. The increase in the likelihood of using modern birth control methods when we add employment and wealth index may be due to the joint impact of those variables (i.e. an arabic woman may belong to higher wealth index and prefer to use modern birth control methods and the effect may be reflected in the ethnicity variable).

woman has an arranged marriage, she is 12 percent less likely to use modern contraceptive methods compared to a woman who decides to marry by herself. However, when we gradually add other control variables, the statistically significant negative effect disappears. Moreover, in columns 7-13 we observe a positive association between having an arranged marriage and modern contraceptive method use, although the association is not statistically significant. Likewise, having a husband with a controlling attitude decreases the probability of using modern birth control methods and the effect is statistically insignificant. However, when we include the other factors the impact turns positive, although it is still statistically insignificant. These contradicting results related to the woman's empowerment across different models can be attributed to the fact that the information contained in woman's education level, occupation status and household wealth index dominate the information contained in woman's empowerment indicators within the household.

Both the woman's and husband's education levels have positive and statistically significant impacts on the likelihood of woman's use of modern contraceptive methods. Husband's education level, however, loses its statistical significance when we add the employment variables as well as the wealth index variable. Nevertheless, woman's education level remains to show a significant impact on the probability of using modern contraceptive methods (the odds ratios vary between 1.043 and 1.061 across different models). Thus, one may conclude that higher number of years of schooling increases the awareness of the advantages of modern birth control methods among married women. In other words, woman's education level is one of the most important determinants of modern contraceptive use. This result is strongly consistent with both developed and developing country literature.

We then interact the education variables with empowerment indicators, and include these new interaction variables in our model. Here, our objective is to see whether presumably having little power in taking decisions within the household affects the choice of modern

contraceptive method, or not, even if the woman has a high level of education. As expected, Table 3 suggests that albeit the woman has a high education level, having a husband with a controlling attitude or having an arranged marriage decreases the likelihood of using modern birth control methods (by 3 percent for husband with a controlling attitude, and by 4 percent for an arranged marriage, on average); but these interaction effects are also found to be statistically insignificant.

Next, we include the variables regarding the employment status of the woman and her husband as well as the employed woman's occupation type in the model. For women, the omitted category is 'wage-earner'. Even though our results do not provide a statistically significant association between the woman's employment category and her likelihood of choosing modern birth control methods, in general, the direction and sign of the relationship confirm our expectations. For instance, unemployed and inactive women are less likely to use modern birth control methods compared to wage-earners. Similarly, unpaid family workers are about 23 percent less likely to use modern contraceptive techniques than wage-earners. In addition, government employees are more likely to use modern birth control methods than wage-earners (30.5 percent in column 11, 31 per cent in column 13). Although the outcomes are not statistically significant, they signal that women who have paid-jobs have a higher likelihood of using more effective contraceptive methods compared to women who are out of the labor force or unemployed; furthermore, women in higher-status jobs like government service are more likely to use more effective contraceptive methods compared to women with lower status jobs (wage earners mostly have minimum wage jobs). For husbands, the omitted employment status category is 'employed'. Logit estimation results suggest that a woman has a lower tendency to use modern birth control methods if her husband is unemployed or inactive, compared to the women with employed husbands, however again the outcomes are not statistically significant. Finally, we include the household's wealth index, which ranges



from 1 to 5, in our model. Table 3 (column 11) shows that higher wealth increases the woman's tendency to use modern contraceptive methods by 2.6 percent; however the effect is statistically insignificant.

## **6 Conclusion**

In this study we examine the factors that influence the likelihood of the choice of modern contraceptive methods among married women utilizing the data provided in the latest round of DHS for Turkey as of 2013. In line with the developed and developing country examples, one of the principal factors that affect the likelihood of using modern contraceptive methods in Turkey is the woman's education level: More educated women have a higher probability to choose modern contraceptive methods. This is not surprising since an increase in education level leads to a rise in awareness about family planning and contraceptive use. Furthermore, our results clearly support that urban residence increases the likelihood of using modern contraceptive methods. In that sense, convenient access to the relevant health care services and widespread availability of family planning services in urban areas considerably increase the use of modern birth control methods. In this regard, since the central and local governments are responsible for the organization and control of family planning programs, necessary measures must be undertaken to devote more resources towards increasing the availability and promotion of such programs particularly in the rural areas, especially to younger women; as our findings indicate that younger women tend to use modern contraceptive methods less compared to older women.

Other strong and consistent components of modern contraceptive use among married women in Turkey are the woman's age, Turkish ethnic background, and having at least one male child. Unlike we observe in the developed country literature founded on the human capital theory, a woman's work status does not have a statistically significant impact on her choice of

contraceptive method. The lack of a statistically significant variation among modern and traditional method users in the econometric model can be attributed to the small sample size of women in the labor force in Turkey. Compared to developed and even most of the developing economies, labor force participation and employment rates of women in Turkey are very low, hence we cannot obtain a statistically significant variation concerning different contraceptive method users. Nevertheless, when we examine the raw data and elaborate on the descriptive statistics, we detect that among the employed women, government workers have the highest likelihood, and the unpaid family workers have the lowest likelihood of using modern contraceptives, and statistically, these outcomes are significant.

Use of modern contraceptives would not only help women regulate their fertility more effectively, it would also prevent possibly risky abortions of unwanted pregnancies as the failure rates are lower than the traditional methods. Therefore governments are expected to communicate the advantages and promote the use of modern contraceptives not only for the healthy regulation of women's fertility, but also as a public health issue. Although it is still a controversial issue in Turkey, incorporation of the school system into the education of the young population in sexual health remains to be one of the most effective public health policy options to increase awareness and knowledge about the available alternatives and access to family planning.

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## TABLES IN TEXT

Table 1. Trends in current use of contraception, Turkey\*

Contraceptive method	1988	1993	1998	2003	2008	2013
<b>Any method</b>	63.4	62.6	63.9	71.0	73.0	73.5
<b>Any modern method</b>	31	34.5	37.7	42.5	46.0	47.4
Pill	6.2	4.9	4.4	4.7	5.3	4.6
IUD	14	18.8	19.8	20.2	16.9	16.8
Male condom	7.2	6.6	8.2	10.8	14.3	15.8
Female sterilization	1.7	2.9	4.2	5.7	8.3	9.4
Other modern methods	2.0	1.3	1.1	1.1	1.1	0.8
<b>Any traditional method</b>	32.2	28.1	26.1	28.5	27	26
Periodic abstinence	3.5	1.0	1.1	1.1	0.6	0.3
Withdrawal	25.7	26.2	24.4	26.4	16.2	25.5
Other traditional methods	3.1	0.9	0.6	1.0	0.2	0.2
<b>Not currently using</b>	36.6	37.4	36.1	29	27	26.5

Source: Turkey DHS 2013.

\*Percentage distribution of currently married women aged 15-49 by method of contraceptive method currently used.

Table 2. Descriptive statistics of currently married, non-pregnant women using traditional versus modern contraceptive methods, TDHS 2013

<i>Continuous Variables</i>	Traditional Birth Control Method Users	Modern Birth Control Method Users	p-value*
<b>Women's average age</b>	34.5	35.2	0.0037
<b>Average number of children under 5 years old</b>	0.69	0.65	0.7479
<b>Education</b>			
Woman's average years of schooling	7.2	7.9	0.0000
Husband's average years of schooling	8.1	8.8	0.0000
<i>Discrete Variables</i>	Traditional Birth Control Method Users (% of total)	Modern Birth Control Method Users (% of total)	p-value
<b>Type of residence</b>			
Urban	34.1	65.9	0.0002
Rural	41.8	58.2	0.0002
<b>Ethnicity</b>			
Turkish	34.0	66.0	0.0005
Kurdish	44.7	55.3	0.0000
Arabic	36.1	63.9	0.7243
Other ethnicity	34.0	66.1	0.4083
<b>Household Structure</b>			
Women with at least one son	34.8	65.2	0.0010
Women with no sons	37.8	62.2	0.0010
Women with husbands with a controlling attitude	37.1	62.9	0.6135
Women with husbands without a controlling attitude	35.1	64.9	0.6135
Women who had arranged marriages (with or without consent)	37.3	62.7	0.2903
Women who had marriages with own decision	33.9	66.1	0.2903
<b>Women's employment status</b>			
Employed	32.7	67.3	0.3974
Unemployed	34.6	65.4	0.8852
Inactive	37.1	62.9	0.4444
<b>Women's occupation type</b>			
Employer	31.0	69.0	0.3110
Waged worker (regular)	31.0	69.0	0.3689
Government employee	21.5	78.5	0.0000
Seasonal/temporal worker	37.2	62.8	0.3053

Self-employed	29.9	70.2	0.4015
Unpaid family worker	40.8	59.2	0.0100
Other job	21.5	78.5	0.2301
<b>Husband's employment status</b>			
Employed	34.5	65.5	0.0042
Unemployed	40.9	59.1	0.2902
Inactive	39.1	60.9	0.3366
<b>Household's wealth</b>			
Income bracket			
1 (lowest)	40.8	59.8	0.0701
Income bracket 2	40.3	59.7	0.0013
Income bracket 3	38.0	62.0	0.0144
Income bracket 4	33.2	66.8	0.0682
Income bracket 5 (highest)	28.8	71.2	0.0000
Number of observations	1,802	3,084	

Notes: Weighted statistics are shown in the table.

\* Null hypothesis is no differentiation between modern and traditional birth control users.

Source: Authors' calculations using data from the 2013 Turkey DHS.

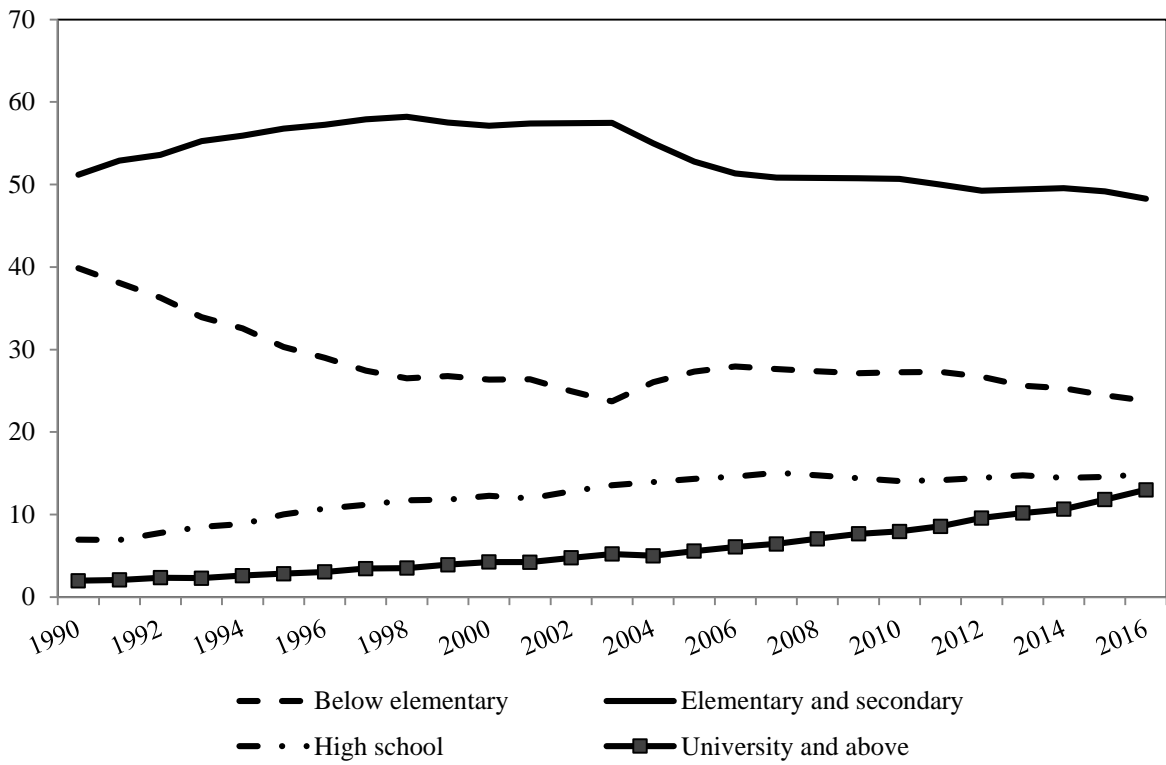
Table 3. Model Results

VARIABLES	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)		Model (7)	
	(1) Odds Ratio	(2) 95% CI	(3) Odds Ratio	(4) 95% CI	(5) Odds Ratio	(6) 95% CI	(7) Odds Ratio	(8) 95% CI	(9) Odds Ratio	(10) 95% CI	(11) Odds Ratio	(12) 95% CI	(13) Odds Ratio	(14) 95% CI
<b>Woman's Age</b>	1.013**	1.003 - 1.023	1.014***	1.004 - 1.024	1.016**	1.004 - 1.028	1.015**	1.002 - 1.029	1.014**	1.001 - 1.028	1.016**	1.001 - 1.030	1.015**	1.000 - 1.029
<b>Type of Residence</b>														
Urban			1.413***	1.216 - 1.641	1.400***	1.201 - 1.632	1.386***	1.170 - 1.641	1.396***	1.178 - 1.654	1.347***	1.117 - 1.623	1.306**	1.063 - 1.605
Rural	1.000		1.000		1.000		1.000		1.000		1.000		1.000	
<b>Ethnicity</b>														
Kurdish					0.640***	0.524 - 0.782	0.647***	0.496 - 0.845	0.638***	0.488 - 0.833	0.609***	0.458 - 0.809	0.613***	0.461 - 0.816
Arabic					0.957	0.600 - 1.526	0.992	0.592 - 1.662	0.992	0.592 - 1.664	1.737*	0.921 - 3.275	1.743*	0.925 - 3.283
Other					0.957	0.443 - 2.068	1.004	0.451 - 2.234	1.053	0.467 - 2.378	0.938	0.409 - 2.149	0.934	0.409 - 2.128
Turkish					1.000		1.000		1.000		1.000		1.000	
<b>Household Structure</b>														
Number of children under 5 years old					1.069	0.966 - 1.184	1.059	0.943 - 1.188	1.057	0.941 - 1.186	1.053	0.931 - 1.190	1.055	0.933 - 1.194
Presence of at least one son					1.175*	0.984 - 1.404	1.276**	1.060 - 1.536	1.285***	1.067 - 1.547	1.272**	1.050 - 1.542	1.276**	1.053 - 1.546
No sons in the family					1.000		1.000		1.000		1.000		1.000	
<b>Woman's Empowerment</b>														
Arranged marriage					0.879*	0.758 - 1.018	1.016	0.859 - 1.201	1.303	0.869 - 1.953	1.277	0.833 - 1.959	1.286	0.838 - 1.973
Marriage with own decision					1.000		1.000		1.000		1.000		1.000	
Husband with a controlling attitude					0.966	0.812 - 1.149	0.949	0.784 - 1.149	1.268	0.813 - 1.978	1.171	0.732 - 1.874	1.177	0.736 - 1.882
Husband without a controlling attitude					1.000		1.000		1.000		1.000		1.000	
<b>Education</b>														
Woman's years of schooling							1.043***	1.013 - 1.074	1.061***	1.025 - 1.098	1.052***	1.012 - 1.094	1.050**	1.009 - 1.092

Husband's years of schooling			1.025*	0.999 - 1.051	1.023*	0.997 - 1.049	1.019	0.991 - 1.046	1.016	0.989 - 1.045
<b>Interaction Variables</b>										
Woman's years of schooling* husband with a controlling attitude					0.960	0.906 - 1.017	0.978	0.920 - 1.039	0.978	0.920 - 1.039
Woman's years of schooling*arranged marriage					0.964	0.912 - 1.019	0.966	0.911 - 1.025	0.966	0.911 - 1.025
<b>Woman's Employment and Occupation Status</b>										
Unemployed							0.931	0.628 - 1.381	0.938	0.633 - 1.391
Inactive							0.928	0.708 - 1.217	0.932	0.711 - 1.223
Employer							0.809	0.374 - 1.749	0.805	0.372 - 1.743
Government employee							1.305	0.791 - 2.152	1.310	0.794 - 2.159
Seasonal/Temporal worker							0.997	0.647 - 1.537	1.014	0.657 - 1.565
Self-Employed							1.171	0.810 - 1.693	1.179	0.815 - 1.704
Unpaid family worker							0.771	0.558 - 1.065	0.778	0.562 - 1.076
Wage-earner							1.000		1.000	
<b>Husband's Employment Status</b>										
Unemployed							0.697	0.445 - 1.093	0.703	0.447 - 1.105
Inactive							0.740	0.492 - 1.114	0.739	0.491 - 1.113
Employed							1.000		1.000	
<b>Household's Wealth Index</b>									1.026	0.945 - 1.114
Observations	4,886	4,886	4,886	4,301	4,301		3,991		3,991	

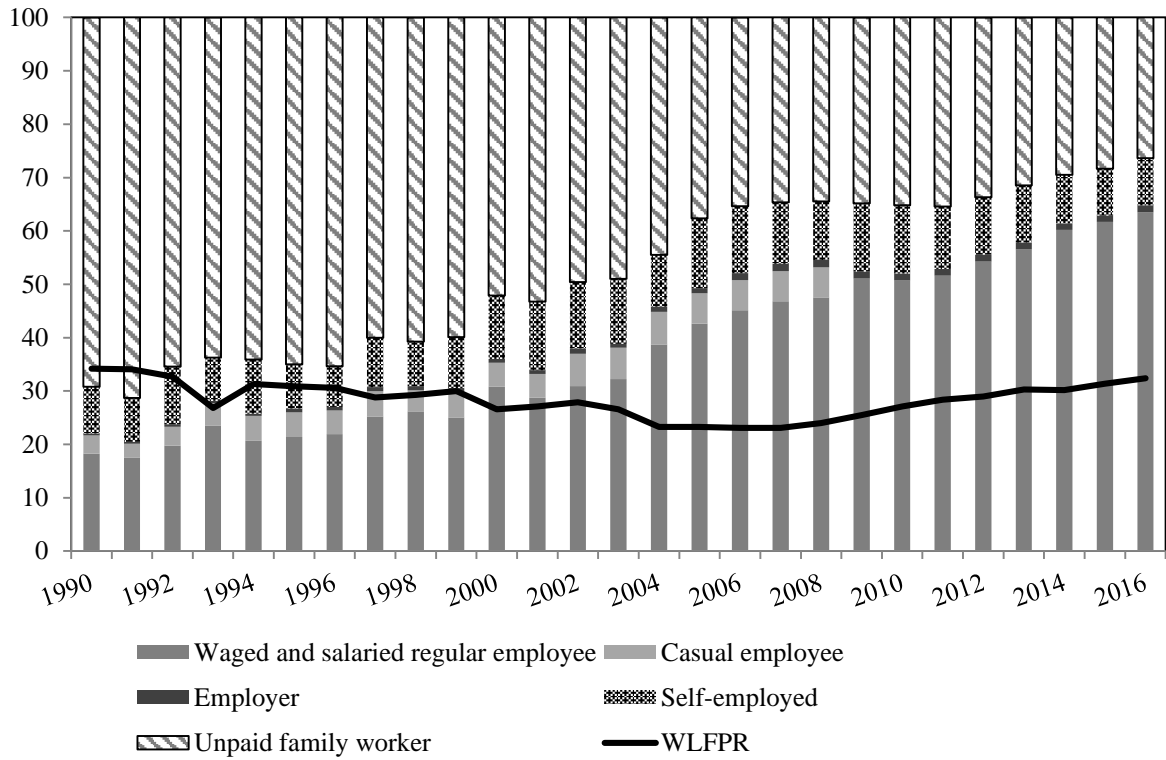
Note: All regressions include a constant term. \*\*\* 1 per cent, \*\* 5 per cent, \* 10 per cent level of significance.

## FIGURES IN TEXT



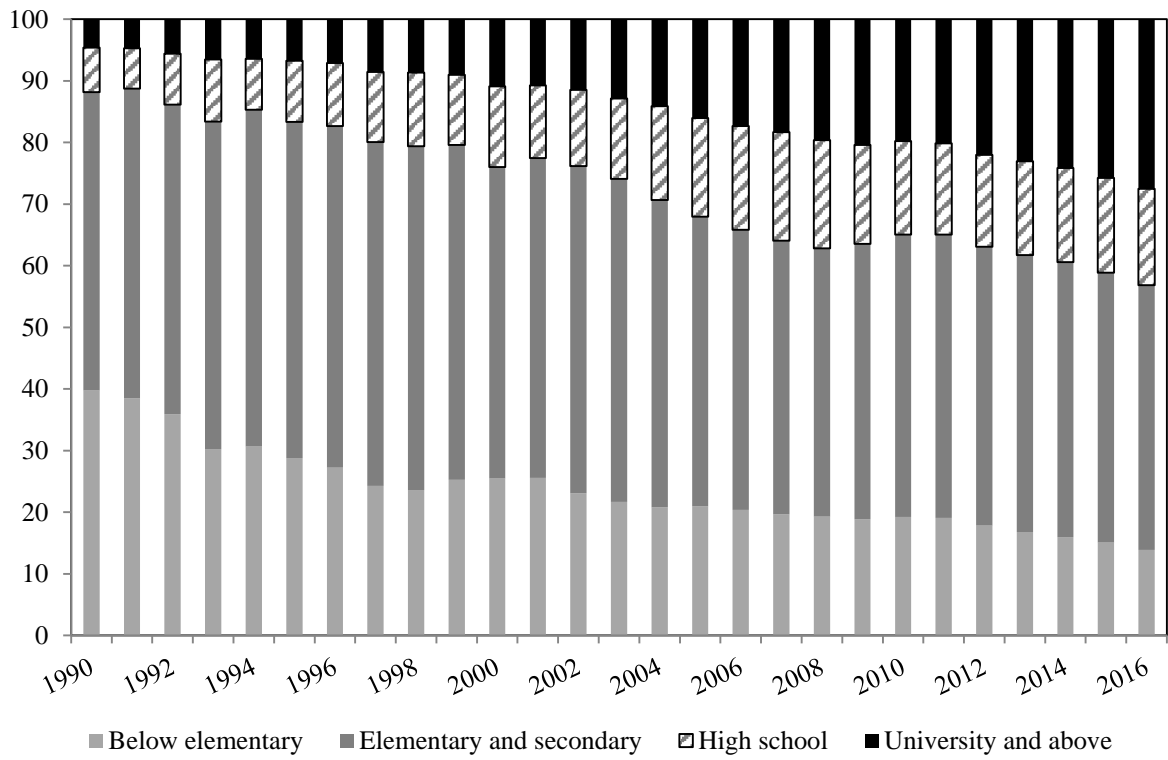
Source: TurkSTAT

Figure 1. The distribution of educational attainment of women, Turkey  
(% of women population above the age of 15)



Source: TurkSTAT

Figure 2. Occupational composition of women's employment and women's labor force participation rate (%), Turkey



Source: TurkSTAT

Figure 3. Educational composition of women's employment (%), Turkey