Variations in Turkey's Female Labor Market: The Puzzling Role of Education

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Abstract

Although Turkey ranks among the world's 20 largest economies, female labor force participation in Turkey is surprisingly low. Relative to other developed countries, however, the proportion of Turkish women in senior management is high. One explanation for these contrasting pictures of Turkey's female labor force is education. To better understand how women's education and household characteristics explain variations in Turkey's female labor market, I use annual Turkish Household Labour Force Survey data from 2004-2012 to estimate five probabilities: the likelihood that a woman (1) participates in the labor force, or is employed in an (2) agricultural, (3) blue collar, (4) lower white collar, or (5) upper white collar job. I find that labor force participation is relatively high among female primary school graduates, who are most likely to work in agricultural and blue collar jobs. Highly educated married women are the most likely group to participate in upper white collar jobs, and families favor sending single daughters over wives to work during periods of reduced household income.

JEL Classification Numbers: J21, J23 C51, O12
Keywords: Labor Force Participation, Occupation, Women, Employment

Özet

Araştırmanın başlıca amacı Türkiye'de kadınların işgücüne katılımının ekonomik ve sosyal etkenlerini belirlemek ve kadınların işgücü piyasasına katılımındaki farklılıklarını keşfetmektir. Hanehalkı İşgücü Araştırması'nın (2004-2012) mikro verisine dayanan bu ekonomik analizde kadınların işgücüne katılımı ve farklı mesleklerde istihdam olasılığı, yaş, eğitim, doğurganlık ve aile özellikleri ışığında incelenmektedir. Bu sürede birçok programın kanunlaştırılmasına rağmen, kadınların işgücüne katılımının en önemli etkeni üniversite eğitimidir. İlginçtir ki evlilerin beyaz yakalı bir meslekte çalışma olasılığı bekarlardan daha yüksektir ve her alt grup için katılım oranı olasılığı şehirde görece azdır. Araştırmanın sonunda Türk ekonomisini güçlendirmek ve Türk kadınının ekonomik durumunu ilerletmek için analizin bulgularından kamu politikası önerileri verilmektedir.

JEL Klasifikasyon Numaraları: J21, J23 C51, O12
Anahtar Kelimeler: İstihdam, Kadın İsgücü, Türkiye, Eğitim

I. Introduction

Although Turkey ranks among the world's 20 largest economies, female labor force participation in Turkey is surprisingly low. Out of 142 economies, Turkey ranked 132nd for its gender gap in economic participation in the World Economic Forum's 2014 Global Gender Gap Report. In 2014, Turkey's female labor force participation rate was 30.8 percent, significantly below the world and European Union (EU) averages of 50.8 and 50.7 percent (TurkStat, 2014; ILO, 2013). In the same year, Turkey ranked last among OECD countries in female labor force participation (OECD, 2014).

Professional services giant Grant Thornton International paints a different picture of Turkish women. According to its 2015 International Business Report, 26 percent of senior management roles are held by women in Turkey, a proportion comparable to the EU and United States which had 26 and 21 percent. In 2012, 12 percent of Turkish CEOs were female, placing Turkey not far behind the U.S. with 15 percent (World Bank).

One explanation for these contrasting portrayals of Turkey's female labor force is education. Education significantly increases wage-earning potential, thereby increasing the opportunity cost of time-intensive household activities such as childbearing, child-rearing, and domestic chores (Becker, 1981; Schultz, 1981). As a result, highly educated women participate at higher rates—in 2013, 72.7 percent of Turkish female university graduates participated in the labor force compared to 32.1 percent of high school graduates (TurkStat, 2014). Only 10.7 percent of women ages 25 and older had higher education degrees; however, they earned 91 percent more than high school graduates (TurkStat, 2014; OECD, 2014).

Besides education level, Ayşe Gündüz-Hoşgör and Jeroen Smits (2008) find that the labor market outcomes of married Turkish women are influenced by the educational and occupational decisions of their spouses. Interestingly, having a husband with a tertiary degree increases a woman's likelihood of being a housewife. When the husband has a primary school education or higher, a woman's likelihood of formal employment is also significantly lower. Women employed in upper nonmanual occupations tend to have husbands who are employed at the same level; wives of manual workers have the highest probability of being housewives, and wives of farmers participate in farming at an astonishingly high rate of 59 percent.

Building upon the work of Gündüz-Hoşgör and Smits, I seek to determine how personal and household characteristics affect a woman's decision to participate in the labor force and her

probability of employment in a given sector. Using annual Turkish Household Labour Force Survey (HLFS) data from 2004-2012 to conduct bivariate cross-tabulations and construct linear probability models, I estimate five probabilities: the likelihood that a woman (1) participates in the labor force or is employed in an (2) agricultural, (3) blue collar, (4) lower white collar, or (5) upper white collar job. Blue collar jobs involve manual labor and/or service work, and white collar professions include jobs that are typically performed in an office or other administrative setting.

Increasing low female labor force participation rates is not a challenge unique to Turkey; however, the contrast between the non-working majority and senior management position-holding minority of Turkish women is puzzling. If Turkey seeks to become one of the world's ten largest economies by 2023 as its president has claimed, then increasing the economic participation of Turkish women is a worthwhile strategy towards achieving this goal. Identifying the factors that influence Turkey's female labor market variations will inform policy recommendations to increase female economic participation and catalyze inclusive economic growth.

The next section aims to provide important background on Turkey's economic and political environments, as well as to review the existing literature on female labor force participation in Turkey. Section III introduces the relevant economic theories that are empirically tested, and Sections IV-VI outline the data and methodology for these tests. Section VII discusses the results from these procedures, and Section VIII offers a summary of key results and places them in the context of the field.

II. Literature Review

The literature review is divided into three sections: common macroeconomic explanations for Turkey's low female labor force participation rate, microeconomic determinants of Turkish women's economic participation, and Turkish government policies enacted between 2004-2012 that affect the cost of female employment to employers.

A. Explanations for Turkey's declining female labor force participation rates

Economists frequently cite Claudia Goldin's theory of a U-shaped female labor force function across economic development to explain why Turkish female labor force participation

declined from 1980 to 2006, despite a rise in the marriage age and a decline in the fertility rate during this time (World Bank, 2009). In the 1980s, Turkish female participation levels were comparable to those in Austria, the Netherlands, and Switzerland. Unlike these countries, however, Turkey's high participation came from women performing family-based, unpaid agricultural work in rural areas (World Bank, 2009). As Turkey's economy transitioned away from agriculture during the period, rising household income levels and declining agricultural employment led female participation to decrease. Furthermore, the mass migration of women from high-participation rural areas to low-participation urban areas, where there are fewer formal jobs for unskilled women, exacerbated the decline (World Bank, 2009).

As for why female participation remains low in Turkey today, Güven Sak (2012) identifies three factors. First, a significant skills gap between men and women implies lower wages for women. Second, the high cost of hiring childcare and housekeeping services prevents women with low wage-earning potential from entering the work force. Third, poor infrastructure and overcrowded, disorderly public transportation in urban areas make commuting to work particularly unpleasant for women, who are often harassed.

In addition to gender-based wage differences caused by the gender-based skills gap, the literature supports the presence of gender-based wage discrimination in Turkey (Atkas and Uysal, 2012; Selim & İlkkaracan, 2002; Akhmedjonov, 2012). Wage discrimination is defined using Oaxaca's (1973) definition that says discrimination occurs "any time the relative wage of males exceeds the relative wage that would have prevailed if males and females were paid according to the same criteria". Using Oaxaca's wage decomposition method, Alisher Akhmedjonov (2012) finds that 87 percent of the wage gap between men and women is attributable to wage discrimination, and that working women seem to be more educated than working men. Given the substantial evidence of a gender-based wage gap in Turkey, I consider the presence of exogenous wage differentials when analyzing the empirical results that follow.

B. Microeconomic determinants of economic participation

Many papers on the microeconomic determinants of Turkish female participation are unpublished papers written in Turkish that are not available online. Fortunately, the World Bank report on "Female Labor Force Participation in Turkey: Trends, Determinants and Policy Framework" provides a general overview of the literature (Table 2.1).

Table 2.1 A literature review on the determinants of Turkish female labor force participation

Topic	Author(s)	Main Findings
Social and Cultural Factors	Alkan (1995) Aran, Capar, Husamoğlu, Sanalmış, and Uraz (2009) Dayıoğlu (2000) Dayıoğlu and Kirdar (2009) Erman (2001) Eyüboğlu, Özar, and Tanrıöver (2000) Gündüz-Hoşgör and Smits (2006) Kasnakoğlu and Davyıoğlu (2002) Ozar and Günlük Senesen (1998) Taymaz (2009)	The social roles of women (and the influence of patriarchal society) play a strong role in determining women's decisions on labor market participation. House chores and childcare/eldercare are traditionally female duties that may prevent them from participating in the labor market. The presence of young children negatively affects women's LFP. Estimates of Aran and others (2009) indicate that, in an urban setting, if the marriage of a woman is arranged by her family, her likelihood of participating in the labor force declines by 4 to 10. The effect is generally higher among more educated women
Education	Aran, Capar, Husamoğlu, Sanalmış, and Uraz (2009) Başlevent and Onaran (2003) Dayıoğlu and Kirdar (2009) Eyüboğlu, Özar, and Tanrıöver (2000) Gündüz-Hoşgör and Smits (2006) İnce and Demir (2006) Kasnakoğlu and Davyıoğlu (1997) Taymaz (2009)	Evidence shows that as the level of education increases, the probability of women entering the labor market also increases. Higher levels of education also strengthen women's self-esteem, provide them with competitive work skills, and lead to higher levels of labor force participation. Estimates indicate that higher educational attainment increases employment probability from 3 percent (primary school graduate) to 73 percent (college graduate) for women.
Marital Status	Dayıoğlu and Kirdar (2009) Pancaroğlu (2006)	Pancaroğlu finds that unmarried and married women have different priorities while seeking jobs. It seems that childcare benefits are the leading drivers for married women to enter the labor market, whereas unmarried women first seek a job covered with health insurance and pension benefits. Being married is negatively associated with participation in both urban and rural areas, with a particularly large effect in urban areas. Separated and divorced women are also less likely to participate in rural areas but not in urban areas.

In addition to the main findings in Table 2.1, the work of Gündüz-Hoşgör and Smits (2008) on the variation in participation among married Turkish women ages 15-49 serves as a foundation for this paper. They find that married women employed in formal jobs tend to be more educated and have husbands employed in skilled occupations. They also tend to have fewer children, live in western Turkey and urban areas, and have less traditional gender role attitudes.

Probability of formal sector employment increases with each step increase in educational level, but women seem to need at least a secondary education for white collar employment. Women with university degrees are in a special position; three-quarters are employed and 58 percent have upper nonmanual positions.

With regards to husband education and employment, Gündüz-Hoşgör and Smits find that higher husband education increases the probability of being a housewife. When husbands have more human capital, the need for additional income is lower, so women may choose not to work or face pressure from their family if they do. Wives of manual workers have the highest probability of being housewives; wives of upper nonmanual workers tend to also work in upper nonmanual jobs. The presence of young children in the household, as well as living in an urban area, increase a woman's likelihood of being a housewife regardless of education level or how long she has lived in the city. Having children does not affect the probability of agricultural employment.

Gündüz-Hoşgör and Smits also find evidence of an added worker effect among married Turkish women, which supports the idea that married Turkish women work mostly out of necessity. This finding aligns with the work of Karaoğlan and Ökten (2012), who find that unemployment has both a considerable discouraging effect on female labor force participation, as well as an added worker effect. Yet both of these papers contradict the finding of Yıldırım (2014) that only highly educated women in urban areas experience an added worker effect. One of the goals of this paper is to determine which result is more likely, and to observe whether single and married women respond differently to household unemployment.

Another contested topic in the literature is the role of religion on participation rates in Muslim democracies like Turkey. On a household level, Kızılca (2013) finds that the probability of participation for married females increases with household secularity in urban areas and decreases in rural areas where unpaid, family-based employment is common. For single females, secularity appears to have a positive effect on schooling. Kızılca's results may be influenced by his definition of secular households as those whose members consume goods that are forbidden by conservative interpretations of Islam (e.g. alcohol, shellfish, and pork). These goods are luxury goods in Turkey, so if female schooling is also a luxury good, then wealthy families may consume more of both.

In contrast to Kızılca, Meyersson (2014) contradicts the view that local Islamic rule is detrimental to women and generates religiously conservative outcomes. By comparing Turkish municipalities where an Islamic party barely won or lost elections in 1994, Meyersson found that Islamic rule led to higher female participation in education and politics, and decreased preferences for Islamic rule over time. Increases in female secular high school education remained persistent up to 17 years after and reduced adolescent marriages. Counterintuitively, the effects were greatest for poorer and religiously conservative areas where the barriers to female education were highest. In these communities, Islamic leaders increased education rates by pursuing policies that made poor and pious families more willing to send their daughters to school.

C. Policies affecting Turkish LFP from 2004-2012

Between 2004 and 2012 the Turkish government enacted a number of policies that affected the cost of female employment to employers. Appendix A contains a comprehensive list of policies, however the most relevant regulations and subsidy programs are mentioned here.

As of 2004, the Work Conditions of Pregnant or Nursing Women and Nursery Rooms and Child Care Centers Regulation increased the cost of hiring female employees by requiring employers with 100-150 female workers to provide a nursery in the workplace (Dönmez & Özmen, 2013). Employers with over 150 female workers had to provide a childcare center. Most workplaces in Turkey are small and medium sized, however, so few employers had to comply with the rule. Since 2008, employers are allowed to hire private nurseries instead of establishing their own centers.

In 2008, the Turkish government enacted a policy to encourage female and youth employment and decrease informal labor by subsidizing employer social security contributions for female and youth hires between May 2008 and May 2010. The subsidies were offered for individuals hired in addition to the firm's normal employment level and who were not employed as tax-registered workers in the six months prior to being hired. The implementation details of this policy, as well as a number of similar subsidy programs for new hires that were implemented during the same period are described in Table 2.1 on the next page.

Table 2.1 List of Turkish policies subsidizing employment between 2004-2012 (OECD, 2014)

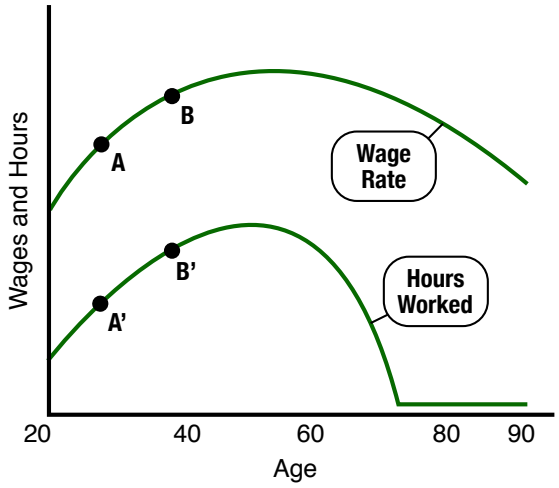
Years	Goal	Policy	Coverage
2004-2011	Boost employment in less developed regions	Starting in 2004, textile, clothing and leather businesses were offered social security exemptions and corporate tax cuts for up to five years to move their operations from developed to less developed parts of Turkey. Beginning in 2007, incentives were offered to all businesses and no longer required relocation from more developed regions. Interest rates on loans were also subsidized, and businesses received customs duty exemptions for procurement of machinery and equipment. New businesses in Turkey's least developed regions were given the longest benefits (G20, 2011).	626,649 workers in 2009; 722,891 in 2010 and 730,000 in beginning of 2011 (17 percent of manufacturing employment in Turkey). Cost was 741 million TL in 2009, 926 million in 2010.
2008-2010	Increase jobs for disadvantaged groups (women and youth)	Employer share of social security contributions for women and youth (aged 18-29) recruited between May 2008-May 2010 are covered for a period of five years by the Unemployment Insurance Fund, starting at 100% in the first year and decreasing by 20% each subsequent year. Women and youths who were registered as unemployed for at least six months prior to recruitment are eligible	2009: 61,615 new jobs, including 31,482 for women. 2010: 63,230 new jobs, including 33,395 for women. Cost was 81 million Turkish Lira (TL) in 2009, 137 million TL in 2010
2008-2010	Reduce informal employment across all sectors	Employer social security contributions for disability, old age and death reduced from 19.5% to 14.5% of gross wages. Employers with employed workers not registered with social security are not entitled to this reduction. The 5% percentage gap is covered by the Treasury.	5.5 million workers covered in 2009; 6.4 million by the end of 2010, at a cost of about 25 Euro per month per worker. Total cost was 3.3 billion TL in 2009, 4.1 billion TL in 2010.
2009-2010	Increase employment and reduce informal employment	Employer social security contributions for all new employees who were unemployed for at least 3 months prior to their hiring were covered by UIF for six months, as long as additional worker represented an increase to the enterprise's workforce level as of April 2009.	64,505 workers benefited in 2009; 76,144 in 2010

Balkan, Başkaya and Tümen (2014) found that the May 2008 policy subsidizing female and young male hires did not have an overall statistically significant effect on women's employment. In their sub-group analysis, they found that the subsidies increased the employment probabilities of older women with low education levels and had a weaker positive effect for younger women. They had no effect for young men. The authors predict that the observed effects of the program would be strong initially, but taper off over time because the beneficiaries of the program are primarily older women and the hiring decisions were likely based on favorable cost conditions rather than job suitability. Since the data in this paper cover the 2008 policy's hiring period, I expect that my models will predict higher participation probabilities for older women in blue collar employment from 2008 onward.

III. Theoretical Framework

The theoretical framework for this paper borrows primarily from the life cycle model of labor supply, the household production model (Becker, 1965), and the under-participation trap hypothesis (Booth and Coles, 2007).

Figure 3.1 The life cycle model of labor supply (Laing, 2011)



According to the life cycle model of labor supply, an individual's age-earnings profile follows a cap-shaped (∩) pattern across her life course (see the top curve in Figure 3.1) . When a person is young, her wage-earning potential is low because she has little job experience and few skills that potential employers value. As she ages, she acquires job experience and skills that increase the market value of her time and, consequently, her wage. Eventually she reaches a

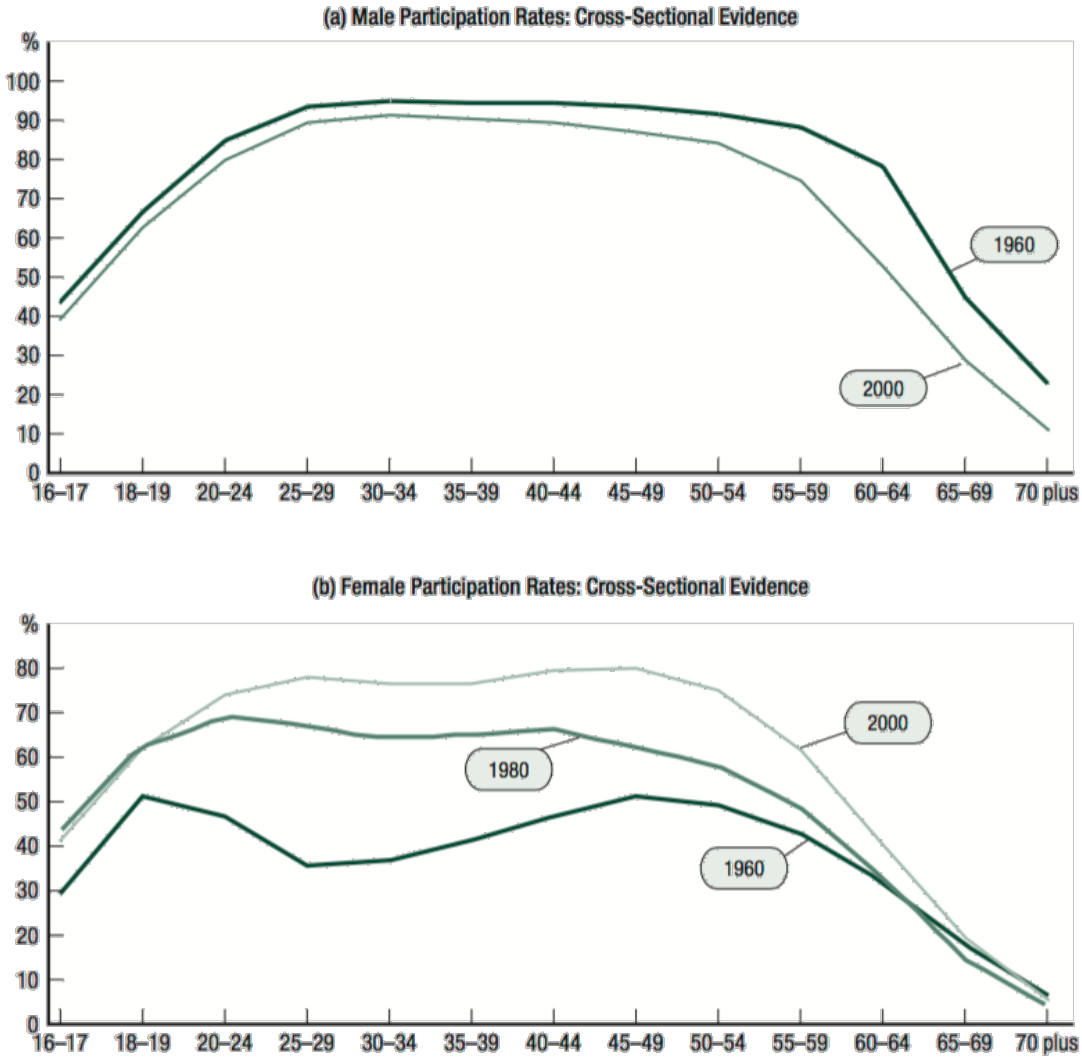
certain age where her productivity and her wage begins to decline, causing the falling portion of the cap-shaped curve.

A person creates an optimal lifetime work and leisure plan based on her initial wealth and the expected wage rates dictated by her age-earnings profile curve to achieve a maximized lifetime utility U_0^*. The optimal labor-supply behavior to achieve U_0^* is represented by the bottom line in Figure 3.1. To understand how this behavior is derived, consider the segment from A to B on the wage rate curve, which corresponds with significant wage growth. When the wage change occurs, it unleashes a pure substitution effect because U_0^* includes the movement from A to B as part of the individual's initial economic opportunities. As a result, there is no opposing income effect, so hours worked strictly increases from A' to B'. A pure wealth effect occurs when initial wealth increases. Because labor is a normal good, higher initial wealth reduces labor supply at every point in the life cycle, causing the hours worked curve to shift down.

The key takeaway of the life cycle model is the intertemporal substitution hypothesis: when wage rates change, individuals substitute between work and leisure so they work more when leisure is expensive and less when leisure is cheap. Two important ideas that follow from this hypothesis are the added and discouraged worker effects. The added worker effect predicts that secondary income earners (traditionally married women and daughters) enter the labor force when primary income earners (traditionally husbands and fathers) become temporarily unemployed or experience a wage cut. The strength of the added worker effect depends on the relative size of the loss in household income. The discouraged worker effect predicts that workers drop out of the labor force during recessions, and enter the labor force when conditions improve. Its relative size may be affected by unemployment benefits.

The life cycle model describes the longitudinal behavior of individual women, but its predictions also apply to cross-sectional analyses. Figure 3.2 shows the labor force participation rates of men and women in the United States in 1960, 1980 and 2000. Although the life cycle model successfully predicts the participation behavior of men, women exhibit an M-shaped participation pattern with a dip around the years where they are most likely to have children. Between 1960 and 2000, the dip becomes shallower and female participation patterns adhere more to the life cycle effect.

Figure 3.2. Cross-sectional participation rates in the United States (Szafran, 2002)



A major weakness of the life cycle model is its assumption of substitution between work and leisure; in reality people also participate in home production. Becker's household production model offers the critical insight that an increase in the market wage unleashes an income effect and substitution effects between each leisure and household production. If the income effect and the leisure-substitution effect offset each other, wage changes may have no effect on leisure and yet induce a huge switch from housework to market work (or market work to housework) to the point that a woman drops out of (or enters) the labor force altogether.

Similar to the life cycle model, the household production model says that an increase in unearned income is associated with a pure income effect and does not affect the relative return to

market work or housework. In response, an individual may maintain her hours of market work and reduce her hours of housework and increase her leisure. Alternatively, she may reduce her hours of market work and maintain her hours of housework, as the life cycle model predicts.

The two models discussed so far offer contrasting predictions about the labor force participation of women from wealthy families. Whereas the life cycle model predicts that women from wealthy families should be less likely to work, the household production model says that a wealthy women's behavior depends on her preferences. This uncertainty aside, the life cycle and household production models support the following predictions about Turkish labor force participation:

- Young and old women should be least likely to work; middle aged women should be the most likely.
- Women with the highest wage-earning potential (i.e. women with high education levels) should be more likely to participate in the labor force.
- Cross-sectional Turkish married female labor force participation behavior should follow an approximate M-shape, with a dip around the most common childbearing years.
- Labor force participation of women who do not invest in the labor force when they are young should not follow the life cycle model, because job experience and skills do not increase with age.
- Labor force participation in occupations that require unskilled labor and offer fewer opportunities for wage growth (e.g. agricultural and blue collar jobs) should exhibit weaker life cycle effects than skilled occupations (e.g. white collar jobs).

The other relevant theory for this paper is the under-participation trap hypothesis (Booth and Coles, 2007), which asserts that increasing returns to education and an imperfectly competitive labor market jointly cause poorly educated women to substitute to home production. In Turkey, Taymaz (2009) argues that women in urban areas are most likely to work in informal sector jobs, which pay low wages relative to the cost of childcare and housekeeping services. Faced with high opportunity costs of informal work, many poorly educated urban women stay at home where their time is more valuable. Having experienced low returns to education firsthand, these women under-invest in their daughters' education, perpetuating the cycle for their daughters.

Table 3.1. Average monthly wage rates (TL) in Turkish urban areas for select occupations in 2006 (Taymaz, 2009)

	All workers		Informal Workers		Formal Workers	
Sector	Female	Male	Female	Male	Female	Male
Agriculture	354	223	205	269	574	670
Manufacturing	554	432	312	425	526	608
Finance, real estate	639	641	317	396	721	686
Other services	792	667	278	331	826	878
Total	543	595	292	394	684	695

Note: Numbers indicate geometric averages

Table 3.1 shows that informal workers earn much lower wages than their formal sector counterparts. There is also a substantial gender-based wage gap in informal work that almost disappears in the formal sector. According to Taymaz, less educated men are likely to transition from informal to formal work over the course of their careers, while less educated women are likely to be stuck in an "informality trap" in which they never not join the formal sector.

Booth and Coles assume that returns to education are increasing for three reasons: (1) a *participation effect* in which highly skilled workers earn higher wages, which makes them more likely to participate; (2) a *labor supply effect* in which more educated workers find it worthwhile to work longer hours; and (3) a *wage competitiveness effect* that causes firms to bid more competitively for worker's services as the value of employment increases. In the sections that follow, I assess the validity of these assumptions by testing for increasing returns to education in both urban and rural areas.

IV. Data

Data for this study come from the 2004-2012 Household Labour Force Survey (HLFS) conducted annually by the Turkish Statistical Institute (TurkStat), the Turkish government agency responsible for producing official statistics on Turkey, its population, economy, resources, society, and culture. Thorough documentation for the Turkish HLFS methodology and classifications are available on the TurkStat website.

The Turkish HLFS consists of two parts: a questionnaire about household member demographic information and a survey about the labor force status of household members aged

15 and above. Questions include monthly income, unemployment history, past work experience, and current employment status.

Although the Turkish HLFS has been conducted since 1966, this study considers results since 2004 because in that year the definition of "employed" individuals changed to match the European Union Statistics Office (EuroStat) definition. As of 2004, the Turkish HLFS defines an "employed" person as someone who is economically active for at least one hour during the reference period as a regular employee, casual employee, employer, self employed or unpaid family worker. Individuals who are self-employed and employers who have jobs but do not work in the reference week are employed. Regular employees with jobs but who do not work during the reference period are employed if they have an assurance of return to work within a 3-month period, or if they receive at least 50 percent of their wage or salary during their absence. Unpaid family workers and casual workers who do not work for at least one hour during the reference week are not employed (TurkStat, 2016).

The sample includes data for single and married Turkish women ages 15-64. Single women include never married women living with one or both parents, who will henceforth be referred to as "single women". I exclude single women living with zero parents because the dataset does not include information about family members living outside the reference household. A woman who lives with no parents by choice is therefore indistinguishable from a woman who lives with no parents because her parents are deceased. This is problematic because in the former scenario, the woman may receive financial support from or make decisions influenced by her parents, while the woman whose parents are deceased does not. Grouping these women together because they both live with no parents could potentially bias the results.

Married women include women who live with their spouses. This distinction is made because in some of the survey years the Turkish HLFS includes categories for women who are married but do not cohabit with their spouses and women who cohabit with a "spouse" but are not legally married. Since these categories are not consistent across all years, I exclude women in these types of relationships from the dataset. I also exclude women younger than 15 and older than 65 from the analysis because 15 is the minimum legal working age and the minimum retirement age in Turkey will eventually increase to 65.

Table 4.1 Comparison of key variables for single women by number of parents

	Number of Parents*		
Variable	0	1	2
Mean Age (Years)	29.25	25.43	20.51
Standard Dev. (Years)	12.29	9.92	5.69
Employment			
LFP	41.89	36.84	30.72
Agriculture	2.63	6.56	6.86
Blue Collar	3.13	3.66	3.87
Lower White Collar	10.24	11.10	8.35
Upper White Collar	20.86	7.26	4.97
Unemployed	5.02	8.26	6.68
Education			
Illiterate	3.29	4.71	3.22
Literate, no school	7.21	12.17	10.95
Primary school	11.27	16.36	10.45
Secondary school	13.54	28.52	40.40
High school	29.01	17.55	17.65
Vocational school	9.40	7.81	7.65
Higher education	26.26	12.88	9.67
Attending School	35.68	25.22	36.26
Total	26720	53463	277315
Percent Total	7.47	14.95	77.57

*Refers to number of parents with whom a woman lives.
Numbers are percentages unless otherwise indicated.

Table 4.1 reveals an unsurprising pattern about single women: Compared to those living with no parents, single women living with one or two parents are younger and less educated. They also have lower participation rates. Surprisingly, single women with zero parents attend school at about the same rate as those who live with both parents (perhaps because the HLFS includes university students living away from their families). Women living with no parents work more because they are older and more educated, so their parents are more likely to be deceased or otherwise not offering them financial support. Given these non-random differences, the true population of single Turkish women 15-64 is likely older, more educated, and more likely to participate in the labor force than the single women in my sample.

The Turkish HLFS classifies currently and previously employed people according to their economic activity, occupation, employment status and educational level. Economic activities are coded using the International Classification of Economic Activities in the European Union (NACE) Revision 1 or Revision 2, depending on the year. Occupations are coded with

International Standard Classification of Occupations (ISCO-88) until 2012, after which ISCO-08 classifications are used. Because of this change, I exclude survey results beyond 2012 from my analysis.

Educational level is measured by the International Standard Classification of Education (ISCE) system, which classifies individuals according to their highest educational attainment. The seven ISCE categories used in the Turkish HLFS are: (1) illiterate, (2) literate without any diploma, (3) primary school, (4) secondary school, (5) high school, (6) vocational school at the high school level, and (7) higher education, which includes any tertiary degree beyond the high school level. A survey respondent's region of residence is coded according to the Nomenclature of Territorial Units for Statistics Level 2 (NUTS-2) of Turkey, which divide Turkey into 26 sub-regions as listed in Appendix E. Labor force status is measured with three categories: (1) employed, (2) unemployed, and (3) not in the labor force.

Labor force participation is the main binary dependent variable, equal to one if a woman is employed or unemployed, and zero otherwise. To create the other binary dependent variables, I divide occupations into the groups shown in Table 4.2—agriculture, blue collar, lower white collar, and upper white collar. By construction, every employed woman belongs to exactly one group. In logical terms,

$$Employed \rightarrow \mathrm{A}griculture \oplus Blue \oplus Lower \oplus Upper$$

where $\oplus$ is the "exclusive or" logical operation, *Employed* denotes the statement "person X is employed", *Agriculture* denotes the statement "person X works in agriculture", and *Blue, Lower*, and *Upper* are defined similarly for blue collar, lower and upper white collar occupations. *Agriculture, Blue, Lower* and *Upper* are mutually exclusive because an individual has at most one primary occupation, Thus, $\{Agriculture\} \cap \{Blue\} \cap \{Lower\} \cap \{Upper\} = \emptyset$ and $\{Agriculture\} \cup \{Blue\} \cup \{Lower\} \cup \{Upper\} = \{Employed\}$. Also, the intersection of any pair of *Agriculture, Blue, Lower* and *Upper* is the empty set, because every occupation belongs to exactly one category. Note that *Employed* implies *Labor Force Participation*, but *Labor Force Participation* does not imply *Employed*.

As Table 4.2 shows, agricultural occupations include skilled and subsistence agriculture and fishery. Blue collar occupations include both skilled and unskilled manual labor or service work. White collar jobs are typically performed in an office or other administrative setting; in particular, professionals, managers, and senior officials are upper white collar. These divisions

can be applied to the NACE Rev. 2 economic activity classifications to achieve similar results as those that follow (see Appendix B). For both ISCO- and NACE-based divisions, about 40 percent of employed single women work as agricultural and fishery workers, office clerks, and salespersons, and about half of employed married women work in agriculture.

Table 4.2. Key for recoding ISCO-88 classifications to occupation groups

			% Total		Total	
International Standard Classification of Occupations (ISCO-88)*		**Type**	Single	Married	Single	Married
11	Legislators and senior officials	Upper WC	0.05	0.09	204	35
12	Corporate managers	Upper WC	1.14	1	2,389	763
13	Managers of small enterprises	Upper WC	0.85	1.47	3,329	568
21	Physical, mathematical and engineering science professionals	Upper WC	1.14	0.49	1,105	761
22	Life science and health professionals	Upper WC	0.82	1.36	3,083	545
23	Teaching professionals	Upper WC	5.08	6.29	14,198	3,386
24	Other professionals	Upper WC	0.99	1.02	2,295	1,326
31	Physical and engineering science associate professionals	Upper WC	1.99	0.87	1,973	1,329
32	Life science and health associate professionals	Upper WC	2.64	2.71	6,114	1,758
33	Teaching associate professionals	Upper WC	0.76	0.21	84	504
34	Other associate professionals	Upper WC	4.19	1.94	4,375	2,795
41	Office clerks	Lower WC	12.79	4.28	9,675	8,528
42	Customer services clerks	Lower WC	5.33	1.55	3,504	3,556
51	Personal and protective services workers	Lower WC	5.14	4.26	9,625	3,427
52	Models, salespersons and demonstrators	Lower WC	9.42	3.7	8,361	6,281
61	Market-oriented skilled agricultural and fishery workers	Agriculture	17.98	37.04	83,669	11,984
62	Subsistence agricultural and fishery workers	Agriculture	2.19	3.99	9,014	1,459
71	Extraction and building trades workers	Blue Collar	0.12	0.06	143	77
72	Metal, machinery and related trades workers	Blue Collar	0.39	0.13	295	262
73	Precision, handicraft, craft printing and related trades workers	Blue Collar	0.59	3.03	6,854	390
74	Other craft and related trades workers	Blue Collar	5.04	2.71	6,115	3,359
81	Stationary plant and related operators	Blue Collar	0.12	0.06	138	83
82	Machine operators and assemblers	Blue Collar	6.22	2.35	5,309	4,149
83	Drivers and mobile plant operators	Blue Collar	0.04	0.02	51	24
91	Sales and services elementary occupations	Lower WC	2.03	6.65	15,022	1,351
92	Agricultural, fishery and related labourers	Agriculture	8.36	11.03	24,906	5,572
93	Labourers in mining, construction, manufacturing and transport	Blue Collar	3.59	1.62	3,650	2,390
†Overall labor force participation for women ages 15-64		LFP	30.72	24.89	85,200	242,028

*Full documentation for the ISCO-88 classifications is available from the International Labour Organization at http://bit.ly/1Wx5jCB

†Single women include never married women who live with both parents. Married women include women who live with their spouse.

In addition to recoding the occupation variables, I wrote several Python programs to generate parent and spouse education and employment variables by using a unique household ID and "queue" number provided in the dataset. I also calculated the numbers of employed, unemployed and non-participating household members, as well as the number of young children in the household. Appendix C contains a full list of variables and how they were calculated.

After removing 8 and 11.6 percent of single and married observations belonging to "impossible" families[2] and families with miscoded queue numbers, the final dataset contains 330,429 single women and 972,129 married women[3]. Overall, 31.7 percent of single women and 24.9 percent of married women participate in the labor force, which means that they were employed or unemployed at the time of the survey. The mean age of married women is 40 years, about twice the mean age of single women, and there is more variation in their ages (Table 4.3).

The household size variables in Table 4.3 do not include the reference woman, her parents (if she is single) or her spouse (if she is married). The reasons for these definitions are explained in Section VI. The number of children refers only to a woman's own children living in the household, so children living away from home are not counted. Child relatives such as grandchildren, nieces, and nephews are counted as "not in the labor force". Based on these definitions, it seems that single women live in larger households on average. Because fertility rates and household size in Turkey have declined over time, women's childhood homes may be larger than those they create; a woman's mother is more likely to have more children than the woman herself.

Table 4.3. Summary of select variables for single and married women

	Single		Married	
Variable	Mean	SD	Mean	SD
Age (Years)	21.30	6.80	40.01	11.56
Household Size*				
Employed	0.50	0.83	0.38	0.78
Unemployed	0.12	0.38	0.07	0.30
Not in LF	1.81	1.99	0.77	1.30
Children**				
Ages 0-5	0.00	0.04	0.41	0.69
Ages 6-14	0.00	0.04	0.70	0.99
Total Women	330,429		972,129	

*Excludes reference woman, parents if single, and spouse if married. **Refers to woman's own children.

[2] "Impossible" families include families that not make no biological sense (e.g. a family in which the mother is younger than her daughter).

[3] Compared to 359,269 single women and 1,100,151 married women. Miscoding errors are assumed to be randomly distributed across data.

V. Bivariate Cross Tabulations

Since many of the explanatory variables are categorical and the dependent variables are binary, bivariate cross-tabulations are necessary to determine the correlations between them. Following the life cycle model of labor supply, Table 5.1 shows that labor force participation is highest for women ages 25-44, and lowest for women young and old. Single women have higher labor force participation and employment rates than married women in all but agricultural jobs. Agricultural employment increases with age among married women, yet is relatively stable across all single age groups. Perhaps age and living in a rural area are correlated for married women: younger women may be descended from families who moved to urban areas as a result of increasing urbanization in the 1980s. Older women would then be more likely to live on subsistence farms.

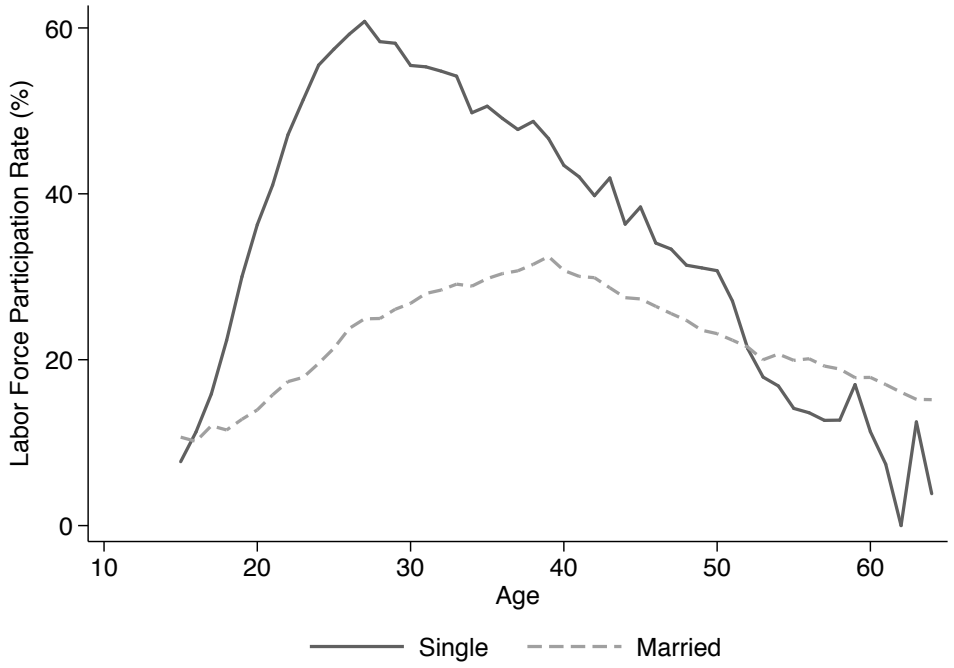
Table 5.1. Labor force participation and employment rates by age, education, and location

	LFP		**Agriculture**		**Blue Collar**		**Lower WC**		**Upper WC**		**Total**		**% Total**	
	Single	Married	Single	Married	Single	Married	Single	Married	Single	Married	Single	Married	Single	Married
Age														
15-19	16.31	12.12	6.23	8.04	2.92	1.04	3.59	1.21	0.65	0.28	173,313	12,924	52.45	1.33
20-24	45.03	17.42	7.68	7.34	5.12	2.53	13.58	3.16	6.78	1.72	85,830	71,358	25.98	7.34
25-29	58.73	24.34	6.75	7.62	5.03	2.94	17.77	5.15	15.73	5.83	36,708	126,423	11.11	13.00
30-34	54.24	28.22	7.03	9.35	4.87	3.20	16.22	6.36	15.51	6.87	16,181	143,489	4.90	14.76
35-39	48.80	30.94	8.44	11.88	4.41	3.49	13.02	7.06	14.57	6.29	8,393	138,344	2.54	14.23
40-44	41.05	29.40	8.66	13.34	2.86	2.88	10.97	6.76	13.49	4.85	4,931	130,241	1.49	13.40
45-49	34.09	25.61	8.39	14.96	2.09	1.84	9.08	4.76	12.52	3.06	2,731	117,294	0.83	12.07
50-54	24.11	21.63	7.71	15.86	1.26	0.97	6.52	2.55	7.15	1.72	1,427	99,230	0.43	10.21
55-59	13.91	19.30	4.54	16.53	0.44	0.57	2.20	1.27	6.00	0.72	683	77,836	0.21	8.01
60-64	8.62	16.41	0.86	15.01	0.86	0.31	0.43	0.74	6.03	0.29	232	54,990	0.07	5.66
Attending school														
Yes	14.14	48.05	1.39	0.92	1.03	2.39	5.80	18.43	2.45	18.67	113,903	10,637	34.47	1.09
No	40.94	24.63	9.66	12.21	5.41	2.32	10.36	4.60	6.85	3.90	216,526	961,492	65.53	98.91
Education														
Illiterate	14.58	20.10	11.15	18.10	1.99	0.59	0.52	1.03	0.10	0.09	11,453	91,530	3.47	9.42
Literate, no schooling	18.98	22.23	11.04	18.66	4.40	1.10	1.45	1.78	0.19	0.12	36,848	143,490	11.15	14.76
Primary school	36.81	22.64	17.18	13.91	8.89	2.88	5.23	4.11	1.13	0.46	37,698	490,445	11.41	50.45
Secondary school	18.27	18.58	6.50	5.31	3.66	3.74	4.51	6.01	0.73	1.17	127,182	75,166	38.49	7.73
High school	32.00	23.67	2.49	1.73	2.29	2.55	14.84	11.45	3.25	4.21	58,253	64,558	17.63	6.64
Vocational school	53.70	28.25	2.70	1.52	4.45	3.35	21.22	10.07	10.02	8.84	25,357	48,173	7.67	4.96
Higher education	79.44	64.19	0.86	0.25	1.05	0.43	19.92	9.74	34.93	49.63	33,638	58,767	10.18	6.05
Urban	31.51	18.25	1.32	2.46	4.22	2.69	10.90	5.84	6.76	5.20	232,377	685,353	70.33	70.50
Rural	32.16	40.74	19.83	35.10	2.93	1.44	3.78	2.12	1.96	1.35	98,052	286,776	29.67	29.50
Total	31.70	24.88	6.81	12.09	3.84	2.32	8.78	4.75	5.33	4.06	330,429	972,129	25.37	74.63

Entries represent the percent of women in a row who belong to a given column. For example, 16.31 percent of women ages 15-19 participate in the labor force.

Counter to expectations, both single and married labor force participation curves in Figure 5.1 approximately follow the cap-shaped curve that the life cycle model of labor supply predicts. The single women curve is skewed slightly to the left because older single women have older parents who require more help with household activities. Unlike married women in the United States, neither group exhibits an M-shaped trend; that is, there is no dip in participation during childrearing years. Without the aid of regression analysis to control for other characteristics of married women, however, it is difficult to explain this pattern.

Figure 5.1. Turkish female labor force participation rates by age (2004-2012)



Whether single or married, women with a higher education degree participate in the labor force at the highest rates (79.44 percent for single women and 64.19 percent for married), followed by women who have completed some form of vocational high school (53.70 percent for single women and 28.25 percent for married). Outside of these categories, the relationship between education and labor force participation is difficult to discern. Single labor force participation rates double to from 18 to 36 percent with primary schooling, but dip to about 18 percent again for secondary school graduates. For married women, too, secondary school graduates have the lowest labor force participation rate (18 percent) of all education groups.

Unsurprisingly, agricultural employment decreases and upper white collar employment increases for both single and married women. No obvious relationship exists between blue collar jobs and education, perhaps because some blue collars jobs are skilled. More married women with higher education degrees work in upper white collar jobs than do single women with the same education level (49.63 percent of married women compared to 34.93 percent of single women). Perhaps married women have more job experience that qualifies them for upper white collar jobs because they are older on average. Alternatively, married women may have a higher demand for upper white collar jobs because they provide steady income, favorable working hours, social security benefits, and childcare services.

Single women participate in the labor force in rural and urban areas at the same rate (about 32 percent), whereas married women in rural areas participate more than twice as much as those in cities (40.74 percent compared to 18.25 percent). This gap seems to be caused by differences in rural and urban married agricultural employment, since married employment rates are higher in urban areas for all other occupations.

The "Totals" column in Table 6 suggests that despite being younger, single women are more educated than married women. Over three-quarters of married women have less than a secondary school education; about three-quarters of single women have a secondary school education or higher. Since single women are younger, they are more likely to have been affected by the Compulsory School Law in 1997, which made completing secondary school mandatory for all Turkish nationals. Hence, differences in educational attainment between single and married women are likely related to birth cohort and not necessarily a result of early marriage.

Table 5.2 shows that single women work in the same field as their parents at above average rates, and that daughter occupation appears to be more strongly related to mother occupation than father occupation. Having a mother who works in an upper white collar job is negatively correlated with daughter labor force participation; yet having a mother who works in agriculture, however, has a strong positive relationship with labor force participation. In addition to the presence of wealth effects which reduce the need for daughters from wealthy families to work, women whose mothers work in upper white collar jobs may attend school at higher rates. Only 14.14 percent of single women attending school participate in the labor force (Table 5.1).

Table 5.2. Participation rates for single women by parent's employment status and occupation

	LFP	Ag	BC	LWC	UWC	% Total	Total
Mother Labor Force Status							
Not in labor force	28.77	1.98	4.04	9.30	6.01	249,524	75.52
Works in agriculture	48.07	**38.80**	2.06	3.17	1.39	43,402	13.14
Works in blue collar	35.15	0.71	**13.12**	10.27	4.01	6,205	1.88
Works in lower WC	32.39	0.38	3.08	**15.86**	5.05	14,600	4.42
Works in upper WC	28.44	4.92	2.34	7.87	**6.85**	12,719	3.85
Unemployed	39.48	0.33	3.64	12.54	4.20	3,979	1.20
Father Labor Force Status							
Not in labor force	36.00	2.71	4.55	11.23	8.56	82,173	24.87
Works in agriculture	39.20	**29.72**	2.18	3.04	1.48	48,442	14.66
Works in blue collar	26.00	2.56	**5.14**	8.66	3.35	57,394	17.37
Works in lower WC	24.05	1.58	3.77	**8.80**	3.38	37,432	11.33
Works in upper WC	30.63	4.01	2.67	9.76	**6.93**	89,220	27.00
Unemployed	31.41	1.55	7.23	8.62	3.21	15,768	4.77
Total	31.70	6.81	3.84	8.78	5.33	330,429	25.37

Entries are interpreted as the percent of women in a row who belong to a given column. For example, 48.07 percent of women whose mothers work in agriculture participate in the labor force. Entries are bolded where parent and daughter occupations match.

Table 5.3. Participation rates of married women by spouse's employment status and occupation

	LFP	Ag	BC	LWC	UWC	% Total	Total
Spouse Education							
Illiterate	21.08	18.73	0.58	1.24	0.14	18,974	1.95
Literate, no schooling	22.97	19.35	0.97	1.84	0.17	55,842	5.74
Primary school	25.02	16.76	2.49	3.93	0.56	487,780	50.18
Secondary school	21.03	9.16	3.11	5.37	1.46	120,990	12.45
High school	21.01	4.93	2.23	6.71	4.77	90,014	9.26
Vocational school	22.49	5.00	3.32	6.89	4.68	87,938	9.05
Higher education	35.20	1.39	0.95	6.41	23.94	110,591	11.38
Spouse Labor Force Status							
Not in labor force	8.13	3.06	1.10	2.19	1.32	202,358	20.82
Works in agriculture	61.86	**60.05**	0.67	0.70	0.20	140,085	10.75
Works in blue collar	18.21	5.91	**4.38**	4.58	1.33	241,581	18.55
Works in lower WC	20.62	3.79	2.74	**8.35**	3.30	157,624	12.10
Works in upper WC	29.74	3.15	1.54	7.71	**15.41**	175,098	13.44
Unemployed	18.47	2.73	3.22	5.41	2.10	55,544	5.71
Total	24.88	12.09	2.32	4.75	4.06	972,129	74.63

Entries are interpreted as the percent of women in a row who belong to a given column. For example, 21.08 percent of women with illiterate spouses participate in the labor force. Entries are bolded where husband and wife occupation match.

Similarly, non-agricultural father employment corresponds to below average labor force participation rates. Conversely, a father's unemployment or not participating in the labor force corresponds with above average daughter labor rates. Together, these findings suggest the existence of an added worker effect among single women, meaning that daughters enter the work force when primary income earners (i.e. fathers) are unemployed.

Table 5.3 suggests that married labor force participation is positively related to spouse employment and negatively related to spouse unemployment and non-participation. Rather than an added worker effect, these correlations suggest the presence of a discouraged worker effect for married women; however, this claim must be tested empirically.

Married women with employed husbands participate in the same field as their husbands at above average rates. This makes sense for agriculture because farming is often a family business in Turkey. Outside of agriculture, husbands and wives likely pursue the same types of jobs because their education levels are correlated. For example, highly educated men are likely to married highly educated women; both are likely to work in upper white collar jobs. Poorly educated men are likely to marry poorly educated women, which means that in urban areas blue collar jobs are the only jobs available to them.

While it is possible to extend this bivariate analysis to other categorical variables such as year and region, these variables are treated as control variables given the narrow focus of this paper. Similarly, non-categorical variables such as the number of children are considered in the following section, since there is no intuitive way to represent them as categorical variables for bivariate analysis.

VI. Empirical Specification

Although bivariate cross tabulations are useful for finding general trends in the data, multivariate regressions are needed to estimate the effect of changing one variable while others remain constant. In total there are five regressions for five dependent variables – labor force participation, agricultural, blue collar, lower white collar, and upper white collar employment. Each dependent variable is a binary variable equal to one if a woman participates in the labor force or in the given occupation. Data for single and married women are pooled, making it possible to test for differences in the impact of explanatory variables across the two groups. *Married* is an indicator variable equal to one if a woman is married; it interacts with all other

explanatory variables except for number of children, because only a small number of single women have children (N = 588, or less than 0.01 percent of the sample).

Similarly, *single* is an indicator variable equal to one if a woman is single that is used to set parent variables to zero for married women. Spouse variables for single women are also set to zero. The reason for this construction is that every single woman in the sample lives with at least one parent, but not all married women live with parents. The dataset contains only information on parents who live in the reference woman's household, so one cannot distinguish the effects of living with no parents by choice or necessity.

The full regression equation is:

In effect, two equations are estimated simultaneously, one for each group:

$$
\begin{aligned}
\text{Single LFP}_i = \quad & \beta_0 \\
& + \beta_2 age_i + \beta_4 age_i^2 \\
& + \beta_6 educ_i + \beta_8 urban_i \times educ_i \\
& + \beta_{10} mom\_educ_i + \beta_{11} mom\_work_i \\
& + \beta_{12} dad\_educ_i + \beta_{13} dad\_work_i \\
& + \beta_{16} household\_size_i \\
& + \beta_{18} kids0\text{-}5_i + \beta_{19} urban_i \times kids0\text{-}5_i \\
& + \beta_{20} kids6\text{-}14_i + \beta_{21} urban_i \times kids6\text{-}14_i \\
& + \beta_{22} region_i + \beta_{23} year_i
\end{aligned}
$$

$$
\begin{aligned}
\text{Married LFP}_i = \quad & \beta_0 + \beta_1 \\
& + (\beta_2 + \beta_3) age_i + (\beta_4 + \beta_5) age_i^2 \\
& + (\beta_6 + \beta_7) educ_i + (\beta_8 + \beta_9) urban_i \times educ_i \\
& + \beta_{14} spouse\_educ_i + \beta_{15} spouse\_work_i \\
& + (\beta_{16} + \beta_{17}) household\_size_i \\
& + \beta_{18} kids0\text{-}5_i + \beta_{19} urban_i \times kids0\text{-}5_i \\
& + \beta_{20} kids6\text{-}14_i + \beta_{21} urban_i \times kids6\text{-}14_i \\
& + \beta_{22} region_i + \beta_{23} year_i
\end{aligned}
$$

Each *educ, work, region,* and *year* variable is coded in the same way described in Section IV. As is standard for multivariate regression, a reference category is selected for each categorical variable so that the relative change in probability of participation or employment with

$$
\begin{aligned}
\mathbf{LFP}_i = \quad & \beta_0 + \beta_1 married_i \\
& + \beta_2 age_i + \beta_3 married_i \times age_i \\
& + \beta_4 {age_i}^2 + \beta_5 married_i \times {age_i}^2 \\
& + \beta_6 educ_i + \beta_7 married_i \times educ_i \\
& + \beta_8 urban_i \times educ_i + \beta_9 married_i \times urban_i \times educ_i \\
& + \beta_{10} single_i \times mom\_educ_i + \beta_{11} single_i \times mom\_work_i \\
& + \beta_{12} single_i \times dad\_educ_i + \beta_{13} single_i \times dad\_work_i \\
& + \beta_{14} married_i \times spouse\_educ_i + \beta_{15} married_i \times spouse\_work_i \\
& + \beta_{16} household\_size_i + \beta_{17} married_i \times household\_size_i \\
& + \beta_{18} kids0\text{-}5_i + \beta_{19} urban_i \times kids0\text{-}5_i \\
& + \beta_{20} kids6\text{-}14_i + \beta_{21} urban_i \times kids6\text{-}14_i \\
& + \beta_{22} region_i + \beta_{23} year_i
\end{aligned}
$$

a change in education or household composition can be estimated. $\{\beta_0 \ldots \beta_{23}\}$ are the coefficient vectors for the explanatory variables to be estimated.

Household size is a vector of three variables: one for each the number of employed, unemployed, and non-participating household members. The *household size* variables are calculated with the formulas in Table 6.1 to avoid double counting parents, spouses and reference women. Parents are considered as *household employed, unemployed* or *dependents* for married women because their parent variables are set to zero. *Household dependents* includes household members ages 15 and over and those under 15 who are not children of the reference woman. A woman's children are accounted for by *kids0-5* and *kids6-14*, which are also defined in Table 6.1. For a full list of variables used in this study, please consult Appendix C.

Table 6.1. Descriptions of household size variables

Variable	Single Women	Married Women
Household employed	Employed household members – (1|woman is employed) – (1|mom is employed) – (1|dad is employed)	Employed household members– (1|woman is employed) – (1|spouse is employed)
Household unemployed	Unemployed household members – (1|woman is unemployed) – (1|mom is unemployed) – (1|dad is unemployed)	Unemployed household members – (1|woman is unemployed) – (1|spouse is unemployed)
Household dependents	Household members who do not participate in the labor force – (1|woman is not in LFP) – (1|mom is not in LFP) – (1|dad is not in LFP) + *hh_num_children – kids0-5 – kids6-14*	Household members who do not participate in the labor force– (1|woman is not in LFP) – (1|spouse is not in LFP) + *hh_num_children – kids0-5 – kids6-14*
hh_num_children	Total number of household members ages 0-15	
kids 0-5	Number of reference woman's children ages 0-5	
kids 6-14	Number of reference woman's children ages 6-14	

If a single woman lives with one parent, the education and employment variables of the missing spouse are set to zero, and one of the *parent missing* variables in Table 6.2 is set to one, depending on the marital status of the non-absent parent. For example, if a single woman lives with her divorced mother, mother education and employment variables are set normally, father education and employment variables are set to zero, and *dad_missing_divorce* is set to one. If a

single woman lives with her widowed father, father education and employment variables are set normally, mother education and employment are set to zero, and *mom_missing_deceased* is set to one. Note that for both *mom_missing_married* and *dad_missing_married*, the present parent could be married to the missing parent or to someone else.

Table 6.2. Description of missing parent variables

Variable	**N**	**Description**
mom_missing_divorce	1,504	Mother absent, woman lives with divorced father
mom_missing_deceased	3,505	Mother absent, woman lives with widowed father
mom_missing_cohabit	1	Dropped due to small *N*
mom_missing_single	20	Dropped due to small *N*
mom_missing_married	1,484	Mother absent, woman lives with father who is married
dad_missing_divorce	12,705	Father absent, woman lives with divorced mother.
dad_missing_deceased	24,171	Father absent, woman lives with widowed mother.
dad_misisng_cohabit	13	Dropped due to small *N*
dad_missing_married	9,683	Father absent, woman lives with mother who is married
dad_missing_single	137	Father absent, woman lives with single mother

VII. Regression Results

Because of the large number of explanatory variables, the discussion is limited to those that are economically significant. Unless otherwise noted, results that are referred to as "significant" are statistically significant at the 0.001 level. The regression results are divided into multiple tables throughout this section. The "married" and "urban" entries in these tables are generated by summing the main and interaction effects estimates displayed in Appendix D, so they can be interpreted as raw percentage point increases in the predicted probability. Significance level for each coefficient is determined using an F-test testing if the sum of the main and interaction effects is statistically different from zero. The F-statistic for the test is reported in brackets below the coefficient.

For example, the coefficient, β^*, in Table 7.2 for married women with a primary school education living in urban areas is calculated in the following way.

$$\beta^* = \beta_{primary} + \beta_{married\times primary} + \beta_{urban\times primary} + \beta_{married\times urban\times primary}$$

Its significance level is determined by calculating the F-statistic testing the null hypothesis:

$$\boldsymbol{H_0}: \quad \beta_{primary} + \beta_{married\times primary} + \beta_{urban\times primary} + \beta_{married\times urban\times primary} = 0$$

For a full table of original results, please see Appendix D. These include coefficients for region and year fixed effects, which were included in the regression but are not discussed in detail here because they are used as control variables and not the main focus of this study. Significance levels are calculated based on p-values determined by clustered standard errors based on the 26 statistical regions of Turkey.

Table 7.1. Predicted regression coefficients for age

	LFP		**Agriculture**		**Blue Collar**		**Lower WC**		**Upper WC**	
	Single	Married	Single	Married	Single	Married	Single	Married	Single	Married
Age	0.0320***	0.0226***	0.0024**	0.0045***	0.0007	0.0018***	0.0136***	0.0094***	0.0112***	0.0065***
	[11.9073]	[303.5249]	[3.0219]	[26.3356]	[0.6965]	[21.7188]	[7.7923]	[66.6824]	[5.4318]	[71.0405]
Age^2	-0.0005***	-0.0003***	-0.0000**	-0.0001***	-0.0000**	0.0000***	-0.0002***	-0.0001***	-0.0001***	-0.0001***
	[-11.3451]	[288.1476]	[-3.0939]	[27.4937]	[-3.1645]	[41.1121]	[-8.3153]	[68.5588]	[-4.6972]	[68.4476]
Observations	1,302,558		1,302,558		1,302,558		1,302,558		1,302,558	
Adjusted R-squared	0.288		0.429		0.040		0.074		0.321	

t-statistics in brackets for single women. F-statistics in brackets for married women. * p<0.05 ** p<0.01 *** p<0.001

Most of the coefficients in Table 7.1 are significantly positive for *age* and negative for age^2, which suggests that the relationship between economic participation and age follows an inverted U-shape (see Figure 7.1). As the life cycle model of labor supply predicts, participation is lowest among young and old women and highest among those who are middle aged. The coefficients for *age* are significantly greater for single women, whereas those for age^2 are larger for married women. As a result, the curves for married women in Figure 7.1 are flatter, meaning the effect of age is less pronounced.

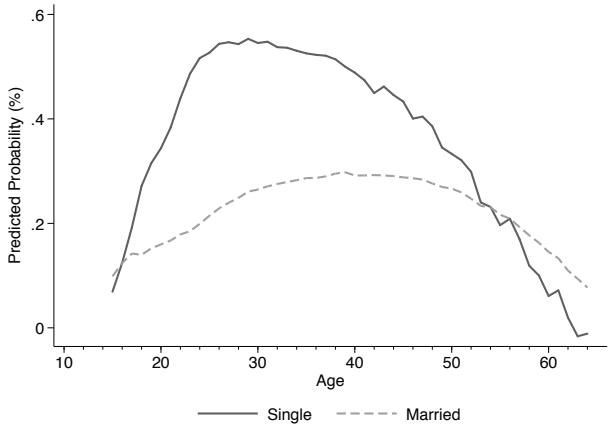
The age^2 coefficients are statistically significant for agricultural and blue collar jobs, but they have magnitudes close to zero. *Age* does not seem to significantly predict blue collar employment in general. Evidently, these occupations do not follow the life cycle model because they offer women fewer opportunities for wage growth.

Counter to expectations, married women's participation in agriculture increases with age (Table 7.1 and Figure 7.1(b)). The coefficient for *age* was 0.002, which corresponds with an increase of about the same size that Gündüz-Hoşgör and Smits predicted. Because age^2 is not significant, a 5-year increase in age corresponds with a 1-percentage point increase in the probability of agricultural employment. Viewed over the life course in Figure 7.1(b), the probability of agricultural employment doubles between the ages of 25 and 50.

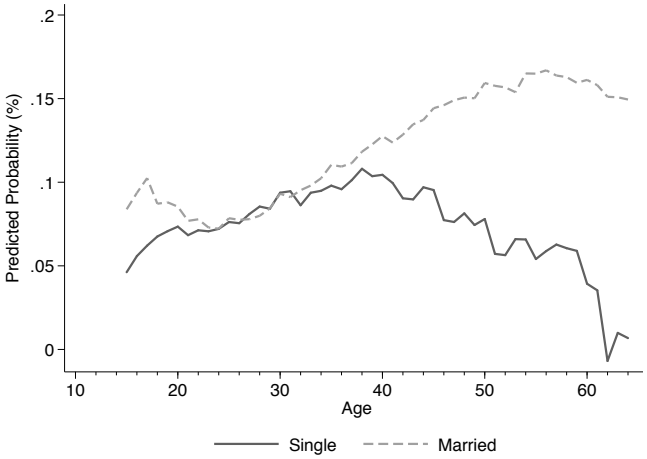
Gündüz-Hoşgör and Smits do not comment on the significant positive relationship between married agricultural employment and age. Older married women may be more likely to work in agriculture because they were raised during a time when high female participation in farming families was common. They may prefer working in agriculture because they can easily change tasks and hours as they age; formal jobs outside of agriculture may not offer the same flexibility. Alternatively, older women may lack the technological skills or connections that blue collar or white collar jobs require. For another, the trend may be an artifact of how participation is defined: In farming families, younger married women take care of children and perform domestic chores that are considered outside formal employment, while older women perform less physically demanding tasks such as feeding chickens that are counted as part of the labor force. The same relationship with age is not observed for single women in agriculture; however, only 5 percent of single women in the sample are older than 35, so the predictions in Figure 7.1 for older single women are not robust.

Figure 7.1. Predicted Participation Rates by Age and Marital Status

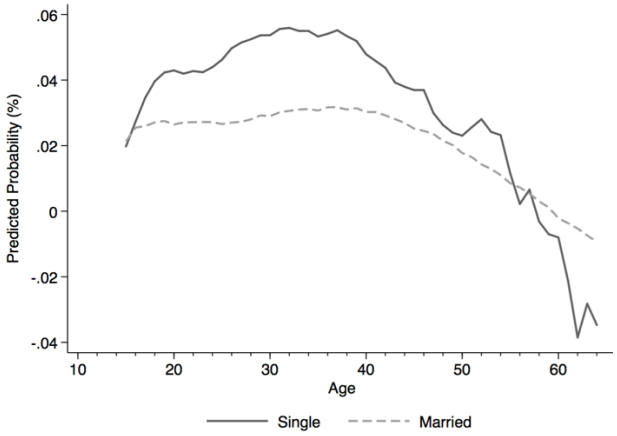
(a) Labor Force Participation



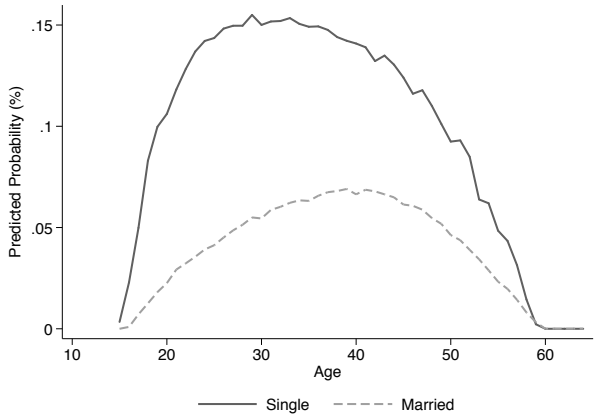
(b) Agriculture



(c) Blue Collar



(d) Lower White Collar



(e) Upper White Collar

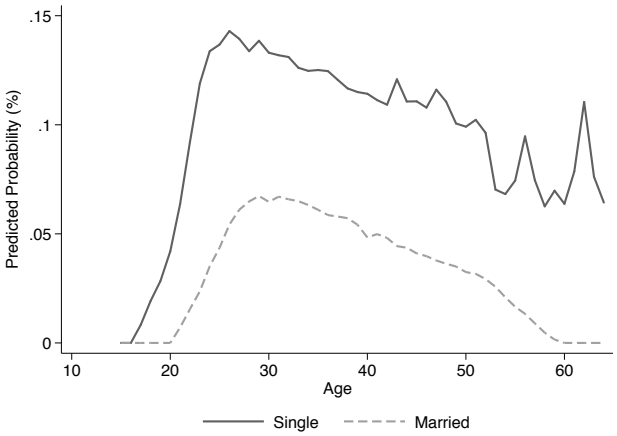


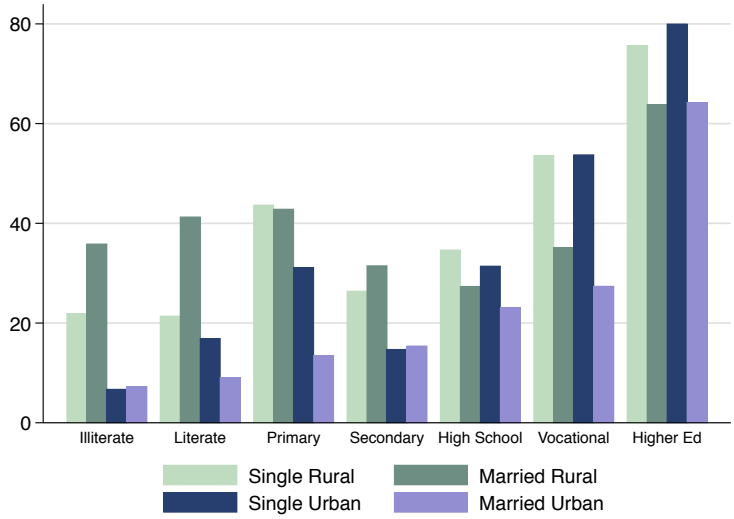
Table 7.2. Predicted regression coefficients for education in rural and urban areas

	LFP		Agriculture		Blue Collar		Lower WC		Upper WC	
Education Variable	Single	Married	Single	Married	Single	Married	Single	Married	Single	Married
Rural										
Literate, no schooling	0.0140	0.0157	-0.0221	0.0361***	-0.0001	-0.0049*	0.0176**	-0.0118***	0.0133***	0.0033***
	[0.7522]	[3.4254]	[-1.6900]	[22.7964]	[-0.0451]	[5.4266]	[3.3441]	[48.5106]	[4.1449]	[39.4499]
Primary school	0.0754*	-0.0051	0.0636**	0.0437*	0.0160	-0.0101***	-0.0059	-0.02***	-0.0025	-0.0064***
	[2.4984]	[0.1095]	[2.8164]	[6.4211]	[1.7968]	[27.345]	[-1.0494]	[50.8422]	[-1.1032]	[20.9645]
Secondary school	0.0749*	-0.0448*	-0.0411*	-0.0353	0.0267***	0.0011	0.0427**	-0.0002	0.0275***	0.0020
	[2.3429]	[7.5733]	[-2.0757]	[4.0111]	[3.7754]	[0.0968]	[3.6318]	[0.0026]	[5.8335]	[0.9346]
High school	0.0614	-0.0418	-0.1047***	-0.0937***	0.0008	-0.0046	0.0824***	0.0404***	0.0206***	0.0114**
	[1.9410]	[3.5454]	[-5.7558]	[17.3042]	[0.2140]	[1.5537]	[5.6878]	[37.9293]	[5.0159]	[9.1438]
Vocational school	0.2076***	0.0343	-0.1121***	-0.0986***	0.0195*	0.0043	0.1125***	0.0408***	0.0734***	0.0724***
	[5.7546]	[3.1564]	[-6.2540]	[22.0522]	[2.1612]	[0.841]	[4.8606]	[18.441]	[11.0617]	[92.9899]
Higher education	0.4096***	0.356***	-0.1692***	-0.1345***	-0.0197*	-0.0205***	0.1165***	0.0457***	0.2555***	0.4431***
	[12.5086]	[107.5026]	[-7.3017]	[19.4415]	[-2.7110]	[35.8109]	[9.1074]	[41.6874]	[12.9016]	[427.9974]
Urban										
Literate, no schooling	0.1282**	-0.0218***	0.0475*	-0.014***	0.0428	-0.0021	0.0126**	-0.0055**	0.014***	0.0042***
	[11.825]	[18.7104]	[5.3604]	[19.6599]	[4.1291]	[2.2606]	[10.6297]	[12.9978]	[26.4227]	[60.3356]
Primary school	0.1426**	-0.0259**	-0.0002	-0.026**	0.0783***	0.0028	0.0271***	0.0036	0.0014	-0.0046**
	[12.6707]	[10.2945]	[0.0001]	[11.4509]	[20.2814]	[1.5708]	[14.0834]	[3.5336]	[0.324]	[12.7542]
Secondary school	0.2147***	0.0072	0.0384	-0.0278**	0.0361***	0.0065	0.0711***	0.0212***	0.0321***	0.0015
	[30.1593]	[0.5121]	[2.8942]	[9.7887]	[29.4865]	[2.5846]	[42.3967]	[67.1648]	[55.9153]	[1.0926]
High school	0.2279***	0.0802***	0.0057	-0.0276*	-0.0026	-0.0021	0.126***	0.0709***	0.0264***	0.0183***
	[40.171]	[50.4243]	[0.0966]	[6.8819]	[0.1078]	[0.3975]	[78.4409]	[388.6746]	[38.3759]	[46.6438]
Vocational school	0.4063***	0.1169***	-0.0053	-0.0325**	0.0068	0.0035	0.1785***	0.0552***	0.0981***	0.0642***
	[131.4826]	[138.6572]	[0.0777]	[9.8765]	[0.3729]	[0.9771]	[111.3848]	[296.9916]	[273.618]	[205.403]
Higher education	0.6301***	0.4976***	-0.0163	-0.0266*	-0.0275*	-0.016***	0.1471***	0.0609***	0.3321***	0.4494***
	[443.783]	[1222.8647]	[0.7788]	[5.8843]	[6.0295]	[26.9649]	[153.5359]	[81.7948]	[636.7162]	[1097.8384]
Observations	1,302,558		1,302,558		1,302,558		1,302,558		1,302,558	
Adjusted R-squared	0.288		0.429		0.040		0.074		0.321	

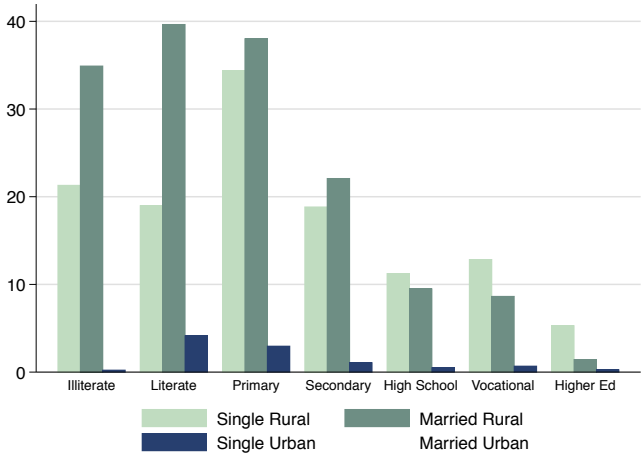
t-statistics in brackets for single women. F-statistics in brackets for married women. * p<0.05 ** p<0.01 *** p<0.001

Except for married women in urban areas, participation peaks at primary school among women with high school education or less (Figure 7.2(a)). This is a surprising finding that may be explained by the theory that women stop their education after primary school in order to join the labor force. Figure 7.2(b) shows that primary school graduates in rural areas are more likely to work in agriculture than any other group with formal schooling. According to Figure 7.2(c), single primary school graduates in urban areas have the greatest likelihood of blue collar employment overall. Together, these findings suggest that single women who stop their education early tend to work in blue collar or agricultural jobs; married dropouts work only in agriculture.

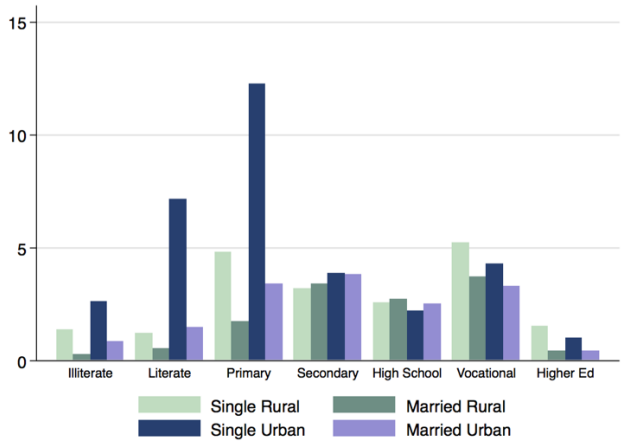
Figure 7.2a Predicted labor force participation by education level



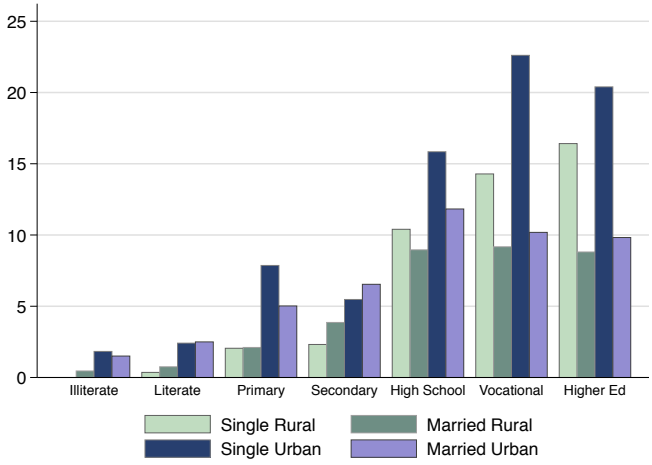
(b) Agriculture



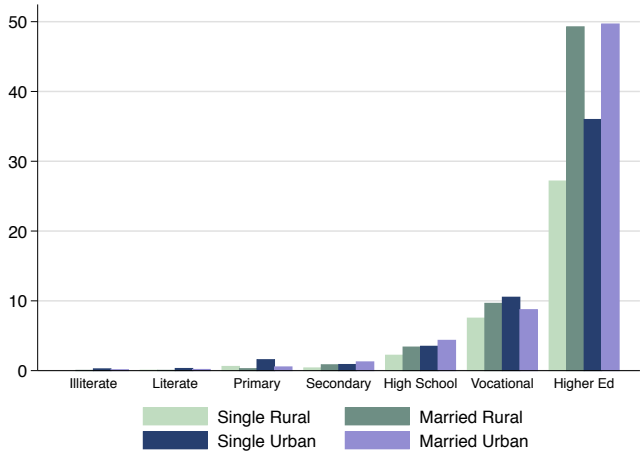
(c) Blue Collar



(d) Lower White Collar



(e) Upper White Collar



The only group in Figure 7.2(a) whose participation rates increase with each educational step as Gündüz-Hoşgör and Smits found is married women in urban areas, who also have the lowest labor force participation probabilities overall. They do not exhibit the same primary school peak as the other groups, because the wages available to them for are low relative to the cost of childcare and other domestic services. On the other hand, single women have no children and perform fewer household duties, so they face lower opportunity costs when seeking blue collar employment. Alternatively, stigma against manufacturing jobs may cause families to prefer sending single over married women to work when household income is low.

Unsurprisingly, single women tend to have higher predicted participation and employment probabilities than married women across all levels of education and in both urban and rural areas. The exception is upper white collar employment: married women with a higher education are about 11 percentage points more likely than single women to be employed in urban upper white collar jobs. In rural areas, the gap increases to 19 percentage points (Table 7.2). Interestingly, this pattern among higher educated women only occurs for upper white collar jobs: in other occupations and labor force participation, single women are significantly more likely to participate or there is no significant difference between the two groups.

Married women with higher education degrees may be more attracted to upper white collar jobs because they offer more stability and childcare benefits. They may also have greater access to these jobs through their husbands, since husband and wife occupation are correlated. Employers may favor hiring married over single women because they are less likely to switch jobs and are therefore safer hires. The actual upper white collar participation rates of single women with higher education degrees are likely much higher, because I excluded those living with no parents—a group that tends to be more educated and work in upper white collar jobs.

Overall the results in Table 7.2 support the existence of an under-participation trap in urban areas. Less educated single and married women participate less in urban areas than their rural counterparts, while highly educated women are equally likely to participate in either type of location (Figure 7.2(a)). Figure 7.2(a) suggests that married women in urban areas need a higher education degree to participate at the same rate as those in rural areas; urban single women need at least a high school degree to participate at the same rate as rural single women. Upper white collar jobs almost exclusively require higher education degrees. Agriculture requires less than a

secondary school education, and blue collar jobs tend to be filled by single women who are literate or have a primary school education.

Table 7.3. Regression coefficients for attending school

	LFP		Agriculture		Blue Collar		Lower WC		Upper WC	
	Single	Married	Single	Married	Single	Married	Single	Married	Single	Married
Attending school	-0.6651***	-0.6504***	-0.1071**	-0.0914***	-0.1444***	-0.1202***	-0.2121***	-0.214***	-0.0330	-0.0937***
	[-15.1173]	[231.2527]	[-3.5722]	[20.9778]	[-3.8940]	[17.4264]	[-13.0522]	[317.3566]	[-1.7195]	[166.0322]
Age × Attending	0.0236***	0.0255***	0.0032**	0.0026***	0.0051**	0.0038***	0.0079***	0.0097***	0.0012	0.0046***
	[14.6616]	[345.7032]	[3.1438]	[20.5043]	[3.5353]	[16.7085]	[9.0684]	[429.2374]	[0.9547]	[113.3493]
Observations	1,302,558		1,302,558		1,302,558		1,302,558		1,302,558	
Adjusted R-squared	0.288		0.429		0.040		0.074		0.321	

t-statistics in brackets for single women. F-statistics in brackets for married women. * p<0.05 ** p<0.01 *** p<0.001

Not surprisingly, the coefficients in Table 7.3 show that attending school decreases the likelihood of economic participation; however, the negative effect diminishes with age. Thus, older women are more likely to attend school to improve their labor market outcomes. The effect is not significantly different for married versus single women, except for upper white collar jobs. Attending school decreases married women's probability of upper white collar employment by 9.37 percentage points, but has no significant effect on single women. I suspect that single women who attend school and work in upper white collar jobs pursue academic programs that have more flexible coursework and/or encourage internships. They also have fewer household obligations compared to married women that allow them to work on top of going to school. Married women who attend school essentially work two jobs as well: schoolwork and household production.

Table 7.4. Predicted labor force participation probability by urban or rural location

	Single			Married		
	Attending	Not Attending	% Change	Attending	Not Attending	% Change
Urban	0.1490	0.4209	-64.60	0.4143	0.1796	130.68
Rural	0.1403	0.3791	-63.00	0.4447	0.4065	9.40

Probabilities are predicted holding all other explanatory variables at their means.

Other differences in participation rates between single and married women attending school can be explained by the fact that married women tend to be older. To see how this is

possible, Table 7.4 shows the predicted labor force participation probabilities for single and married women of mean age. Although attending school decreases a single woman's predicted participation probability by over 60 percent, it increases the probability of a married woman by 9 percent in rural areas and an astounding 130 percent in urban areas.

Table 7.5. Regression coefficients for living in an urban area

	LFP		**Agriculture**		**Blue Collar**		**Lower WC**		**Upper WC**	
	Single	Married	Single	Married	Single	Married	Single	Married	Single	Married
Urban	-0.1185*** [-4.1406]	-0.1124*** [24.6226]	-0.1470*** [-5.1528]	-0.1046*** [20.4128]	-0.0002 [-0.0610]	-0.0032* [5.4087]	0.0224*** [6.4590]	0.0020 [1.119]	0.0046 [1.5235]	-0.0045*** [37.3779]
Observations	1,302,558		1,302,558		1,302,558		1,302,558		1,302,558	
Adjusted R-squared	0.288		0.429		0.040		0.074		0.321	

t-statistics in brackets for single women. F-statistics in brackets for married women. * p<0.05 ** p<0.01 *** p<0.001

Even after accounting for potential interaction effects with education and children, living in an urban area decreases single and married women's labor force participation probably by about 11 percentage points. Although the effects are not significantly different for the two groups in absolute terms, they are very different relatively. Since married women have overall low predicted labor force participation probabilities, living in an urban area corresponds with a 54.9 percent decrease[4] on average. For single women, living in an urban area decreases the probability of participation by only 2.78 percent on average.

In statistical terms, living in an urban area has a significantly different effect for married women in agriculture and white collar jobs than that for single women. But as the example above demonstrates, interpreting these differences is not simple. For this reason, Table 7.5 displays coefficients that correspond with the predicted change in participation likelihood associated with moving from a rural to an urban area. Unsurprisingly, living in an urban area significantly decreases the probability of agricultural employment. Despite the greater availability of blue and white collar jobs, however, living a city seems to have a negative or no significant effect on blue collar and upper white collar employment. It is possible that urban-education interaction effects explain these variations in employment almost entirely.

[4] Relative changes in probability are calculated by using the labor force participation regression results to predict probabilities for single and married women by setting *urban* equal to 0 or 1 and fixing all other explanatory variables at their means. The percent change is then calculated by $\frac{rural\ probability - urban\ probability}{rural\ probability} \times 100$

Table 7.6. Regression coefficients for household size variables

	LFP		Agriculture		Blue Collar		Lower WC		Upper WC	
	Single	Married	Single	Married	Single	Married	Single	Married	Single	Married
# Employed	0.0714***	0.0479***	0.0435***	0.0523***	0.0194**	-0.0009	0.0095***	-0.0011*	0.0017**	-0.0017***
	[16.0367]	[50.3031]	[6.0947]	[67.177]	[3.3798]	[4.0397]	[4.4544]	[4.8813]	[2.8910]	[21.0007]
# Unemployed	0.0476***	-0.0167***	-0.0180***	-0.0123***	0.0031*	-0.0028***	-0.0005	-0.0049***	-0.0058***	-0.0042***
	[7.2313]	[40.0003]	[-5.1424]	[38.2063]	[2.0649]	[19.2925]	[-0.2520]	[25.7096]	[-5.2150]	[34.387]
# Dependents	-0.0154***	-0.0183***	-0.0071***	-0.0128***	-0.0017**	-0.0004	-0.0031***	-0.0013	-0.0001	-0.0023***
	[-9.0110]	[45.0925]	[-3.9135]	[27.8694]	[-3.3813]	[0.1552]	[-3.7418]	[3.5099]	[-0.1922]	[23.3106]
Observations	1,302,558		1,302,558		1,302,558		1,302,558		1,302,558	
Adjusted R-squared	0.288		0.429		0.040		0.074		0.321	

t-statistics in brackets for single women. F-statistics in brackets for married women. * p<0.05 ** p<0.01 *** p<0.001

Except for agriculture, for which large farming families are common, having more employed household members was expected to decrease both single and married participation. The results in Table 7.6 suggest another story: high household employment significantly increases the probability of participation in most occupations. The effect is significantly greater for single women in all but agricultural jobs, which supports the idea that families are more likely to send single women over wives to work.

Interestingly, the number of employed household members has opposite effects for single and married women in white collar jobs. However, the coefficients are small enough that the economic interpretation is insignificant. More puzzling is that the model predicts single women's blue collar employment probability to increase by 1.94 percentage points with each additional employed household member. I expect families with many employed household members are likely to be poor and less educated, which is why they send their single daughters to work in blue collar jobs.

Based on the results in Table 7.6 for the number of unemployed household members, there appears to be an added worker effect for single women. For each additional unemployed household member, a single woman's labor force participation probability increases by 4.76 percentage points. Her probability of blue collar employment also increases significantly by 0.3 percentage points, which is small in absolute terms but large relatively. The coefficients are likely negative for agricultural and white collar employment because the number of unemployed household members is correlated with economic conditions that also make single women more likely to be unemployed.

The household unemployment coefficients for married women are significantly different from those for single women in labor force participation and blue collar employment. In effect, there seems to be a discouraged worker effect for married women. For each additional unemployed household member, a married woman's labor force participation probability decreases by 1.67 percentage points. Relatively speaking, this is a very large effect because predicted married female participation probabilities tend to be low. The coefficients for the other regressions in Table 7.6 are negative because married women are not only more likely to be unemployed due to poor economic conditions, but also more likely to drop out of the labor force. Together, these findings support the theory that families in need of income are more likely to send single daughters over wives to work.

Finally, the number of dependents—individuals other than a woman's own children who do not participate in the labor force—have a strictly negative impact on labor force participation and employment in all occupations for both single and married women. Furthermore, the effect of household dependents is not statistically different for single versus married women, except for white collar jobs. For lower white collar jobs, dependents impact single women more; for upper white collar jobs, they impact married women more. Again, because the coefficients indicate absolute differences in probability, the relative change in married women's predicted probabilities are almost certainly greater.

The size and significance of the coefficients in Table 7.7 suggests that parent education and employment are significant determinants of single female labor force status. As parent education level increases, a daughter's labor force participation and lower white collar employment probabilities decrease, yet her upper white collar employment probability increases. Parent education level is undoubtedly correlated with household wealth, so women with highly educated parents have less need to work, thus predicted labor force participation is lower. Greater household wealth is correlated with higher daughter education, however, so the probability of upper white collar employment increases.

Mother employment has a significantly greater impact on daughter participation than father employment in all but upper white collar jobs. In particular, living with an employed mother significantly increases the probability of working in the mother's field, unless the mother works in an upper white collar job. Upper white collar jobs are most likely an anomaly in this regard because of the wealth effects described above. Mother and father unemployment

significantly increase daughter labor force participation by about 12 and 7 percentage points, thereby supporting the existence of an added worker effect for single women. In particular, father unemployment increases the probability of blue collar work by 2.57 percentage points and mother unemployment significantly increases that of lower white collar by 2.87. These are most likely the fields in which daughters seek employment to compensate for lost family income resulting from unemployment.

Table 7.7. Regression coefficients for parent employment and education

	LFP		**Agriculture**		**Blue Collar**		**Lower WC**		**Upper WC**	
	Mother	Father	Mother	Father	Mother	Father	Mother	Father	Mother	Father
Education level										
Literate, no schooling	-0.0269***	-0.0110	-0.0111**	-0.0006	-0.0010	0.0019	-0.0099***	-0.0096**	-0.0039**	-0.0022
	[-5.1658]	[-1.7294]	[-2.8889]	[-0.1298]	[-0.3446]	[0.5298]	[-4.4912]	[-3.1652]	[-3.2418]	[-1.2590]
Primary school	-0.0047	-0.0148	-0.0189*	-0.0188**	-0.0047	0.0045	0.0104**	-0.0016	0.0053*	0.0006
	[-0.5131]	[-2.0595]	[-2.7335]	[-3.2035]	[-1.4361]	[1.2212]	[3.6675]	[-0.6122]	[2.7680]	[0.4295]
Secondary school	0.0034	-0.0329***	-0.0108	-0.0201**	-0.0107**	-0.0072	-0.0000	-0.0096**	0.0192***	0.0011
	[0.3177]	[-5.3646]	[-1.4336]	[-3.6084]	[-2.9460]	[-1.9489]	[-0.0062]	[-3.0006]	[4.4371]	[0.6898]
High school	-0.0193**	-0.0373***	-0.0003	-0.0121	-0.0099**	-0.0067	-0.0244***	-0.0214***	0.0180**	0.0080**
	[-2.8710]	[-4.3072]	[-0.0397]	[-1.6869]	[-3.4840]	[-2.0265]	[-5.4744]	[-4.5095]	[3.4323]	[2.8003]
Vocational school	-0.0247*	-0.0538***	-0.0078	-0.0183*	-0.0134***	-0.0107**	-0.0269***	-0.0276***	0.0242***	0.0048
	[-2.6166]	[-7.5141]	[-1.1854]	[-2.4084]	[-4.5379]	[-3.2146]	[-5.1350]	[-5.5287]	[4.1668]	[1.6333]
Higher education	-0.0554***	-0.0632***	0.0017	-0.0143	-0.0088*	-0.0046	-0.0694***	-0.0526***	0.0386***	0.0168***
	[-5.4818]	[-7.2670]	[0.2805]	[-1.7856]	[-2.4565]	[-1.2696]	[-10.2234]	[-11.4102]	[5.9367]	[3.9036]
Employment										
Works in agriculture	0.1600***	0.0371**	0.2273***	0.0878***	-0.0234*	-0.0143*	-0.0218***	-0.0162***	-0.0069***	-0.0113**
	[5.6228]	[3.0468]	[7.9500]	[13.2781]	[-2.6849]	[-2.4252]	[-6.2305]	[-4.2293]	[-4.3087]	[-3.7092]
Works in blue collar	0.0863***	0.0075	-0.0032	0.0110***	0.0845***	0.0121**	0.0062	-0.0036	-0.0022	-0.0102***
	[7.9818]	[1.7962]	[-0.8499]	[5.2782]	[8.4688]	[3.7058]	[1.4807]	[-1.0721]	[-1.0576]	[-4.2187]
Works in lower WC	0.0475***	0.0031	-0.0004	0.0082***	-0.0039	0.0052*	0.0548***	0.0016	-0.0064**	-0.0118***
	[12.5677]	[0.8149]	[-0.1594]	[4.6086]	[-1.7262]	[2.4724]	[14.0247]	[0.7296]	[-2.8360]	[-6.4057]
Works in upper WC	0.0246**	-0.0188**	0.0035	0.0093***	0.0048	-0.0059*	0.0315***	0.0005	-0.0158**	-0.0128**
	[3.4672]	[-2.8085]	[1.7012]	[3.8769]	[1.2845]	[-2.1597]	[5.5432]	[0.1686]	[-3.0360]	[-3.6121]
Unemployed	0.1252***	0.0679***	0.0005	0.0105**	-0.0036	0.0257***	0.0287***	0.0027	-0.0025	-0.0055**
	[10.5933]	[12.6091]	[0.1452]	[3.1283]	[-1.0460]	[4.2778]	[6.9433]	[0.8656]	[-0.9058]	[-2.8059]
Lives with one parent*										
Divorced	-0.0344	-0.1013**	0.0543**	0.0923***	0.0238	0.0022	-0.0405***	-0.0925***	-0.0598**	-0.0769**
	[-1.7671]	[-3.7013]	[3.7007]	[4.5603]	[1.5346]	[0.1850]	[-3.9681]	[-6.1654]	[-3.4062]	[-3.4180]
Widowed	-0.0835***	-0.1406***	0.0494**	0.0806***	0.0175	-0.0076	-0.0590***	-0.1028***	-0.0666**	-0.0710**
	[-4.0954]	[-5.4289]	[3.4974]	[4.3873]	[1.2398]	[-0.7330]	[-6.1399]	[-8.6390]	[-3.6938]	[-3.2334]
Married to non-parent	-0.0566*	-0.0059	0.0559**	0.0109	0.0259	-0.0110	-0.0498***	-0.0267*	-0.0646***	0.0146
	[-2.5433]	[-0.5021]	[3.2357]	[1.1162]	[1.6567]	[-1.7529]	[-4.8537]	[-2.2416]	[-3.7694]	[1.9041]
Single (mother only)	-0.0097		0.0703*		0.0383		-0.0554*		-0.0572	
	[-0.2450]		[2.3398]		[1.6670]		[-2.6840]		[-1.6903]	
Observations	1,302,558		1,302,558		1,302,558		1,302,558		1,302,558	
Adjusted R-squared	0.288		0.429		0.040		0.074		0.321	

*Entries refer to living with a mother or father, as indicated by the column category, whose marital status is indicated by the row category. For example, living with a divorced mother (and no father) decreases the probability of labor force participation by 3.44 percentage points.
t-statistics in brackets. * = p<0.05, ** = p<0.01, *** = p<0.001

There is strong evidence that missing a parent significantly decreases a daughter's probability of labor force participation and white collar employment, and that missing a mother mostly corresponds with a greater negative effect than missing a father. Agriculture and blue

collar jobs are exceptions. Daughters are more likely to be employed in agriculture, probably to make up for the tasks that would have been performed by the missing parent. Daughters are not significantly more or less likely to be employed in blue collar jobs, probably because of the difficulty in predicting an outcome that corresponds with less than 1 percent of the sample (N = 1,942). Living with a single mother does not have a significant effect on an employment either, likely for the same reason (N = 137).

Table 7.8. Regression coefficients for spouse employment and education

	LFP	**Ag**	**BC**	**LWC**	**UWC**
Spouse Education					
Literate, no schooling	-0.0072 [-1.4126]	0.0025 [0.5211]	-0.0023* [-2.2706]	-0.0059** [-3.2872]	0.0005 [0.7745]
Primary school	-0.0236** [-3.1650]	0.0111 [1.9283]	-0.0072*** [-4.0734]	-0.0149*** [-7.2603]	-0.0064*** [-5.5481]
Secondary school	-0.0371*** [-5.9057]	0.0021 [0.3474]	-0.0053** [-3.6204]	-0.0178*** [-7.5378]	-0.0093*** [-7.6085]
High school	-0.0531*** [-7.9815]	-0.0012 [-0.1885]	-0.0099*** [-6.3380]	-0.0248*** [-8.7519]	-0.0098*** [-7.4410]
Vocational school	-0.0507*** [-8.1166]	-0.0012 [-0.1974]	-0.0064** [-3.4333]	-0.0249*** [-8.5066]	-0.0101*** [-8.6138]
Higher education	-0.0786*** [-9.9403]	-0.0037 [-0.5907]	-0.0153*** [-6.8689]	-0.0619*** [-12.3176]	0.0175*** [8.2746]
Spouse Employment					
Works in agriculture	0.4351*** [19.1072]	0.4442*** [18.9852]	-0.0045* [-2.4090]	-0.0062** [-3.1772]	0.0029*** [4.8373]
Works in blue collar	0.0676*** [7.0897]	0.0332*** [4.5911]	0.0182*** [5.4744]	0.0096*** [4.4443]	0.0014* [2.4697]
Works in lower WC	0.0829*** [10.3214]	0.0224*** [5.6788]	0.0054** [3.5792]	0.0456*** [9.5710]	0.0019* [2.0808]
Works in upper WC	0.0890*** [8.6623]	0.0246*** [5.4975]	-0.0017 [-1.4294]	0.0337*** [6.0117]	0.0342*** [10.6799]
Unemployed	0.0849*** [9.4575]	0.0073* [2.4096]	0.0127*** [4.4775]	0.0245*** [7.8675]	0.0041*** [5.0737]
Attending school	-0.0151*** [-4.2329]	0.0035 [1.6642]	0.0027 [1.6424]	0.0003 [0.1084]	-0.0113** [-3.3036]
Observations	1,302,558	1,302,558	1,302,558	1,302,558	1,302,558
Adjusted R-squared	0.288	0.429	0.040	0.074	0.321

t-statistics in brackets. * p<0.05 ** p<0.01 *** p<0.001

The results in Table 7.8 confirm Gündüz-Hoşgör and Smits' finding that as husband education level increases, the probability of labor force participation decreases. The only exception is having a husband with a higher education, which corresponds with a 1.75

percentage points increase in a woman's probability of upper white collar job employment. Wives are significantly more likely to work in the same occupation as their husbands. The effect seems to be greatest for husbands working in agriculture, but since the results in Table 7.8 come from five separate regressions, it is not possible to test the relative size of the coefficients.

Husband unemployment increases the probability of participation in most categories, however the coefficients in 7.8 may be skewed by the reference category—having a spouse who does not participate in the labor force. Also, having a husband who is attending school significantly decreases a woman's probability of labor force participation and upper white collar employment.

Table 7.9. Regression coefficients for children under 15

	LFP		**Agriculture**		**Blue Collar**		**Lower WC**		**Upper WC**	
Number of Children	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Ages 0-5	-0.0515***	-0.0452***	-0.0282***	0.0015	-0.0060***	-0.0094***	-0.0088**	-0.0248***	-0.0020*	-0.003*
	[-8.3967]	[31.3677]	[-4.9449]	[0.8232]	[-4.0887]	[18.3474]	[-3.6058]	[52.3929]	[-2.3530]	[4.5377]
Ages 6-14	-0.0000	-0.0081	0.0124	0.0017	-0.0004	0.0005	-0.0058***	-0.0057**	-0.0052***	-0.0024*
	[-0.0042]	[3.7886]	[1.9002]	[3.7135]	[-0.5864]	[1.1677]	[-4.4244]	[9.685]	[-6.8654]	[4.3683]
Observations	1,302,558		1,302,558		1,302,558		1,302,558		1,302,558	
Adjusted R-squared	0.288		0.429		0.040		0.074		0.321	

t-statistics in brackets. * = p<0.05, ** = p<0.01, *** = p<0.001

Table 7.9 proves an unsurprising result: children ages 0-5 decrease mother labor force participation and employment across all occupations. Children ages 6-14, however, do not seem to significantly influence mother participation or employment except in white collar jobs. In lower white collar jobs, a one-child increase corresponds with a 0.5 percentage point decrease in the probability of lower white collar jobs, which is not insignificant in relative terms. Using the lower white collar model to predict employment probabilities, having one more child aged 6-14 corresponds with about a 2 percentage point decrease in probability on average.

VIII. Conclusion

While education explains much of the variation in Turkey's female labor market, other variables such as age, household size, parent and spouse education and employment, number of children, and living in a city seem to be significant contributors as well. My results confirm Gündüz-Hoşgör and Smits' finding that the probability of labor force participation increases with

each educational step, but with an important exception: participation peaks among female primary school graduates. I predict that these women come from relatively poorer families, so they stop their education early to enter the labor force, specifically agricultural jobs in rural areas and blue collar jobs in urban areas. When these women marry, they stop working in blue collar jobs because increased household demand for childbearing and household production raise the opportunity cost of pursuing market work.

This main finding aligns with my result that families are more willing to send single daughters over wives to work in times of financial need. While there is conclusive evidence of an added worker effect for single women, whether there is an added or discouraged worker effect for married women is unclear. Studies seeking to clarify this result should control for economic conditions by including regional unemployment rates and other business cycle indicators.

Counter to this trend, married university graduates are more likely to participate in upper white collar jobs than single university graduates. Married women may have greater access to these jobs through their husbands, who are likely to be employed in upper white collar jobs as well. Married women may also prefer upper white collar jobs because they offer favorable working hours, childcare services, and fair compensation for their time. Most likely the actual difference between single and married women's employment is smaller because my sample excludes single women living with no parents—a group with relatively higher education and upper white collar employment. Married women are also more likely than single women to work in agriculture; and their employment probability increases with age. I offered several possible explanations for this trend, however this finding is likely influenced by the Turkish HLFS definitions of employment and labor force participation.

Blue collar work is the most difficult category to predict, and also the occupation that Turkish women enter out of necessity. Less than 4 percent of women in my sample work in blue collar jobs. Both the cross-tabulations and regression results show that single women with a primary school education in urban areas are most likely to participate in blue collar work, followed by women who are literate but have no formal schooling. Married women are highly unlikely to work in blue collar jobs.

In addition to these findings, another contribution to the literature might be the techniques used to "reconstruct" families from disjoint datasets and to pool single and married women into a

single regression by defining household variables in clever ways. To the best of my knowledge, such techniques have not been applied to study Turkey's female labor market before.

Future research should seek to build a more robust model of labor force participation that accounts for endogeneity in the explanatory variables, education in particular. Multinomial logistic or mixed linear effect models may do the trick. It would also be worthwhile to repeat this analysis using a longitudinal data set that includes household income variables or other proxies for wealth. This would allow one to estimate the effects of marriage, childbirth, and education more precisely and without omitted variable bias.

Finally, the results of this study suggest that increasing education and subsidizing childcare may reverse the depressing effects of under-participation and informality traps on Turkish female labor force participation. By more fully utilizing the potential of its female labor force, Turkey may be able to achieve its goal of becoming one of the world's ten largest economies.

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Appendix A. Selected Turkish policies affecting women in the workplace between 2002-2012

Year	Policy	Effect
2002	New Civil Code	Increased legal marriage age to 18 for both sexes (from 17 for men, 15 for women); abolished concept of husband "head of family" and incorporated spouses as equal partners with equal rights over family; recognized women's unpaid labor as having economic value
2003	New Labor Law (No. 4857)	Reinforced prohibition on gender-based discrimination; added prohibitions of discrimination on basis of marital status or family responsibilities, dismissal on grounds of pregnancy, and sexual harassment in the workplace. Extended paid maternity leave from 12 to 16 weeks (eight weeks each before and after birth), 18 weeks for twins or more
2003	Family Court Law (No. 4787)	Establish specialized courts in districts with populations more than 100,000 people to enforce Civil Code and ensure gender equality [Turkish Ministry for Family and Social Policy 2012]
2005	New Penal Code	"In 2005, the new Penal Code (No. 5237) came into force giving priority to the protection of individuals' rights and freedoms. With the law, offensive acts towards women are exposed and classified as an "offense against an individual" rather than a public offense. New significant changes were also introduced to the definition of sexual violence12 and of sexual harassment in the workplace and punishments for these offences were reinforced.13 Furthermore, Articles 5 and 122 of the Penal Code state "no discrimination shall be made between persons with respect of sex." (TEPAV)
2010	Amendment to Constitution Article 10 (No. 5982)	"Measures taken for this purpose shall not be interpreted as contrary to the principle of equality."
2011	Law No. 6111	Extended maternity leave to 12 months for civil servants, 6 months for others on unpaid basis. Granted 10-day voluntary paternity leave to civil servants whose wives have given birth.

Sources: Government of Turkey, Acar et. al 2013, İnan and Aşık, 2014

Appendix B. Occupation type by NACE Revision 2 classifications

Statistical Classification of Economic Activities (NACE Rev. 2)	Division	Type	Total	% Total
Agriculture, forestry and fishing	01-03	Agriculture	172,671	43.16
Mining and quarrying	05-09	Blue Collar	187	0.04
Manufacturing	10-33	Blue Collar	56,867	14.21
Electricity, gas, steam and air conditioning supply	35	Blue Collar	329	0.08
Water supply; sewerage, waste management and remediation activities	36-39	Blue Collar	402	0.1
Construction	41-43	Blue Collar	1,316	0.63
Wholesale and retail trade; repair of motor vehicles and motorcycles	45-47	Blue Collar	39,230	9.81
Transportation and storage	49-53	Blue Collar	3,388	0.85
Accommodation and food service activities	55-56	Blue Collar	11,047	2.76
Information and communication	58-63	White Collar	2,521	0.63
Financial and insurance activities	64-66	White Collar	5,905	1.47
Real estate activities	68	White Collar	911	0.23
Professional, scientific and technical activities	69-75	White Collar	7,609	1.89
Administrative and support service activities	77-82	White Collar	9,583	2.4
Public administration and defense; compulsory social security	84	White Collar	12,413	3.1
Education	85	White Collar	30,990	7.75
Human health and social work activities	86-88	White Collar	24,575	6.14
Arts, entertainment and recreation	90-93	White Collar	1,148	0.28
Other service activities	94-96	White Collar	6,625	1.66
Activities of households as employer	97-98	Blue Collar	11,029	2.76
Activities of extraterritorial organisations and bodies	99	White Collar	114	0.03
Total women aged 15-64 in labor force			452,207	27.54

Note: Full documentation for NACE Rev. 2 classifications are available via EuroStat at http://bit.ly/1EKGS03

Appendix C. Explanatory variable definitions, sources

Variable	Description	Source
LFP	1 if woman participates in the labor force (is employed or unemployed at the time of the survey); 0 otherwise	HLFS
Agriculture	1 if woman is employed in an agricultural job; 0 otherwise	Coded according to Table 4.2
Blue Collar	1 if woman is employed in an blue collar; 0 otherwise	Coded according to Table 4.2
Lower White Collar	1 if woman is employed in an lower white collar; 0 otherwise	Coded according to Table 4.2
Upper White Collar	1 if woman is employed in an upper white collar job; 0 otherwise	Coded according to Table 4.2
Age	Woman's age in years	HLFS
Age^2	*Age* × *Age*	Calculated with HLFS data
Education	Illiterate (Reference) Literate, no schooling Primary school Secondary school High school Vocational high school Higher education	HLFS, ISCE
Attending school	1 if attending school at time of survey; 0 otherwise	HLFS
Age × *Attending school*	*Age* × *Attending school*	Calculated with HLFS data
Urban	1 if living in a city with a population of 20,001 or more; 0 otherwise	HLFS
Urban × *Education*	*Urban* × *Education*	Calculated with HLFS data
Parent Education	0 if parent is illiterate, missing, or woman is married, otherwise 1 for one of the following: Literate, no schooling Primary school Secondary school High school Vocational high school Higher education	Calculated with HLFS data

Parent Employment	0 if parent is not in the labor force, missing, or woman is married, otherwise 1 for one of the following: Works in agriculture Works in blue collar Works in lower white collar Works in upper white collar Unemployed	Calculated with HLFS data
Spouse Education	0 if spouse is illiterate or woman is single, otherwise 1 for one of the following: Literate, no schooling Primary school Secondary school High school Vocational high school Higher education	Calculated with HLFS data
Spouse Employment	0 if spouse is not in the labor force, missing or woman is single, otherwise 1 for one of the following: Works in agriculture Works in blue collar Works in lower white collar Works in upper white collar Unemployed	Calculated with HLFS data
# Employed Household Members	See Table 6.1	Calculated with HLFS data
# Unemployed Household Members	See Table 6.1	Calculated with HLFS data
# Dependent Household Members	See Table 6.1	Calculated with HLFS data
Kids 0-5	Number of reference woman's children ages 0-5 living in household	Calculated with HLFS data
Kids 6-14	Number of reference woman's children ages 6-14 living in household	Calculated with HLFS data
Region	Level 2 Statistical Regions of Turkey (see Appendix E)	HLFS

Year	2004 (Reference)	HLFS
	2005	
	2006	
	2007	
	2008	
	2009	
	2010	
	2011	
	2012	

Appendix D. Final regression results

	LFP	Agriculture	Blue Collar	Lower WC	Upper WC
Married	-0.0114	-0.0433*	-0.0074	-0.0067	0.0177*
	[-0.5923]	[-2.3522]	[-1.2325]	[-0.9659]	[2.4984]
Age	0.0320***	0.0024**	0.0007	0.0136***	0.0112***
	[11.9073]	[3.0219]	[0.6965]	[7.7923]	[5.4318]
Age^2	-0.0005***	-0.0000**	-0.0000**	-0.0002***	-0.0001***
	[-11.3451]	[-3.0939]	[-3.1645]	[-8.3153]	[-4.6972]
Education (Main Effect, Illiterate Reference)					
Literate, no school	0.0140	-0.0221	-0.0001	0.0176**	0.0133***
	[0.7522]	[-1.6900]	[-0.0451]	[3.3441]	[4.1449]
Primary school	0.0754*	0.0636**	0.0160	-0.0059	-0.0025
	[2.4984]	[2.8164]	[1.7968]	[-1.0494]	[-1.1032]
Secondary school	0.0749*	-0.0411*	0.0267***	0.0427**	0.0275***
	[2.3429]	[-2.0757]	[3.7754]	[3.6318]	[5.8335]
High school	0.0614	-0.1047***	0.0008	0.0824***	0.0206***
	[1.9410]	[-5.7558]	[0.2140]	[5.6878]	[5.0159]
Vocational school	0.2076***	-0.1121***	0.0195*	0.1125***	0.0734***
	[5.7546]	[-6.2540]	[2.1612]	[4.8606]	[11.0617]
Higher education	0.4096***	-0.1692***	-0.0197*	0.1165***	0.2555***
	[12.5086]	[-7.3017]	[-2.7110]	[9.1074]	[12.9016]
Attending school	-0.6651***	-0.1071**	-0.1444***	-0.2121***	-0.0330
	[-15.1173]	[-3.5722]	[-3.8940]	[-13.0522]	[-1.7195]
Age × Attendance	0.0236***	0.0032**	0.0051**	0.0079***	0.0012
	[14.6616]	[3.1438]	[3.5353]	[9.0684]	[0.9547]
Urban	-0.1185***	-0.1470***	-0.0002	0.0224***	0.0046
	[-4.1406]	[-5.1528]	[-0.0610]	[6.4590]	[1.5235]
Urban × Education (Interaction Effects)					
Urban × literate	0.1142***	0.0695**	0.0430*	-0.0050	0.0008
	[3.9730]	[2.9705]	[2.0900]	[-1.1075]	[0.6703]
Urban × primary	0.0672**	-0.0638***	0.0623***	0.0329***	0.0038*
	[3.2034]	[-4.2158]	[5.3123]	[7.9611]	[2.4551]
Urban × secondary	0.1398***	0.0795***	0.0094*	0.0283***	0.0046**
	[6.7058]	[3.9099]	[2.6501]	[8.8396]	[2.9630]
Urban × high school	0.1665***	0.1104***	-0.0034	0.0436***	0.0058
	[7.1183]	[5.0228]	[-0.5342]	[8.8013]	[1.9718]
Urban × vocational	0.1987***	0.1068***	-0.0127	0.0660***	0.0247**
	[6.3212]	[5.2603]	[-1.3080]	[5.2882]	[3.5476]
Urban × higher education	0.2205***	0.1530***	-0.0078	0.0306**	0.0766***
	[8.2392]	[5.6538]	[-1.3393]	[3.1940]	[5.6385]
Single × Mother Education					
Literate, no school	-0.0269***	-0.0111**	-0.0010	-0.0099***	-0.0039**
	[-5.1658]	[-2.8889]	[-0.3446]	[-4.4912]	[-3.2418]
Primary school	-0.0047	-0.0189*	-0.0047	0.0104**	0.0053*
	[-0.5131]	[-2.7335]	[-1.4361]	[3.6675]	[2.7680]
Secondary school	0.0034	-0.0108	-0.0107**	-0.0000	0.0192***
	[0.3177]	[-1.4336]	[-2.9460]	[-0.0062]	[4.4371]
High school	-0.0193**	-0.0003	-0.0099**	-0.0244***	0.0180**
	[-2.8710]	[-0.0397]	[-3.4840]	[-5.4744]	[3.4323]
Vocational school	-0.0247*	-0.0078	-0.0134***	-0.0269***	0.0242***
	[-2.6166]	[-1.1854]	[-4.5379]	[-5.1350]	[4.1668]
Higher education	-0.0554***	0.0017	-0.0088*	-0.0694***	0.0386***
	[-5.4818]	[0.2805]	[-2.4565]	[-10.2234]	[5.9367]
Single × Mother Employment					
Works in agriculture	0.1600***	0.2273***	-0.0234*	-0.0218***	-0.0069***
	[5.6228]	[7.9500]	[-2.6849]	[-6.2305]	[-4.3087]
Works in blue collar	0.0863***	-0.0032	0.0845***	0.0062	-0.0022
	[7.9818]	[-0.8499]	[8.4688]	[1.4807]	[-1.0576]
Works in lower WC	0.0475***	-0.0004	-0.0039	0.0548***	-0.0064**
	[12.5677]	[-0.1594]	[-1.7262]	[14.0247]	[-2.8360]
Works in upper WC	0.0246**	0.0035	0.0048	0.0315***	-0.0158**
	[3.4672]	[1.7012]	[1.2845]	[5.5432]	[-3.0360]
Unemployed	0.1252***	0.0005	-0.0036	0.0287***	-0.0025
	[10.5933]	[0.1452]	[-1.0460]	[6.9433]	[-0.9058]
Single × Missing Mother					
Lives with divorced father	-0.1013**	0.0923***	0.0022	-0.0925***	-0.0769**
	[-3.7013]	[4.5603]	[0.1850]	[-6.1654]	[-3.4180]
Lives with widowed father	-0.1406***	0.0806***	-0.0076	-0.1028***	-0.0710**
	[-5.4289]	[4.3873]	[-0.7330]	[-8.6390]	[-3.2334]
Lives with married father	-0.0059	0.0109	-0.0110	-0.0267*	0.0146
	[-0.5021]	[1.1162]	[-1.7529]	[-2.2416]	[1.9041]
Single × Father Education					
Literate, no school	-0.0110	-0.0006	0.0019	-0.0096**	-0.0022
	[-1.7294]	[-0.1298]	[0.5298]	[-3.1652]	[-1.2590]
Primary schooll	-0.0148	-0.0188**	0.0045	-0.0016	0.0006
	[-2.0595]	[-3.2035]	[1.2212]	[-0.6122]	[0.4295]
Secondary school	-0.0329***	-0.0201**	-0.0072	-0.0096**	0.0011
	[-5.3646]	[-3.6084]	[-1.9489]	[-3.0006]	[0.6898]
High school	-0.0373***	-0.0121	-0.0067	-0.0214***	0.0080**
	[-4.3072]	[-1.6869]	[-2.0265]	[-4.5095]	[2.8003]
Vocational school	-0.0538***	-0.0183*	-0.0107**	-0.0276***	0.0048
	[-7.5141]	[-2.4084]	[-3.2146]	[-5.5287]	[1.6333]
Higher education	-0.0632***	-0.0143	-0.0046	-0.0526***	0.0168***
	[-7.2670]	[-1.7856]	[-1.2696]	[-11.4102]	[3.9036]
Single × Father Employment					
Works in agriculture	0.0371**	0.0878***	-0.0143*	-0.0162***	-0.0113**
	[3.0468]	[13.2781]	[-2.4252]	[-4.2293]	[-3.7092]
Works in blue collar	0.0075	0.0110***	0.0121**	-0.0036	-0.0102***
	[1.7962]	[5.2782]	[3.7058]	[-1.0721]	[-4.2187]
Works in lower WC	0.0031	0.0082***	0.0052*	0.0016	-0.0118***
	[0.8149]	[4.6086]	[2.4724]	[0.7296]	[-6.4057]
Works in upper WC	-0.0188**	0.0093***	-0.0059*	0.0005	-0.0128**
	[-2.8085]	[3.8769]	[-2.1597]	[0.1686]	[-3.6121]
Unemployed	0.0679***	0.0105**	0.0257***	0.0027	-0.0055**
	[12.6091]	[3.1283]	[4.2778]	[0.8656]	[-2.8059]
Single × Missing Father					
Lives with divorced mother	-0.0344	0.0543**	0.0238	-0.0405***	-0.0598**
	[-1.7671]	[3.7007]	[1.5346]	[-3.9681]	[-3.4062]
Lives with widowed mother	-0.0835***	0.0494**	0.0175	-0.0590***	-0.0666**
	[-4.0954]	[3.4974]	[1.2398]	[-6.1399]	[-3.6938]
Lives with married mother	-0.0566*	0.0559**	0.0259	-0.0498***	-0.0646***
	[-2.5433]	[3.2357]	[1.6567]	[-4.8537]	[-3.7694]
Lives with single mothere	-0.0097	0.0703*	0.0383	-0.0554*	-0.0572
	[-0.2450]	[2.3398]	[1.6670]	[-2.6840]	[-1.6903]
Married × Age Effects					
Married × Age	-0.0094***	0.0021**	0.0011	-0.0042***	-0.0047**
	[-5.4145]	[2.8897]	[1.3156]	[-5.4723]	[-3.2708]
Married × Age^2	0.0002***	-0.0000*	-0.0000	0.0001***	0.0001*
	[6.4106]	[-2.3295]	[-0.3302]	[6.8102]	[2.6351]
Married × Education Effects					
Married × Literate	0.0017	0.0582***	-0.0048	-0.0294***	-0.0099**
	[0.1058]	[4.9826]	[-1.4611]	[-6.4916]	[-3.0149]
Married × Primary	-0.0805	-0.0199	-0.0261**	-0.0141**	-0.0039
	[-1.9859]	[-0.6148]	[-2.9990]	[-3.2484]	[-1.2626]
Married × Secondary	-0.1197**	0.0058	-0.0256***	-0.0430***	-0.0255***
	[-3.0439]	[0.2165]	[-4.2138]	[-4.8643]	[-5.1068]
Married × High school	-0.1032*	0.0110	-0.0054	-0.0420**	-0.0092
	[-2.7489]	[0.4597]	[-1.1351]	[-3.5554]	[-1.9763]
Married × Vocational	-0.1733***	0.0135	-0.0151	-0.0718**	-0.0009
	[-4.5974]	[0.5380]	[-1.4172]	[-3.2912]	[-0.0865]
Married × Higher ed	-0.0536	0.0348	-0.0008	-0.0708***	0.1876***
	[-1.2807]	[1.6142]	[-0.1128]	[-5.5298]	[5.8876]
Married × Attendance Effects					
Married × Attendance	0.0147	0.0157	0.0242	-0.0019	-0.0607**
	[0.6341]	[1.2391]	[1.9507]	[-0.1250]	[-3.2770]
Married × Age × Attendance	0.0019	-0.0007	-0.0013	0.0019	0.0034**
	[1.4923]	[-1.1802]	[-1.9225]	[2.0570]	[3.2159]
Married × Urban × Education Effects					
Married × Urban	0.0061	0.0424***	-0.0030	-0.0204***	-0.0091**
	[0.6802]	[5.6379]	[-0.9710]	[-5.8238]	[-2.8547]
Married × Urban × Literate	-0.1517***	-0.1196***	-0.0402	0.0113*	0.0001
	[-5.3984]	[-5.3892]	[-1.8442]	[2.6103]	[0.0785]
Married × Urban × Primary	-0.0880***	-0.0059	-0.0494***	-0.0094*	-0.0021
	[-5.5764]	[-0.3199]	[-3.8590]	[-2.5741]	[-1.2884]
Married × Urban × Secondary	-0.0878***	-0.0720***	-0.0040	-0.0069	-0.0051**
	[-5.5291]	[-3.9867]	[-1.0744]	[-1.5244]	[-2.8887]
Married × Urban × High school	-0.0445**	-0.0444**	0.0059	-0.0131	0.0011
	[-2.8720]	[-3.4929]	[1.3870]	[-1.8134]	[0.2935]
Married × Urban × Vocational	-0.1161***	-0.0408**	0.0118	-0.0515**	-0.0330**
	[-3.9923]	[-3.0461]	[1.3651]	[-3.2672]	[-3.2661]
Married × Urban × Higher ed	-0.0789**	-0.0451***	0.0123*	-0.0154	-0.0703**
	[-3.5974]	[-5.1259]	[2.2554]	[-1.2392]	[-3.1893]
Spouse Education					
Literate, no school	-0.0072	0.0025	-0.0023*	-0.0059**	0.0005
	[-1.4126]	[0.5211]	[-2.2706]	[-3.2872]	[0.7745]
Primary school	-0.0236**	0.0111	-0.0072***	-0.0149***	-0.0064***
	[-3.1650]	[1.9283]	[-4.0734]	[-7.2603]	[-5.5481]
Secondary school	-0.0371***	0.0021	-0.0053**	-0.0178***	-0.0093***
	[-5.9057]	[0.3474]	[-3.6204]	[-7.5378]	[-7.6085]
High school	-0.0531***	-0.0012	-0.0099***	-0.0248***	-0.0098***
	[-7.9815]	[-0.1885]	[-6.3380]	[-8.7519]	[-7.4410]
Vocational school	-0.0507***	-0.0012	-0.0064**	-0.0249***	-0.0101***
	[-8.1166]	[-0.1974]	[-3.4333]	[-8.5066]	[-8.6138]
Higher education	-0.0786***	-0.0037	-0.0153***	-0.0619***	0.0175***
	[-9.9403]	[-0.5907]	[-6.8689]	[-12.3176]	[8.2746]
Attending school	-0.0151***	0.0035	0.0027	0.0003	-0.0113**
	[-4.2329]	[1.6642]	[1.6424]	[0.1084]	[-3.3036]
Spouse Employment					
Works in agriculture	0.4351***	0.4442***	-0.0045*	-0.0062**	0.0029***
	[19.1072]	[18.9852]	[-2.4090]	[-3.1772]	[4.8373]
Works in blue collar	0.0676***	0.0332***	0.0182***	0.0096***	0.0014*
	[7.0897]	[4.5911]	[5.4744]	[4.4443]	[2.4697]
Works in lower WC	0.0829***	0.0224***	0.0054**	0.0456***	0.0019*
	[10.3214]	[5.6788]	[3.5792]	[9.5710]	[2.0808]
Works in upper WC	0.0890***	0.0246***	-0.0017	0.0337***	0.0342***
	[8.6623]	[5.4975]	[-1.4294]	[6.0117]	[10.6799]
Unemployed	0.0849***	0.0073*	0.0127***	0.0245***	0.0041***
	[9.4575]	[2.4096]	[4.4775]	[7.8675]	[5.0737]
Household Size					
# Employed	0.0714***	0.0435***	0.0194**	0.0095***	0.0017**
	[16.0367]	[6.0947]	[3.3798]	[4.4544]	[2.8910]
# Unemployed	0.0476***	-0.0180***	0.0031*	-0.0005	-0.0058***
	[7.2313]	[-5.1424]	[2.0649]	[-0.2520]	[-5.2150]
# Dependents	-0.0154***	-0.0071***	-0.0017**	-0.0031***	-0.0001
	[-9.0110]	[-3.9135]	[-3.3813]	[-3.7418]	[-0.1922]
Married × Household Size					
Married × # Employed	-0.0235*	0.0087	-0.0203**	-0.0106***	-0.0034***
	[-2.7209]	[1.8183]	[-3.4284]	[-4.5520]	[-4.2281]
Married × # Unemployed	-0.0643***	0.0057	-0.0059**	-0.0045	0.0016
	[-8.2046]	[1.6870]	[-3.4910]	[-1.7898]	[1.2022]
Married × # Dependents	-0.0029	-0.0057	0.0014	0.0019**	-0.0023***
	[-0.8551]	[-1.7905]	[0.9666]	[3.6213]	[-4.3416]
Number of Children					
Ages 0-5	-0.0515***	-0.0282***	-0.0060***	-0.0088**	-0.0020*
	[-8.3967]	[-4.9449]	[-4.0887]	[-3.6058]	[-2.3530]
Ages 6-14	-0.0000	0.0124	-0.0004	-0.0058***	-0.0052***
	[-0.0042]	[1.9002]	[-0.5864]	[-4.4244]	[-6.8654]
Urban × Children 0-5	0.0063	0.0298***	-0.0034**	-0.0161***	-0.0010
	[0.8977]	[5.2021]	[-2.8569]	[-11.1522]	[-1.1894]
Urban × Children 6-14	-0.0080	-0.0107	0.0009	0.0001	0.0028***
	[-1.2096]	[-1.5962]	[1.2120]	[0.0699]	[3.7715]
Constant	-0.1168***	0.0244	0.0271*	-0.1037***	-0.0849***
	[-3.7978]	[1.0794]	[2.4515]	[-4.8913]	[-7.0226]
Region Effects	Yes	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes	Yes
Observations	1302558	1302558	1302558	1302558	1302558
Adjusted R^2	0.288	0.429	0.040	0.074	0.321

t-statistics in brackets. * p<0.05 ** p<0.01 *** p<0.001

	LFP	Agriculture	Blue Collar	Lower WC	Upper WC
Region (Istanbul is reference)					
TR21	0.0905***	0.0157***	0.0295***	0.0218***	0.0011**
	[24.0577]	[4.4399]	[28.3000]	[34.4368]	[2.9393]
TR22	0.0397***	0.0439***	-0.0107***	0.0084***	-0.0098***
	[8.5826]	[9.5320]	[-7.1131]	[7.3575]	[-24.3538]
TR31	0.0492***	0.0287***	-0.0062***	0.0135***	-0.0048***
	[29.6378]	[13.8338]	[-6.9212]	[35.3437]	[-15.8885]
TR32	0.0868***	0.0403***	0.0068***	0.0255***	-0.0085***
	[14.7761]	[6.5699]	[6.5939]	[22.0028]	[-17.4510]
TR33	0.0038	0.0368***	-0.0096***	-0.0184***	-0.0068***
	[0.8605]	[8.1622]	[-13.2840]	[-15.8530]	[-15.5103]
TR41	0.0614***	0.0281***	0.0279***	0.0040***	-0.0039***
	[38.9002]	[17.5856]	[34.8433]	[8.8970]	[-16.6422]
TR42	0.0213***	0.0259***	-0.0037***	-0.0045***	-0.0072***
	[12.2084]	[14.0356]	[-8.5692]	[-7.1830]	[-30.3346]
TR51	-0.0048*	0.0157***	-0.0250***	0.0078***	-0.0084***
	[-2.7061]	[6.3550]	[-16.3556]	[17.3798]	[-19.0413]
TR52	-0.0018	0.0305***	-0.0043***	-0.0268***	-0.0066***
	[-0.4829]	[8.9449]	[-4.2483]	[-20.3842]	[-11.4484]
TR61	0.0955***	0.0661***	-0.0100***	0.0319***	-0.0072***
	[19.7766]	[14.0008]	[-9.3862]	[34.9614]	[-13.0803]
TR62	0.0178***	0.0296***	-0.0206***	-0.0054***	-0.0084***
	[7.9154]	[11.7509]	[-31.0558]	[-6.2224]	[-33.0148]
TR63	-0.0033	0.0319***	-0.0212***	-0.0142***	-0.0082***
	[-0.9726]	[8.0042]	[-31.1784]	[-10.7988]	[-17.2839]
TR71	-0.0276***	0.0270***	-0.0272***	-0.0220***	-0.0068***
	[-8.0707]	[7.6122]	[-27.0075]	[-19.7045]	[-12.4655]
TR72	-0.0338***	0.0282***	-0.0261***	-0.0306***	-0.0096***
	[-10.8471]	[8.5068]	[-35.4287]	[-23.5116]	[-20.8554]
TR81	0.0983***	0.1205***	-0.0186***	-0.0025*	-0.0068***
	[17.9556]	[19.3921]	[-29.2029]	[-2.4689]	[-28.9238]
TR82	0.0461***	0.0540***	-0.0124***	-0.0083***	-0.0060***
	[8.9621]	[9.7673]	[-13.6180]	[-7.1935]	[-10.9414]
TR83	0.0753***	0.0979***	-0.0155***	-0.0060***	-0.0081***
	[14.8523]	[17.8964]	[-18.5319]	[-4.7139]	[-16.7846]
TR90	0.1425***	0.1694***	-0.0188***	-0.0092***	-0.0062***
	[23.8322]	[24.9613]	[-14.6992]	[-7.2341]	[-15.5334]
TRA1	0.0007	0.0806***	-0.0311***	-0.0329***	-0.0072***
	[0.1215]	[11.6201]	[-26.9208]	[-17.8652]	[-12.1170]
TRA2	-0.0253**	0.0412***	-0.0308***	-0.0261***	-0.0047***
	[-3.6551]	[5.2648]	[-18.1808]	[-7.9066]	[-3.7491]
TRB1	-0.0363***	0.0317***	-0.0307***	-0.0328***	-0.0124***
	[-7.9963]	[5.4310]	[-27.0933]	[-22.0315]	[-28.3452]
TRB2	-0.0887***	-0.0124	-0.0389***	-0.0300***	-0.0045**
	[-12.5867]	[-1.4855]	[-15.0660]	[-7.3092]	[-2.9472]
TRC1	-0.0920***	-0.0153**	-0.0300***	-0.0310***	-0.0062***
	[-24.7378]	[-3.6766]	[-17.9328]	[-13.7665]	[-7.5875]
TRC2	-0.1138***	-0.0163**	-0.0434***	-0.0344***	-0.0085***
	[-22.5906]	[-3.4595]	[-13.0281]	[-8.4265]	[-6.2346]
TRC3	-0.1093***	-0.0227***	-0.0419***	-0.0308***	-0.0061***
	[-20.4548]	[-4.4745]	[-12.5939]	[-7.5096]	[-4.0749]
Year (2004 is reference)					
2005	-0.0007	-0.0036	0.0015	0.0019	0.0008
	[-0.1471]	[-0.9940]	[1.3392]	[1.6456]	[1.5852]
2006	0.0055	-0.0032	0.002	0.0063***	0.001
	[0.8466]	[-0.6347]	[1.4282]	[4.2818]	[1.1684]
2007	0.0064	-0.0026	0.0017	0.0086***	-0.0007
	[0.9084]	[-0.4795]	[1.0147]	[7.4910]	[-0.9620]
2008	0.016	0.0018	0.0025	0.0113***	-0.0013*
	[1.9951]	[0.3109]	[1.1709]	[6.8308]	[-2.7250]
2009	0.0324***	0.0056	0.0051	0.0159***	-0.0032**
	[3.7401]	[1.0467]	[1.7490]	[8.4420]	[-3.4972]
2010	0.0459***	0.0122	0.0088**	0.0206***	-0.0044***
	[4.3552]	[1.8499]	[3.1122]	[11.2088]	[-5.8275]
2011	0.0483***	0.0115	0.0093**	0.0269***	-0.0052***
	[4.2460]	[1.4551]	[3.4776]	[12.1417]	[-5.7345]
2012	0.0503***	0.0088	0.0092**	0.0315***	-0.0035***
	[4.4913]	[1.1056]	[3.7030]	[13.4038]	[-3.8048]
Constant	-0.1168***	0.0244	0.0271*	-0.1037***	-0.0849***
	[-3.7978]	[1.0794]	[2.4515]	[-4.8913]	[-7.0226]
Observations	1,302,558	1,302,558	1,302,558	1,302,558	1,302,558
Adjusted R-squared	0.288	0.429	0.04	0.074	0.321

t-statistics in brackets. * p<0.05 ** p<0.01 *** p<0.001

Regions are coded according to the Nomenclature of Territorial Units for Statistics of Turkey in Appendix E.

Appendix E. Nomenclature of Territorial Units for Statistics (NUTS) of Turkey

Level 1	**Level 2**
TR1 Istanbul	**TR10** Istanbul
TR2 West Marmara	**TR21** Tekirdağ, Edirne, Kırklareli **TR22** Balıkesir, Çanakkale
TR3 Aegean	**TR31** İzmir **TR32** Aydın, Denizli, Muğla **TR33** Manisa, Afyonkarahisar, Kütahya, Uşak
TR4 East Marmara	**TR41** Bursa, Eskişehir, Bilecik **TR42** Kocaeli, Sakarya, Düzce, Bolu, Yalova
TR5 West Anatolia	**TR51** Ankara **TR52** Konya, Karaman
TR6 Mediterranean	**T61** Antalya, Isparta, Burdur **TR62** Adana, Mersin **TR63** Hatay, Kahramanmaraş, Osmaniye
TR7 Central Anatolia	**TR71** Kırkkale, Aksaray, Niğde, Nevşehir, Kırşehir **TR72** Kayseri Sivas Yozgat
TR8 West Black Sea	**TR81** Zonguldak, Karabük, Bartın **TR82** Kastamonu, Çankırı, Sinop **TR83** Samsun, Tokat, Çorum, Amasya
TR9 East Black Sea	**TR90** Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane
TRA Northeast Anatolia	**TRA1** Ezurum, Erzincan **TRA2** Ağrı, Kars, Iğdır, Ardahan
TRB Central East Anatolıa	**TRB1** Malatya, Elazığ, Bingöl, Tunceli **TRB2** Van, Muş, Bitliş, Hakkari
TRC Southeast Anatolıa	**TRC1** Gazientep, Adıyaman, Kilis **TRC2** Şanlıurfa, Diyarbakır **TRC3** Mardin, Batman, Şırnak, Siirt