

Gender, Education, Family Structure, and the Allocation of Labor in Iran

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December 2010

The gender gap in labor force participation (LFP) in Iran is much larger than most other countries, but it has been declining. Also, the composition of women's employment has been shifting towards professional and entrepreneurial positions, especially in the private sector. Analyzing the forces behind these patterns is important from a policy perspective and for predicting the future trends in the Iranian labor market. Understanding the case of Iran has also implications for other economies, especially those in the Middle East and North Africa, which have similar labor market conditions. Using a large sample derived from Iran's 2006 census and employing IV Probit and multinomial Logit models, we examine the role of education and other individual and family characteristics in LFP and employment of Iranian men and women aged 25-54. We find that while about 60 percent of the rise in female LFP rate between 1986 and 2006 can be attributed to the decline in fertility, the expansion of education accounts directly for about a third of the rise. However, part of the fertility effect is also owed to female education, which has played an important role in lowering the number of children ever born. Since fertility is unlikely to decline further, female education could become the main driving force in the continued rise of women's participation in the labor market. We also find that women who join the labor market as a result of tertiary education, especially at the graduate level, have a much higher chance of joining the private sector, especially as employers and self-employed, than the average person in their cohort. Contrary to the common perception, the association between education and public employment is much stronger for men than for women. These findings imply that tertiary education, especially at the graduate level, may help address the important policy challenges that Iran and other MENA countries in alleviating unemployment, diversifying the economy, and empowering women.

Key words: Gender, Education, Fertility, Marriage, Labor Force Participation, Employment.

JEL Classification: J22, J24

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1. Introduction

As in most other countries in the Middle East and North Africa (MENA), the gender gap in labor force participation (LFP) in Iran is quite notable. While for Iranian men the LFP rate is within the range common around the world, for Iranian women it is much lower than the rates typically observed elsewhere outside MENA. A number of hypotheses have been put forward in the literature to explain this phenomenon. In particular, the prevalence of conservative attitudes towards gender roles, especially among urban middle classes, seems to be the preferred explanation among researchers in the field. The rise of oil rents and incomes after the 1950s and the concomitant increase in the average number of surviving children per family may have contributed to the low and declining female LFP, at least until the 1980s (Karshenas, 2001; V. Moghadam, 2005; Ross, 2008). Since 1980, the socially restrictive policies of the Islamic Republic have been viewed by many observers as the primary impediments to the rise in LFP rate among women (V. Moghadam, 2000; F. Moghadam, 2004). However, pointing to the considerable role of economic disruptions and structural changes in Iran since 1980, some scholars have questioned the significance of the Islamic Republic's social policies as impediments for female LFP beyond the early years of the 1979 Revolution (Bahramitash and Esfahani, 2009). In fact, there are visible signs of expansion in women's role in the economy during the past two decades, along with rapid increases in their educational attainments and declines in fertility and family size. These changes are taking deeper roots as the demographic transition changes the relations within the family, between the spouses as well as between parents and children, making it possible for families to invest more intensively in the education and well-being of the next generation. Understanding the factors behind Iranian women's labor market experience is important because the trends in education and family structure are continuing and could bring about major changes in Iran's economic and social environment.

There have been a number of attempts to assess the role of education and family structure in women's LFP and employment in Iran. However, most of these studies are essentially qualitative or use simple statistical approaches that do not discern and measure the effects of various factors (e.g., Alizadeh, 2000; Mehran, 2003; Mehryar, Farjadi, and Tabibian, 2004; Rostami Povey, 2005; Rezai-Rashti and James, 2009; Bahramitash and Esfahani, 2009 and 2011). The studies that rely on quantitative methods are quite limited. Salehi-Isfahani (2005) analyzes the determinants of LFP and paid employment, using a Probit method and a sample survey of about 6000 observations in 2001. Salehi-Isfahani and Marku (2008) use a pseudo-panel based on annual household surveys during 1984-2004 to identify the age, cohort, and period effects on female LFP. Majbouri (2010) employs a short panel with about 16000 observations during 1992-1995 to examine the impact of economic stability in that period on LFP. In this paper, we make an attempt to use a recent large, census-based dataset and a more comprehensive model

to identify some of the key determinants of LFP and employment types in Iran. We also go beyond the previous work and carry out a test of exogeneity of educational attainment in LFP and employment outcomes in Iran.

Our focus is on the role of gender, education, and family structure in the choice among various options inside and outside the labor market. Discerning the role of education and fertility is of particular interest because these variables can be shaped by policy and have been underlined in the literature as important mechanisms for Iranian women to overcome the impediments to their participation in the labor market and beyond (Bahramitash and Esfahani, 2011). These effects need to be examined carefully to assess the magnitude of each and separate them from the roles played by other factors. For education in particular, the case for a large positive effect on LFP is far from clear. Theoretically, to the extent that education raises income as well as the opportunity cost of non-market activities, its net impact on LFP may be ambiguous (Bloom et al., 2009). Empirically, this ambiguity can be observed in the case of adult men, for whom the correlation between schooling and LFP is often negligible, with or without controls for simultaneity. Also, the cross-country study by Bloom et al. (2009) suggests that conditional on fertility, education may not be a significant determinant of women's LFP. Indeed, in recent decades, female LFP rate has been stagnant or declining in some countries despite significant expansion in female education. This phenomenon has been well documented for the United State, where the LFP of women with at least high school diploma, especially those with college education, has declined.¹ Another notable example is Turkey, where female LFP rate has precipitously dropped from around 77 percent in 1955 to 24.3 percent in 2007 (Tansel, 2001; World Bank, 2009). A similar trend existed in Iran between the 1950s and 1980s (see Table 1 below).

The declining female LFP in some developing countries, of course, may be reflecting the downward segment of the "U-curve" commonly attributed to the modernization process, whereby the LFP declines as traditional female skills and roles become obsolete and rises back when women acquire new skills (see section 2). The decline may also be seen as a consequence of rising incomes in conservative societies where women's participation in the labor market is discouraged. Such norms are less likely to hold back uneducated women from poorer families, who badly need the money. So, LFP rates tend to be high when the incomes are very low and the absolute majority of families are in bad economic conditions. However, as education and incomes rise, more families can afford to observe the conservative norms and, as a result, LFP rate of women declines. The trend may eventually be reversed if rising education or other developments change the social attitudes towards gender (Bahramitash and Esfahani, 2011). In such

¹ See, for example, Aaronson et al., 2006, and especially Lawrence Katz's comments on that paper (Burtless and Katz, 2006: 147).

situations, which seem to be the case in Iran, it is important to ask: which factors are driving the outcome, what role each factor plays, and what are the prospects for the process to continue?

Besides potentially affecting LFP, education is likely to shape the types of employment that an individual may seek and find. A great deal of employment in Iran, especially for young women in rural areas, used to be unpaid family jobs. Education seems to be enabling young Iranians to move away from such positions. However, there is a concern that this may only be swelling the ranks of the unemployed. Does education simply raise the probability of unemployment as it reduces unpaid family work or homemaking? Is the expansion of education in Iran mainly a path to public employment, rather than providing the students with skills needed in the private sector, especially those that enable them to become entrepreneurs and employers? How does education affect occupational outcomes (e.g., self-employment vs. employee in the private or public sector)?

Besides education, a host of other variables affect labor market outcomes for individuals. Marriage, fertility, and household size, especially the presence of children and elderly in the household, are often considered as key factors that shape individuals' incentives and opportunities to seek employment. For women in traditional societies, these factors are often found to act as impediments. To what extent this is the case in Iran these days? How does the impact of these variables vary by gender? Do the age structure and gender composition of the children or adults in the family influence the outcome? Do these effects vary in rural vs. urban areas? How do marriage and family structure interact with education in shaping labor market outcomes?

The answers to the above questions are important because they can shed light on Iran's labor market and its prospects in the coming decades. In this study, we make an attempt to address them. We use a multinomial Logit model to relate education, family structure, and other characteristics of each individual to the probability of different options each adult faces in terms of participation in the labor market and types of employment he/she may seek. Our data set, obtained from the website of the Statistical Center of Iran, www.amar.org.ir/nofoos1385/, has relatively detailed information about each individual in a large sample (2 percent of the country's entire population, or about 1.4 million people, surveyed as part of the 2006 national census). This feature of the dataset enables us to explore a host of issues and control for a variety of factors. However, the dataset has a limitation in that it is cross-sectional, which prevents us from controlling the effects of unobserved individual characteristics. Nevertheless, we use it for our study because it is still quite informative and, besides, there is no panel dataset for Iran with sufficient length that can be employed for our purposes. We try to compensate for this limitation of the dataset by controlling for many different factors and by taking account of potential estimation biases. We also identify an exogenous variable in the data set—rural vs. urban birthplace—that

can serve as a good instrument for female tertiary education. We use this instrumental variable to test the exogeneity of tertiary education as a determinant of female LFP and employment probabilities. The results support the exogeneity assumption, giving credence to our estimates of the impact of education on labor market outcomes based on a multinomial Logit model, where instrumenting is not practical.

Our empirical analysis is based on the sample of 25-54 age groups in order to focus on the cohorts that are largely beyond school age and before retirement. We carried out the exercise for different cohorts with five and ten year intervals and found that the effects of the main variables of interest are similar across these age groups once we control of the life-cycle rise and decline of participation in various activities through a quadratic age terms. For the sake of parsimony, here we present only the results of regressions based on the entire group.

Our estimates indicate that by 2006, education had indeed come to have a large impact on the LFP and employment rates of women 25-54 years of age, but not of men in that age range. We find that compared to those with no education in our sample, women with elementary education are on average 11 percent less likely to participate in the labor force. However, higher degrees tend to raise LFP rate sharply. High School Education raises the probability of LFP by more than 10 percent and university education by more than 25 percent above the situation for those with Elementary Education. The impact of education on the probability of LFP is slightly larger than the impact on employment, raising the chances of unemployment by about 1 percent for secondary and 2 percent for tertiary degrees, when compared to women holding elementary degrees. For men in the 25-54 age group, the average impact of middle and high school degree is close to zero and an undergraduate education tends to lower the probability of LFP and employment by about 2 percent, also lowering the chances of unemployment by about 1 percent. Only graduate education compensates for that and raises men's average probability of LFP by 2 percent and employment by 7 percent relative to elementary education or less, lowering unemployment probability by 5 percent.

Within employment categories, education drives both men and women towards public employment in significant ways. But, contrary to the common perception that the public sector is a more important absorber of educated women than men, the marginal impact of education on men's probability of public employment is significantly larger than the impact for women. For example, compared to an elementary degree, a high school degree raises the probability of ending up in the public sector by about 10 percent for women and by 16 percent for men. An undergraduate degree raises that probability by about 20 percent for women and 37 percent for men! The shift for men is largely due to outflow from self-employment and (to lesser extents) from private-sector and unpaid-family positions. For women, the probability of private employment tends to rise with tertiary education, along their overall chances of

being employed. Their self-employment also rises sharply with graduate education. The main origin of these shifts is homemaking, with some flow out of unpaid family work as well. Homemaking for women and self-employment for men seem to serve similar roles as reservation options. Finally, the employer status for both men and women is associated with greater education, especially at the graduate level.

Our empirical analysis takes account of a number of other determinants of LFP and employment besides education. We find that marriage is associated with a significant reduction in LFP probability for women (by about 8.5 percent on average for the sample), but an increase for men (about 7 percent). Being married is also associated with lower chances of being unemployed, especially for men. As a result, the probability of employment declines by about 7 percent for women and increases by 13 percent for men. The positive effect of marriage on employment for men is largely concentrated in the public sector and, to a lesser extent, self-employment positions. For women, the reduction in the employment rate is distributed almost evenly across the employer, self-employed, and public and private employee positions. Interestingly, these reductions tend to be smaller for women with undergraduate degrees and are completely reversed for those with graduate education. For men, the only such significant effect is the lower probability of self-employment for married men with undergraduate education.

Residing in rural areas marginally increases the chances of LFP and employment (in the form of unpaid family work) for both men and women, giving rise to a more unemployment risk there than in urban areas.

Since the opportunities and constraints in the locality where an individual lives are likely to shape her/his choices, it is important to take them into account. In principle, a good way to address this concern is to employ fixed effects. However, implementing fixed effects in a multinomial Logit framework is currently not a manageable task. We address this problem by including a series of district-level indicators that reflect key aspects of labor market conditions in the district for each individual in the sample. When included in the regressions, these variables show statistical significance and offer interesting insights, but they do not change the main results obtained for individual and household characteristics.

The rest of this paper is organized as follows. In section 2 we briefly review some highlights of the literature on gender and LFP. Section 3 offers an overview of the patterns of labor allocation in Iran. Section 4 provides some evidence in support of exogeneity of education in the LFP decision. Section 5 presents the results of the multinomial Logit analysis and section 6 examines some extensions. Section 7 concludes.

2. The Literature on Gender and LFP

The most widely used framework for the analysis of gender gap in LFP is the so-called “U-curve” hypothesis that suggests a nonlinear relationship between female LFP rate and the modernization process (Boserup, 1970; Scott and Tilly, 1975; Psacharopoulos and Tzannatos, 1989; Rau and Wazienski, ; Lincove, 2008). This view posits that in traditional societies, women participate extensively in economic activities as part of the family. They lack education, but possess skills that make them productive in those tasks. In the early stage of industrialization, the emerging economic activities require new skills that are initially acquired by men. As a result, women’s opportunities to participate in the production process shrink and they are forced to stay home. Rising income opportunities for men also contribute to this division of labor (Goldin, 2006). In later stages, as educational and fertility-control opportunities expand, women gain new abilities to participate in the labor market and offer an alternative to male labor. At the same time, the presence women in the labor force gives firms an option to lower their employment costs. Attitudes towards the employment of women change gradually and the discriminatory practices in the labor market diminish (Boserup, 1970; Psacharopoulos and Tzannatos, 1989; Forsythe et al., 2000; Goldin, 2006).²

The U-curve hypothesis offers a plausible explanation for a broad pattern of female LFP rate in most countries. However, it does not explain the long persistence of low LFP rates in some countries and the significant variations in LFP across countries at similar development levels (Forsythe et al., 2000; Morrisson and Jütting, 2005). These phenomena are often explained by specific labor market conditions, such as demographics, socioeconomic characteristics of the population, culture, and government policy (Hijab, 2001; Gündüz-Hoşgör and Smits, 2008).³

Earlier studies of female LFP (e.g., Mincer, 1962; Heckman, 1980; Hausman, 1981; Moffitt, 1984) focused on the impact of marriage. Later studies added the role of childbearing (e.g., Cain, 1966; Heckman, 1974; Schultz, 1990; Klerman and Leibowitz, 1994). Keane and Wolpin (2002) went further

² An alternative view of the gender gap in the LFP pattern is the “constancy” hypothesis, which claims that female LFP does not change much during the industrialization process, but it is not recorded properly in the early stages, hence generating the observed U-curve. In other words, the curvilinear pattern is a statistical artifact, not a real trend in women’s participation in the production process (Robinson, 2005). While this might be the case, the phenomenon and its variations still need to be explained.

³ The U-curve hypothesis can be viewed as an outgrowth of the classic modernization theory, which relates the female LFP directly to the modernization process and emphasizes the “emancipation hypothesis.” In that view, the changes brought about by modernization (especially changes in occupational structure, education, fertility, and urbanization) creates opportunities for women to seek paid work and eventually get equal rights with men in the labor market (Inglehart and Norris, 2003). However, that view cannot explain the initial decline in female LFP as modernization takes off (Gündüz-Hoşgör and Smits, 2008).

and developed a dynamic, simultaneous model of women's labor supply, schooling, marriage, and fertility decisions.⁴ Empirical application of such models requires calibration and simulation methods, which have gained popularity in recent years. However, their results remain dependent on a host of assumptions that are difficult to test separately. Studies of LFP that rely on regression analysis for measurement and hypothesis testing need to address the simultaneity issue with instrumental variables or structural estimation methods. Many studies have managed to identify appropriate instrumental variables and offer useful and plausible results. Other studies, however, simplify the task by assuming weak exogeneity for education or family structure, which has proven reasonably accurate in some contexts (see, for example, Bratti, 2003; Connelly et al., 2006; Bloom et al., 2009).

Among socioeconomic factors examined in empirical studies, besides marriage and child-rearing, education is often considered as determinant of female labor supply. The dominant view is that by raising the potential for earning higher income and social status through the labor market participation, education increases the opportunity cost of homemaking for women. However, as pointed out in the introduction, the effect does not seem to be universal and has been hard to detect at the aggregate level (Bloom et al., 2009). It seems to be strong in countries that have reached the rising segment of the modernization U-curve, where attitudes have changed and technological and economic developments transform the nature of jobs, offering new positions that women can attain through higher education. At such a stage, educational opportunities also contribute to reduced fertility, which in turn has a significant positive impact on female LFP and on investment in children.⁵ Spierings and Smits (2007), for example, conclude that higher education is an important factor in women's LFP in five MENA—Egypt, Jordan, Morocco, Syria and Tunisia. Tansel (2001) and Gündüz-Hoşgör and Smits (2008) confirm this for the case of Turkey.⁶ Duryea, Cox Edwards and Ureta (2001) examine 18 countries in Latin America and the Caribbean during the 1990s and conclude that the increase in female schooling accounts for about 30 percent of the overall increase in female LFP rates, with the remaining 70 percent originating from other factors that have increased participation rates at given levels of education. Such effects, of course, are not uniform across countries and need to be explored in specific contexts.

⁴ This literature is quite vast, with numerous empirical applications to different countries and time periods. A number of contributions are noted in the text.

⁵ The link between education and fertility is complex and the total effect of education can act through several channels. For example, education can influence fertility through the opportunity cost of time, age of marriage, and timing of births, among many other effects. For recent studies of these points see Bloom et al. (2009) and Isen and Stevenson (2010).

⁶ For a survey and overview focused on MENA countries, see Salehi-Isfahani (2006). Also see, among many others, Assaad and Zouari (2003) and Gündüz-Hoşgör and Smits (2006).

The inverse relationship between fertility and female LFP rate has proven to be empirically significant and robust (Bloom et al., 2009). However, as in the case of education, there is concern over the simultaneity of fertility and LFP decisions; e.g., lower fertility and higher education and LFP may all originate from cultural factors that encourage greater career-orientation among women (Evans, 1988). Nevertheless, when there are adequate controls for simultaneity and other factors, researchers usually find that exogenous fertility shocks have strong impacts on female LFP. Herr and Wolfram (2009), for instance, find that the birth of a child has a profound impact on the decision of women to exit the labor market, even among the highly educated. Bloom et al. (2009) confirm the impact of child-bearing on LFP using cross-country panel data. The details and the magnitude of the effect, however, seem to vary across institutional and cultural environments.

Studies of the impacts of education and fertility on LFP typically find that education works partly through fertility besides its other direct and indirect effects. In the case of Iran, for instance, Mehryar and Aghajani (2002) and Abbasi-Shavazi et al. (2008) examine the impact women's education on fertility and find it to be very significant: about one-third of fertility decline may be attributable to the expansion in female education. However, the education and fertility effects on LFP may exist separately and act simultaneously. In Ghana, for example, Sackey (2005) finds that female schooling matters in both urban and rural localities and both primary and post-primary schooling levels exert a significant positive impact on women's LFP and a strong negative effect on fertility.⁷

It is important to note that increased educational attainment of women does not necessarily improve their relative position in the labor market. While women with higher education have higher expected returns and tend to participate more in the labor market, the gender gap in wages and unemployment sometimes increase with education (Bertrand et al., 2009; Evertsson et al., 2009). A variety of factors may be responsible for such patterns. One notable factor is occupational segregation, which is often associated with higher salaries among male-dominated occupations. Also, women tend to face discrimination and greater likelihood of careers disruptions, which tend to flatten their salary profiles and dampen their job opportunities. Their tendency to opt for homemaking and child-rearing much more

⁷ Education may also have externality and general equilibrium effects. An interesting line of inquiry has tried to measure these externalities along with the individual returns. For example, Duflo (2001) combines micro data with regional variation in school construction in Indonesia to measure the impact of education on LFP, wage rate, and incomes in a general equilibrium setting. Also, Acemoglu and Angrist (2000) estimate human capital externalities exploiting individual-level differences in schooling together with state-wide differences in average schooling and Acemoglu, Autor, and Lyle (2004) estimate the general equilibrium effects of increased female labor supply (on male and female wages).

easily than men also makes their labor supply elastic and may lower the opportunity costs of job search, hence raising their unemployment rates and rendering their LFP more pro-cyclical (Addison, 1993).

A number of studies emphasize the role of structural adjustment measures and market-oriented reforms on women's relative position in the economy (e.g., Assaad and Arntz, 2005; Beneria, 2003; Afshar and Dennis, 1995). Some of these reforms, especially those that encourage labor intensive exports, tend to raise women's LFP and employment, but in other liberalization attempts, the net impact appears to be negative. For example, Assaad and Arntz (2005) find that under the structural adjustment program in Egypt, gender gaps in access to wage and salary employment and in earnings widened during 1988-1998, largely due to women's more limited geographical mobility.

The low LFP rates of women in MENA countries have posed a puzzle that a number of scholars have tried to address. High fertility, low education, Islam, culture, and oil income have been the factors most often examined in the literature (Karshenas, 2001; V. Moghadam, 2005; Ross, 2008). Since education has risen and fertility has dropped sharply in the past few decades, oil, Islam and culture have come to be viewed as the main culprits. In his cross-country econometric study, Ross (2008) argues that oil rather than Islam has been the main factor. His evidence regarding the absence of an effect by the share of Muslims in a country's population is plausible. However, the role of culture cannot be ruled out since the MENA dummy in his regressions remains relatively large and statistically significant. Moreover, even the impact of oil revenues, which Ross (2008) proposes as the main cause of low female LFP rate, is contingent on cultural factors that shape the division of labor by gender. To see this point, it is important to note that the presence of oil revenues does not by itself reduce LFP. In fact, it may even increase LFP if capturing a share of the revenues requires some form of employment. The argument that oil rents reduce female LFP requires critical assumptions, such as the following pair: (i) Rising family incomes resulting from oil rents raise the value of non-market activities relative to market participation; (ii) the society's norms ensure that non-market activities (especially homemaking) are assigned to women. In this sense, it seems that oil revenues may have exacerbated the role of traditional norms rather than acting as an separate force that keeps women's LFP low. This further implies that this oil effect may diminish as norms change through education or other factors.

Finally, there are a number of other factors that have been examined in the literature as determinants of female LFP. A prime example is the role of household appliances ("Engines of Liberation") in enabling women to participate in the labor market (Coen-Pirani et al., 2010; Cavalcanti and Tavares, 2008). Given the limitations of our dataset, we will not attempt to deal with such factors here. Our study focuses mainly on education and family structure. We start our analysis in the following section with an overview of the labor market situation in Iran since mid-1950s.

3. Gender and Labor Allocation in Iran: An Overview of the Census Sample

Iran's labor force grew quite rapidly in the second half of twentieth century. In the fifty years from 1956 and 2006, the labor force aged 20 years and older grew 4.2 times from about 5 million to over 21 million (see Table 1). As in many other countries, the growth rate was much faster for women compared to men (on average, 4.1 vs. 2.8 percent per year), with the difference being larger and the growth rate being higher in urban areas, where female labor force grew close to 17 times in that period. However, until recently this was largely due to population growth since urban women's LFP rate had remained relatively flat and low until the late 1990s. In rural areas, where female labor force and LFP rate were higher in the 1960s and 1970s, there was a sharp drop in female labor force, where the LFP rate for women 20 years and older almost halved in the 1980s. This was largely due to the disruption in internal and external trade during the war with Iraq, which significantly reduced the production of carpets and handicraft, where many rural women were employed as unpaid family workers (Bahramitash and Esfahani, 2009). Ever since, female LFP rate has risen, but it has been associated with high unemployment rates (Table 1). It appears that the patriarchal traditions that have kept Iranian women in their role as mothers and housewives are weakening, but many obstacles remain. For men, the LFP rates have followed a secular decline, largely due to expansions in education and social security, which have changed the LFP incentives for the young and the elderly.⁸

Starting from very low levels in the 1950s, educational attainment of the population, especially those of women, increased significantly during the subsequent five decades (Table 2). Interestingly, for men this has been associated with a decline in LFP rate, while for women the two variables have moved in the same direction in recent years. Increased engagement in education has certainly reduced the LFP rates for younger people. However, the decline in men's LFP can also be observed among older cohorts, which seems to be due to the expansion of social security and insurance options. For women, social barriers to LFP seem to be declining, possibly as a result of their increased educational attainments, among other factors. In this paper, we explore the role that education may have played in LFP of men and women in some detail.

A further glimpse of the structure of Iranian labor market is offered in Table 3, which presents the distribution of population sample aged 25-54 across various activities in 2006. The table shows that for women in this age group, LFP rate is 16.1 percent and the unemployment rate, 13.3 percent. More than

⁸ It is possible that the trend may also be partly due to an increase in informal economic activities that do not get captured in census data. This issue may be important in the case of women as well (F. Moghadam, 2009), implying that the actual rise in their LFP and employment rates might be faster than reflected in census statistics. For a survey of studies of informality and its rise in Iran, see Bagheri et al. (2002).

three-quarters of the women in the sample are homemakers and about 2-3 percent are in each of the following categories: students, pensioner/non-active income earners, and “others” (the residual group). Among those with jobs, the largest group is Public Employees and the smallest is Employers. The rest are equally distributed between Self-Employed and Private Employee positions. For men, self-employment is the most common position, with public and private employment coming second with almost equal shares. Employer and unemployed positions follow these. The overall LFP rate of men in the age group is 92.3 percent, with an unemployment rate of 7.0 percent.

Table 4 shows further characteristics of the population in our sample and their pattern of LFP. About 85 percent of the group is married, with the men in being in married status slightly more than women. About 28 percent reside in rural areas, with the percentage being somewhat higher for women compared to men. In terms of educational attainment, the largest subgroup is those who hold elementary degrees (28 percent of the population) followed by those with a high school degree or with no education (22 percent each). For men, the largest educational group is high school graduates (27 percent), while those with no education are just over 10 percent. About 12 percent of women and 16 percent of men hold bachelor degrees. Graduate degree holders are 0.3 percent of women and 0.7 percent of men.

Table 4 shows that the LFP rate rises very fast with educational attainment among women, while displaying little variation among men. There is some drop in LFP rate for men with higher education. However, this seems to be entirely due to the rising share of students among those with higher educational attainment. If students are added to those participating in the labor market, then their share in total male population rises with education (see the last column of Table 4). For women, this share rises much faster than for men. In section 5, we will examine in more detail the choice between study and LFP and show the tendency of those with higher degrees to continue as students for longer years. The LFP rate is noticeably lower for women who are married, have more children, or live in rural areas. For men with these characteristics, only the ones with 2 children or more tend to have somewhat higher LFP rates.

For the key characteristics of the households under consideration, we turn to Table 5. The average household size is about 4.2 with a standard deviation of 1.7. There is an average of 1.1 child under 15 years of age per family, with about 43 percent of them under 6 years. (The average number of children ever born to a woman in the 25-54 age range—not reported in the table—is about 2.5.) The number of individuals over 55 in the households is on average 0.25, with in 0.11 of them being female. We are interested in role of older individuals as well as the children in the household because of the care they may need or the support they may offer, which may affect LFP participation of household members. Since women’s role in these respects may be different from men’s, we also look at women’s share among adults and elderly in the household.

Table 6 summarizes the averages and the standard deviations of the district-level indicators used in our analysis. We form these indicators as weighted averages individual and household characteristics for the observations in each district, using sampling weights. There many more variables of this kind that can be calculated and added to the analysis. However, those variables do not seem to add much to the explanatory power of model. So, for the sake of parsimony, we keep the list relatively short. The first two variables in Table 6—Urbanization (the share of urban population in the district) and Household Size—are calculated for the entire sample. All other district-level variables reflect the average labor allocation and are calculated separately for the 25-54 age group of each gender. There are 336 districts in Iran with an average of 1588 observations per district (ranging from 166 to 31267, with a median of 1257).

4. Education and LFP: A Test of the Exogeneity Hypothesis

Assessing the impact of education on LFP is complicated by the potential existence of unobserved factors correlated with both variables, such as innate individual ability, which may bias the estimates. Cross-sectional datasets typically offer few possibilities for addressing this endogeneity problem. However, there is an exogenous variable in our dataset, indicator of rural vs. urban birthplace, which seems to be a good instrument for higher educational attainment among women.⁹ A rural birthplace tends to reduce a child’s chances of attaining higher levels of education because children born in rural areas are likely to remain there at least for their elementary education. Lack of access to good quality schools in rural areas of Iran, means that children, especially girls, growing up there were less likely to develop strong educational foundations and to pass the substantial hurdles in reaching tertiary education levels. However, there is little reason to believe that a rural birthplace should have a significant direct effect on the decision of a woman to participate in the labor market, and this is confirmed empirically. For these reasons, we use the “Rural Birthplace” indicator as an instrument for higher education in determining LFP among women aged 25-54 years. We concentrate on tertiary education because the adverse impact of Rural Birthplace may not show up with sufficient strength in secondary education, which entails far fewer barriers than the tertiary level does. The exercise focuses on women because education is not an important driver of men’s LFP.

The equation that we estimate is specified as follows:

$$(1) \quad \text{Prob}(\text{LFP}_i = 1 | \text{HE}_i, x_i) = \Phi(\alpha + \beta \cdot \text{HE}_i + \gamma \cdot x_i + \varepsilon_i),$$

⁹ The census data contain this information in the form of two questions. The first one records whether the respondent lives in rural or urban areas. The second one asks whether the subject has been born in the same place, in another village, or in another town/city. Combining the two responses, one can determine whether the respondent has been born in a rural or an urban area.

where LFP_i as a dichotomous variable for individual i (1 for those in the labor force and 0 otherwise), HE_i is the measure higher education, and x_i is a set of control variables. Φ is the standard normal distribution, α , β , and γ are parameters, and ε_i is an error term.

Estimating the impact of higher education on LFP requires a Probit model with instrumental variables. However, in applying this method, we face a difficulty. Educational attainment information in our data set is a discrete variable, while the IV Probit model requires that the instrumented regressors be continuous. To deal with this problem, we form a “Higher Education” indicator which equals 0 for individuals with no higher education, 0.5 for those with unfinished undergraduate education, 1 for those with an undergraduate degree, 1.1 for those with unfinished graduate education, and 1.2 for those with complete graduate degrees. We treat this variable as “roughly” continuous. The relative magnitudes assigned to graduate education are based on a Probit regression of LFP on educational level dummies.¹⁰ Changing these relative magnitudes does not have any notable impact on the results because the main effect of education on LFP comes from the attainment of undergraduate degree.

LFP is determined by a host of factors other than education. We leave out most such variables to avoid potential endogeneity problems that they may introduce. However, we include in x_i age and its square as well as the district-level female LFP rate, as a key indicator of socio-economic environment in which the individual lives. We first verify that Rural Birthplace is negatively and strongly correlated with our indicator of higher education and then examine its potential role as a direct determinant of LFP. This is done in the first two columns of Table 7. Rural Birthplace is clearly inversely related to Higher Education (see the first column), but it shows no direct significance as a determinant of LFP (second column). The third column shows the IV Probit estimate of the LFP model, with Rural Birthplace serving as an instrument for Higher Education. A quick comparison of columns 2 and 3 shows that the estimated coefficients the variables remaining on the right-hand side decline somewhat as a result of using the Rural Birthplace as an instrument. For the education variable, this is consistent with the view that the Probit estimates may be biased upward due to simultaneity. However, the size of the bias seems to be rather small. Indeed, the Wald test of exogeneity of Higher Education shows that this hypothesis cannot be rejected at any notable level of statistical significance. Also, the correlation coefficient of first and second stage random terms is very small, suggesting that the Higher Education does not contain components that are not captured by the instrument, but are important in the determination of LFP and could be cause simultaneity. The last two columns of Table 7 repeat the exercise with an indicator of being Employed (1 if the subject has a job and 0 otherwise). Again, Rural Birthplace seems to be a suitable instrument for

¹⁰ The multinomial Logit model in the next section confirms that the effect of graduate education on LFP is about 20 percent stronger than an undergraduate degree.

Higher Education, but the measured bias is quite small and weak exogeneity cannot be rejected. This is not an unusual result. Bratti (2003), for example, obtains a similar result in his study of the effect of education on fertility and LFP among Italian women.

The estimates of our IV Probit model of LFP and education show that, compared to those with secondary education or lower, women in the 25-54 age group who earn an undergraduate degree are about 32 percent more likely to participate in the labor force LFP and about 30 percent more likely to hold a job. This also means that tertiary education is not of adequate help for women to move out of the unemployment pool; rather, it raises the likelihood that they end up being unemployed by 2 percent. Our estimates of the impact of education on female LFP are considerably lower than the corresponding marginal probabilities found by Salehi-Isfahani (2005), applying a Probit model to a 2001 household survey (19 percent for high school and 61 percent for college education). This is partly due to the IV method used here. However, it could also be due differences and size and characteristics of the sample.

The age terms are both highly significant in the regression and indicate that LFP and employment are rising with age for the younger cohorts and declining for the older ones. The probability of being in the labor force peaks for those around age 30, but employment probability peaks for those around 37. It should be kept in mind that due to the cross-sectional nature of our regressions, the coefficients of age variables reflect life-cycle as well as cohort effects. In this sense, their predictive power for the future pattern of LFP is limited since the pattern may be different for different cohorts. For example, the LFP of the cohort currently 25-29 years may peak at somewhat different age than the experienced by those currently 35-39 years old.

In the next section, we introduce dichotomous indicators for each level of education to avoid the indexing problem that may afflict the Higher Education indicator. We also introduce a host of additional explanatory variables into the model and differentiate among various job options as well as positions outside labor force. These additional features come at the cost of abandoning the attempt to address the potential simultaneity biases among the host of right-hand side variables used in the regressions. However, as in the case of education, the extent of bias due to endogeneity may be small. Indeed, many studies of the relationships between these variables and LFP in other countries find that the weak exogeneity hypothesis cannot be rejected (Bratti, 2003; Connelly et al., 2006). Nevertheless, the results should be treated with caution, interpreting them mainly as associations rather than causations.

5. Education, Family Structure, and the Job Market

To delve deeper into the relationship between education, family structure, and labor allocation in Iran, for each individual aged 25-54, we consider five employment positions—Employer, Self-Employed,

Public Employee, Private Employee, and Unpaid Family Worker—and five non-employment possibilities—Unemployed, Student, Pensioner/Non-Active Income Earner, Homemaker, and Other. We refer to these options as “status” or “position” and show it with variable $Status_i$, which takes values j from the set of these 10 status alternatives.

For educational attainment, we consider six levels—No Education, Elementary, Middle School, High School, Undergraduate, Graduate—and create a dummy, E_{ik} , for individual i with educational status k . We lump together all those who have worked towards a degree with those holding the degree in order to avoid dealing with too many minor categories. This does not have much impact on the results because the number of those with incomplete degrees is relatively small. We use the largest group, those with Elementary education, as the base and compare the labor market experiences of all others with them.

The equation that estimate in this section is:

$$(2) \quad \text{Prob}(Status_i = j | E_{ik}, y_i) = \text{Exp}(\pi_i + \sum_k \beta_{jk} E_{ik} + \gamma_j y_i + \varepsilon_{ij}),$$

where y_i is a set of control variables for individual i , including interaction terms and the district characteristics where he/she lives, β_{jk} and γ_j are parameter sets, and π_i serves as a proportionality factor equaling $-\ln[\sum_j \exp(\sum_k \beta_{jk} E_{ik} + \gamma_j y_i)]$.

To account for the role of family structure, we start with a dummy for Married status and the log of Household Size.¹¹ Being married is expected to lower LFP participation for women, but may raise it for men. For the sake of parsimony, we lump the widowed, divorced, and never-married groups together as an “unmarried” group. We did experiment with the inclusion of separate dummies for these categories, but the differences among them were not statistically significant.

Presence of children and their numbers are often considered as impediment for women’s LFP, but the impact on men’s economic activity is less clear. We include on the right-hand side of the regressions for women the log of 1 plus the Number of Children Ever Born, which is available only for women. This variable includes the children who are no longer part of the household, ensuring that the history of child-bearing is taken into account, at least minimally. Since younger children tend to need more attention at home and may further reduce female LFP, we add two other variables to the right-hand side: the log of 1 plus the Number of Children under 6 in the Household and the log of 1 plus the Number of Children 7-15 Years Old in the Household. The presence of elderly may also affect the labor decisions of working age men and women, though the direction of impact depends on the balance of the care they require vs. the support they provide to other adults in the household. To allow for this effect, we use the log of 1 plus the

¹¹ We use the log of variables such as household size and the number of children because it produces better fit to the data than the variables themselves do without transformation.

Number of Household Members over 55. Since men and women in the household may play different roles in the labor choices of each member, we include in our analysis the log of 1 plus the Number of Female Household Members over 55 and the Share of Women among Household Adults over 21. In addition to these variables, we experimented with a number of other indicators of household structure. However, none of them changed the results or added new insight.

The characteristics of the location where one lives should also matter in the decision to work and the kinds of jobs might be found. To deal with this issue, we first add a Rural Resident dummy to the regression to account for the first-order differences between rural and urban areas in terms of employment opportunities and social constraints. In the next section, we discuss the use of interaction terms to explore how the relationship between education and labor allocation may vary between the two areas. In addition, as mentioned earlier, we experimented with the district characteristics such as those listed in Table 6. Inclusion of these variables does not change the results concerning individual and household characteristics in tangible ways. So, we do not present those results in this section. We show the results inclusive of those variables as part of the extensions discussed in the next section.

The results of our basic multinomial Logit regressions are reported in Table 8. Part 1 focuses on non-employment position for each individual and Part 2 shows the results for employment options. The aggregate effects of LFP and employment options are presented in Table 9. Since the latter table provides the big picture, we start there and then come back to Table 8. The first two rows of Table 9 capture the fact that the probabilities of LFP and Employed positions have an inverted-U relationship with age. However, the peak LFP and employment ages for women turn out to be 40 and 42, respectively, which are higher than what we found in section 3. For men, the peak ages are much lower, 27 and 33, respectively.¹² Since the share of the cohort aged 35-44 has risen in recent decades (by about 5 percentage points between 1986 and 2006), the change in age structure of the population may have contributed to the closing of the gender gap in LFP, even if the age profile of LFP had remained constant for both sexes. However, this effect could not have been large (about 0.16 percent increase in the female LFP rate).

Age tends to reduce the probability of unemployment, but the effect is statistically significant only for men (see Table 8, Part 1). For young women, homemaking rather than unemployment seems to be the fall-back option when they do not have employment. Women with higher ages tend to move away from homemaking until age of about 46.

¹² Majbouri (2010), who also uses a quadratic expression for age in an LFP equation, find the peak age for both men and women to be around 35 years.

Being married is associated with substantially lower the probabilities of LFP, employment and unemployment for women; a decrease of 8.4 percent for LFP, 6.7 percent for employment, and 1.8 percent for unemployment. For men, on the other hand, the associations of marriage with LFP and employment are strongly positive (an increase of 6.8 percent for LFP and 13 percent for employment), with the probability of unemployment dropping by 6.1 percent. These large effects are, of course, likely to be bidirectional. For example, given the traditional setting of the Iranian society, men with jobs are more likely to be accepted as husbands and women without jobs may opt for marriage more easily. Nevertheless, it is interesting to observe and quantify the pattern of associations.

Household size is associated with reduced probabilities of LFP and employment and increased probability of unemployment and student status, all by small amounts. An increase in family size from 2 to 4 people is associated with lower LFP and employment probabilities of about 0.5-1.5 percent for women and somewhat more (1-2 percent) for men.¹³ Given the country-wide reduction in family size from about 5.1 to 4.3 during 1986-2006, this factor does not seem to explain much of the past rise in female LFP.

The Number of Children Ever Born is inversely related to female LFP and employment probabilities (by about 4 percent and 2 percent, respectively, when the number of children goes from 0 to 2).¹⁴ The likelihood of being Unemployed also declines, while Homemaking becomes more probable. This is somewhat mitigated when children grow above 6 years of age. These effects seem to explain a significant part of the recent changes in LFP in Iran because the average country-wide number of children ever born to a woman declined from about 7 in 1986 to about 2 in 2006. Assuming no change in behavior across cohorts, our estimates imply that this fertility decline could be responsible for 3.6 percentage points increase in LFP, which is about 60 percent of the actual increase during those two decades. The effect on employment is 1.8 percentage points, implying a rise in unemployment. For men, the presence of children aged less than 15 tends to increase the probability of LFP and employment.

The number of household members over 55 has generally negative effects on LFP and employment for both men and women, especially if the elderly are women. However, when the Share of Women among Household Adults over 21 rises, the LFP and employment likelihood for each woman in

¹³ The unemployment probability tends to rise with Household Size by the same amounts that LFP and employment decline. A possible explanation of this pattern is that belonging to a larger household, given the numbers of children and elderly, means that the working age adult lacks good job opportunities and remains dependent on the family. As we will see below, Household Size is associated with increased unpaid family work and public employment and reduced chance of serving as Employer, Self-Employed, or Private Employee.

¹⁴ These figures are somewhat lower than the estimates that Salehi-Isfahani finds for similar variables in his regressions.

the household rises and homemaking decline tangibly (by about 5 percent when an adult woman is added to a family with 2 adults).

Living in rural areas is associated with about 2.5 percent increase in LFP, employment, and unemployment probabilities for women, with a decrease of similar magnitude in Homemaker position (see Table 8, Part 1, and Table 9). Since the share of women living in rural areas has declined from 35 percent to 26 percent during 1986-2006, this effect may explain part of the rise in LFP, but a very small one (less than 4 percent of the increase). For men, the effects are in the same directions, but even smaller.

Turning to the effects of education dummies, the first eye-catching result in Table 8, Part 1, and in Table 9 is that compared to those with Elementary Education (our base case), individuals with No Education have higher LFP, employment, and unemployment rates. The effect is stronger for women compared to men, especially when we take into account that the average probability of being unemployed for women is about 35 percent of that for men (2.1 percent for women vs. 5.9 percent for men, as shown in Table 3).¹⁵ This effect is also notable because it may partly explain the decline of LFP among Iranian men and the flatness of LFP among Iranian women over the past five decades. As literacy and elementary education have expanded, participation in the labor market has tended to diminish. For men, further expansion of secondary and tertiary education, except at the graduate level, does not seem to have reverse this negative effect of education. In fact, Undergraduate Education may have somewhat reduced LFP and employment probabilities for them. For women, on the other hand, education beyond Elementary has had tangible and rising consequences for labor market participation. A middle school degree seems to raise the probabilities of LFP and employment for women in our sample by an average of about 2 percent compared to women with an elementary education. A high school diploma raises this probability by an additional 8 percent, an undergraduate degree by 15 percent more, and graduate education by a further 3 percent (i.e. an overall increase of 28 percent over the average LFP probability of women with elementary education). These estimates are in the same range as the effects we found in section 4, though they somewhat lower, which could be due the large number of controls used in present exercise. In any case, these marginal probabilities are sizable, especially when compared with the average odds of LFP and employment for women: For a randomly selected woman, extending her education from elementary to undergraduate education raises her probability of LFP by 1.55 times the average odds. A graduate degree increases this ratio to 1.74. The corresponding ratios for the marginal probability effects on employment are 1.63 and 1.85. In other words, educational attainments at the tertiary levels have substantially contributed to the rise in the historically low employment and LFP rates among Iranian women. Based on

¹⁵ These probabilities are based on shares of population in each activity status, which is different from the unemployment rate. Women's unemployment rate is higher than men's because their LFP rate is much lower.

our marginal effect estimates, assuming similarity in the age-profile of cohorts, the changes in the composition of population and educational attainments altogether can explain at least one third of the rise in female LFP.

Consistent with our IV Probit estimation, the multinomial estimates show that employment chances for women don't rise as fast as LFP when educational attainment rises. As a result, their likelihood of unemployment rises by about 1 percent for high school diploma holders and about 2 percent for university graduates.¹⁶ For men, the increased education tends to lower the risk of unemployment, especially at the graduate level.

Education facilitates LFP for many women by taking them away from homemaking. In fact, educational attainment seems to induce more departures from homemaking than those who join the labor force. Those with higher education tend to continue longer in the Student status. They also tend to join the Pensioner/Non-Active Income Earner group more often, except those with graduate education. This is also the case for men.

Perhaps the most interesting and novel result of our multinomial Logit estimation is the impact of education on the shifts among employment categories (see Table 8, Part 2). Increased education is strongly correlated with a shift among employed men from Private Employee and especially Self-Employed categories towards Public Employee positions. The probability of joining the public sector peaks for men after they attain Undergraduate Education at about 37 percent above the odds for those with Elementary Education. This is 1.66 times higher than the average odds of being a Public Employee for men. Education also channels women towards public employment, though the marginal probability peaks at 22 percent for those with graduate vs. elementary education. This is still quite large for women because on average they have the odds of 6.7 percent to become Public Employee. Interestingly, public sector positions for educated women don't come at the cost of self-employment and private sector jobs. Indeed, their likelihood of joining the private sector tends to rise after High School Education, and their Self-Employment jumps with Graduate Education. The reason for this pattern is largely the role that homemaking plays as the reserve option for women. For men, self-employment seems to play the same role. A second reserve pool for women is Unpaid Family Worker status, which they leave as a result of education, though mainly at the university and graduate levels.

¹⁶ Salehi-Isfahani (2005) finds that the marginal probability of paid employment in response to educational improvement is much larger than that those of LFP, hence reducing the combined pool of the unemployed and unpaid family workers. According to our estimates, the total pool would not decline with education, except at the graduate level.

Educational attainment tends to draw both men and women to serve as employers. However, the effects are relatively small for men, especially compared to the average odds of becoming an Employer. For women, although the marginal effects have small magnitudes, they are rather large relative to the share of female population that serves as Employer, especially for those attaining Graduate Education (by 3.7 times). In other words, tertiary education serves as an important vehicle for women to become entrepreneurs.

It is worth noting that the differential impact of education on public vs. private sector positions is much larger for men than for women. This is particularly notable because there is a perception in some countries that educated women are disposed to seek public sector employment much more than educated men do. Our results show that the opposite is true in Iran: At the margin, education is associated with much greater chances of public sector employment for men than for women.

Marriage, which discourages female LFP and encourages male LFP, seems to play those roles across the board among employment categories. However, for men, being married is strongly associated with public employment. Household size, which is negatively correlated with employment, also has a positive association with public employment for men. It is also associated with increased probability of Unpaid Family Worker status for both men and women. The Number of Children Ever Born tends to reduce the chances of employment for women, especially as Private Employees when the children are younger. The number of elderly members in the household is associated with lower public employment, but higher likelihood of private and self-employment for men. In households with relatively more female adult members, women are more likely to have jobs, especially as Self-Employed, Private Employees, and Employers. Other aspects of family structure do not seem to impact women's likelihood of reaching Employer position. Rural Residence is systematically associated with more self-employment for men and unpaid family jobs for women, at the cost of Public and Private Employee options.

Finally, age up to early 40s has a clear association with women's move from Homemaker, Student, and Unpaid Family Worker positions towards gainful employment options. Reaching Employer positions is particularly sensitive to the age in the case of women. After age 45, Pensioner status becomes an important option besides homemaking. For men, age helps them move from Student, Unemployed, and Unpaid Family Worker towards gainful employment, and within the employment options, Private Employee to Public Employee and Employer positions. There is a similar move out of Self-Employment position among younger cohorts, but it is reversed for those above age 30.

6. Extensions

In this section, we examine a number of extensions to the model of Section 5. In particular, we ask how the role of education may vary under different circumstances and how socio-economic circumstances in each province may influence individual choices. For this purposes, we introduce a number of interactive and new terms to the right-hand side of the model and estimate a more extensive multinomial Logit model. We discuss the results here in two parts. The first part focuses on interactive terms between education, marriage, and rural residence. The second part examines the role of socio-economic characteristics in each district on labor allocation. We show the marginal probability effects of these characteristics on all activities in Table 11. Table 10 shows the effects on LFP and employment by these variables as well as the interactive terms. We do not present the details of the coefficient estimates for the interactive terms here to save space. The full estimation results are available from the authors as an appendix.

6.1. The Role of Education in Different Settings

Does marriage change the way education affects labor allocation for men and women? How does rural residence influence the role of education? To address these questions, we interact Married and Rural Resident dummies with the educational attainment variables and include them in our multinomial Logit model.¹⁷

The interaction terms of marriage and education variables in Table 10 show that the negative effects of marriage on women's LFP and employment are not mitigated by education, except at the graduate level. Graduate degrees seem to overcome the disadvantages of marriage for women in the labor market, particularly in securing employment in public and private sectors, including Employer positions. It also significantly reduces married women's transition into the pension or non-active income earners status. For men, education does not change the consequences of marriage, except for undergraduate education that seems to lower the LFP of married men somewhat by reducing their roles as Self-Employed or Unemployed.

Married men and women in rural areas also experience a bit more participation (2.6 percent) than their urban counterparts. But, rural conditions seem to clearly dampen the LFP and employment opportunities for the educated ones, except in the public sector. For women in rural area, increased education reduces private and self-employment options, especially at the graduate level. For rural men, graduate education is associated with sharply higher chances of public and self-employment.

¹⁷ In addition to the role of marriage and rural conditions, we considered a number of other factors that might condition the education-labor allocation relationship. However, we did not find significant and meaningful results.

6.2. Socio-Economic Circumstances and Labor Allocation

The estimated effects of the district-level socio-economic variables included in our multinomial Logit model are shown in Tables 10 and 11. The first two indicators, Urbanization and Large City (dummy indicator of the largest 7 cities in Iran), are meant to identify first-order differences that may exist in more urbanized areas and large cities in Iran. The estimates indicate that the effects on LFP and employment are almost negligible for men, and more noticeable, though still rather small, for women (about 2 percent increases in probability). Female LFP and employment are higher in more urbanized districts, but the effect gets cancelled out in large cities. These changes are associated with changes in women's labor allocation from homemaking to self-employment and unpaid family work. A possible explanation for this outcome is that urban areas offer more opportunities for women to participate in family businesses, but in large cities, where incomes tend to be higher and expectations are different, cultural inhibitions against this type of work act as a countervailing factor. For men, urban settings also seem to be more conducive to self-employment, reducing the reliance on public and private employment, but in large cities there is shift from public to private employment.

A larger average Household Size in a district has little impact on LFP and employment, but is associated with increased probability of public employment at the cost of self-employment, especially among men. It is possible that average household size reflects less economic development in the district, giving government jobs more role in total employment.

District-level LFP and unemployment rates, which are key indicators of local labor market conditions, have strong and predictable effects: District-level LFP rate is associated with higher the probability of LFP by each individual and unemployment rate discourages it (Table 10). The estimates in Table 11 show that in districts where the rate of female LFP is higher, women tend to leave homemaking in favor of various forms of private employment (Employer, Self-Employed, Private Employee, and Unpaid Family Worker). They also tend to become unemployed more often. So, effect of LFP rate in the district, after we control for other factors, reflects the variables in the social environment that encourage women to join the labor force. For men, the effects are similar, except that in that environment they end up serving less often as Public Employees.

An increase in the unemployment rate is associated with higher chances of being Unemployed or a Pensioner for both sexes. The chances of being an Employer, Self-Employed, or Private Employee sharply decline. For men, there are lower odds of Public Employment and for women, less chance of becoming Unpaid Family Worker. Women end up being Homemakers more often, while men tend to join the ranks of Students.

As one expects, the district-level shares of Students, Pensioners, Homemakers, Self-Employed, Public and Private Employees, and Unpaid Family workers are associated with high probabilities that each individual ends up in the corresponding status categories. However, these characteristics have further consequences as well. For example, a larger Share of Self-Employed in the district population is associated with higher public employment and lower chances of being an employer. The odds of private employment for men and homemaking for women also decline. Finally, the risk of unemployment for men rises, possibly reflecting the special nature of most self-employment for men as a close substitute for unemployment.

The relative abundance of public sector jobs in a district is associated with higher chances of unemployment for men and homemaking for women. On the other hand, the high frequency of private sector jobs in a district tends to raise the probability of Public Employee positions for both sexes. For men, the reallocation seems to come largely from self-employment and for women from homemaking, again highlighting the role of those positions for each sex.

Greater prevalence of Unpaid Family Workers in the district reflects more primitive economic environments. As a result, it seems reasonable that it is associated with less homemaking for women and less unemployment odds for men. Public and Self-Employment chances rise and the options to become Employer shrink.

The district-level share of Students among those aged 25-54 indicates the availability of greater higher education facilities in the district. Naturally, this raises the likelihood of that each adult may be a student. Interestingly, in such districts the chances of becoming Self-Employed or Private Employee are higher for men, while private employment is less likely for women. The odds of public employment are lower for both sexes.

7. Conclusion

Iranian women's participation in the labor market has been quite low compared to men, and the gender gap in this respect has been much wider in Iran compared to most other economies outside the MENA region. This situation has started to change in the past two decades and female LFP has been on the rise. In this paper, using IV Probit and multinomial Logit models and a large sample from the 2006 census, we have examined the micro-level roles of education, family structure, and local market conditions in the structure of LFP and employment of Iranian men and women aged 25-54. We find that education, especially at the tertiary levels, has a very large impact on the LFP of women, but not of men. Our multinomial Logit estimation also shows that women who join the labor market as a result of graduate education have a 2-4 times above average propensity to join the ranks of employers, self-

employed, and public and private sector employees. For undergraduate degree holders, the tendency of ending up in the public sector is disproportionately high, but the propensity to become employers is still above average.

Male educational attainment is strongly correlated with a shift among employed men from private employee and especially self-employed positions towards public employment. Indeed, contrary to the common perceptions, the association between education and public employment is much stronger for men than for women. While the effects of most variables for women is the movement between homemaking and various employment options, for men the effects are most notable in movements between self-employment and other options, especially public sector employment. In other words, self-employment seems to be the reserve option for men, the same role that homemaking plays for women.

Besides education, we examined the roles of many other household and district characteristics. Urbanization tends to raise LFP and employment for women, though living in a large city reverses that advantage. Given the level of urbanization, living in rural areas is associated with small increases in LFP, employment, and unemployment probabilities, with the effects being stronger for women than for men. Marriage and the number of children are associated with higher LFP and unemployment for men, while reducing them for women. Indeed, the rapid decline in fertility seems to have been the most important factor in the rise of LFP among women, and to the extent that education has played a role in that reduction, there are added benefits to education than those directly captured in our regressions.

An important policy implication of these findings is that tertiary education, especially at the graduate level, may play an important role for women to break the barriers against the expansion of their roles in economy, especially as entrepreneurs and private sector leaders. This latter effect is particularly important because it could help address at least three important policy challenges: alleviating unemployment, diversifying the economy, and empowering women (World Bank, 2007). Given the currency appreciation in countries with large foreign exchange inflows, as in most MENA countries, these challenges cannot be addressed by encouraging labor-intensive export industries, which has proven successful in many developing countries. In countries with resource rents or large capital inflows, the better option is to invest in greater human capital gain competitiveness at higher-end services and products. Female higher education can play a central role in this regard in Iran and other MENA countries in at least two ways: (i) It enables more women to become entrepreneurs and contribute to job creation and diversification in the economy. (ii) It can help train professionals who can contribute to the solution of complex problems facing women in the economy. Of course, to achieve these goals effectively, the higher education system needs to be focused on producing professionals with business and technical skills rather than degree holders.

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Table 1
Labor Force and LFP and Unemployment Rates in Iran
Population Aged 20 Years and Over

Census Year	1956	1966	1976	1986	1996	2006
Labor Force (Millions)	5.05	5.93	7.91	10.71	14.07	21.28
Female						
<i>Urban</i>	0.14	0.22	0.38	0.61	1.02	2.33
<i>Rural</i>	0.28	0.41	0.57	0.33	0.58	0.83
Male						
<i>Urban</i>	1.47	2.10	3.38	5.57	7.85	12.53
<i>Rural</i>	3.16	3.20	3.58	4.20	4.62	5.59
Labor Force Participation Rate (Percent)						
Female						
<i>Urban</i>	9.5	10.3	10.8	10.0	11.1	15.2
<i>Rural</i>	8.7	12.3	14.8	7.4	11.1	12.9
Male						
<i>Urban</i>	93.6	88.0	86.9	86.3	82.2	79.4
<i>Rural</i>	96.1	91.0	93.6	91.0	88.4	85.4
Unemployment Rate (Percent)						
Female						
<i>Urban</i>	0.7	2.5	4.6	21.1	8.8	19.7
<i>Rural</i>	0.2	10.7	25.8	11.3	8.9	21.2
Male						
<i>Urban</i>	4.0	4.6	3.5	11.5	7.1	8.5
<i>Rural</i>	1.2	10.4	11.1	7.9	6.2	10.6

Source: Statistical Center of Iran, <http://www.amar.org.ir>.

Table 2
Educational Attainment of the Population

Census Year	1956	1966	1976	1986	1996	2006
Literacy Rate (Percent in Population 10 Years and Over)						
Female	7.3	16.5	31.0	47.6	71.7	79.5
Male	22.2	39.0	53.2	68.0	83.3	88.5
Share of 10+ Year Population with High School Degree						
Female	0.2	1.1	2.9	7.0	12.1	16.8
Male	0.5	3.2	7.2	15.6	22.7	24.2
Share of 20+ Year Population with Tertiary Degree						
Female	0.04	0.3	1.0	1.5	3.4	8.3
Male	0.6	1.6	2.7	3.9	6.8	11.3

Source: Statistical Center of Iran, <http://www.amar.org.ir>.

Table 3
Labor Allocation of Population Aged 25-54 Years Old, 2006
 (Percent of Population, Using Sampling Weights)

Labor Market and Non-Market Activity	Female	Male
Employer	0.5	7.5
Self-employed	2.8	33.2
Public Employee	6.7	22.2
Private Employee	2.9	23.0
Unpaid Worker	1.1	0.5
Unemployed	2.1	5.9
Student	2.2	1.1
Pensioner/Non-Active Income Earner	2.9	3.8
Homemaker	76.4	0.1
Other	2.4	2.7
Total	100.0	100.0
Labor Force Participation Rate	16.1	92.3
Unemployment Rate	13.3	7.0

Source: 2006 Census 2-Percent Sample Survey, Statistical Center of Iran, <http://www.amar.org.ir>.

Table 4
LFP and the Characteristics of Population Aged 25-54 Years Old, 2006
 (Percentages, Using Sampling Weights)

Category	Share of Population		LFP Rate		Share of Population Studying or in Labor Force	
	Female	Male	Female	Male	Female	Male
Married	84.5	85.9	12.9	93.7	14.3	94.0
With 2 or More Children in the Household	38.0	36.2	12.1	95.2	13.4	95.6
With 4 or More Children in the Household	4.4	4.0	7.3	93.2	8.1	94.1
Rural Residents	28.3	27.4	12.8	93.8	14.0	94.4
Highest Educational Level Attained or Being Attained						
<i>No Education</i>	22.2	10.1	7.2	88.2	7.2	88.2
<i>Elementary</i>	28.1	23.4	8.2	92.9	9.7	93.0
<i>Middle School</i>	15.4	22.3	8.1	93.7	9.1	93.8
<i>High School</i>	22.0	27.6	17.6	93.3	19.7	93.9
<i>Undergraduate</i>	11.9	15.9	60.6	90.1	69.6	94.9
<i>Graduate</i>	0.3	0.7	73.4	87.6	88.4	96.6
Total Population	100.0	100.0	16.4	92.1	18.5	93.1

Source: 2006 Census 2-Percent Sample Survey, Statistical Center of Iran, <http://www.amar.org.ir>.

n.a. Not Applicable.

Table 5
Characteristics of Households with Members Aged 25-54 Years Old, 2006

(Percent of Population, Using Sampling Weights)

Variable	Mean	Std. Dev.
Household Size	4.18	1.72
Children in the Household Under 6 Years Old	0.48	0.67
Children in the Household Between 7 and 15 Years Old	0.63	0.85
Number of Household Members over 55	0.25	0.55
Number of Female Household Members over 55	0.11	0.32
Share of Women among Household Adults over 21	0.49	0.18

Source: 2006 Census 2-Percent Sample Survey, Statistical Center of Iran, <http://www.amar.org.ir>.

Table 6
District-Level Characteristics of Population, 2006
 (Percent of Reference Population, Using Sampling Weights)

District-Level Variables	Mean	Std. Dev.
Urbanization Rate (for the sample of all age groups)	0.52	0.11
Average Household Size in the District (for the sample of all age groups)	4.94	0.65
<i>Activities and Positions of Women 25-54 Years Old in the District:</i>		
LFP Rate	0.157	0.081
Unemployment Rate	0.152	0.126
Share of Self-Employed among the Employed in the Group	0.246	0.123
Share of Public Employees among the Employed in the Group	0.454	0.178
Share of Private Employees among the Employed in the Group	0.133	0.095
Share of Unpaid Family Workers in the Group	0.107	0.133
Share of Students in the Group	0.017	0.009
Share of Pensioner/Non-Active Income Earner in the Group	0.027	0.013
Share of Homemakers in the Group	0.762	0.078
<i>Activities and Positions of Men 25-54 Years Old in the District:</i>		
LFP Rate	0.927	0.027
Unemployment Rate	0.080	0.066
Share of Self-Employed among the Employed in the Group	0.454	0.117
Share of Public Employees among the Employed in the Group	0.228	0.081
Share of Private Employees among the Employed in the Group	0.231	0.083
Share of Unpaid Family Workers in the Group	0.009	0.010
Share of Students in the Group	0.008	0.006
Share of Pensioner/Non-Active Income Earner in the Group	0.031	0.017
Share of Homemakers in the Group	0.001	0.001

Source: 2006 Census 2-Percent Sample Survey, Statistical Center of Iran.

Table 7
Female Education, LFP, and Employment: Testing the Exogeneity of Higher Education
 (Probit and IVProbit Regressions with Sampling Weights)[†]

Dependent Variable:	Higher Education	LFP	LFP	Employed	Employed
Estimation Method	OLS	Probit [‡]	IV Probit [‡]	Probit [‡]	IV Probit [‡]
Right-Hand-Side Variables:					
Higher Education		0.367*** (0.00325)	0.319*** (0.0113)	0.310*** (0.00228)	0.295*** (0.0110)
Rural Birthplace	-0.114*** (0.00138)	0.00227 (0.00176)		-0.00024 (0.00165)	
Age in Decades	-0.134*** (0.0085)	0.0999*** (0.0105)	0.0895*** (0.0098)	0.217*** (0.0099)	0.205*** (0.00093)
Age in Decades Squared	0.0106*** (0.0011)	-0.0165*** (0.00138)	-0.0150*** (0.0013)	-0.0290*** (0.00129)	-0.0274*** (0.0012)
Female LFP Rate (District Average)	0.476*** (0.0101)	0.749*** (0.0117)	0.699*** (0.0171)	0.660*** (0.0108)	0.622*** (0.0157)
Constant	0.420*** (0.01620)				
ρ (Correlation coefficient of first and second stage random terms)			0.0256		-0.0315
Wald Test of Exogeneity, <i>p-value</i>			0.198		0.880
Number of Observations	258734	258734	258734	258734	258734
R ² /Pseudo R ²	0.0766	0.1900		0.1786	

[†] The numbers in parentheses are standard errors.

[‡] Reported estimates are sample-average marginal effects.

* 10% significance level

** 5% significance level

*** 1% significance level

Table 8. Education, Gender, and Allocation of Labor
Part 1: Non-Employment Options
(Marginal Probabilities Based on Multinomial Logit Regressions with Sampling Weights)[†]

Dependent Variable:	Unemployed		Student		Pensioner/Non-Active Income Earner		Homemaker		Other	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Gender										
Right-Hand-Side Variables:										
Age in Decades	-0.00217 (0.00571)	-0.0604*** (0.00698)	-0.0727*** (0.00535)	-0.0629*** (0.00421)	0.0152*** (0.00494)	0.00317 (0.00673)	-0.131*** (0.0113)	-0.000953 (0.00110)	-0.0616*** (0.00424)	-0.0461*** (0.00450)
Age in Decades Squared	-0.00117 (0.000842)	0.00499*** (0.000939)	0.00750*** (0.000730)	0.00737*** (0.000572)	0.00145** (0.000610)	0.00594*** (0.000798)	0.0142*** (0.00150)	0.000116 (0.000143)	0.00813*** (0.000568)	0.00637*** (0.000583)
Log(Household Size)	0.0121*** (0.000912)	0.0164*** (0.00144)	0.00880*** (0.00115)	0.00381*** (0.000617)	-0.0151*** (0.000988)	-0.00102 (0.00133)	-0.00334 (0.00279)	0.000192 (0.000220)	0.0179*** (0.000972)	0.0116*** (0.000959)
Log(1+ Number of Children Ever Born)	-0.0174*** (0.00114)	n.a. n.a.	0.0110*** (0.00122)	n.a. n.a.	0.00992*** (0.000833)	n.a. n.a.	0.0334*** (0.00226)	n.a. n.a.	-0.0178*** (0.000910)	n.a. n.a.
Log(1+ Number of Children Under 6 Years Old in the Household)	-0.000905 (0.00117)	-0.00193 (0.00150)	-0.0165*** (0.00140)	-0.000719 (0.00102)	0.00244* (0.00128)	-0.0139*** (0.00148)	0.0225*** (0.00266)	0.000165 (0.000234)	-0.00741*** (0.00125)	-0.00343*** (0.00110)
Log(1+ Number of Children 7-15 Years Old in the Household)	-0.00565*** (0.00100)	-0.00198 (0.00138)	0.00107 (0.00114)	0.00189** (0.000823)	0.00328*** (0.00102)	-0.0103*** (0.00114)	-0.00843*** (0.00240)	-0.0000728 (0.000215)	-0.00701*** (0.00102)	-0.00312*** (0.000949)
Log(1+Number of Household Members over 55)	0.00317** (0.00131)	0.0285*** (0.00259)	0.000817 (0.00168)	-0.000812 (0.00101)	-0.00591*** (0.00176)	-0.0350*** (0.00587)	0.00252 (0.00420)	0.0000773 (0.000372)	0.00867*** (0.00137)	0.0120*** (0.00180)
Log(1+Number of Female Household Members over 55)	-0.000861 (0.00166)	-0.0127*** (0.00334)	-0.00232 (0.00228)	0.00360** (0.00145)	-0.0188*** (0.00284)	0.0305*** (0.00674)	0.0277*** (0.00624)	0.000482 (0.000463)	0.000716 (0.00167)	0.000294 (0.00222)
Share of Women among Household Adults over 21	0.0127*** (0.00230)	0.00552* (0.00325)	0.00749*** (0.00279)	-0.00849*** (0.00150)	0.0714*** (0.00259)	0.00244 (0.00339)	-0.233*** (0.00664)	0.000837 (0.000576)	0.0193*** (0.00234)	0.00192 (0.00227)
No Education	0.0374*** (0.00177)	0.0556*** (0.00180)	-0.366*** (0.00589)	-0.127*** (0.00314)	0.00581*** (0.00109)	0.00316** (0.00143)	0.209*** (0.00551)	0.000684*** (0.000233)	0.0377*** (0.00122)	0.0293*** (0.00114)
Middle School Education	0.00640*** (0.00123)	-0.000208 (0.00148)	-0.0137*** (0.00151)	-0.00362* (0.00188)	0.00143 (0.00140)	0.0107*** (0.00133)	-0.00975*** (0.00323)	-0.00083*** (0.000236)	-0.000811 (0.00110)	-0.00771*** (0.00111)
High School Education	0.0114*** (0.00101)	-0.00713*** (0.00146)	-0.00932*** (0.00113)	0.00784*** (0.00151)	0.0124*** (0.00122)	0.00494*** (0.00125)	-0.108*** (0.00286)	-0.0010*** (0.000234)	-0.00315*** (0.000962)	-0.0150*** (0.00112)
Undergraduate Education	0.0207*** (0.000943)	-0.0052*** (0.00176)	0.0192*** (0.000892)	0.0279*** (0.00147)	0.0308*** (0.00135)	0.0119*** (0.00141)	-0.290*** (0.00357)	-0.0015*** (0.000359)	-0.0098*** (0.00116)	-0.0146*** (0.00136)
Graduate Education	0.0206*** (0.00538)	-0.0482*** (0.0138)	0.0518*** (0.00342)	0.0430*** (0.00202)	-0.0109 (0.0196)	-0.0422*** (0.0115)	-0.320*** (0.0264)	-0.0216*** (0.00167)	-0.000954 (0.0107)	-0.0122 (0.00742)
Married	-0.0175*** (0.00117)	-0.0609*** (0.00162)	-0.0160*** (0.00120)	-0.0101*** (0.000779)	-0.0389*** (0.00114)	-0.0110*** (0.00228)	0.175*** (0.00283)	-0.0018*** (0.000343)	-0.0363*** (0.00142)	-0.0447*** (0.00130)
Rural Resident	0.00214*** (0.000696)	0.0143*** (0.000963)	-0.00498*** (0.000910)	-0.0000869 (0.000578)	0.00120 (0.000807)	-0.0130*** (0.00104)	-0.0226*** (0.00200)	-0.00057*** (0.000174)	-0.000769 (0.000730)	-0.00298*** (0.000725)
<i>Number of Observations</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>

[†] The numbers in parentheses are standard errors.

* 10% significance level

** 5% significance level

*** 1% significance level

n.a. Not applicable

Table 8. Education, Gender, and Allocation of Labor
Part 2: Employment Options
(Marginal Probabilities Based on Multinomial Logit Regressions with Sampling Weights)[†]

Dependent Variable:	Employer		Self-employed		Public Employee		Private Employee		Unpaid Worker	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Gender										
Right-Hand-Side Variables:										
Age in Decades	0.00849*** (0.00250)	0.0319*** (0.00929)	0.0219*** (0.00521)	-0.0475*** (0.0147)	0.197*** (0.00788)	0.263*** (0.0137)	0.0333*** (0.00621)	-0.0674*** (0.0147)	-0.00826*** (0.00261)	-0.0131*** (0.00274)
Age in Decades Squared	-0.00099*** (0.000332)	-0.00196* (0.00119)	-0.00313*** (0.000685)	0.00778*** (0.00190)	-0.0219*** (0.00107)	-0.0313*** (0.00178)	-0.00507*** (0.000845)	-0.000362 (0.00194)	0.00093*** (0.000336)	0.00110*** (0.000391)
Log(Household Size)	0.000146 (0.000623)	-0.00873*** (0.00227)	-0.00613*** (0.00132)	-0.0269*** (0.00361)	-0.0119*** (0.00201)	0.0343*** (0.00336)	-0.00537*** (0.00135)	-0.0351*** (0.00353)	0.00295*** (0.000656)	0.00535*** (0.000425)
Log(1+ Number of Children Ever Born)	-0.000673 (0.000518)	n.a. n.a.	-0.000184 (0.00102)	n.a. n.a.	-0.0109*** (0.00175)	n.a. n.a.	-0.00648*** (0.00122)	n.a. n.a.	-0.000924* (0.000480)	n.a. n.a.
Log(1+ Number of Children Under 6 Years Old in the Household)	-0.00146** (0.000621)	0.00196 (0.00196)	-0.00151 (0.00122)	0.0226*** (0.00308)	0.0192*** (0.00182)	-0.00116 (0.00278)	-0.0135*** (0.00159)	-0.00273 (0.00300)	-0.00278*** (0.000591)	-0.00087** (0.000444)
Log(1+ Number of Children 7-15 Years Old in the Household)	0.000446 (0.000550)	-0.00139 (0.00191)	0.00349*** (0.00109)	0.0128*** (0.00301)	0.0135*** (0.00174)	0.00917*** (0.00274)	-0.000762 (0.00140)	-0.00648** (0.00303)	6.02e-05 (0.000540)	-0.000527 (0.000412)
Log(1+Number of Household Members over 55)	0.000980 (0.000901)	-0.00451 (0.00598)	-0.000420 (0.00202)	0.0542*** (0.00871)	-0.0180*** (0.00326)	-0.0778*** (0.00817)	0.00412* (0.00227)	0.0179** (0.00783)	0.00408*** (0.000845)	0.00539*** (0.000679)
Log(1+Number of Female Household Members over 55)	-0.00388*** (0.00137)	0.00362 (0.00752)	-0.00119 (0.00277)	0.000108 (0.0110)	0.0149*** (0.00454)	0.0340*** (0.0105)	-0.0130*** (0.00304)	-0.0594*** (0.0103)	-0.00328** (0.00132)	-0.000577 (0.000769)
Share of Women among Household Adults over 21	0.00687*** (0.00145)	-0.00387 (0.00494)	0.0429*** (0.00300)	0.0184** (0.00771)	0.0265*** (0.00498)	0.0224*** (0.00720)	0.0458*** (0.00341)	-0.0368*** (0.00704)	-0.000313 (0.00150)	-0.00236*** (0.000904)
No Education	0.00387*** (0.000738)	-0.0148*** (0.00261)	0.00900*** (0.00112)	0.0318*** (0.00366)	0.0239*** (0.00586)	-0.0464*** (0.00527)	0.0364*** (0.00197)	0.0670*** (0.00375)	0.00315*** (0.000464)	0.000250 (0.000542)
Middle School Education	0.000812 (0.000682)	0.00410** (0.00191)	-0.00288** (0.00122)	-0.0227*** (0.00291)	0.0307*** (0.00362)	0.0541*** (0.00325)	-0.00427** (0.00185)	-0.0327*** (0.00289)	-0.00797*** (0.000838)	-0.00110*** (0.000390)
High School Education	0.00232*** (0.000570)	0.00712*** (0.00183)	-0.000256 (0.00112)	-0.0833*** (0.00290)	0.0974*** (0.00293)	0.163*** (0.00289)	0.00832*** (0.00140)	-0.0742*** (0.00288)	-0.0107*** (0.00106)	-0.00266*** (0.000419)
Undergraduate Education	0.00614*** (0.000539)	0.0000324 (0.00229)	0.00123 (0.00167)	-0.331*** (0.00498)	0.199*** (0.00277)	0.369*** (0.00274)	0.0313*** (0.00126)	-0.0532*** (0.00384)	-0.00808*** (0.00230)	-0.00414*** (0.000690)
Graduate Education	0.0187*** (0.00128)	0.0437*** (0.00747)	0.0848*** (0.00613)	-0.181*** (0.0209)	0.219*** (0.00728)	0.316*** (0.0104)	0.0608*** (0.00544)	-0.0976*** (0.0186)	-0.124*** (0.00319)	0.00121 (0.00408)
Married	-0.00217*** (0.000654)	0.0126*** (0.00293)	-0.0168*** (0.00135)	0.0378*** (0.00449)	-0.0280*** (0.00219)	0.0727*** (0.00402)	-0.0175*** (0.00155)	0.00907** (0.00395)	-0.00218*** (0.000671)	-0.00354*** (0.000470)
Rural Resident	-0.000731 (0.000462)	-0.0309*** (0.00152)	0.0123*** (0.000807)	0.119*** (0.00203)	-0.00134 (0.00160)	-0.0540*** (0.00215)	-0.00780*** (0.00108)	-0.0395*** (0.00210)	0.0226*** (0.000701)	0.00732*** (0.000354)
<i>Number of Observations</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>

[†] The numbers in parentheses are standard errors.
* 10% significance level
** 5% significance level
*** 1% significance level
n.a. Not applicable

**Table 9. Education, Family Structure, and Allocation of Labor
LFP and Employment Probabilities**

(Marginal Probabilities Based on Multinomial Logit Regressions with Sampling Weights)

Dependent Variable:	LFP		Employed	
Gender	Female	Male	Female	Male
Right-Hand-Side Variables:				
Age in Decades	0.250	0.107	0.252	0.167
Age in Decades Squared	-0.031	-0.020	-0.030	-0.025
Log(Household Size)	-0.008	-0.015	-0.020	-0.031
Log(1+ Number of Children Ever Born)	-0.037	n.a.	-0.019	n.a.
Log(1+ Number of Children Under 6 Years Old in the Household)	-0.001	0.018	0.000	0.020
Log(1+ Number of Children 7-15 Years Old in the Household)	0.011	0.012	0.017	0.014
Log(1+Number of Household Members over 55)	-0.006	0.024	-0.009	-0.005
Log(1+Number of Female Household Members over 55)	-0.007	-0.035	-0.006	-0.022
Share of Women among Household Adults over 21	0.134	0.003	0.122	-0.002
No Education	0.114	0.093	0.076	0.038
Middle School Education	0.023	0.001	0.016	0.002
High School Education	0.108	0.003	0.097	0.010
Undergraduate Education	0.250	-0.024	0.230	-0.019
Graduate Education	0.280	0.034	0.259	0.082
Married	-0.084	0.068	-0.067	0.129
Rural Resident	0.027	0.016	0.025	0.002

n.a. Not applicable

**Table 10. Education, Family Structure, and Allocation of Labor
LFP and Employment Probabilities**

(Marginal Probabilities Based on Multinomial Logit Regressions with Sampling Weights)

Dependent Variable:	LFP		Employed	
	Female	Male	Female	Male
Gender:				
Right-Hand-Side Variables:				
Age in Decades	0.244	0.118	0.251	0.160
Age in Decades Squared	-0.031	-0.021	-0.030	-0.024
Log(Household Size)	0.000	-0.015	-0.011	-0.027
Log(1+ Number of Children Ever Born)	-0.036	n.a.	-0.020	n.a.
Log(1+ Number of Children Under 6 Years Old in the Household)	-0.002	0.022	-0.001	0.032
Log(1+ Number of Children 7-15 Years Old in the Household)	0.008	0.012	0.014	0.020
Log(1+Number of Household Members over 55)	-0.008	0.017	-0.011	-0.012
Log(1+Number of Female Household Members over 55)	-0.009	-0.029	-0.007	-0.013
Share of Women among Household Adults over 21	0.126	0.000	0.114	-0.007
No Education	0.080	0.041	0.049	0.011
Middle School Education	0.021	0.011	0.014	0.010
High School Education	0.114	0.019	0.103	0.027
Undergraduate Education	0.245	0.007	0.227	0.009
Graduate Education	0.236	0.033	0.215	0.070
Married	-0.104	0.063	-0.084	0.121
Married Interacted with:				
No Education	0.029	0.083	0.021	0.060
Middle School Education	0.005	-0.009	0.004	-0.005
High School Education	-0.005	-0.017	-0.004	-0.009
Undergraduate Education	0.007	-0.033	0.001	-0.011
Graduate Education	0.116	0.009	0.130	0.024
Rural Resident	-0.011	-0.001	-0.013	0.007
Rural Residence Interacted with:				
Married	0.026	0.017	0.026	0.001
No Education	0.025	0.015	0.024	0.017
Middle School Education	0.015	-0.008	0.020	-0.008
High School Education	-0.017	-0.005	-0.012	-0.015
Undergraduate Education	-0.035	-0.012	-0.029	-0.033
Graduate Education	-0.247	0.316	-0.248	0.319
District-Level Variables:				
Urbanization	0.018	0.013	0.018	-0.006
Large City	-0.023	0.001	-0.021	0.004
Average Log(Household Size)	0.005	-0.002	0.006	-0.003
LFP Rate of Women 25-54 Years Old	0.753	0.674	0.599	0.509
Unemployment Rate of Women 25-54 Years Old	-0.035	-0.035	-0.118	-0.463
Share of Self-Employed among Employed Women 25-54 Years Old	0.172	-0.013	0.171	-0.151
Share of Public Employees among Employed Women 25-54 Years Old	0.076	0.000	0.079	-0.139
Share of Private Employees among Employed Women 25-54 Years Old	0.151	-0.021	0.163	-0.109
Share of Unpaid Family Workers among Women 25-54 Years Old	0.128	-0.009	0.132	0.232
Share of Students among Women 25-54 Years Old	-0.525	0.265	-0.464	0.232
Share of Pensioners among Women 25-54 Years Old	0.253	-0.075	0.118	-0.332
Share of Homemakers among Women 25-54 Years Old	0.290	0.754	0.206	0.234

n.a. Not applicable

Table 11. Education, Gender, and Allocation of Labor
Part 1: Non-Employment Options and Socio-Economic Conditions of the District
(Marginal Probabilities Based on Multinomial Logit Regressions with Sampling Weights)[†]

Dependent Variable:	Unemployed		Student		Pensioner/Non-Active Income Earner		Homemaker		Other	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Gender										
Right-Hand-Side Variables:										
District-Level Variables:										
Urbanization	0.000149 (0.00372)	0.0194*** (0.00539)	-0.00129 (0.00417)	-0.00272 (0.00301)	-0.00350 (0.00420)	-0.00533 (0.00471)	-0.0242*** (0.00923)	-0.000130 (0.000930)	0.0110*** (0.00400)	-0.00482 (0.00394)
Large City	-0.00218* (0.00124)	-0.00337* (0.00198)	-0.000688 (0.00128)	0.00150 (0.00091)	-0.00193 (0.00136)	-0.000585 (0.00154)	0.0283*** (0.00324)	-0.000007 (0.000284)	-0.00248* (0.00137)	-0.00163 (0.00139)
Average Log(Household Size)	-0.00133* (0.00069)	0.000482 (0.00097)	0.00287*** (0.00077)	0.000401 (0.0005)	0.00295*** (0.000795)	0.00488*** (0.00101)	-0.00495*** (0.00177)	-0.000119 (0.000186)	-0.00579*** (0.000680)	-0.00257*** (0.000758)
LFP Rate (for age group 25-54, gender-specific)	0.154*** (0.0206)	0.165*** (0.0295)	-0.0465* (0.0246)	-0.0331* (0.0177)	0.0303 (0.0250)	-0.0225 (0.0330)	-0.221*** (0.0534)	0.00222 (0.00577)	-0.515*** (0.0178)	-0.620*** (0.0207)
Unemployment Rate (for age group 25-54, gender-specific)	0.0831*** (0.00275)	0.428*** (0.00858)	0.00545 (0.00414)	0.0141** (0.00647)	0.00882** (0.00381)	0.0414*** (0.0107)	0.0309*** (0.00895)	-0.00182 (0.00231)	-0.0101*** (0.00351)	-0.0190*** (0.00663)
Share of Students in Population (for age group 25-54, gender-specific)	-0.0615 (0.0510)	0.0323 (0.0846)	0.768*** (0.0544)	0.440*** (0.0311)	0.0683 (0.0588)	-0.0567 (0.0801)	0.293** (0.131)	-0.00258 (0.0128)	-0.604*** (0.0496)	-0.645*** (0.0592)
Share of Pensioners in Population (for age group 25-54, gender-specific)	0.135*** (0.0325)	0.257*** (0.0469)	0.00657 (0.0404)	0.00395 (0.0273)	0.722*** (0.0348)	0.718*** (0.0464)	-0.361*** (0.0864)	-0.000501 (0.00857)	-0.620*** (0.0343)	-0.647*** (0.0345)
Share of Homemakers in Population (for age group 25-54, gender-specific)	0.0841*** (0.0208)	0.520 (0.382)	0.000432 (0.0243)	-0.0948 (0.206)	0.0346 (0.0248)	-0.353 (0.360)	0.199*** (0.0535)	0.574*** (0.0588)	-0.525*** (0.0172)	-0.905*** (0.281)
Share of Self-Employed among Employed (for age group 25-54, gender-specific)	0.000662 (0.00823)	0.138*** (0.0214)	0.00157 (0.0103)	0.00354 (0.0123)	-0.00825 (0.00964)	0.0188 (0.0210)	-0.180*** (0.0218)	-0.00239 (0.00364)	0.0147* (0.00807)	-0.00875 (0.0156)
Share of Public Employees among Employed (for age group 25-54, gender-specific)	-0.00295 (0.00744)	0.139*** (0.0214)	-0.0128 (0.00966)	-0.0117 (0.0120)	-0.0189** (0.00893)	0.0149 (0.0209)	-0.0525*** (0.0203)	-0.00194 (0.00378)	0.00821 (0.00739)	-0.00158 (0.0158)
Share of Private Employees among Employed (for age group 25-54, gender-specific)	-0.0124 (0.00864)	0.0874*** (0.0227)	-0.00698 (0.0104)	-0.00425 (0.0128)	-0.0226** (0.00995)	0.0335 (0.0219)	-0.141*** (0.0224)	-0.00265 (0.00381)	0.0206** (0.00828)	-0.00543 (0.0165)
Share of Unpaid Family Workers among Those Employed (gender-specific)	-0.00439 (0.00767)	-0.241*** (0.0709)	0.00650 (0.00990)	-0.00135 (0.0404)	-0.0110 (0.00929)	-0.0103 (0.0741)	-0.120*** (0.0209)	0.00350 (0.0108)	-0.00306 (0.00782)	0.0166 (0.0491)
<i>Number of Observations</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>

[†] The numbers in parentheses are standard errors.

* 10% significance level

** 5% significance level

*** 1% significance level

n.a. Not applicable

Table 11. Education, Gender, and Allocation of Labor
Part 2: Employment Options and Socio-Economic Conditions of the District
(Marginal Probabilities Based on Multinomial Logit Regressions with Sampling Weights)[†]

Dependent Variable: Gender	Employer		Self-employed		Public Employee		Private Employee		Unpaid Worker	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Right-Hand-Side Variables:										
District-Level Variables:										
Urbanization	0.00179 (0.00218)	-0.0228*** (0.00761)	0.0127*** (0.00458)	0.0669*** (0.0115)	-0.0115* (0.0063)	-0.0215** (0.0103)	-0.000401 (0.00529)	-0.0346*** (0.0106)	0.0151*** (0.00237)	0.00555*** (0.00176)
Large City	-0.000764 (0.00070)	-0.000575 (0.00231)	-0.00563*** (0.00172)	0.00603 (0.0040)	-0.0089*** (0.0019)	-0.0123*** (0.00339)	-0.00279 (0.00171)	0.0122*** (0.00359)	-0.00296** (0.00121)	-0.00121 (0.000758)
Average Log(Household Size)	0.000142 (0.00041)	0.00049 (0.00158)	-0.00394*** (0.000880)	-0.0104*** (0.0024)	0.0148*** (0.0012)	0.0184*** (0.00203)	-0.000081 (0.00109)	-0.00926*** (0.00227)	-0.00468*** (0.000506)	-0.00220*** (0.000311)
LFP Rate (for age group 25-54, gender-specific)	0.0348*** (0.0132)	0.0917* (0.055)	0.209*** (0.0273)	0.376*** (0.0747)	0.0310 (0.0367)	-0.330*** (0.0656)	0.221*** (0.0362)	0.357*** (0.0780)	0.103*** (0.0145)	0.0142 (0.0105)
Unemployment Rate (for age group 25-54, gender-specific)	-0.0059*** (0.00227)	-0.0723*** (0.0193)	-0.0239*** (0.00460)	-0.211*** (0.0254)	-0.040*** (0.0063)	0.0315 (0.0216)	-0.0403*** (0.00658)	-0.215*** (0.0275)	-0.00789*** (0.00250)	0.00370 (0.00413)
Share of Students in Population (for age group 25-54, gender-specific)	0.0204 (0.0322)	0.123 (0.11)	0.0198 (0.0658)	0.595*** (0.178)	-0.419*** (0.0908)	-0.883*** (0.155)	-0.218** (0.0859)	0.346* (0.166)	0.133*** (0.0313)	0.0512* (0.0263)
Share of Pensioners in Population (for age group 25-54, gender-specific)	0.0205 (0.0217)	0.00998 (0.0772)	0.104** (0.0428)	0.126 (0.113)	-0.109* (0.0611)	-0.628*** (0.0990)	0.0956* (0.0578)	0.155 (0.111)	0.00651 (0.0204)	0.00541 (0.0171)
Share of Homemakers in Population (for age group 25-54, gender-specific)	0.0195 (0.0133)	-0.0727 (0.556)	0.0879*** (0.0278)	2.191*** (0.828)	-0.0638* (0.0366)	-3.212*** (0.749)	0.107*** (0.0362)	1.192 (0.825)	0.0554*** (0.0146)	0.136 (0.113)
Share of Self-Employed among Employed (for age group 25-54, gender-specific)	-0.0291*** (0.00285)	-0.851*** (0.0328)	0.0837*** (0.00979)	0.577*** (0.0480)	0.0995*** (0.0170)	0.303*** (0.0441)	0.00118 (0.0145)	-0.186*** (0.0478)	0.0156*** (0.00605)	0.00641 (0.00726)
Share of Public Employees among Employed (for age group 25-54, gender-specific)	-0.0318*** (0.00274)	-0.883*** (0.0326)	-0.0133 (0.00952)	-0.00352 (0.0479)	0.124*** (0.0159)	0.794*** (0.0432)	-0.00454 (0.0138)	-0.0452 (0.0473)	0.00421 (0.00575)	-0.00128 (0.00718)
Share of Private Employees among Employed (for age group 25-54, gender-specific)	-0.0320*** (0.00323)	-0.855*** (0.0338)	-0.00992 (0.0104)	-0.240*** (0.0502)	0.0590*** (0.0173)	0.363*** (0.0455)	0.149*** (0.0143)	0.624*** (0.0486)	-0.00275 (0.00632)	-0.000616 (0.00776)
Share of Unpaid Family Workers among Those Employed (gender-specific)	-0.0335*** (0.00310)	-0.733*** (0.107)	0.00304 (0.00959)	0.242* (0.145)	0.118*** (0.0161)	0.281** (0.140)	-0.00645 (0.0138)	0.173 (0.156)	0.0511*** (0.00580)	0.269*** (0.0130)
<i>Number of Observations</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>

[†] The numbers in parentheses are standard errors.

* 10% significance level

** 5% significance level

*** 1% significance level

n.a. Not applicable

Appendix A: Table I. Education, Gender, and Allocation of Labor: Extended Model
Part 1: Non-Employment Options
(Marginal Probabilities Based on Multinomial Logit Regressions with Sampling Weights)[†]

Dependent Variable:	Unemployed		Student		Pensioner/Non-Active Income Earner		Homemaker		Other	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Right-Hand-Side Variables:										
Age in Decades	-0.00658 (0.00545)	-0.0428*** (0.00687)	-0.0688* (0.00531)	-0.0604*** (0.00417)	0.0083*** (0.00483)	-0.00364 (0.00672)	-0.121*** (0.0112)	-0.00118 (0.00110)	-0.0623*** (0.00419)	-0.0519*** (0.00450)
Age in Decades Squared	-0.000486 (0.0008)	0.00290*** (0.000924)	0.00721*** (0.000723)	0.00703*** (0.000567)	0.00216*** (0.000599)	0.00662*** (0.000798)	0.0131*** (0.00149)	0.000145 (0.000143)	0.00816*** (0.000562)	0.00718*** (0.000583)
Log(Household Size)	0.0114*** (0.000899)	0.0125*** (0.00146)	0.00637*** (0.00116)	0.00372*** (0.000661)	-0.0145*** (0.00102)	-0.000803 (0.00136)	-0.0111*** (0.00285)	0.000126 (0.000210)	0.0189*** (0.00100)	0.0115*** (0.000997)
Log(1+ Number of Children Ever Born)	-0.0163*** (0.00112)	n.a. n.a.	0.00810*** (0.00124)	n.a. n.a.	0.00890*** (0.000813)	n.a. n.a.	0.0366*** (0.00224)	n.a. n.a.	-0.0172*** (0.000884)	n.a. n.a.
Log(1+ Number of Children Under 6 Years Old in the Household)	-0.000849 (0.00118)	-0.0101*** (0.00148)	-0.0141*** (0.00136)	-0.00132 (0.000986)	-0.000746 (0.00130)	-0.0143*** (0.00148)	0.0239*** (0.00269)	0.000128 (0.000223)	-0.00699*** (0.00126)	-0.00598*** (0.00109)
Log(1+ Number of Children 7-15 Years Old in the Household)	-0.00577*** (0.000992)	-0.00724*** (0.00137)	0.00130 (0.00114)	0.00125 (0.000825)	0.00264*** (0.00102)	-0.00998*** (0.00114)	-0.00598** (0.00238)	8.92e-06 (0.000211)	-0.00642*** (0.000999)	-0.00373*** (0.000944)
Log(1+Number of Household Members over 55)	0.00347*** (0.00130)	0.0290*** (0.00256)	-0.0000236 (0.00170)	-0.00106 (0.00101)	-0.00150 (0.00179)	-0.0293*** (0.00570)	0.000395 (0.00424)	0.000185 (0.000367)	0.00895*** (0.00137)	0.0130*** (0.00182)
Log(1+Number of Female Household Members over 55)	-0.00200 (0.00164)	-0.0158*** (0.00328)	-0.00206 (0.00230)	0.00377*** (0.00146)	-0.0196*** (0.00276)	0.0255*** (0.00657)	0.0296*** (0.00620)	0.000336 (0.000460)	0.000833 (0.00166)	-0.000940 (0.00223)
Share of Women among Household Adults over 21	0.0123*** (0.00226)	0.00760** (0.00315)	0.00884*** (0.00284)	-0.00951*** (0.00154)	0.0715*** (0.00258)	0.00354 (0.00342)	-0.225*** (0.00666)	0.000882 (0.000575)	0.0188*** (0.00228)	0.00468** (0.00228)
No Education	0.0312*** (0.00294)	0.0303*** (0.00487)	-0.339*** (0.00591)	-0.116*** (0.00396)	0.00182 (0.00179)	0.0311*** (0.00647)	0.218*** (0.00855)	0.000630 (0.000425)	0.0388*** (0.00187)	0.0435*** (0.00234)
Middle School Education	0.00710*** (0.00203)	0.00147 (0.00331)	-0.00421 (0.00340)	-0.00219 (0.00345)	0.00307 (0.00215)	0.000557 (0.00632)	-0.0187*** (0.00721)	-0.00110*** (0.000362)	-0.00165 (0.00171)	-0.00839*** (0.00203)
High School Education	0.0111*** (0.00166)	-0.00824*** (0.00311)	0.00760*** (0.00241)	0.0116*** (0.00289)	-0.00463** (0.00198)	-0.0137** (0.00604)	-0.113*** (0.00613)	-0.00166*** (0.000371)	-0.00384*** (0.00143)	-0.0147*** (0.00193)
Undergraduate Education	0.0182*** (0.00162)	-0.00145 (0.00343)	0.0413*** (0.00229)	0.0310*** (0.00282)	0.00265 (0.00268)	-0.0231*** (0.00805)	-0.278*** (0.00878)	-0.00244*** (0.000543)	-0.0113*** (0.00169)	-0.0129*** (0.00218)
Graduate Education	0.0217*** (0.00703)	-0.0368** (0.0182)	0.0698*** (0.00705)	0.0411*** (0.00339)	-0.0126 (0.0205)	-0.0429 (0.0334)	-0.283*** (0.0629)	-0.0216*** (0.00169)	-0.0109 (0.0137)	-0.00893 (0.00948)
Married	-0.0201 (0.00233)	-0.0582*** (0.00323)	0.00759*** (0.00247)	-0.00701** (0.00301)	-0.0521*** (0.00201)	-0.0143*** (0.00517)	0.188*** (0.00567)	-0.00225*** (0.000426)	-0.0398*** (0.00226)	-0.0396*** (0.00207)
Rural Resident	0.00110 (0.00172)	-0.00748*** (0.00273)	-0.000805 (0.00217)	-0.00467* (0.00278)	0.00246 (0.00175)	0.00494 (0.00431)	0.0125** (0.00542)	2.66e-05 (0.000329)	-0.00272** (0.00138)	-0.00866*** (0.00183)
<i>Number of Observations</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>

[†] The numbers in parentheses are standard errors.
* 10% significance level
** 5% significance level
*** 1% significance level
n.a. Not applicable

Appendix A: Table I. Education, Gender, and Allocation of Labor: Extended Model
Part 2: Non-Employment Options and the Interaction of Education with Marriage and Rural Residence
(Marginal Probabilities Based on Multinomial Logit Regressions with Sampling Weights)[†]

Dependent Variable:	Unemployed		Student		Pensioner/Non-Active Income Earner		Homemaker		Other	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Gender										
Right-Hand-Side Variables:										
Married	-0.0201*** (0.00233)	-0.0582*** (0.00323)	0.00759*** (0.00247)	-0.00701** (0.00301)	-0.0521*** (0.00201)	-0.0143*** (0.00517)	0.188*** (0.00567)	-0.00225*** (0.000426)	-0.0398*** (0.00226)	-0.0396*** (0.00207)
Married Interacted with:										
No Education	0.00842** (0.00330)	0.0226*** (0.00485)	-0.0333*** (0.00231)	-0.0292*** (0.00312)	0.00454** (0.00218)	-0.0323*** (0.00649)	0.00405 (0.00826)	0.000430 (0.000474)	-0.00439* (0.00226)	-0.0218*** (0.00239)
Middle School Education	0.00148 (0.00275)	-0.00408 (0.00348)	-0.00933*** (0.00360)	-0.00233 (0.00382)	0.000405 (0.00295)	0.00904 (0.00637)	0.00467 (0.00762)	0.000544 (0.000440)	-0.000904 (0.00282)	0.00154 (0.00226)
High School Education	-0.000612 (0.00230)	-0.00776** (0.00334)	-0.0218*** (0.00258)	-0.00414 (0.00316)	0.0342*** (0.00244)	0.0187*** (0.00610)	-0.00852 (0.00654)	0.00136*** (0.000442)	0.00114 (0.00248)	0.00117 (0.00225)
Undergraduate Education	0.00566** (0.00232)	-0.0225*** (0.00432)	-0.0339*** (0.00247)	-0.00320 (0.00295)	0.0464*** (0.00319)	0.0363*** (0.00817)	-0.0289*** (0.00963)	0.00206*** (0.000688)	0.00947*** (0.00315)	-0.00206 (0.00318)
Graduate Education	-0.0142 (0.0144)	-0.0143 (0.0278)	-0.0240*** (0.00834)	0.00411 (0.00379)	-0.208*** (0.0211)	0.00495 (0.0355)	0.0784 (0.0669)	-0.00554*** (0.000548)	0.0374* (0.0216)	-0.0124 (0.0168)
Rural Resident	0.00110 (0.00172)	-0.00748*** (0.00273)	-0.000805 (0.00217)	0.00467* (0.00278)	0.00246 (0.00175)	0.00494 (0.00431)	0.0125** (0.00542)	2.66e-05 (0.000329)	-0.00272** (0.00138)	-0.00866*** (0.00183)
Rural Residence Interacted with:										
Married	-0.000860 (0.00158)	0.0158*** (0.00220)	-0.00219 (0.00195)	-0.00130 (0.00131)	0.000964 (0.00180)	-0.0198*** (0.00408)	-0.0359*** (0.00467)	-0.000728** (0.000330)	0.0115*** (0.00163)	0.00479*** (0.00153)
No Education	0.00165 (0.00317)	-0.00167 (0.00335)	-0.0182*** (0.00182)	-0.0212*** (0.00291)	-0.00472** (0.00210)	0.00834*** (0.00282)	0.000630 (0.00781)	-0.000485 (0.000440)	-0.00321* (0.00193)	-0.00171 (0.00203)
Middle School Education	-0.00549** (0.00241)	-0.000311 (0.00282)	-0.00793** (0.00325)	0.00132 (0.00368)	-0.00414 (0.00300)	0.00316 (0.00285)	-0.00442 (0.00657)	-0.000413 (0.000457)	0.00180 (0.00215)	0.00435** (0.00209)
High School Education	-0.00438** (0.00204)	0.0104*** (0.00282)	-0.000768 (0.00241)	-0.00483 (0.00301)	-0.0169*** (0.00324)	0.00424 (0.00299)	0.0318*** (0.00595)	-4.05e-05 (0.000445)	0.00237 (0.00191)	0.00543** (0.00216)
Undergraduate Education	-0.00510** (0.00224)	0.0207*** (0.00417)	0.00156 (0.00235)	-0.00341 (0.00278)	-0.0233*** (0.00570)	0.00790* (0.00454)	0.0560*** (0.00969)	-9.09e-05 (0.000835)	0.000286 (0.00304)	0.00719** (0.00324)
Graduate Education	0.00102 (0.0195)	-0.00222 (0.0549)	-0.000291 (0.0176)	-0.0162** (0.00783)	-0.173*** (0.0226)	-0.342*** (0.0250)	0.599*** (0.0694)	0.000830 (0.000665)	-0.180*** (0.0137)	0.0416** (0.0185)

[†] The numbers in parentheses are standard errors.

* 10% significance level

** 5% significance level

*** 1% significance level

n.a. Not applicable

Appendix A: Table I. Education, Gender, and Allocation of Labor: Extended Model
Part 3: Employment Options
(Marginal Probabilities Based on Multinomial Logit Regressions with Sampling Weights)[†]

Dependent Variable:	Employer		Self-employed		Public Employee		Private Employee		Unpaid Worker	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Right-Hand-Side Variables:										
Age in Decades	0.00787*** (0.00251)	0.0240*** (0.00927)	0.0212*** (0.00519)	-0.0307** (0.0146)	0.202*** (0.00779)	0.267*** (0.0136)	0.0273*** (0.00613)	-0.0900*** (0.0145)	-0.00741*** (0.00257)	-0.00983*** (0.00280)
Age in Decades Squared	-0.00094*** (0.000332)	-0.00128 (0.00119)	-0.00304*** (0.000683)	0.00570*** (0.00189)	-0.0225*** (0.00105)	-0.0314*** (0.00176)	-0.00452*** (0.000833)	0.00241 (0.00192)	0.00081** (0.00033)	0.000673* (0.000403)
Log(Household Size)	0.000425 (0.000642)	-0.00242 (0.00232)	-0.00368*** (0.00137)	-0.0247*** (0.00365)	-0.01000*** (0.00200)	0.0213*** (0.00334)	-0.00194 (0.00139)	-0.0285*** (0.00347)	0.00421*** (0.000677)	0.00725*** (0.000508)
Log(1+ Number of Children Ever Born)	-0.000570 (0.000522)	n.a. n.a.	-0.0000215 (0.00104)	n.a. n.a.	-0.0119*** (0.00168)	n.a. n.a.	-0.00703*** (0.00123)	n.a. n.a.	-0.000558 (0.000504)	n.a. n.a.
Log(1+ Number of Children Under 6 Years Old in the Household)	-0.00152** (0.000635)	0.00399** (0.00197)	-0.000774 (0.00125)	0.0242*** (0.00308)	0.0133*** (0.00179)	-0.00452 (0.00276)	-0.0109*** (0.00158)	0.00935*** (0.00298)	-0.00127** (0.000603)	-0.00142*** (0.000449)
Log(1+ Number of Children 7-15 Years Old in the Household)	0.000407 (0.000552)	0.000269 (0.00191)	0.00335*** (0.00109)	0.0100*** (0.00299)	0.0102*** (0.00171)	0.00850*** (0.00271)	0.0000551 (0.00139)	0.00206 (0.00299)	0.000202 (0.000541)	-0.00117*** (0.000420)
Log(1+Number of Household Members over 55)	0.000931 (0.000908)	-0.00947 (0.00597)	-0.00231 (0.00204)	0.0378*** (0.00854)	-0.0140*** (0.00321)	-0.0653*** (0.00814)	0.00152 (0.00225)	0.0204*** (0.00776)	0.00260*** (0.000839)	0.00476*** (0.000637)
Log(1+Number of Female Household Members over 55)	-0.00385*** (0.00138)	0.0108 (0.00753)	-0.000626 (0.00279)	0.00385 (0.0108)	0.00976** (0.00449)	0.0194* (0.0104)	-0.00890*** (0.00304)	-0.0459*** (0.0102)	-0.00316** (0.00130)	-0.00102 (0.000731)
Share of Women among Household Adults over 21	0.00683** (0.00146)	-0.00844* (0.00499)	0.0417*** (0.00301)	-0.000859 (0.00765)	0.0217*** (0.00490)	0.0407*** (0.00721)	0.0447*** (0.00342)	-0.0337*** (0.00704)	-0.00134 (0.00151)	-0.00486*** (0.000898)
No Education	0.00313** (0.00151)	-0.0275* (0.0142)	0.00473* (0.00267)	-0.0498** (0.0195)	0.0217*** (0.01000)	0.0204 (0.0270)	0.0242*** (0.00368)	0.0694*** (0.0171)	-0.00475** (0.00194)	-0.00187 (0.00193)
Middle School Education	0.000624 (0.00148)	-0.000129 (0.00881)	0.00443 (0.00283)	0.0263** (0.0124)	0.0112 (0.00748)	0.00811 (0.0173)	0.00338 (0.00335)	-0.0239** (0.0114)	-0.00525** (0.00248)	-0.000615 (0.00108)
High School Education	0.00292** (0.00125)	0.00318 (0.00811)	0.00872*** (0.00246)	-0.0341*** (0.0116)	0.0805*** (0.00539)	0.122*** (0.0152)	0.0140*** (0.00267)	-0.0636*** (0.0106)	-0.00350 (0.00244)	-0.000666 (0.00103)
Undergraduate Education	0.00588*** (0.00129)	-0.000874 (0.00924)	0.00857** (0.00379)	-0.257*** (0.0153)	0.184*** (0.00522)	0.326*** (0.0152)	0.0281*** (0.00269)	-0.0569*** (0.0122)	0.000726 (0.00419)	-0.00239* (0.00133)
Graduate Education	0.0148*** (0.00291)	0.0453** (0.0229)	0.0794*** (0.0144)	-0.173*** (0.0596)	0.203*** (0.0170)	0.281*** (0.0347)	0.0195 (0.0128)	-0.0878* (0.0474)	-0.102*** (0.00521)	0.00474 (0.00413)
Married	-0.00252** (0.00122)	0.0140 (0.00764)	-0.0175*** (0.00222)	0.0492*** (0.0109)	-0.0419 (0.00589)	0.0502*** (0.0146)	-0.0178*** (0.00284)	0.0113 (0.0100)	-0.00391** (0.00198)	-0.00323*** (0.000992)
Rural Resident	-0.000132 (0.00111)	-0.000957 (0.00641)	0.00738*** (0.00206)	0.0919*** (0.00838)	-0.0387*** (0.00576)	-0.0931*** (0.00905)	-0.00131 (0.00257)	0.000449 (0.00777)	0.0202*** (0.00205)	0.00824*** (0.000968)
<i>Number of Observations</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>	<i>251,990</i>	<i>256051</i>

[†] The numbers in parentheses are standard errors.

- * 10% significance level
- ** 5% significance level
- *** 1% significance level
- n.a. Not applicable

Appendix A: Table I. Education, Gender, and Allocation of Labor: Extended Model

Part 4: Employment Options and the Interaction of Education with Marriage and Rural Residence
(Marginal Probabilities Based on Multinomial Logit Regressions with Sampling Weights)[†]

Dependent Variable: Gender	Employer		Self-employed		Public Employee		Private Employee		Unpaid Worker	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Right-Hand-Side Variables:										
Married	-0.00252** (0.00122)	0.0140* (0.00764)	-0.0175*** (0.00222)	0.0492*** (0.0109)	-0.0419*** (0.00589)	0.0502*** (0.0146)	-0.0178*** (0.00284)	0.0113 (0.0100)	-0.00391** (0.00198)	-0.00323*** (0.000992)
Married Interacted with:										
No Education	0.00113 (0.00154)	0.0108 (0.0142)	0.00143 (0.00251)	0.0753*** (0.0193)	-0.00824 (0.0113)	-0.0565** (0.0273)	0.0193*** (0.00375)	0.0298* (0.0171)	0.00707*** (0.00140)	0.000897 (0.00109)
Middle School Education	0.000453 (0.00157)	0.00464 (0.00891)	-0.00427 (0.00288)	-0.0336*** (0.0124)	0.0185** (0.00815)	0.0348** (0.0174)	-0.0105*** (0.00382)	-0.0113 (0.0115)	-0.000464 (0.00196)	0.000739 (0.000788)
High School Education	-0.000664 (0.00131)	0.00467 (0.00823)	-0.00685*** (0.00260)	-0.0288** (0.0117)	0.0180*** (0.00606)	0.0226 (0.0153)	-0.0114*** (0.00301)	-0.00891 (0.0108)	-0.00351 (0.00223)	0.00111 (0.000875)
Undergraduate Education	0.000305 (0.00140)	0.00000139 (0.00961)	-0.00601 (0.00434)	-0.0507*** (0.0161)	0.0146** (0.00591)	0.0200 (0.0155)	-0.00140 (0.00308)	0.0175 (0.0130)	-0.00617 (0.00469)	0.00251 (0.00156)
Graduate Education	0.00696** (0.00311)	-0.00689 (0.0243)	0.0241 (0.0158)	0.0518 (0.0633)	0.0498*** (0.0185)	0.0277 (0.0363)	0.0585*** (0.0140)	-0.00132 (0.0513)	-0.00908* (0.00486)	-0.0477*** (0.00449)
Rural Resident	-0.000132 (0.00111)	-0.000957 (0.00641)	0.00738*** (0.00206)	0.0919*** (0.00838)	-0.0387*** (0.00576)	-0.0931*** (0.00905)	-0.00131 (0.00257)	0.000449 (0.00777)	0.0202*** (0.00205)	0.00824*** (0.000968)
Rural Residence Interacted with:										
Married	0.000334 (0.00102)	-0.0136** (0.00607)	0.00176 (0.00196)	0.0130* (0.00777)	0.0139*** (0.00359)	-0.00422 (0.00788)	0.0116*** (0.00238)	0.00738 (0.00709)	-0.00110 (0.00196)	-0.00122 (0.000761)
No Education	-0.000117 (0.00133)	0.0180*** (0.00507)	0.00499** (0.00228)	0.0188*** (0.00723)	0.00980 (0.0111)	-0.0121 (0.0101)	0.00660* (0.00347)	-0.0111 (0.00717)	0.00254 (0.00156)	0.00317* (0.00192)
Middle School Education	-0.000362 (0.00140)	-0.00609 (0.00389)	-0.00391 (0.00245)	-0.0319*** (0.00559)	0.0355*** (0.00714)	0.0291*** (0.00661)	-0.0111*** (0.00373)	0.00110 (0.00558)	0.0000595 (0.00193)	-0.000329 (0.00108)
High School Education	-0.00172 (0.00136)	-0.0186*** (0.00414)	-0.00818*** (0.00244)	-0.0477*** (0.00584)	0.0238*** (0.00586)	0.0597*** (0.00601)	-0.0212*** (0.00331)	-0.00601 (0.00583)	-0.00482** (0.00199)	-0.00267** (0.00106)
Undergraduate Education	-0.00265 (0.00167)	-0.0339*** (0.00853)	-0.0207*** (0.00587)	-0.0495*** (0.0127)	0.0187*** (0.00565)	0.121*** (0.00729)	-0.0131*** (0.00364)	-0.0677*** (0.0107)	-0.0117*** (0.00414)	-0.00264* (0.00153)
Graduate Education	0.00183 (0.00518)	-0.0602 (0.0508)	-0.324*** (0.0135)	0.204** (0.0916)	0.102*** (0.0218)	0.314*** (0.0460)	-0.0118 (0.0290)	-0.0562 (0.100)	-0.0159*** (0.00485)	-0.0831*** (0.00566)

[†] The numbers in parentheses are standard errors.

* 10% significance level

** 5% significance level

*** 1% significance level

n.a. Not applicable