Education and Time Investment in Domestic and Parental activities in Urban Areas of Iran[1]

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Abstract

Education is considered one of the most important determinants of population change; operating through cultural change, enhancing negotiating powers or increasing opportunity costs of some behaviors. However, the role of education in gender division of household activities has not been investigated in Iran. This paper uses data from the 2014-2015 Time Use Survey, representing urban areas of Iran, to examine the association between the spouses' education and their participation in domestic and parental activities. The findings show that wives are five times more likely to participate in either domestic or parental activities than their husbands, suggesting the persistence of gender division of roles in family sphere in urban areas of Iran. There are considerable gender differences in the association between education and the amount of time allocated to these activities. However, the experience of both wives and husbands is consistent with cultural explanations. Although different levels of education determines wives' and husbands' participation in domestic and parental activities but the positive direction of these associations suggest that the economic explanations are irrelevant. It seems that higher education does not increase the opportunity costs of household activities nor used as a negotiating power to reduce one's share in household activities. Education appears to operate by enhancing egalitarian gender attitudes and the importance of quality parenting. Similar analyses in rural areas can deepen our understanding about gender relations in Iran and help evidence-based policy making in a context where family dynamics have raised serious concerns at the highest political levels.

Keywords: gender, education, time use, domestic, parental, Iran

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1. Introduction and background

Education is one of the most important factors influencing population change; operating through cultural change, enhancing negotiating powers or increasing opportunity costs of some behaviors. The majority of the population of Iran is literate and gender differences in higher education have almost disappeared, although female participation in the labor force has remained low. According to the results of the 2016 Iranian census (Statistical Center of Iran 2016), 84.2% of women aged 6 years and above are literate (22.4% with high-school and 21.7% with university degrees). The corresponding figures for men are 91%, 21.3% and 21.7%. Despite the growing share of highly educated women and the concentration of 74% of the population in urban areas, only 14.4% of women aged 15 years and above are employed or in search of employment.

The role of education in increasing the age at marriage and reducing the number of children has been well documented in Iran (see, e.g., Kazemipour 2004; Mahmoudian 2005; Abbasi-Shavazi et al. 2009; Torabi et al. 2013). Although no study to date has examined the role of education in the spouses' participation in domestic and parental activities in Iran, the international research suggests that these activities are not divided equally between spouses (see, e.g. Shelton and John 1996). Gender inequality in family roles can lead to marriage delay (Blossfeld 1995), fertility decline (McDonald 2000) and deterioration of marital relationships (Aghajanian 1988; Suitor 1991; Hofmeister and Moen 1999; Ward 1995). Trends toward later marriage, lower fertility and higher incidence of divorce have made family building and protection a prominent policy issue in Iran (Torabi and Abbasi-Shavazi 2016).

In order to fill the existing research gap and provide more information for policy makers, this paper examines the role of education in the spouses' time investment in domestic and parental activities. Because of the existence of a patriarchal gender system in the country (Moghadam, 2004), it is expected to find these family-oriented roles to be unequally divided between wives and husbands. However, the magnitude of gender gap may differ between domestic and parental activities, based on the values and norms attached to these activities. The importance of the quality of children, which has been reflected in a universal access to education, may imply that both parents are expected or ready to take part in activities involving children for educational, entertainment or health-related purposes. Although this parental time investment can

be expected to grow across the educational spectrum, gender patterns of educational influences are not clear. The same argument about gender-oriented social prescriptions and educational differences can be extended to those activities involving housekeeping.

This paper uses the 20014-2015 Time Use Data, representing urban areas of Iran to answer the following questions: (1) To what extent is the time investment in domestic and parental activities associated with one's own educational attainment? (2) To what extent is the time investment in domestic and parental activities associated with the spouse's educational attainment? (3) Are these associations explained by economic or cultural approaches?

2. Conceptual approaches

There are multiple pathways of the influence of education on attitudes and behaviors. Education transfers basic skills such as the ability of reading and writing as well as more complex cognitive skills, which are required for evaluating information and decision making (Diamond et al. 1998). It also provides access to information networks beyond the family and local environment and exposes individuals to new ideas and cultures more in line with individualistic values, personal independence and rationality (Caldwell 1982; Thornton et al. 1994). For instance, higher education can lead to later marriage by changing spousal preferences, attitudes towards the optimum timing of marriage, introducing alternative roles, postponing transition to adulthood roles and increasing the role of young men and women in marriage decision making (McLaughlin et al. 1993; Jejeebhoy 1995; Torabi and Abbasi-Shavazi 2016). Similarly, higher education can motivate and facilitate lower fertility by diffusing new ideas such as the importance of quality vs. quantity of children and birth control and changing attitudes towards gender roles (Cleland and Wilson 1987; Cleland and Rodriguez 1988).

Education can also hasten women's participation in labor force and lead to changes in family patterns. According to the micro-economic theory of family (Schultz 1974; Becker 1988), individuals are rational beings who seek to optimize their benefits in family-related decision makings. For instance, they decide to marry when the benefits obtained from marriage is greater than those from remaining unmarried or to have children when the satisfaction gained from childbearing is greater than consumption of other goods, services or employment opportunities.

Women's higher access to education and labor force participation has changed family by diminishing traditional gender roles based on men's specialization in labor market and women's concentration on home duties, which in turn has reduced the spouses' interdependence and the benefits obtained from marriage and childbearing, especially for women. Because both household and child care activities and paid work require time investment, more chances of employment for women means that they have to limit the amount of time allocated to the former to advance in the latter. If education reduces time investment in household activities by increasing the opportunity costs of income earning, the association between education and household activities should disappear after accounting for income or the amount of time allocated to employment activities. However, the empirical evidence does not always confirm this theoretical expectation (England and Srivastava 2013). In societies like Iran, where women's participation in labor market has remained low, higher education can reduce motivations for family roles by increasing the opportunity costs of participation in non-economic activities such as education, sport, entertainment and social interactions.

Based on the notion that paid work is more desired than unpaid household activities, the relative resources approach suggests that spouses use their resources (such as education, job status and income) to reduce their share of housekeeping and childcare responsibilities (Blood and Wolfe 1960: Birnes 1996). Thus, higher education is used as a negotiating power to reduce one's share of household work in the expense of increasing the share of his or her spouse's share. The time availability does not relate homemaking and childcare activities only to those activities that directly or indirectly increase income-earning capabilities. According to this approach, the higher the amount of time spent on any sort of non-household activity (including employment, social and individual), the lower the amount of time allocated to household activities (Hiller 1984; Coverman 1985; England and Farkas 1986). This association does not need to be a causal one and the allocation of time to different kinds of household and non-household activities can be expected to be decided in a shared process of decision making. According to this approach, higher number of children in the household can be expected to increase demands for household activities. This association can be modified by the age of children and the amount of time required for taking care of their need at different developmental stages. The gender composition of children can also contribute to time investment in household activities because of the

existence of a patriarchal gender system (Moghadam 2004) which still contributes to childbearing behavior in Iran, although to a limited extent (see Torabi 2011).

It can be argued that different social groups do not necessarily share similar views regarding the desirability or importance of activities concerning household and childcare responsibilities. In other words, different cultural models about the appropriate form of housekeeping and child raising could co-exist, which differ by social status and educational attainment. For instance, Lareau (2003) shows that the American middle class consider child care as a time consuming activity. To those with lower education and working class jobs, however, child development is a natural process and the parents' responsibilities are limited to providing food, shelter, security and compassion, which do not require a great time investment. Thus, education can change the values and norms attached to homemaking and child raising in a way that these activities are no longer viewed as burdensome and act as a motivational resource to increase participation at least in some of these activities.

The existing research suggests that there are gender differences in the association between household activities and education. Shelton and John (1996) show that household activities are generally negatively associated with women's education but display a positive association with men's education. Thus, participation of women in household activities is consistent with predictions of economic approaches but men's education does not appear to be used either as a negotiating power to reduce their share of household activities or as a source to increase opportunity costs of involvement in such activities. This leads us to consider the role of cultural factors such as enhanced egalitarian gender attitudes or higher values attached to child care among men with higher education. It is also important to consider not only one's but their spouse's education as well. England and Srivastava (2013) show that the amount of time spent by men to child care is more related to their partner's than their own education. For women, however, the opposite is true. Furthermore, the association between parents' education and time investment in child raising activities does not disappear after accounting for income. This shows the role of cultural norms in childcare activities, especially among women with higher education because their education influences both spouses' participation in child care.

To summarize, the micro-economic theory of family suggests that higher education reduces the amount of time spent on household activities because it increases the required

knowledge, skills and motivation for participation in the labor market. According to the relative resources approach, higher education reduces one's time investment in household activities in the expense of raising the share of their spouse. In both approaches, these associations are expected to disappear after accounting for income or the amount of time allocated to paid work. In the context of Iran, where education has not considerably increased opportunities of paid work, higher education is expected to increase the opportunity of income earning for a small group of women but increase the opportunity of participation in non-economic roles (such as social and individual) for a larger group of women. Thus, the predictions of economic approaches can be modified so that the association between time investment in household activities and education changes after accounting for participation in economic as well as non-economic activities. It is worth noting that the time investment in household activities is expected to be incompatible and negatively associated with the time spent on other activities as well as the number of children in the household, as predicted by the time availability approach. Cultural approaches, on the other hand, suggest that time investment in household activities will be positively associated with education if people with higher education attach a higher value to homemaking and child raising activities and this association will not disappear once the variables of employment and income are taken into account. Gender roles cannot be overlooked in explaining the association between household activities and education, particularly in the context of Iran, where patriarchy and dominance of gender roles in family sphere has been traditionally in operation. The paper examines whether and to what extent the experience of spouses living in urban areas of Iran is consistent with these approaches.

3. Data and method

This paper uses data from the Time Use Survey (TUS), conducted in four waves (i.e. autumn and winter 2014 and spring and summer 2015) in urban areas of Iran. The sampling method is a two stage stratified method, with urban area and household being the first and second sampling units. The questionnaire include information about basic socio-economic and demographic characteristics of household members and the time diaries for members aged 15 and above (Statistical Centre of Iran 2015 and Torabi and Abbasi-Shavazi 2016). The whole sample (including four waves) is comprised of 16912 households. Only married couples who live

together with at least one child present in the household are included in the analysis, comprising 19528 spouses living in 9764 households.

Table 1 contains all the variables included in the analysis. The dependent variables are the daily amount of time (in hours) allocated to domestic and parental activities. This distinction allows us to capture component-specific responses of household activities to the variables included in the analysis, which has been supported by previous research (see Kato, Kumamaru and Fukuda 2018). Independent variables include education, the daily amount of time (in hours) spent on occupational, community and individual activities and the number, age and gender composition of children in the household. Because the TUS does not provide any information about earning, this variable is not included in the analysis. This limitation, however, is not expected to make significant changes in the results due to low levels of female labor force participation in Iran. It should be noted that the amount of time devoted to the activities specified here (i.e. domestic, parental, occupational, community and individual) do not add up to 24 hours, as the rest of the respondents' daily time is spent on eating, drinking, sleeping or resting, which have not been included in this analysis. The age of spouses are included as the control variable and treated as a categorical variable to capture curvilinear effects.

In order to predict the time investment in domestic and parental activities, tobit regression models on the amount of time spent on these activities are run. The tobit regression (Tobin 1958) adjusts for censored values, which in this study are respondents who spend no time on these activities. The models are run separately for wives and husbands. First, unadjusted regression models are run. Then, independent variables are included in successive models which also contain the variable of education as well the interaction terms between wives' and husbands' education. This allows us to capture the main effect of education as well as its cross-spouse influences. Finally, a full model including all variables and the interaction terms is run to assess the association between time investment in domestic and parental activities after accounting for other factors. As suggested by England and Srivastava (2013), although wives' and husbands' education are generally correlated, but failing to account for the spouse's education may provide evidence for the respondent's education which may in fact be a result of the spouse's education and these results can be misleading. In this paper the correlation is not problematic and therefor both variables (one's and their spouse's education) are simultaneously included in the analysis.

Because introducing interaction terms results in omission of the final term, the variable of education will be presented in three categories of less than high school, high school and university. This categorization although removes some of the information, but merits comparing low, mediate and high educational attainment. Furthermore, the correlations between the variables of daily activities are not high enough to create a problem with collinearity. In fact, all correlation coefficients of wives are less than 0.4. For husbands, only the coefficient of occupational activities with individual activities is higher (-0.6). Survey design will be accounted in all analyses.

Table 1 Variables included in the analysis

Dependent	Domestic activities	Time (hours) spent on unpaid household services (e.g. cleaning, shopping, preparing food or decorating) or taking care of adults (e.g. medical care, emotional care, accompanying to receive different services, to do shopping or to attend different events)
	Parental activities	Time (hours) spent on unpaid childcare (e.g. nursing, bathing, feeding or school preparation), training children (e.g. reading books, playing or talking) or accompanying children (e.g. to receive personal and medical services or visit cultural or amusement places)
Independent	Educational attainment	Illiterate, primary school, secondary school, high school or university education
	Occupational activities	Time (hours) spent on paid work in formal sector (e.g. work for government or companies), primary sector (e.g. work in agriculture, forestry, fishery, hunting or mining), non-primary sector (e.g. producing goods for sale or self-consumption), construction sector (e.g. building houses, etc.) or service sector (e.g. preparing food, peddling, repairing goods, typing or private teaching)
	Community activities	Time (hours) spent on unpaid services to the local community (e.g. household management, shopping or childcare), socializing (e.g. talking, writing letters or attending parties) or attending group religious performance or religious ceremonies
	Individual activities	Time (hours) spent on education (formal, informal, vocational), visiting places (cultural, sport or amusement), entertainment (by art, technical or game activities), sport (indoor or outdoor), reading books, journals, etc., watching TV or listening to radio or other acoustic media, using computer for reading, watching movies, receiving news, etc., going to library, personal care (e.g. taking shower, brushing teeth, going to beauty salons, health care, etc.), thinking or planning for the future or individual religious performances (praying, getting advices from clergies, etc.)
	Number of children	Total number of children present in the household

	Age of children	Completed age (years) of children present in the household
	Gender composition of children	Female, male and mixed
Control	Age	<30, 30-39, 40-49, 50-59 or 60+ years

4. Findings

In this section, first the variables are described and their variation across the educational spectrum is discussed. Then, using the multivariate analysis, the association between education and participation in domestic and parental activities are assessed after accounting for the role of other determinants of household activities. As shown in Table 2, there are substantial gender and educational differences in the variables included in the analysis. The amount of time spent by wives on either domestic or parental activities (5 hours and 48 minutes and 59 minutes per day, respectively) is five times larger than that spent by husbands on these activities (1 hour and 3 minutes and 11 minutes per day, respectively). On the other hand, husbands are 11 times more likely to spend time on occupational activities than wives (6 hours and 11 minutes vs. 34 minutes per day). Thus, the male breadwinner and female homemaking gender division of roles is clearly still in operation in urban areas of Iran. Although gender gap is observed in other activities but this gap is much narrower than what observed with regard to household and occupational activities. Husbands spend more time than wives on individual activities (4 hours and 21 minutes vs. 3 hours and 56 minutes per day), whereas wives are more engaged in community activities (1 hour and 13 minutes vs. 1 hour and 1 minute per day).

The educational attainment of wives and husbands is comparable. Although illiteracy is more common among wives than husbands but literacy is widespread among both. Almost half of spouses have either high school or university education but only tertiary education is more prevalent among husbands. As displayed in Figure 1, the educational variation in the two most dominant activities among wives and husbands (domestic and occupational, respectively) follow an inverse U-shaped pattern. In other words, individuals with the lowest and highest levels of education spend less time on these activities than those in the middle. Across the educational spectrum, the variation in husbands' occupational activities (i.e. 4 hours and 20 minutes among

illiterates to 6 hours and 46 minutes among high school graduates) is twice larger than those observed with regard to wives' domestic activities (i.e. 4 hours and 49 minutes among university graduates to 6 hours and 8 minutes among primary school graduates).

Table 2 Mean or percentages for variables included in the analysis by spouses' gender and education, urban areas of Iran, 2014-2015

Wives						
Variable	Illiterate	Primary school	Secondary school	High school	University	Total
Domestic activities (hour)	5.86	6.13	6.11	5.85	4.82	5.80
Parental activities (hour)	0.37	0.64	0.98	1.23	1.35	0.98
Occupational activities (hour)	0.27	0.40	0.31	0.38	1.70	0.57
Community activities (hour)	1.46	1.32	1.20	1.14	1.13	1.22
Individual activities (hour)	4.00	3.95	3.94	3.96	3.78	3.93
Number of children	2.26	2.06	1.93	1.73	1.55	1.87
Age of children (year)	21.81	16.62	13.18	11.54	9.48	13.75
Gender composition of children						
Girl	35.77	35.40	31.32	37.62	41.34	36.40
Boy	20.09	23.60	27.79	30.14	35.07	27.94
Mixed	44.13	40.99	40.89	32.24	23.58	35.66
Age (year)						
<30	4.03	8.20	21.84	25.25	21.28	17.78
30-39	9.01	26.61	34.96	39.05	45.07	33.28
40-49	26.14	38.93	29.71	20.68	25.02	27.89
50-59	34.22	19.79	10.81	12.39	7.43	15.30
60+	26.60	6.47	2.68	2.64	1.20	5.75
Percentage	10.06	24.10	17.37	32.43	16.04	100
Husbands						
Variable	Illiterate	Primary school	Secondary school	High school	University	Total
Domestic activities (hour)	0.97	1.03	0.97	0.99	1.24	1.05
Parental activities (hour)	0.07	0.12	0.20	0.20	0.24	0.18
Occupational activities (hour)	4.34	5.74	6.58	6.76	6.08	6.18
Community activities (hour)	1.37	1.10	0.95	0.92	1.04	1.02
Individual activities (hour)	4.71	4.44	4.11	4.15	4.63	4.35
Number of children	2.24	2.04	1.91	1.74	1.70	1.87
Age of children (year)	21.22	16.41	12.23	12.09	12.27	13.75
Gender composition of children						
Girl	35.60	36.07	34.47	36.43	38.91	36.40
Boy	20.12	23.61	27.36	31.37	30.99	27.94
Mixed	44.28	40.31	38.18	32.20	30.10	35.66
Age (year)						
<30	1.95	5.07	8.86	8.17	6.31	6.80
30-39	6.04	19.96	34.88	34.54	31.66	28.79
40-49	16.28	33.15	32.45	28.01	31.83	30.10
50-59	27.77	24.61	15.88	20.44	21.29	21.10
60+	47.95	17.21	7.92	8.83	8.90	13.21
Percentage	6.84	22.42	21.07	28.58	21.08	100

Although individual activities are the second most prevalent activities among both spouses but they follow different patterns among wives and husbands. Across the educational spectrum, wives' participation does not vary but husbands' participation follows a U-shaped pattern. Wives' community activities monotonically reduces across the educational spectrum but levels off towards the end of the spectrum. For husbands, the decline is reversed at the highest level of education, so that university graduates spend 7 minutes more time per day on these activities than those with a high school degree. For wives, the remaining activities are least prevalent among most educational groups. Specifically, participation in parental activities increases across the educational spectrum, so that the time spent on these activities by university graduates clearly exceeds the time spent on community activities by this group. Although participation on the lease prevalent set of activities (i.e. occupational) remains relatively stable at less than half an hour per day, but again the amount of time spent on these activities sharply increases to 1 hour and 42 minutes per day among the most educated wives. Husbands' participation in domestic activities follows a similar pattern but their trivial participation in parental activities increases in the middle of educational spectrum before levels off towards the end of the spectrum.

Considering other variables shown in Table 2, there are on average 1.9 children per household, which is consistent with persistent below-replacement fertility level in the country (see Abbasi-Shavazi et al. 2009). The number of children reduces across the educational spectrum and so does the age of wives (i.e. 52.3, 43.6, 38.3, 37.2 and 36.7 years among successive groups). Therefore, the negative association between number of children and age of women, observed here can be explained by the age structure of educational groups as well the more desire and higher access to contraception. The five-year age difference between wives (mean age of 40.4 years) and husbands (mean age of 45.4 years) also reflect the difference between male and female age at marriage in Iran (see Torabi and Askari-Nodoushan 2012).

Figure 1 Amount of time (hour) spent on various activities per day by spouses' gender and education, urban areas of Iran, 2014-2015

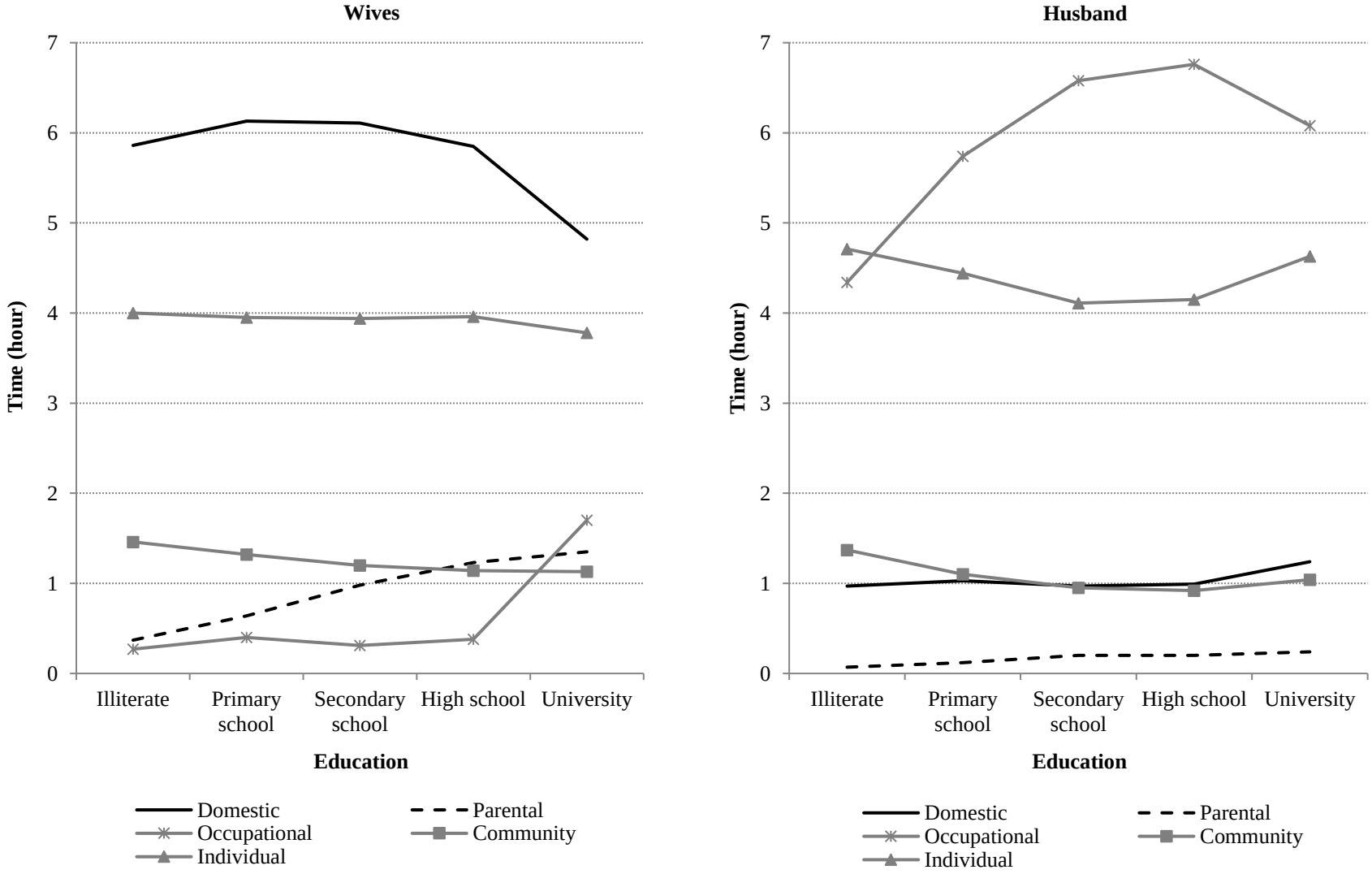

Table 3 shows coefficients of a series of tobit regression models on the amount of time spent on domestic activities, separately for wives and husbands. Column 1 contains unadjusted coefficients of covariates. Regression coefficients of individual's own education, the spouse's education and interaction terms of the spouses' education are shown in columns 2, 3 and 4, respectively. Other columns add occupational activities, community activities, individual activities and children's traits to Model 4, respectively. This allows us to determine the association between education and domestic activities after accounting for the role of various independent and control variables. As previously discussed, the variable of education has been categorized in three categories in order to avoid complications in including interaction terms in regression models. A full model is presented in the last column, which determines the association between education and domestic activities after accounting for the main as well as interaction effects.

Before making any adjustment (Column 1), the amount of time spent on domestic activities reduces as the educational attainment of wives and their husband increases, which is consistent with prediction of economic approaches. This difference is particularly large when those with less than high school degrees are compared with university graduates. Compared to wives with less than high school degrees, those with high school and university degrees spend 13 minutes and 1 hour and 16 minutes less time per day than those with less than high school education on homemaking duties. The corresponding figures with regard to husbands' education are, respectively, 11 and 37 minutes per day. As predicted by the time availability approach, higher participation in all non-domestic activities reduces participation in domestic activities.

Each additional child increases participation in homemaking activities by 14 minutes per day. Although the age of children is also positively associated with domestic activities but the increase in the amount of time spent on such activities is only 1 minute per day. The gender composition of children contributes to participation in homemaking activities as well. Compared to the households where only female children are present, wives spend 15 minutes less time per day on homemaking in those households where only male children are present. The opposite is true with regard to the households with both male and female children. Participation in domestic activities appears to increase by age, before a downward trend starts among those at their fifth

decade of their life. There is no evidence to suggest that this participation is different between the youngest and oldest women.

Adjusting for age (Column 2) does not make considerable changes in the coefficients of wives' education. After adding husbands' education (Column 3) the initial associations between husband's education and wives' domestic activities disappear but wives' higher education still reduces participation in such activities. After accounting for interaction effects (Column 4), only the difference between the two ends of the educational spectrum remains. Patterns of educational homogamy do not make differences in participation in homemaking. Although, as shown by the first interaction term, spouses with high school education are different than those with lower education but because there is no evidence of the main effect of education at high school level, this difference does not contribute to the time investment in domestic activities.

Although all non-domestic activities retain their negative association with domestic activities after adjusting for the main and interaction effects of education as well the age of wives (Columns 5-7), it is only the individual activities whose inclusion make considerable changes in these effects. Specifically, husbands' higher education appears to increase wives' participation in domestic activities and spouses with similar levels of education at high school or university levels appear to spend less time on these activities than those with similar education at lower levels. Because there is no evidence of the main effect of wives' education at high school level, it is only educational homogamy at the highest level of education that contributes to the time investment in domestic activities.

As shown in Column 8, neither the number nor the age of the children in the household contributes to the wives' participation in homemaking, after adjusting for their age and the spouse's education. The only variable in this category which partly retains its initial influence is children's gender composition. Specifically, wives spend less time on domestic activities in households where only boys are present than those where only girls are present. It appears if households were similar in terms of wives' age as well as the education of both spouses and patterns of educational homogamy, raising girls would require more time on household chores.

Table 3 Tobit regression models of predicting domestic activities by spouses' gender, urban areas of Iran, 2014-2015

	Wives								
Variable	**(1)** Unadjusted coefficients	**(2)** One's education	**(3)** 2 + Spouse's education	**(4)** 3 + Interaction terms	**(5)** 4 + Occupational activities	**(6)** 4 + Community activities	**(7)** 4 + Individual activities	**(8)** 4 + Children's traits	**(9)** Full model
Wife' education									
Less than high school	0	0	0	0	0	0	0	0	0
High school	-0.215**	-0.181**	-0.190**	-0.033NS	-0.006NS	-0.082NS	-0.002NS	-0.013NS	0.020NS
University	-1.266**	-1.262**	-1.248**	-1.061**	-0.680**	-1.086**	-0.931**	-1.019**	-0.354NS
Husband's education									
Less than high school	0		0	0	0	0	0	0	0
High school	-0.179**		0.049NS	0.132NS	0.075NS	0.070NS	0.233*	0.147NS	0.120NS
University	-0.621**		-0.030NS	0.292NS	0.245NS	0.259NS	0.401*	0.291NS	0.333*
Interaction terms of education									
Both less than high school				0	0	0	0	0	0
Both high school				-0.325*	-0.256NS	-0.279NS	-0.376*	-0.321*	-0.244NS
Wife high school and husband university				-0.344NS	-0.353NS	-0.341NS	-0.365NS	-0.336NS	-0.386*
Wife university and husband high school				0.104NS	0.158NS	0.115NS	-0.096NS	0.103NS	-0.062NS
Both university				-0.635NS	-0.297NS	-0.640NS	-0.851*	-0.609NS	-0.468NS
Occupational activities	-0.449**				-0.429**				-0.557**
Community activities	-0.362**					-0.373**			-0.499**
Individual activities	-0.280**						-0.300**		-0.425**
Number of children	0.227**							0.056NS	0.018NS
Age of children (year)	0.017**							0.004NS	0.026**
Gender composition of children									
Girl	0							0	0
Boy	-0.257**							-0.203**	-0.102NS
Mixed	0.241**							0.008NS	0.029NS
Age (year)									
<30	0	0	0	0	0	0	0	0	0
30-39	0.379**	0.396**	0.399**	0.410**	0.513**	0.422**	0.463**	0.340**	0.486**
40-49	0.658**	0.557**	0.562**	0.567**	0.769**	0.590**	0.723**	0.447**	0.720**
50-59	0.601**	0.422**	0.427**	0.440**	0.528**	0.489**	0.721**	0.322NS	0.497**
60+	0.019NS	-0.237NS	-0.228NS	-0.211NS	-0.216NS	-0.112NS	0.098NS	-0.326NS	-0.314NS
Intercept		5.715**	5.704**	5.663**	5.711**	6.134**	6.677**	5.619**	7.658**

Husbands									
Variable	**(1)** Unadjusted coefficients	**(2)** One's education	**(3)** 2 + Spouse's education	**(4)** 3 + Interaction terms	**(5)** 4 + Occupational activities	**(6)** 4 + Community activities	**(7)** 4 + Individual activities	**(8)** 4 + Children's traits	**(9)** Full model
Wife' education									
Less than high school	0		0	0	0	0	0	0	0
High school	0.022NS		0.101NS	0.076NS	0.171NS	0.094NS	0.104NS	0.089NS	0.115NS
University	0.171NS		0.133NS	0.403NS	0.215NS	0.366NS	0.395NS	0.432NS	0.230NS
Husband's education									
Less than high school	0	0	0	0	0	0	0	0	0
High school	0.030NS	0.122NS	0.070NS	0.030NS	0.123NS	0.051NS	0.013NS	0.028NS	0.171NS
University	0.431**	0.507**	0.429**	0.581**	0.451**	0.580**	0.517**	0.586**	0.557**
Interaction terms of education									
Both less than high school				0	0	0	0	0	0
Both high school				0.088NS	0.046NS	0.070NS	0.094NS	0.091NS	0.046NS
Wife high school and husband university				-0.137NS	-0.173NS	-0.129NS	-0.162NS	-0.140NS	-0.140NS
Wife university and husband high school				-0.218NS	-0.098NS	-0.184NS	-0.205NS	-0.214NS	-0.147NS
Both university				-0.455NS	-0.190NS	-0.422NS	-0.410NS	-0.468NS	-0.259NS
Occupational activities	-0.253**				-0.263**				-0.408**
Community activities	0.154**					0.135**			-0.285**
Individual activities	0.148**						0.114**		-0.315**
Number of children	0.032NS							0.017NS	0.021NS
Age of children (year)	0.031**							0.004NS	-0.002NS
Gender composition of children									
Girl	0							0	0
Boy	0.132NS							0.166*	0.178**
Mixed	0.112NS							0.133NS	0.139NS
Age (year)									
<30	0	0	0	0	0	0	0	0	0
30-39	0.173NS	0.153NS	0.153NS	0.151NS	0.145NS	0.150NS	0.137NS	0.125NS	0.174NS
40-49	0.316**	0.307**	0.324**	0.324**	0.151NS	0.317**	0.267*	0.255NS	0.222NS
50-59	0.824**	0.819**	0.846**	0.844**	0.167NS	0.820**	0.697**	0.758**	0.276*
60+	1.075**	1.116**	1.147**	1.147**	-0.196NS	1.098**	0.893**	1.039**	-0.086NS
Intercept		-0.290*	-0.328**	-0.329**	1.666**	-0.464**	-0.737**	-0.463**	4.077**

Note: NS: Not significant; *Significant at 5%; **Significant at 1%.

After accounting for all variables (Column 9), time investment of wives on domestic activities appear to be associated only with the following variables: husbands' education, non-domestic activities, the age of children and their own age. Specifically, wives of the most educated husbands spend 20 minutes more time per day on domestic activities than those whose husbands have not graduated from high school. Each hour increase in the amount of time spent on occupational, community and individual activities reduces the amount of time spent on domestic activities by 33, 30 and 25 minutes per day, respectively. Furthermore, each year increase in the age of children in the household increased wives' participation in homemaking only by 2 minutes per day. Age retains its inversed U-shaped pattern, with wives in successive 10-year age groups spending 29, 43 and 30 minutes per day more time than those aged less than 30 years. There is no evidence to suggest that wives aged 60 years and over are different with the youngest age group.

Similar analyses for husbands yield interesting results. According to unadjusted coefficients shown in Column 1, there is no evidence to suggest that husbands' participation in domestic activities is associated with their education but having a university educated wife increases this participation. Among non-domestic activities, only occupational activities reduce the time spent on domestic activities. Contrary to the prediction of the time availability approach, both the community and individual activities increase husbands' participation in domestic activities. Only the children's age is associated with the father's homemaking duties, with each year increase in the former increasing the latter by 2 minutes per day. Even this trivial influence does not exist with other children's characteristics. Except for the first two age groups, which appear indifferent, participation in domestic activities increases by age.

Adjusting for either spouses' education as well as husbands' non-domestic activities (Columns 2-7) does not make considerable changes in initial association. However, as shown in Column 8, accounting for the spouses' education and husbands' age removes the initial association between domestic activities and children's age. Instead, children's gender appears to be important. Specifically, husbands who have only boys present in their households spend more time on domestic activities than those who have only girls at home. Adjusting for these variables also extends the similarity of the first two age groups in participation in domestic activities to the

first three age groups. Thus, the positive association between age and domestic activities starts in the fifth decade of life.

The only major result of accounting for all variables (Column 9) is a reversal in the direction of the association between domestic activities and both the community and individual activities. The spouse's education still does not make any difference but husbands with university education spend 33 minutes more time per day on domestic activities than those with less than high school education. More participation in all forms of non-domestic activities reduces the amount of time spent on domestic activities, with each hour increase in occupational, community and individual activities reducing the amount of time spent on domestic activities by 24, 17 and 19 minutes per day, respectively. Raising only boys appears to increase fathers' participation in household chores, with husbands with male children in the household spending 11 minutes more time per day than those with female children present in the household. Furthermore, the only age group which remains important in determining participation in domestic activities is the 50-59 age groups, with husbands in this age group spending 17 minutes more time than the youngest husbands in these activities.

Table 4 contains similar analyses for the spouses' parental activities. First, consider wives' experience. As shown by unadjusted coefficients (Column 1) and contrary to what we previously observed, the time spent on parental activities increases as either the wives' or the husbands' education increases. As noticed with regard to domestic activities, higher participation in non-parental activities reduces the amount of time spent on parental activities. Contrary to the wives' experience in domestic activities, the number and age of children in the household are both negatively associated with participation in parental activities. Also, wives spend more time on these activities if they live in households where only boy are around, compared with those living in household where only girls are present. Age patterns are also different from what we observed before; in that time investment in parental activities reduces in successive age groups.

Adjusting for wives' age (Column 2) and husbands' education (Column 3) does not change the direction of the initial association between parental activities and education, although reduces its magnitude. There is also no evidence to suggest that husbands' education contributes to wives' parental activities, once wives' education and age is taken into account. The initial difference between the least and most educated wives disappears in all other models. Educational

homogamy does not contribute to parental activities (Columns 4-8). All non-parental activities retain their negative association with parental activities after accounting for other variables (Columns 5-7). Accounting for the spouses' education as well wives' age changes the direction of the association between parental activities and number and gender composition of children (Column 8). Now, more children as well as having both male and female children around increase parental activities.

The full model (Column 9) reveals no major changes. Among various variables of education, only wives' own education is partly associated with their participation in parental activities, with high school educated wives spending 22 minutes more time on these activities than those with lower education. Each hour increase in occupational, community and individual activities increases the amount of time spent on parental activities by 14, 13 and 14 minutes per day. Each additional child increases the amount of time spent on childcare by 15 minutes per day, whereas each year increase in the age of children reduces this amount by 10 minutes per day. Having both girls and boys around appears to increase childcare responsibilities by 12 minutes per day. Successive age groups display lower involvement in parental activities, with wives aged 30-39, 40-49 and 50-59 years spending 23, 58 and 1 hour and 11 minutes less time on these activities than those aged less than 30 years. There is still no evidence to suggest that the youngest and oldest age groups are different.

Now, consider the husbands' experience. Before adjusting for other variables (Column 1), the only considerable difference between the wives' and husbands' experience is that here participation in community activities does not appear to be relevant. Adjusting for age (Column 2) only reduces the magnitude of the coefficients of education but accounting for the spouse's education (Column 3) removes the initial difference between husbands with high school education and those with lower education. There is no evidence to suggest that patterns of educational homogamy contribute to the husbands' parental activities (Columns 3-8). Accounting for either the occupational (Column 5) or the individual (Column 7) activities removes the initial difference between the most and least educated husbands. Furthermore, Accounting for the variables of education changes the direction of the association between parental and individual activities from a negative to a positive one, although the magnitude remains trivial. Accounting for children's traits (Column 8) not only removes the initial

difference between the most and least educated husbands, but makes some changes in the associations between parental activities and the number as well as the gender composition of children. Parental activities is now positively associated with the number of children but their gender does not appear to be relevant anymore. Furthermore, there is no evidence to suggest that the first three age groups are different in terms of the time they spend on parental activities.

The only considerable result of accounting for all the variables (Column 9) is a boost in the magnitude of the coefficients of non-parental activities. Higher education of both husbands and their spouses is positively associated with parental activities. Husbands with high school and university education spend 16 and 18 minutes more time per day on childcare than those with less than high school education. The corresponding figures for the education of their spouses are 12 and 28 minutes per day. Each hour increase in the amount of time spent on occupational, community and individual activities reduces the amount of time spent on parental activities by 9, 9 and 7 minutes per day, respectively. Each additional child increases participation in parental activities by 5 minutes per day, whereas each year increase in the age of children reduces this participation by 5 minutes per day. Husbands in their 50s and 60s spend 38 and 30 minutes less time on parental activities than those less than 30 years old but there is no evidence to suggest that those in their 40s or 30s or 40s are different from the youngest age group.

Table 4 Tobit regression models of predicting parental activities by spouses' gender, urban areas of Iran, 2014-2015

	Wives								
Variable	**(1)** Unadjusted coefficients	**(2)** One's education	**(3)** 2 + Spouse's education	**(4)** 3 + Interaction terms	**(5)** 4 + Occupational activities	**(6)** 4 + Community activities	**(7)** 4 + Individual activities	**(8)** 4 + Children's traits	**(9)** Full model
Wife' education									
Less than high school	0	0	0	0	0	0	0	0	0
High school	1.242**	0.399**	0.429**	0.515**	0.524**	0.492**	0.524**	0.369**	0.368**
University	1.453**	0.570**	0.639**	0.185NS	0.317NS	0.190NS	0.285NS	0.018NS	0.298NS
Husband's education									
Less than high school	0		0	0	0	0	0	0	0
High school	0.713**		-0.034NS	0.012NS	-0.007NS	-0.015NS	0.087NS	0.061NS	0.077NS
University	0.596**		-0.110NS	-0.177NS	-0.188NS	-0.197NS	-0.106NS	-0.144NS	-0.124NS
Interaction terms of education									
Both less than high school				0	0	0	0	0	0
Both high school				-0.174NS	-0.146NS	-0.153NS	-0.202NS	-0.141NS	-0.109NS
Wife high school and husband university				-0.022NS	-0.030NS	-0.012NS	-0.020NS	0.063NS	0.071NS
Wife university and husband high school				0.504NS	0.528NS	0.491NS	0.332NS	0.279NS	0.139NS
Both university				0.546NS	0.696*	0.534NS	0.380NS	0.402NS	0.428NS
Occupational activities	-0.165**				-0.190**				-0.232**
Community activities	-0.226**					-0.177**			-0.220**
Individual activities	-0.336**						-0.224**		-0.238**
Number of children	-0.198**							0.288**	0.259**
Age of children (year)	-0.214**							-0.178**	-0.162**
Gender composition of children									
Girl	0							0	0
Boy	0.369**							0.073NS	0.120NS
Mixed	0.013NS							0.198*	0.204*
Age (year)									
<30	0	0	0	0	0	0	0	0	0
30-39	-1.065**	-1.051**	-1.047**	-1.052**	-1.006**	-1.047**	-1.007**	-0.438**	-0.379**
40-49	-3.085**	-2.976**	-2.967**	-2.968**	-2.871**	-2.954**	-2.836**	-1.090**	-0.963**
50-59	-4.659**	-4.509**	-4.502**	-4.500**	-4.444**	-4.473**	-4.253**	-1.280**	-1.180**
60+	-4.857**	-4.621**	-4.617**	-4.617**	-4.592**	-4.559**	-4.368**	-0.316NS	-0.292NS
Intercept		1.547**	1.555**	1.553**	1.579**	1.776**	2.317**	1.934**	3.008**

Husbands									
Variable	**(1)** Unadjusted coefficients	**(2)** One's education	**(3)** 2 + Spouse's education	**(4)** 3 + Interaction terms	**(5)** 4 + Occupational activities	**(6)** 4 + Community activities	**(7)** 4 + Individual activities	**(8)** 4 + Children's traits	**(9)** Full model
Wife' education									
Less than high school	0		0	0	0	0	0	0	0
High school	0.494**		0.142*	0.260**	0.291**	0.261**	0.270**	0.195*	0.194*
University	0.833**		0.375**	0.627**	0.543**	0.625**	0.619**	0.522**	0.472**
Husband's education									
Less than high school	0	0	0	0	0	0	0	0	0
High school	0.322**	0.180**	0.085NS	0.239*	0.270*	0.239*	0.235*	0.220*	0.270*
University	0.504**	0.400**	0.196*	0.339*	0.300NS	0.339*	0.322NS	0.327NS	0.297*
Interaction terms of education									
Both less than high school				0	0	0	0	0	0
Both high school				-0.283NS	-0.279NS	-0.283NS	-0.279NS	-0.273NS	-0.270NS
Wife high school and husband university				-0.218NS	-0.217NS	-0.218NS	-0.230NS	-0.209NS	-0.157NS
Wife university and husband high school				-0.375NS	-0.310NS	-0.372NS	-0.362NS	-0.407NS	-0.413NS
Both university				-0.382NS	-0.278NS	-0.380NS	-0.367NS	-0.395NS	-0.316NS
Occupational activities	-0.032**				-0.087**				-0.145**
Community activities	-0.021NS					0.006NS			-0.149**
Individual activities	-0.030**						0.035**		-0.111**
Number of children	-0.124**							0.089*	0.081*
Age of children (year)	-0.089**							-0.077**	-0.076**
Gender composition of children									
Girl	0							0	0
Boy	0.144*							0.028NS	0.022NS
Mixed	-0.060NS							0.055NS	0.051NS
Age (year)									
<30	0	0	0	0	0	0	0	0	0
30-39	-0.225**	-0.241**	-0.243**	-0.243**	-0.245**	-0.244**	-0.248**	-0.089NS	-0.071NS
40-49	-0.823**	-0.824**	-0.790**	-0.789**	-0.827**	-0.789**	-0.805**	-0.184NS	-0.190NS
50-59	-1.665**	-1.662**	-1.605**	-1.604**	-1.794**	-1.605**	-1.648**	-0.480**	-0.639**
60+	-1.915**	-1.866**	-1.795**	-1.780**	-2.173**	-1.782**	-1.858**	-0.112NS	-0.495**
Intercept		-0.692**	-0.757**	-0.795**	-0.139NS	-0.801**	-0.923**	-0.591**	1.068**

Note: NS: Not significant; *Significant at 5%; **Significant at 1%.

5. Summary and conclusion

This paper used the 2014-15 Time Use Survey data, representing urban areas of Iran, to examine gender differences in the association domestic and parental activities with education. This section answers three questions raised in the introduction: (1) To what extent is the time investment in domestic and parental activities associated with one's own educational attainment? (2) To what extent is the time investment in domestic and parental activities associated with the spouse's educational attainment? (3) Are these associations explained by economic or cultural approaches? The findings show that wives are five time more likely to participation in either domestic or parental activities than their husbands, suggesting the persistence of gender division of roles in family sphere. There are also considerable gender differences in the association between education and the amount of time allocated to these activities.

Consider the *first question*. The findings suggest that wives' participation in domestic activities across successive educational levels displays an inverse U-shaped pattern but their participation in parental activities increases across the educational spectrum and so does husbands' participation in either domestic or parental activities. For wives, these associations are mostly explained by differences in their spouse's education, time investment in non-household activities and their children's traits. Adjusting for these variables removes all the initial differences between educational groups in domestic activities but retains the difference between high school graduates and those with lower education in parental activities, with the former being more likely to spend time on these activities than the latter. Husbands' education, on the other hand, appears to be more important in determining their household role. Higher education increases their participation in domestic activities only at the highest level of education but this association operates at all levels with regard to parental activities. These findings are consistent with previous research only with regard to the husbands' experience (see Shelton and John 1996).

Turning to the *second question*, the initial associations between participation in household activities and the spouse's education almost totally disappears for wives once other variables are taken into account. For husbands, these associations are either nonexistent (in case of domestic activities) or remain significant despite reductions in the magnitude of the association (in case of parental activities). Regardless of gender, those associations which remain

important in determining household activities are positive. In other words, wives whose husband has university education are more likely than those whose husband has less than high school education to spend time on domestic activities. For husbands, their spouse's higher education at all levels increases their participation in parental activities. The findings presented so far is not consistent with previous research (England and Srivastava 2013), suggesting that the amount of time spent by men on child care is more related to their partner's than their own education. In fact, once the spouses' differences in all variables are taken into account, wives' participation in household activities appears to be similarly influenced by their own and their spouse's education because their domestic activities is partly associated with their spouse's education whereas their parental activities is partly associated with their own education. For husbands, on the other hand, their own education seems to be more important because their domestic activities are partly associated by their own education although their parental activities is associated with their own as well as their spouse's education. There is no evidence to suggest that educational homogamy contributes to the household activities of either spouse.

Considering the *third question*, the findings suggest that the experience of both wives and husbands is consistent with cultural explanations. Although different levels of education determines the wives' and husbands' participation in domestic and parental activities but the positive direction of these associations suggest that the economic explanations are irrelevant. It seems that higher education does not increase the opportunity costs of household activities nor used as a negotiating power to reduce one's share in household activities. Education appears to operate by enhancing egalitarian gender attitudes and the importance of contribution of both parents in raising their children.

This paper provided more insight about gender differences in the association between household activities and education and cross-spouse effects. Collecting similar information in rural areas can deepen our understanding about gender relations in Iran and help evidence-based policy making in a context where family dynamics have raised serious concerns at the highest political levels.

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