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Employment and the Nonlinear Relationship of Household Income on Divorce in Iran Using the Quasi-Panel Data Logit Model

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Abstract: In this paper, the effect of income distribution on divorce in Iran has been investigated using micro data of Household Expenditure and Income Survey of urban households in 2014 and applying the Quasi-panel data method. Primary data included 18885 urban households. At first, sub-section of the data were selected including divorced and married male and female (16503 Households) and clustered in provinces. The data was then analyzed based on the initial and categorized data. In the next step, using the Deaton (1985) Quasi-panel data, Logit model is estimated with the Maximum likelihood method. The results of first estimation indicate that household per capita income reduces the probability of divorce, and the result of the secondary model (the initial model with including the square of per capita income) indicates a U shape effect of per capita income on the probability of divorce. That is, the probability of divorce in the two groups of income (low and high) is higher than the middle income holders. Threshold per capita income is estimated equivalent to 1275 thousand Toman on average and monthly for urban households or 5100000T in a month for a family of four in 2014. Also, having job reduces the probability of divorce. Therefore, unemployment reduction policies and supportive policies to reduce income inequality in society will be a way to reduce the probability of divorce.

Keywords: Divorce; Household Per Capita Income; Logit Method, Quasi-Panel Data; Micro Data of Household Expenditure and Income Survey.
J.E.L Classification*: J12, C1, D31*

Introduction

In the last three decades, there have been many changes to the demographic structure of Iranian household such as an increase in the rate of singleness and divorce rate and a

decrease in the family size, which has attracted the attention of researchers to the effects of economic and social factors on changing the household demographic structure. Divorce is a socio-economic problem that also has demographic effects. In this paper, due to the increase in divorce in Iran, we consider the factors affecting divorce with emphasis on per capita household income.

Many studies have been conducted on divorce, both micro and macro level. Becker is one of the pioneers in studying socio-economic problem of divorce in a cohesive framework (Becker, 1973). He proposes a simple model of marriage that relies on two basic assumptions: 1-Each person is trying to find a spouse who maximizes his or her prosperity. 2- The marriage market is in balance, meaning that no person can change his wife and choose a better one. Accordingly, each person considers the income from marriage compared to not marrying and staying single, which is directly related to the income of persons, the relative difference in the level of wages of both parties to the marriage, or it depends on the level of non-market variables such as education and beauty.

In another study, Becker supplemented his previous research by addressing issues such as divorce. Households using non-market time and market goods produce a set of non-market goods that they expect to use in their lifetime. With risk-neutrality, this criterion simplifies to the maximization of expected full wealth the present value of the stream of commodities consumed. Full wealth does not equal money wealth alone but also takes account of the productivity of nonmarket time. The wealth of the single age is less than the wealth of the post-marriage; because with marriage, wealth increases due to the birth of children, division of labor, and other income from marriage (Becker, Landers & Michael, 1977).

However, the recognition of the existence of a nonlinear relationship between the impacts of per capita income on divorce, the structure of this paper is as follows. Section 2 presents a literature review on relationship of income distribution and divorce. Section 3 describes the applied methodology in this study. In Section 4, we provide our empirical results and eventually, and in Section 5, we summarize and draw conclusion.

Literature Review

a) Theatrical Review

Researchers and policymakers have spent a great deal of time identifying the causes of marital instability, especially for vulnerable groups. The extent, to which macroeconomic conditions like as unemployment, inflation, and their impact on household income fluctuations affect households' behavior, helps understand how households respond to changes in relative incomes.

By considering divorce in a random framework, the probability of divorce is considered as a function of two factors: income from marriage and the distribution of a variable that represents unexpected income. It is assumed that the person at the time of marriage predicts that the net income at the time of marriage is $\hat{G}t(\hat{G}_t > 0)$. While the income at time t is $G_t = \hat{G}_t + e_t$ which e_t is a random component with density function $F(e_t)$ with mean ē and variance δ_t^2. A positive e_t indicates a positive unexpected income and a negative e_t indicates a negative unexpected income (loss). The probability of a person divorcing at time t equals the probability that

Ĝt + e_t<0, in other words, it is equal to$\int_{-\infty}^{-G} F(e_t)\partial(e_t)$; Therefore, the smaller Ĝt and ēt and the largerδ_t^2, The probability of divorce increases. Becker et al. also state that most divorces are due to uncertainty and undesirable consequences, and therefore divorce occurs less frequently in a world where the consequences are predictable. The fact that most divorces occur in the early years of marriage, not after years when children grow up or couples get tired of each other, is indirect evidence in support of this view. Accordingly, couple divorce when their combined wealth in the event of divorce is greater than their combined wealth in the case of marriage; thus, when the expected benefit of marriage is smaller, divorce is more likely (Becker, Landers & Michael, 1977).

Married people invest in many assets, including housing, children, market and non-market skills, and information. Some of these investments, such as home and car ownership, have the same value as before divorce (public capital); this is while other investments become less valuable after divorce. Children are an important example of this type of investment because one parent will usually have less contact with the children after the divorce. These investments, which are significantly less valuable when single, are called marriage-specific investments (Becker, Landers & Michael, 1977).

Since, by definition, the accumulation of the marriage capital is not valid at the time of celibacy, it affects the expected benefit of the marriage, but the accumulation of public capital does not affect the expected benefit of the marriage over the divorce. Of course, the possibility of divorce also reduces the accumulation of marriage-specific capital; because such capital will become less valuable after divorce; For example, people at risk of divorce are less likely to invest in children and have specific marriage skills (Becker, Landers & Michael, 1977).

As Becker et al. (1977) point, persons with relatively high levels of schooling, the effect of specialized investments on the gain from marriage at least partly offsets the effect of optimal sorting. On the one hand, marriages between highly educated individuals have greater gains because of the spouses' high levels of market and nonmarket skills. On the other hand, they have lower gains because they typically involve less specialization between spouses, since more educated women participate more in the labor force. Consequently, there is no clear theoretical prediction about the net effect of schooling level on the gain from marriage. Although, Becker et al. argued that an increase in women's expected incomes would increase their social and economic status and thus make women less dependent on their husbands, and thus, increase women's income levels and increase their probability of divorce. Some theoretical approaches argue that women's employment destabilizes marriage. They predict that if the income from marriage, which is earned through specialization in domestic and paid work, exceeds the income from separation, the marital bond will remain. As in many societies, women still specialize mainly in household chores and men in earning an income, this theory predicts that women entering the labor market will reduce the couple's gains in specialization, and therefore, it increases the risk of marital disorders. This issue has been raised in the

economics literature as the effect of women's economic independence on marriage. There are similar conclusions about the impact of women's economic activity on marital instability in sociological theories, although the proposed mechanisms are different. For example, a woman's participation in the labor market may indicate her partner's poor earnings performance, which may lead to marital discord and marital instability (Cherlin, 1979; Jalovaara, 2003). According to the independence hypothesis, some researchers have argued that working by creating economic resources for women can lead to their withdrawal from unpleasant marriages (Hobson, 1990; Ruggles, 1997; Schoen, Astone, Kim, Rothert & Standish, 2002). In this regard, Lombard and Oppenheimer found that increasing the share of women in the labor force increases their level of independence and thus increases the probability of divorce. In fact, there is a significant relationship between women's economic independence and increased risk of divorce (Oppenheimer, 1997; Lombard, 1999). Some researchers have also found that there is a positive relationship between women's working hours and marital instability (Spitze & South, 1985; Grinstean, 2000).

Burgess et al. (2003) examined the role of income in marriage and divorce among young Americans. According to this study, high-income capacities for young men increase the probability of marriage and reduce the probability of divorce, and for young women, high-income capacities reduce the probability of marriage and have no effect on divorce. Hoffman and Duncan (1995) found that divorces were less probability in marriages with husbands' higher incomes. Weiss and Willis (1997) found that positive mutations in men's incomes reduced the probability of divorce. South and Spitze (1985) also found that men's working hours were inversely related to divorce.

b) Empirical Review

Mousaei et al. (2009) showed that the significant relationship between the divorce rate with income distribution, monthly expenditure, and urbanization during the years 1974-2006. According to the results, the number of divorces increases with the deterioration of income distribution. There is also an inverse relationship between divorce and income and literacy levels.

Asgari and et al. (2012) studied the effect of temporary and permanent fluctuations in household income on divorce in 30 provinces of Iran from 2004 to 2011 through the use of panel data method. The results showed that temporary household income shocks increase the divorce rate, but Sustained shocks do not have a significant effect on the divorce rate. Variables including unemployment rate, women's economic participation rate, housing index and urbanization have a positive and significant effect on divorce rate, but literacy rate and household income have a negative effect on divorce rate.

Nasrollahi et al. (2014) examined the determinants of divorce in Iran by focusing on economic factors using the panel data method in 28 provinces of Iran in the period 2002-2007. The results showed that there is a direct relationship between unemployment, women's literacy rate, and urbanization with divorce, but the GDP per capita variable has a negative effect on the divorce rate.

Alimandgari et al. (2017), in a qualitative study and interview of 60 divorced men and women in Tehran, concluded that unfavorable economic conditions affect employment and stable income and put pressure on family relationships and interactions, as a result, it increases the couple's intellectual and behavioral conflicts over time. Economic problems are a hidden and delayed factor that affects the couple's decision to divorce.

Edwards et al. (1992) studied "Women's Employment and Marital Instability: Evidence from Thailand" during the 1970s and 1990s, by using econometric analysis of time series data, concluded that women's employment leads to marital instability. They also found that there is a positive relationship between women's working hours and the tendency to divorce.

Lester (1996) studied "Impact of Unemployment on Marriage and Divorce" with regression of panel data for twelve countries during the years1950 to 1985. On the base of results, the unemployment rate has a positive and significant relationship with divorce rates in 11 of 12 countries.

Oppenheimer (1997) studied "Women's employment and gain marriage: the specialization and trading model" for European countries during the years 1965-95, and concluded that there was a significant relationship between women's economic independence and increased divorce risk.

A study of the increase in divorce and separation in the United States in 1880-1901 showed that with the change in economic opportunities and the employment of married women, the possibility of increasing marital instability and the increasing trend of divorce and separation has increased. In fact, with the increase in women's participation in the labor market, the divorce process has increased (Ruggles, 1997).

In an investigation entitled "Women's rising market opportunities and increased labor force participation" in the United States during the period 1975-1991, Lambard (1999) showed that by increasing the contribution of women in the labor force and their participation in the labor market, the level of independence, the probability of marital breakdown increases.

Boheim and Ermisch (2001) conducted a study for the UK by using a panel data regression method and a sample of 5,500 households from 1991 to 1998. They concluded that a negative economic change, such as male unemployment, significantly increases the probability of divorce. Also, higher income of women than men increases the probability of divorce and higher income of men than their wives reduces the probability of divorce.

Lee (2004) studied risk factors in the rapidly rising incidence of divorce of Korean couples which data obtained from a year 1997 and 2002 national survey. He found that rising unemployment in the late 1990s led to an increase in divorce. Regardless of the impact of the recession, women's employment and reduced fertility increase divorce, while working without women's rights in family business and college education reduces the risk of divorce.

In the study “Does High Unemployment Rate Result in a High Divorce Rate? A Test for Japan" using the panel data regression method up to 2006, Kawata (2008) concluded a positive relationship between unemployment rates and divorce rates.

Nunley & Seals (2010) investigated the effects of household income volatility on

divorce in the United States from 1979 to 2006 showed that negative household income shocks increase the probability of divorce. They also examined the effect of household income fluctuations on higher and lower income households' divorce and concluded that increasing fluctuations in household income increases the probability of divorce.

Lyngstad (2011) in a studied the economic and social factors influencing divorce based on panel data method and data from twenty generations of Norwegians whose first marriage was in 1980-2000. Findings indicate that with increasing population density, Findings indicate that with increasing population density, the rate of divorce decreases, and with increasing education of couples, the rate of divorce increases. There is also a direct relationship between male unemployment rates and divorce.

Amato & Beattie (2011) in the study "Does the unemployment rate affect the divorce rate? an analysis of state data 1960–2005" by using the panel data regression method in 50 US states and Colombia, concluded that the relationship between the unemployment rate and the divorce rate is positive and significant.

Boertien & Harkanon (2014) in a study entitled "Less Education, More Divorce: Explaining the Inverse Relationship between Women's Education and Divorce" in the UK, by using the data of 1887 couples during 1996 to 2009 found that educated women have a more stable married life than less educated women.

Mo (2016) investigated the effective factors on divorce in the historical study and concluded that improving the social status of women and their employment, industrial progress and modernity, improving the social welfare system, ease of divorce law and the number of children, have a positive effect on divorce rates.

Gonzalez and Marcen (2018) by using Spanish regional data for the period from 1998 to 2013 founded that an increase in the unemployment rate leads to a decrease in the marriage.

Daliri (2019) during the period of 1385-1395 in Iranian provinces showed the rising inflation in the housing sector, male unemployment, and female university education rates and income inequality have led to an increase in divorces. On the other hand, increasing the welfare and men employment, even incompletely, reduce the divorce rate in society.

Alola et al. (2020) examined the influence of income and gender unemployment on divorce in the Organization for Economic Cooperation and Development (OECD) countries over the period 1995–2016. Empirical results showed that gross domestic product per capita as a measure of income level has a negative and significant impact on the divorce rate only in the long run. In addition, findings indicated that an increase in the female unemployment rate would lead to a decrease in the divorce rate, while an increase in male unemployment will lead to an increase in the divorce rate in the long run.

Despite of numerous studies on divorce in the world, there is less research in Iran that examines social anomalies such as divorce from an economic point of view. The present paper investigates the factors affecting the probability of divorce in Iran using micro data of Household Expenditure and Income Survey of urban households in 2014. The innovation of this paper in comparison with other foreign

and domestic articles is using one-year data with focusing on household income at the level of micro data and regressing model by quasi-panel data method in the provinces of Iran.

Methodology

Data Analysis

Data for this research is obtained from Household Expenditure and Income Survey (HEIS) conducted by the Statistical Center of Iran which covered 18885 households in 2014. A household was defined as a person or a group of people related or unrelated to each other, who live together in the same dwelling unit and share a common source of food (The Statistical Center of Iran, 2007). At first we take some points from data analysis which is shown in tables.

- ***The marital status of heads of households***

The marital status of the head of the household in urban areas of Iran is shown in Table (1).According to this table, the highest percentage of married heads of households is in Kohgiluyeh, Boyer-Ahmad, Qom, and Hormozgan provinces, respectively, while Tehran, with 3.1% of unmarried heads due to divorce, has the highest rank. Also, the provinces of Tehran and Hormozgan had the highest percentage of heads of households who had never been married.

Due to the fact that the purpose of the study is to determine the factors affecting the probability of divorce, the initial data for this study were refined and only heads who were married or divorced remained in the sample. The following is a data description for divorced or married people only (16503 heads of households).

Table 1. Number and percentage of heads of urban households according to marital status by province

Provinces	Never Married (percentage)	Divorced (percentage)	Widow (percentage)	Married (percentage)	Number of Households
Azerbaijan, East	1.8	0.9	12.3	84.8	**609**
Azerbaijan West	0.8	0.6	9.8	88.6	**580**
Ardabil	1.6	1.3	12	84.8	**589**
Isfahan	1.2	1.2	14.4	83	**712**
Ilam	1	0.8	11.1	86.9	**476**
Alborz	1	2.1	9.4	87.3	**457**
Bushehr	1.7	1.1	7.5	89.5	**586**
Tehran	2.4	3.1	11.5	82.8	**1524**
Chahar Mahal and Bakhtiari	1.2	0.2	11.6	86.9	**495**
Khorasan, South	1.7	0.9	14.3	82.9	**632**
Khorasan, Razavi	0.7	1.4	13.1	84.7	**785**
Khorasan, North	1.5	2.5	13.4	82.4	**700**
Khuzestan	1.3	0.7	10.9	86.8	**647**
Zanjan	0.9	0.3	13.6	84.9	**606**
Semnan	1.6	0.2	9.5	88.6	**483**

Sistan and Baluchesta	1.3	1.3	10.5	86.8	**684**
Fars	1.5	1.07	11	86.3	**650**
Qazvin	1.4	0.7	13.3	84.4	**412**
Qom	0.7	1.2	7.7	90.3	**558**
Kurdistan	0.9	2.6	9.4	86.9	**423**
Kerman	0.8	1	13	85.1	**599**
Kermanshah	1.2	2.01	14.1	82.6	**546**
Kohgiluyeh and Boyer-Ahmad	2	0.1	7.2	90.5	**539**
Golestan	0.9	1.8	11.3	85.9	**654**
Gilan	0.5	1.8	11.8	85.7	**540**
Lorestan	1.2	1.02	10.2	87.4	**486**
Mazandaran	0.9	2.1	9.5	87.2	**502**
Markazi	0.8	0.5	11.7	86.8	**595**
Hormozgan	2.7	1	6	90.1	**579**
Hamadan	0.9	0.4	11.6	86.9	**642**
Yazd	1.3	0.4	11.3	86.4	**595**

Source: Calculated by authors based on Iran's urban Household Expenditure and Income Survey in 2014

- ***The Properties of the heads of households***

Out of 18885 households in the sample, 16503 heads of households (87.4%) were married and divorced. The gender compositions of married and divorced male and female heads of households were 97.6% and 2.4%, respectively. Also, the head of the illiterate household was 13.3%, primary school 24.4%, middle and high school 20.1% and diploma and pre-university 21.1%, while those with high education are 21.1%. Table (2) shows the distribution of divorce according to the activity status of the head of the household. According to this table, the largest number of divorced people are employed. Also, the high number of divorced employed women shows that women participate in the labor market despite their divorce in order to earn money for their living, and therefore have a higher participation rate to others.

Table 2. Status of activity of heads of divorced households

Activity Status	Number of Divorces	Percent of Total	Number of Divorced Women	Percentage of Divorced Women
Employed	100	40	59	34.3
Unemployed	8	3.2	2	1.1
Income	119	47.6	93	54.06
Student	3	1.2	1	0.58
Housewife	16	6.4	15	8.72

Other	4	1.6	2	1.16
Total	250	100	172	100

Source: Calculated by authors based on Iran's urban Household Expenditure and Income Survey in 2014

Econometric Model Specification

In this study, for using pseudo panel data regression, the data should be clustered. Therefore, data are geographically grouped on the basis of provinces. In fact, urban households are clustered into 30 regions.

There are important analogies between the econometric techniques used here and the methods of estimation routinely used for panel data. In a panel data, we typically have a short time series on a large cross-section of individuals. Error structures are specified that allow either fixed or random effects for each individual. In the application here, the role of the individuals is taken by the clusters in the survey and repeat time series observations are replaced by the individual households within each cluster (Ghazouani and Goaied, 2001).

It should be noted that in this study, the provinces in the role of sections and heads of households - married or divorced - in each province in the role of time series. Considering these explanation, for a household h in cluster c it can be written as follows[1]:

$$y^*_{ch} = \mu_c + X'_{ch}\beta + \varepsilon_{ch} \qquad c=1,2,..,\ C;\ h=1,2,..,\ H_c \qquad (1)$$

In expression (1) y^*_{ch} is an observed latent variable and X is a vector of socio-economic characteristics of household as following:

Demographic characteristics of household:

- Household size: Size is taken into model to explore the effect of it on divorce.
- Age of head and its square: We expect an inverse U relationship between age and divorce.

Social and Economical characteristics of household:

- **Household activity status** : Activity status entered into the model as a DummyVariable employed (1) and otherwise (0). Having a job is expected to reduce the probability of divorce.
- **Women's employment** : In the twentieth century, the importance of women's participation in the labor market was considered as one of the reasons of the increase in divorce (Jalovaara, 2003). Two theoretical approaches have been proposed in the literature to describe the relationship between employed women and the dissolution of marriage: Parsons functionalism (a specialized division of labor among couples as a practical necessity for the continuation of the

[1] It should be noted that the base of this methodology is on the study of Ghazouani and Goaied (2001).

institution of marriage) (Parsons, 1955), and Becker economic theory (The more specialized role of the parties involved in the marriage leads to increased exchange benefits that help increase marital stability) (Becker, 1974). Besides, the effect of independence (wife's economic independence destabilize marriage and enhance the risk of divorce) and the effect of income (for example, higher income, whether a woman or a husband's income, is assumed to improve family quality of life and thus increase marital stability) or arguing that, time spent by the wife working outside, impedes the completion of tasks necessary to the maintenance of the household and hence increase the probability of divorce (Ross & Sawhill, 1975; Spitze & South, 1985; Sayer & Bianchi, 2000).

The Becker economic theory of dissolution of marriage is widely accepted as an incentive against opportunity cost. If the woman in a family can provide part of the family's economic burden by participating in finances, the incentive for divorce is likely to decrease. However, women's economic independence also provides an opportunity for them to initiate divorce if they are not satisfied with their marriage. As a result, income on the one hand reduces the motivation for divorce, but on the other hand gives women a chance to start a divorce (Spitz & South, 1985). Two conflicting aspects of theories are reflected in the inconsistent results of empirical research on the relationship between women's income and marital dissolution.

- **Household income**: One of the factors affecting the likelihood of divorce is household income. Low-income households are more at risk of family breakdown (Emery, Martin & Peris, 2004). This case by itself reduces their standard of living. However, in the present study, per capita income was considered instead of household income because the authors believe that for a household, per capita income is more important than total household income.
- **Income distribution:** the square variable of per capita household income was included in the model to show the effect of income distribution on the probability of divorce. This variable is used in this research.

Also in expression (1), β is a vector of parameters and ε_{ch} is an error term. The remaining term μ_c is a cluster fixed or random effect. H_C is the number of household in cluster c. Therefore, the binary variable (being married or divorced) can be defined as follows:

$$y_{ch} = \begin{cases} 1 & if \quad y^*_{ch} = (Z - X_{ch}) > 0; \quad c = 1,2,..,C;\ h = 1,2,..,Hc \\ 0 & if \quad y^*_{ch} < 0 \end{cases} \qquad (2)$$

In the panel data analysis, there are two specifications: random effects and fixed effects. At the practical level, the specification with fixed effects suffers from two shortages. The first is that the impact of the invariable variables in a cluster (regions, month of the survey, and so forth) cannot be identified. The second concerns the possible loss of information in the estimation of the vector of parameters β which can be the result of the invariability of the value of y (0 or 1) within the same cluster. Hence, modeling with component errors proves more appropriate. This needs the treatment of the terms μ_c as

being a random variable to which case, we must associate a distribution of probability (Ghazouani and Goaied, 2001).

In relation to model defined by expression (2) above, the error term is $\eta_{ch} = \mu_{ch} + \varepsilon_{ch}$ .The specific term μ_c is supposed to be random and independent from the explicative variables (vector X) and from the residual terms ε_{ch}. It is normally distributed ($\mu_c \rightarrow N(0, \sigma_\mu^2)$). Moreover, and according to the associated distribution to the residual terms ε_{ch}, we can deduce a probit version when ε_{ch} follows a normal distribution or logit version in the presence of a Weibull distribution.

It should be noted that the estimation of logit and probit regression are very close and in a large sample they are the same. Also, Maximum Likelihood approach is used for estimation of panel data with limited dependent variable models.

Estimation Results

Considering that the dependent variable is a binary choice (divorce or marriage), so dual choice models (logit or probit) are used. In this research, due to nonlinearity of model, the estimation is based on the logit method of pseudo panel data with random effects using the maximum likelihood method

The results of estimation are presented in Tables 3 and 4. In both estimation, based on LR statistics, the use of a simple logit model is rejected. W statistic indicates that regression is significant in general in both. All coefficients are significant at the 95% confidence level.

In the first estimation in Table (3), indicates the main determinants of divorce in urban areas of Iran in terms of household size, employment of the head, literacy of the head, age and age squared of the head, per capita household income and women with higher education.

In the second model, besides the mentioned variables, the square variable of per capita household income was included in the model to show the effect of income distribution on the probability of divorce.

Table 3. Results of estimating the first model of panel data logit with random effects by maximum likelihood method in 2014

Explanatory Variables	Estimated Coefficient	(dy/dx) Marginal Effect	P>|z|
Household size	-1.708817	-0.038059	**0.000**
Employment of the head	-1.703243	-0.0063526	**0.000**
Age of the head	0.3384201	0.0007537	**0.000**
Age squared of the head	-0.003948	-0.00000379	**0.000**
Literacy of the head	-0.05493098	-0.0015141	**0.007**
Women with higher education	3.51542	0.0672205	**0.000**
Per capita household income	-0.0747393	-0.0001665	**0.000**
Constant	-3.841995		**0.000**
	Log likelihood =-879.36295		
	Statistic LR = 21.19		
	Statistic W =561.20		
	Number of Obs = 16503		

Source: Estimation of this research

a) Results of first estimation are as follows:

According to the results, the variables of household size, employment, literacy of the head of the household as well as household income have a negative effect on the probability of household exposure to family dissolution, while higher education for women increase the probability of family collapse. The marginal effect shows that having job is one of important variables on probability of divorce. Because, having a job reduces the probability of divorce by 0.6%.

The age variable and the age square indicate the effect of the inverted U-shape of the age of the head on the probability of divorce. In other words, in middle age, divorce is more likely than in youth and entering old age. It is estimated that the highest probability will be around the age of 43 years old.

Literacy versus illiteracy of the head of the household reduces the probability of divorce, but college-educated women are more likely to expose divorced. The highest probability of divorce was related to women with higher education (6.4%).

b) Results of second estimation are as follows:

The estimation of second model is shown in Table (4).

Table 4. Results of estimating the second model of panel data logit with random effects by maximum likelihood method in 2014

Explanatory Variables	Estimated Coefficient	(dy/dx) Marginal Effect	P >|z|
Household size	-1.763661	-0.037513	**0.000**
Employment of the head	-1.716726	-0.0061464	**0.000**
Age of the head	0.337902	0.0007187	**0.000**
Age squared of the head	-0.0039423	-0.00000839	**0.000**
Literacy of the head	-0.0543411	-0.0014271	**0.000**
Per capita household income	-0.1203842	0.0002561	**0.000**
Per capita household income squared	0.00095	0.00000202	**0.000**
Women with higher education	3.502095	0.0635703	**0.000**
Constant	-3.44031		**0.001**
	Log likelihood =-870.4643		
	Statistic LR = 21.58		
	Statistic W =568.12		
	Number of Obs = 16503		

Source: Estimation of this research

Household per capita income, which somehow indicates the impact of the economic factor affecting divorce, has a negative relationship with the divorce. But the reality of society and the prevalence of divorce in poor and prosperous households became a reason to include the per capita income square variable in the model. On the base of our search, this variable is used in our research. The results show a U-shaped relationship between per capita income and the probability of divorce. That's mean; divorce is more likely

in the low-income and high-income groups than in middle-income earners. In other words, reducing income inequality in society will be a way to reduce the probability of divorce in society. According to these results, the lowest probability of divorce in 2014 is related to households that had an average annual per capita income of about15.3 million T (1275000T in a month and 5100000T in a month for a family of four).

Summary and Conclusion

Obviously, marital dissolution is one of the main concerns of economic and social science researchers and one of the concerns of national policymakers. Many internal and external studies have been conducted to investigate the causes and consequences of divorce at the micro and macro levels. The difference between the current study and other studies presented in Iran is the use of micro data with coverage of more than 16,000 divorced and married households in the urban area of Iran in the provinces in 2014. Also, according to the authors, the difference between this study and other similar studies in Iran and abroad is the use of data for a given year (2014) and estimating the logit model with quasi-panel data which estimated random effects through the use of the maximum likelihood method.

Given the complexity of the divorce study due to its socioeconomic dimensions, it is believed that several socioeconomic factors at the micro and macro levels have been influenced divorce. Theoretical studies and empirical studies showed that the improvement of women's socio-economic status as a result of increasing women's education, increasing their knowledge of their rights, their participation as a labor force, differences over the internal distribution of labor and incompatibility between employment and work at home, has fueled women's tendency to divorce. In other words, socio-economic changes resulting from industrialization and modernity and the desire for nuclear life, increasing the level of education, increasing the unemployment rate, and unequal income distribution are among the factors affecting divorce. In particular, studies conducted at the micro-level have emphasized factors such as family income, the difference of income and level of education between men and women, and the number of children.

In the present study, explanatory variables of socio-economic characteristics were used to investigate the factors affecting the probability of divorce. Since the dependent variable was a two-choice variable (divorce or marriage), so binary selection models (Logit or Probit) were used, which due to non-linearity, the estimation method was using the likelihood function. It means, at first Household Expenditure and Income Survey (HEIS) conducted by Statistical Center of Iran in the year 2014 were arranged in a pseudo panel by the Dayton (1985) method, and then the model was estimated based on the logit method of panel data with random effects using the maximum likelihood method.

According to the results, household size, the employment status, literacy of the head of the household, and household income have a negative effect on the probability divorce. While variables of higher education for women and unemployment of heads of

households increase the probability of family collapse.

Household per capita income has a negative effect on divorce, but a U-shaped relationship between per capita income and the probability of divorce indicates the divorce is more likely in the low-income and high-income groups than in middle-income earners. Due to the income gap in Iran and the accumulation of high population towards low-income groups, which is the result of poor economic conditions, rising inflation, rising exchange rates, declining purchasing power, and unemployment a large number of job seekers; unemployment reduction policies and supportive policies to reduce income inequality in society will be a way to reduce the probability of divorce. Also, educating men and women about changing the role of women from just being a mother and a spouse to a partner in both family and economic activities can be a step in aligning with the modern world of the present century.

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اثر اشتغال زنان و ارتباط ناخطی درآمد خانوار بر طلاق در ایران بااستفاده از مدل لاجیت داده‌های شبه تابلویی

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چکیده: در این مقاله تاثیر توزیع درآمد بر طلاق در ایران با استفاده از داده‌های طرح هزینه-درآمد خانوار شهری در سال ۱۳۹۳ و کاربرد روش داده‌های شبه‌تابلویی بررسی شده‌است. داده‌های اولیه شامل ۱۸۸۸۵ خانوار شهری بوده‌است که در مرحله اول زیر بخشی از داده‌ها شامل سرپرستان خانوار مرد و زنِ مطلقه و متاهل (۱۶۵۰۳ مشاهده) انتخاب و در سطح استان‌ها دسته‌بندی شدند. براساس داده‌های اولیه و دسته‌بندی‌شده، توصیف داده‌ای صورت گرفت. در مرحله بعد با روش داده‌های شبه‌تابلویی دیتون(۱۹۸۵) برآورد مدل لاجیت با روش حداکثر درستنمایی انجام شد. نتایج حاصل از برآورد مدل اولیه نشان می‌دهد که درآمد سرانه خانوار احتمال طلاق را کاهش می‌دهد و نتیجه مدل ثانویه (مدل اولیه با ورود مجذور درآمد سرانه) نشانگر رابطه U شکل درآمد سرانه و احتمال وقوع طلاق است. یعنی احتمال طلاق در دو گروه کم‌درآمدها و پردرآمدها بیش از دارندگان درآمد میانی است. درآمد آستانه در برآورد، معادل متوسط سرانه ماهانه ۱۲۷۵ هزار تومان برای خانوار شهری در سال ۱۳۹۳ است.

واژه‌های کلیدی: طلاق، درآمد سرانه خانوار، روش لاجیت، داده‌های شبه‌تابلویی، ریزداده‌های طرح هزینه درآمد خانوار.