Determinants of Part-Time Working at Home: Evidence from Turkey

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Abstract: This study examines the probabilities and determinants of part-time working at home for the case of Turkey. Data used in the study are based on Turkish Household Labor Force Survey of 2015. In the context of logistic regression model, a number of demographic, social, cultural, and economic characteristics of employees are used to be main determinants of part-time working at home or out-of- home. According to the results, there is an inverted U-curve relationship between age and part-time working at home decision. For the males and females, the industries related with professional jobs are more attractive for part-time working at home. In addition, as education level of employee rises, the probability of part-time working at home also increases.

Keywords: Part-time working at home; Inverted U-curve; Logistic regression

JEL Classification: J21; J10

1. Introduction

In recent years, one of the dramatic changes in the structure of Turkish labor market has been the increasing proportion of the work force at home and unexpected changes in the composition of labor force. According to Turkish Labor Force Statistics of 2015, there are more than 757 thousand persons working at home usually or sometimes. 164 thousand employees are male, the rest are female. These significant changes in the nature of work place and in the composition of the labor force have attracted some attention in both public policy and research literature.

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In this subject, most of previous studies focused on practicing managers and organizational scientist and argued that advances in the technology of telecommunications and in the availability of personal computers have stimulated questions about the desirability of employees working at home rather than at conventional locations (Huws, 1984; Bisset & Huws, 1984; Olson & Primps, 1984; Ruiz & Walling, 2005; Beauregard, Basile & Canonico, 2013). Although importance of technological changes on working at home is evident, in this study the effect of technological progress on working at home will not be analyzed and discussed because it is not possible to determine how many persons are working at home using a computer in their works, or how many employees are telecommuting to their jobs at their homes in Turkish Household Labor Force Survey of 2015.

In the labor economics literature, there is no large existing body of studies on determinants of working preferences at home, using household labor force survey. Only a few studies focuses the role of demographic, social, cultural and economics characteristics on the working preferences at home (Horvath, 1986; Hakim, 1987a; Hakim, 1987b; Kraut & Grambsch, 1987; Ours, 1991; Felstead, Jewson, Phizacklea & Walters, 2000). Among them, the study of Kraut and Grambsch (1987) examines the impact of household and demographic characteristics on the probability of working at, using logistic regression in a multivariate framework and utilizing data from 1980 U.S. Decennial Census. Ours (1991) investigates the determinants of working at home for Dutch household under three services: small home repairs, car repairs and maintenance, and ladies' hairdressing by using logit model and 1985 Dutch Household Survey. However, within our knowledge, little attention has been paid to home-based work in Turkey (Esim & Sims, 2000; Özgüler, 2012). A majority of studies on this subject carries out for part-time employment rather than employment at home (Baslevent, 2002; Palaz, 2003; Kusaksiz, 2006; Kumas & Caglar; 2011; Palaz, Tasci & Darici; 2013; Oncel & Dereli, 2015).

In order to fill the gap in the literature, this study aims to examine the factors that affect the probability of working at home in the Turkish labor market. For the purpose of the study, all necessary dependent and independent variables are extracted from the Turkish Household Labor Force Survey of 2015. In this study, the logistic regression model is separately employed for the males, females and whole working group. The plan of this paper is as follows. Part 2 describes data and econometric approach used in this study. In Part 3, the logistic regression results are presented. Part 3 concludes the study.

2. Data and Methodology

In 2015, Turkish Statistical Institute made attempt to determine the size of home based work force in Turkey. The respondents were asked whether they were working at home usually and sometimes.

In order to examine the probabilities of the determinants on home-based work, we used the Turkish Household Labor Force Survey of 2015 data set conducted by the Turkish Statistical Institute (TURKSTAT). Since the purpose of this study is to investigate part-time working at home and its determinant, we only extracted data for employed individuals from the survey. Part-time homeworker was defined as a person who is regularly doing his or her same job at home and working 30 hours or less in the reference week. After determining part time homeworkers, we divided sample population into two groups: one group of females and one group of males.

The probability of part-time working at home is assumed to be function of number of demographic, social, cultural, and economic characteristics of employee. In this study, we will use logistic regression model. Our dependent variable is naturally binary. Its value is one or zero depending on whether employee works at home. Because of binary dependent variable, determination of the factors which may affect the probability of part-time working at home requires a logistic regression model. Logistic regression models employ standard logistic probability distribution function. To be more precise, logistic regressions utilize maximum likelihood estimation to evaluate the probability of categorical membership.

Table 1 gives descriptions of dependent and independent variables. Dependent variable HW is equal to 1 if person works at home usually and sometimes and equal is 0 if person does not work at home. As seen in Table 1, there are a number of independent variables to explain the probabilities of part-time working at home.

Table 1. Descriptions of Variables

NAME	DESCRIPTION
Dependent Variable	
HW	=1, If person is working at home usually and sometimes; =0 otherwise
Independent Variables	
FEMALE	=1, If person is female; =0 if person is male,
MALE	=1, If person is male; =0 if person is female,
AGE	Person's age
AGE-SQUARED	AGE*AGE
NUTS1	=1, If person lives in Istanbul; =0 otherwise
NUTS2	=1, If person lives in West Marmara region; =0 otherwise
NUTS3	=1, If person lives in Aegean region; =0 otherwise
NUTS4	=1, If person lives in East Marmara region; =0 otherwise

NUTS5	=1, If person lives in West Anatolia region; =0 otherwise
NUTS6	=1, If person lives in Mediterranean region; =0 otherwise
NUTS7	=1, If person lives in Central Anatolia region; =0 otherwise
NUTS8	=1, If person lives in West Black Sea region; =0 otherwise
NUTS9	=1, If person lives in East Black Sea region; =0 otherwise
NUTSA	=1, If person lives in Northeast Anatolia region; =0 otherwise
NUTSB	=1, If person lives in Central East Anatolia region; =0 otherwise
NUTSC	=1, If person lives in Southeast Anatolia region; =0 otherwise
HSIZE	Total number of members in household
ILLITERATE	=1, If person literate but not completed any educational institution; =0 otherwise
PRIMARY	=1, If person graduated from primary school; =0 otherwise
LSECONDARY	=1, If person graduated from lower secondary, vocational and technical secondary school or primary education; = 0 otherwise
USECONDARY	=1, If person graduated from upper secondary school (high school); =0 otherwise
TECHNICAL	=1, If person graduated from vocational and technical high school; =0 otherwise
UNIVERSITY	=1, If person graduated from 2 or 3 year higher education or faculty or 4 years higher education or faculty; =0 otherwise
MASTER	=1, If person graduated from master degree or doctorate; =0 otherwise
SINGLE	=1, If person is single; =0 otherwise
MARRIED	=1, If person is married; =0 otherwise
DIVORCED	=1, If person is divorced; =0 otherwise
WIDOWED	=1, If person is widowed; =0 otherwise
PROFESSIONALS	=1, If person's business code is managers, professionals and associate professionals ; =0 otherwise
TECHNICIAN	=1, If person's business code is technicians, clerical support workers, service and sales workers, skilled agricultural, forestry and fishery workers, craft and related trades workers and plant and machine operators, and assemblers; =0 otherwise
ELEMENTARY	=1, If person's business code is elementary occupations ;

	=0 otherwise
AGRICULTURE	=1, If person is working in agricultural sector ; =0 otherwise
INDUSTRY	=1, If person is working in industry sector ; =0 otherwise
SERVICE	=1, If person is working in service sector ; =0 otherwise
PRIVATE	=1, If person's workplace status is private ; =0 otherwise
PUBLIC	=1, If person's workplace status is public ; =0 otherwise
OTHER	=1, If person's workplace status is foundations, associations, cooperatives, political parties, non-governmental organizations, international organizations, embassies, etc.; =0 otherwise
SSI	=1, If person is registered in the Social Security Institution; =0 otherwise

In analyzing the relationships between the probability of working at home and explanatory variables listed in Table 1, our expectations in the possible relationships must be given in advance.

2.1. Region

Region can be an important determinant of part-time working at home in Turkey. Traditionally, service sectors which are recently being called knowledge economy such as communication, banking, insurance and information technology services are proner to part-time working at home. Since these sectors have largely concentrated in the west of Turkey, it is expected that the probability for working at home in this region is higher than the rest of Turkey.

2.2. Education

According to findings of the empirical studies in the related literature, there is a strong and positive association between education level and part-time working at home. As education level of an employee increases, the probability of working at home for the employee increases. For the USA, the study of Metzger and Glinow (1988) reports that higher percentage of home workers has some degree of collage experience. Similarly, Hakim (1987) argues that home-based workers in the USA are well-educated with regard to national standards. However, some service sectors such as repairing sector in the economy do not require qualified labor. Therefore, unqualified or uneducated employees may work at home, too. If so, it must be expected that the relationship between education and working at home is negative. The sign of association between education and part-time working at home is not clear and will depend on what kind of job is done.

2.3. Age

Age may also influence part time working at home decision of the individuals. According to Metzger and Glinow (1988), the homeworkers in the USA range in age from 19 to 67 years with an average age of 40. In addition, the study of Kraut and Grambsch (1987) demonstrates that the probability of working at home increases at all ages, but the rate of increase steepens appreciably around the retirement age. Older people are more established and may have gathered enough experience, clients, or capital for home-based work. Therefore it is expected that as person's age increases, the probability of part-time working at home also increases. The squared value of age variable is included in the regression equations as a separate explanatory variable in order to control the probable non-linear relationship between age and the probability of part-time working at home (inverted U-curve form).

2.4. Marital Status

The marital status of the person can be an important factor in affecting the probability of working at home decision. Since married person has more responsibility in terms of family income, and need more flexible time to stay at home for childcare, the probability of working at home decision for married person is expected higher than that for single person.

2.5. Household Size

The larger family size, the smaller family income per person. Larger households may need to compensate for lowness of income per person by continuing part-time work at home. Thus, it is expected that there exists a positive and statistically significant association between household size and probability of working at home.

2.6. Sector

Whether a person can work at home depends for many services on the possession of suitable tools. This can be a constraint on working at home decision for business and repair industries. On the other hand, for professionals, this kind of constraint may not exist. Professionals can work at their homes without using tools. Also, they can decide to work at home to avoid the office politics and to reduce stress. We therefore expect the higher probability of part-time working at home for professionals than that for workers in the technical and unqualified jobs.

In order to see sector differences on the probability of working at home decision, we use three sectors: agriculture, service and industry. As mentioned above, in addition to sectoral differences, occupational differences of employees can affect the probability of working at home. To measure occupational differences on part time working at home, three dummy variables are constructed and used in the regression equations. One of them is related with managers, professionals, and

associate professionals. The second one is related with technicians, clerical support workers, service and sales workers, skilled agricultural, forestry and fishery workers, craft and related trades workers and plant and machine operators, and assemblers. Finally, the third one is related with elementary occupations.

2.7. Social Security Status

An important socio-economic characteristics of working at home is whether employee has been in the Social Security System of Turkey. Actually, for employees except manager and professionals there is no tendency for part-time working at home. Since social security is their priorities, they will not prefer working at home. Thus, there must be a negative association between existence of social security and part-time working at home.

2.8. Type of Employer

One of the determinants of working at home is whether employee is public, private or self employee. Naturally, private and self employees do not face any legal constraint in working at home if their jobs are convenient. Working at home is not possible to public sector employees. If a person who is public employee is part-time working at home, it means that he or she is certainly working more than one job. Thus, whether there exists an association between working at home and type of employer is not previously clear.

3. Empirical Results

The logistic regression results for female employees, male employees and whole data are separately reported in Table 2. As seen from Table 2, the coefficients of most dummy variables for region are statistically significant in all three regressions. The coefficients of NUTS1, NUTS2, NUTS6, NUTS8 and NUTSA regions are positive and statistically significant in the regression on whole data. It is both negative and statistically significant for NUTS3, NUTS5, NUTS9 in the same regression. The findings in the regressions on male and female data are almost the same. According to all three regression equations, the highest probability of part-time working at home is estimated to be the Northeast Anatolia for female employees and whole data, but the Mediterranean Region for male employees. The results on the males and whole data are not actually expected since the economy in northeast region of Turkey consists of agriculture and livestock breeding. Male employees in the Mediterranean have higher probability of working at home than those in other regions of Turkey. However, the lowest probability of working at home appears in the East Black Sea Region. It is valid for the males, the females and whole data.

The coefficient of the household size variable is found to be statistically significant only for whole data. But, it is negative as unexpected. It means that the probability of working at home will decrease as the household size increases. In all cases, the estimated coefficient of age variable is positive while the coefficient of squared age variable is negative. This finding indicates that there is an inverted U-curve relationship between age and probability of working at home. For the females, age variable has a positive impact on the probability of part-time working at home until 52.5 years old. After that age, the probability of working at home is starting to decrease. It is 56 years old for the males.

Table 2. Estimation Results of Logistic Regressions

	Full Data		Female		Male	
	Coefficient	Odds Ratio	Coefficient	Odds Ratio	Coefficient	Odds Ratio
FEMALE	1.9303[a] (0.0502)	6.8915				
AGE	0.0814[a] (0.0113)	1.0848	0.0630[a] (0.0130)	1.0650	0.0779[a] (0.0251)	1.0810
AGE-SQUARED	-0.0008[a] (0.0001)	0.9992	-0.0006[a] (0.0001)	0.9994	-0.0007[b] (0.0002)	0.9993
NUTS1	0.2547[b] (0.1033)	1.2900	-0.0439 (0.1387)	0.9570	0.4827[a] (0.1779)	1.6204
NUTS2	0.9484[a] (0.1034)	2.5815	0.6324[a] (0.1374)	1.8821	1.2354[a] (0.1802)	3.4397
NUTS3	-0.2784[a] (0.1046)	0.7569	-0.3775[a] (0.1352)	0.6855	-0.5668[a] (0.2107)	0.5673
NUTS4	-0.0978 (0.1140)	0.9068	-0.2209 (0.1459)	0.8017	-0.3327 (0.2334)	0.7169
NUTS5	-0.2800[a] (0.1028)	0.7557	-0.2425[c] (0.1299)	0.7846	-1.1682[a] (0.2524)	0.3109
NUTS6	0.9498[a] (0.1006)	2.5851	0.4701[a] (0.1384)	1.6001	1.4531[a] (0.1675)	4.2763
NUTS7	0.0649 (0.1125)	1.0670	0.0802 (0.1430)	1.0835	-0.6655[b] (0.2799)	0.5140
NUTS8	0.6681[a] (0.1058)	1.9505	0.3879[a] (0.1429)	1.4738	1.1060[a] (0.1785)	3.0222
NUTS9	-0.6822[a] (0.1278)	0.5055	-0.5536[a] (0.1568)	0.5748	-1.5203[a] (0.4065)	0.2186
NUTSA	2.7945[a] (0.0966)	16.3544	3.4264[a] (0.1349)	30.7656	1.1704[a] (0.1918)	3.2232
NUTSB	-0.1175 (0.1131)	0.8891	0.0132 (0.1431)	1.0132	-0.7124[b] (0.2964)	0.4904
HSIZE	-0.0290[b] (0.0118)	0.9714	-0.0138 (0.0138)	0.9862	-0.0240 (0.0314)	0.9762
ILLITERATE	-0.9815[a] (0.1363)	0.3747	-0.9201[a] (0.1908)	0.3984	-0.8862[a] (0.2502)	0.4122

PRIMARY	-1.2085[a] (0.1251)	0.2986	-0.8486[a] (0.1812)	0.4280	-1.8119[a] (0.1794)	0.1633
LSECONDARY	-1.3339[a] (0.1309)	0.2634	-0.9849[a] (0.1861)	0.3734	-1.6903[a] (0.2046)	0.1844
USECONDARY	-1.3891[a] (0.1423)	0.2492	-1.0540[a] (0.1929)	0.3485	-1.7181[a] (0.2312)	0.1794
TECHNICAL	-1.5543[a] (0.1476)	0.2113	-1.3980[a] (0.1958)	0.2470	-1.5471[a] (0.2315)	0.2128
UNIVERSITY	-0.4981[a] (0.1062)	0.6076	-0.5924[a] (0.1550)	0.5529	-0.3025[b] (0.1366)	0.7389
SINGLE	-0.5819[a] (0.1295)	0.5588	-0.6382[a] (0.1511)	0.5282	-0.4392 (0.3549)	0.6445
MARRIED	-0.2040[c] (0.1067)	0.8154	-0.0554 (0.1166)	0.9461	-0.6979[b] (0.3416)	0.4976
DIVORCED	-0.1617 (0.1472)	0.8506	-0.3079[c] (0.1616)	0.7349	0.0410 (0.3884)	1.0418
PROFES.	2.1976[a] (0.1148)	9.0033	1.9906[a] (0.1428)	7.3199	3.2963[a] (0.3693)	27.0125
TECHNICIAN	1.1726[a] (0.1001)	3.2303	1.0870[a] (0.1072)	2.9653	1.7999[a] (0.3681)	6.0490
INDUSTRY	2.6797[a] (0.0750)	14.5807	3.5757[a] (0.0905)	35.7196	0.1621 (0.2468)	1.1759
SERVICE	1.4870[a] (0.0636)	4.4238	2.0782[a] (0.0860)	7.9900	0.7720[a] (0.1705)	2.1640
PRIVATE	-3.6623[a] (0.0816)	0.0256	-3.5032[a] (0.0993)	0.0301	-3.5730[a] (0.1842)	0.0280
PUBLIC	-2.8261[a] (0.0962)	0.0592	-2.5642[a] (0.1283)	0.0769	-2.9811[a] (0.1854)	0.0507
SSI	-2.6394[a] (0.0679)	0.0714	-2.9709[a] (0.0920)	0.0512	-1.5514[a] (0.1202)	0.2119
Constant	-3.5040 (0.3403)	0.0300	-2.9323[a] (0.4210)	0.0532	-3.8037[a] (0.7500)	0.0222
Observations	174452		55486		118966	
Wald Chi^2	7700.15[a]		5311.67[a]		1844.24[a]	
Pseudo R^2	0.3930		0.4069		0.2600	
Log-Likelihood	-2090.2240		-1257.1089		-694.5509	
Note: Robust standard errors in parentheses. a, b and c represent statistical significance at 1% , 5% and 10% levels, respectively.						

As seen in Table 2, the education variable appears to be an important variable in influencing the probability of part-time working at home. The coefficients of all dummy variables constructed for education are statistically significant and negative. The findings related to the sign of the relationship between education and working at home are mixed. Although it is very difficult to make generalization, it can be inferenced that female employees graduated from vocational and technical

high school have the lowest probability of working at home among various education groups. For the males, they are ones graduated from the primary school. However, male and females graduated from master or doctorate program have the highest probability for working at home among all education groups.

In order to see the sectoral differences on the probability of working at home, three dummy variables are produced and two of them (industry and service) are included into regression equations. For the females, both dummies are positive and statistically significant. But, since the estimated coefficient of the industry dummy variable is greater than that of service dummy variable, female employees in industry sector have higher probability of working at home than female employees in agriculture and service sectors. The findings for the male employees are different. Only the coefficient of service dummy variable is found to be statistically significant and positive. This means that male employees in service sector have higher probability of working at home than employees in industry and agriculture services.

Additionally, coefficients of the dummy variables created to measure the effect of occupational differences on the probability of working at home decision are positive and statistically significant for both males and females. The estimated coefficient of the dummy variable for professionals is greater than those for technicians and elementary occupations. This means that professionals have higher probability of part-time working at home than technicians and elementary occupations. As seen from the table, odds ratio for the professional is almost twice that for the technicians in all cases.

Marital status of males and females appears also to be an important variable in affecting the probability of part-time homeworking. According to the results, single female and married male employees have the lowest probability of working at home. Married and widowed female employees and single divorced and widowed male employees have higher probability.

The coefficients of the dummy variable for workplace status are also found to be statistically significant both for males and females. Both female and male self-employees have higher probability than private and public employees. Finally, male and female employees who are not in social security system have higher probability of working at home than those in social security system.

4. Conclusion

The frequency of working at home has been dramatically increasing. According to the Turkish Labor Force Statistics of 2015, there are more than 757 thousand persons working at home usually or sometimes. These dramatic changes in the nature of work place and in the structure of the labor force have attracted some

attention in both public policy and research literature. Therefore, in this study, probabilities and determinants of part-time working at home are empirically investigated for the case of Turkey. Data used in the study are based on Household Labor Force Survey of 2015. In the context of logistic regression model, a number of demographic, social, cultural, and economic characteristics of workers are used to be main determinants of part-time working at home or out-of- home.

According to the findings from estimated logistic regressions, region is an important determinant for the probability part-time working at home. The highest probability of part-time working at home is found in Northeast Anatolia for female employees, but Mediterranean region for male employees. It is also determined that there is a strong negative relationship between household size and working at home. One of the most important findings of this study is that there is an inverted U-curve relationship between age and working at home. Employee's education level also appears to be an important variable in influencing the probability of part-time working at home. As expected, males and females graduated from master or doctorate program have the highest probability for working at home among all education groups. Another finding of the study is that female employees in industry sector have higher probability of working at home than female employees in agriculture and service sectors. On the contrary, male employees in service sector have higher probability of working at home than employees in industry and agriculture services. Finally, professionals have higher probability of part-time working at home than technicians and elementary occupations in Turkey.

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