Topics in Middle Eastern and African Economies
Proceedings of Middle East Economic Association
Vol. 23, Issue No. 1, May 2021

Association among Health, Disability and Labor Force Status: A Panel Analysis on Turkish Females

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This paper studies the relationship among health, disability status and labor force participation of Turkish females by using Turkish panel of Survey of Income and Living Conditions (SILC) for the years 2012-2015. Although the aggregate behavior of labor force participation of Turkish females has been studied widely, the association between labor force status and health indicators has drew less attention. However, I believe that revealing the connection of health status and labor force behaviors in a country with a low level of female labor force participation is important for policy implications. I use self-reported health and disability status as health indicators and education level as socioeconomic status indicator. Results show that females with worse health and with disabilities have lower labor force participation rates. Additionally, when I control for education the results become even more profound.

Keywords: female labor force participation, health, disability
JEL Classification: C10, C33, I10, J21

1. Introduction

Health status is regarded as one of the key elements of labor force participation and related to lower labor force participation and employment rates (Baldwin and Johnson, 1994; Kidd et al., 2000; Gannon, 2009; Ali et al., 2011; Mizunga and Mitra, 2012; Schuring et al., 2013; Lindeboom et al.,2016; Vornholt et al.,2017). Additionally, the structure of female labor force participation and its relationship with health indicators are also important in terms of labor market dynamics. The relationship between health status and labor force participation of females has been analyzed widely for developed countries (Chai and Kalb, 2005; Chai, 2010; Schuring et al., 2013). However few studies examine the link between health and labor force outcomes for less-developed countries. Likewise, the studies on the association between health status of females and their labor market outcomes are also limited in Turkey. Although the aggregate behavior of labor force participation of Turkish females has been studied widely, the association between labor force status and health has drew less attention. In this respect, I aim to present the relationship among health indicators and labor force participation of Turkish females by using Turkstat Panel Survey of Income and Living Conditions (SILC) for the years 2012-2015. I use educational attainment as socio-economic status indicator with other demographic controls. I believe that revealing the connection of health status and labor force behaviors in a country with a low level of female labor force participation is important for policy implications. The outline of the study is as follows: section 2 describes the data and methodology. Section 3 presents the results. Section 4 concludes.

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2. Data and Methodology

2.1 Data

The data is from Turkish Panel Survey of Income and Living Conditions (SILC) for the years 2012-2015 prepared by Turkish Statistical Institute (TURKSTAT). SILC is both household level and individual level survey covering a broad range of issues in relation to income and living conditions. The main health indicators used in this study are self- reported health status and disability status. Health status is measured by using the question about self-reported health status. Individuals in the survey respond the question 'how is your health in general?' with five possible responses: very good health (1), 'good health (2), 'fair health' (3), 'poor health' (4) and very poor health (5). I use categories very good, good and fair health to indicate "good health" and I use the categories of poor and very poor health to indicate "bad health". I define the disability status by following World Health Organization's (WHO) definition which is an impairment or long term health condition that had lasted or was likely to last for six months or more which restricts the individual in daily activities. Individuals with disabilities are identified by using two questions in the survey (Kidd et al., 2000; Gannon, 2009; Pagan, 2013). The first question is "Do you suffer from any chronic, physical or mental illness that exists more than 6 months?" If the respondent answers the first question as "Yes" then he/she is asked "Does this chronic problem limit your daily activities?". The answer to this question has three categories: not limits, limits to some extent and severely limits. Educational attainment has five categories: non-graduate, primary school of 5 years, secondary school of 8 years, high or vocational high school and university or higher. I also use age and marital status as demographic controls.

2.2 Methodology

Objective health measures are not available and subjective measures that I use may possess selection bias. In order to overcome a possible bias, I apply Propensity Score Matching (PSM) by following Rosenbaum and Rubin (1983). I match the treated (good health/disabled) with untreated (bad health/ nondisabled) in terms of observable characteristics to calculate robust average treatment effect on the treated (ATT). I calculate ATTs as the following:

$$ATT = E(L_{it}(1) - L_{it}(0|H_{it} = 1) = E(L_{it}(1)|H_{it}) - E(L_{it}(0)|H_{it}) \quad (1)$$

The bias is defined as the following:

$$B(ATT) = E(L_{it}(0)|H_{it} = 1) - E(L_{it}(0)|H_{it} = 0) \quad (2)$$

Since I group the individuals with the same propensity score (with the similar characteristics), I expect to find unbiased ATTs. Thus, the conditional probability receiving treatment given pre-treatment characteristics is:

$$P_i(X_{it}) \equiv \Pr(H_{it} = 1|X_i) = E(H_{it}|X_i) \quad (3)$$

where$H_{it} = \{0,1\}$ is the indicator of treatment (health status) and X_i is the vector of covariates on which I make the matching process, L_{it} is a binary variable indicating whether the respondent is in the labor force or out of labor force.

However, in the panel data in this study, I have time varying treatment for some observations. In order to control for the time varying treatment, I apply propensity weighting with multiple treatments. Thus, using the whole panel data, I assign indicator variables for both treated individuals and treated period. I create a wide format data set, format the pre-treatment variables and then apply the matching procedure. Finally, I merge the information about the matched cases with the original data set.

3. Results

3.1 Descriptive Results

Table 1 shows the distribution of labor participation rates and work hours for the period 2012 and 2015 in order to show the disparities between females and males labor force participation rates and weekly work hours. The average labor force participation rate for females is about 30 percent, while the same ratio is about 80 percent for males throughout the analyzed period. Furthermore, mean weekly work hours for females who are employed is about 40 hours, whereas it is about 50 hours for males.

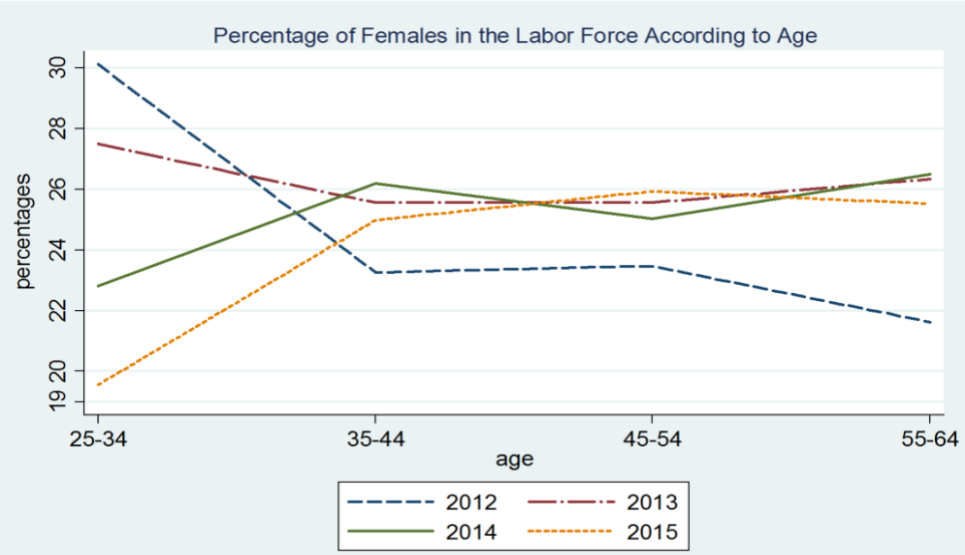
Table 1: Distribution of Labor Participation Rates and Work Hours (2012-2015)

	Females (Total)			Males (Total)		
	LFP(%)	mean work hours	sample size	LFP(%)	mean work hours	sample size
2012	32.53	42.32	3754	82.90	53.35	3334
2013	34.26	42.02	3754	82.15	53.05	3334
2014	32.87	41.91	3754	80.56	52.87	3334
2015	31.67	42.43	3754	78.61	52.64	3334

Source: Turkstat SILC 2012-2015 and author's calculations. Sample weights applied.

Figure 1 shows shares of females in the labor force according to age. Lines in the figure represent years. I observe relatively higher labor force participation rates in the young ages in the years 2012 and 2013. On the other hand, participation rates of females in 2014 and 2015 is relatively lower for younger ages, while it is higher for middle ages.

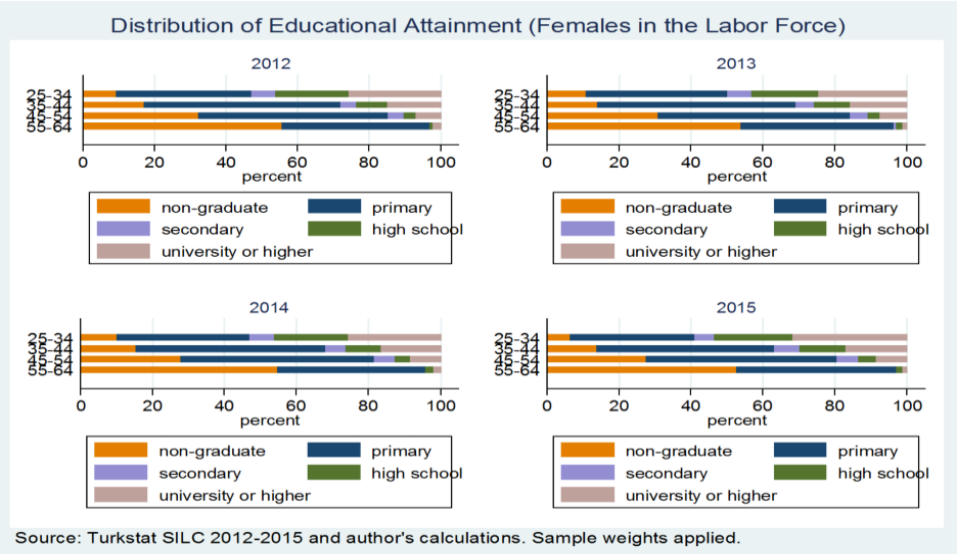
Figure 1 Shares of Females in the Labor Force According to Age (2012-2015)



Source: Turkstat SILC and author's calculations. Sample weight applied.

Figure 2 presents the distribution of education for females who are in the labor force. According to the figure I observe that share of university graduates who are in the labor force is higher for the 25-34 age group. Furthermore, educational attainment of females in the labor force decreases with age.

Figure 2 Distribution of Education for Females in The Labor Force



Source: Turkstat SILC 2012-2015 and author's calculations. Sample weights applied.

Figure 3 and Figure 4 show percentages in health status and disability status according to labor force status and years respectively. Left columns in the figures are for females who ares in the labor force and

right columns are for females who are out of labor force. The figures reveal interesting patterns. Health gradient for females in the labor force is wider than the gradient for females out of labor force. In other words, share of females in the labor force who report good health is higher and females who report bad health. These ratios are similar for females who are out of labor force. Similarly, share of nondisabled females in the labor are higher than their disabled counterparts implying the existence of disability gradient in labor force status as well.

Figure 3 Share in Health Status According to Labor Force Status and Time

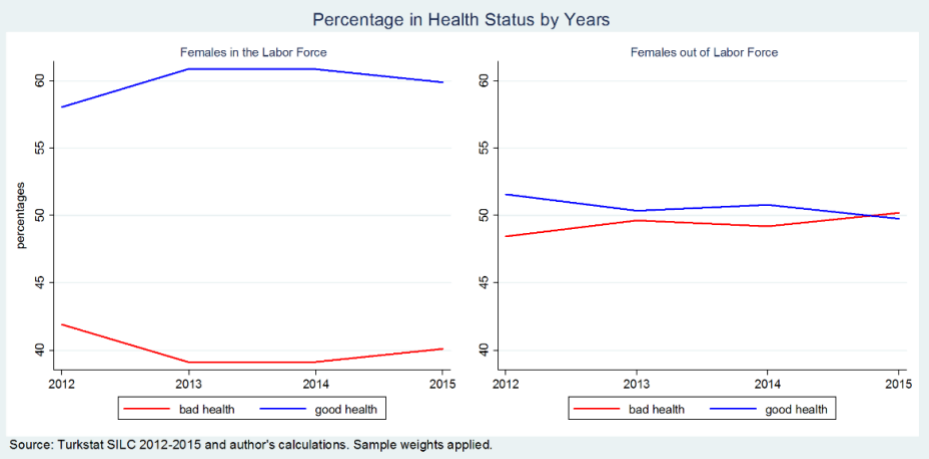
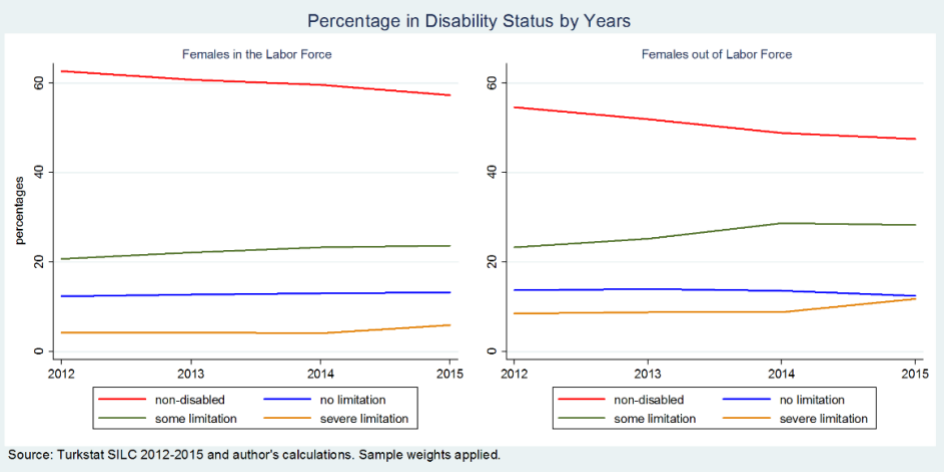


Figure 4 Share in Disability Status According to Labor Force Status and Time



3.2 PSM Results

Before estimating the relationship between health (disability) status and labor force participation of females, I match the samples with respect to covariates and calculate propensity scores. I conduct the matching according to health and disability status respectively which can be seen in Figure 5 and Figure 6.

Left panels of the figures show the distribution of covariates before the matching and right panels show the distribution of covariates after the matching. Propensity scores after the matching shows convergence both in Figure 5 and Figure 6 which implies that matching procedure works well.

Table 2 shows average treatment effects of the treated from PSM estimates. I calculate ATTs by using several matching techniques on common support. These techniques are Nearest Neighbor (NN) Matching, Stratification Matching, Kernel Matching and Radius Matching. Model 1 estimates the relationship between labor force participation and treatment group is females in good health. Model 2 estimates the association between labor force participation and disability status and treatment group is females with disabilities. The ATTs from all matching procedures are negative and strongly significant in first specification and positive and significant in the second specification. Thus, being in bad health or being disabled prevents females from participating in the labor force.

Figure 5 Matching According to Health Status

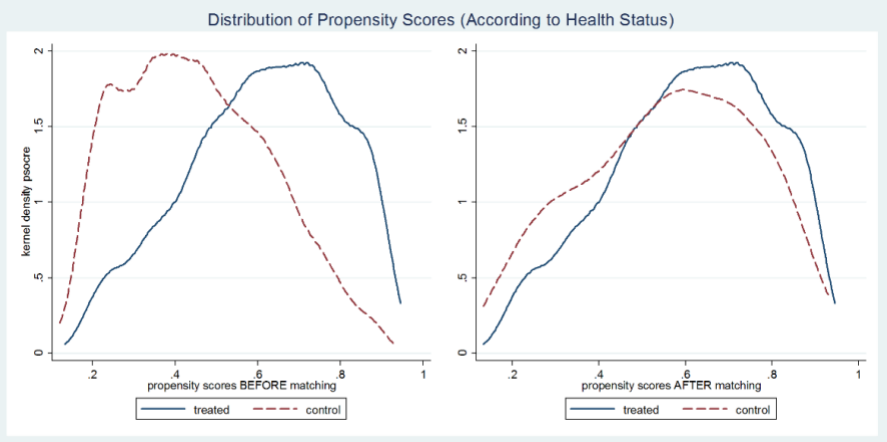


Figure 6 Matching According to Disability Status

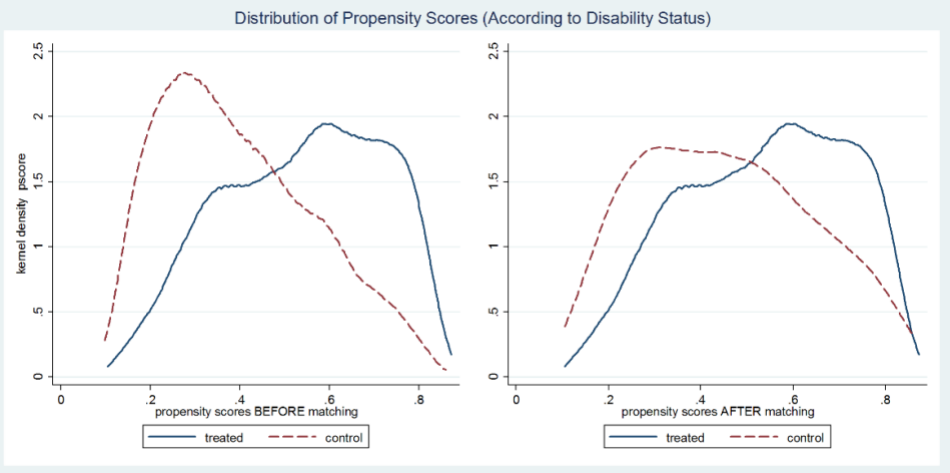


Table 2: Average Treatment Effects on the Treated from PSM Estimates

	NN Matching	Stratification Matching	Kernel Matching	Radius Matching
Model 1 (Treatment: Disability Status)				
ATT	-0.037***	-0.035***	-0.040***	-0.035***
	(0.009)	(0.009)	(0.008)	(0.008)
# of treated(control) in 2012	1607 (1911)			
# of treated(control) in 2013	1691 (1874)			
# of treated(control) in 2014	1788 (1802)			
# of treated(control) in 2015	1855 (1742)			
Model 2 (Treatment: Health Status)				
ATT	0.021***	0.027***	0.038***	0.024***
	(0.0011)	(0.0010)	(0.0010)	(0.0012)
# of treated(control) in 2012	2015 (1637)			
# of treated(control) in 2013	2026 (1642)			
# of treated(control) in 2014	2031 (1645)			
# of treated(control) in 2015	1989 (1643)			

Notes: ***$p < 0.01$, **$p < 0.005$, *$p < 0.1$. Data is from Turkstat SILC 20120-2015. Sample weights are applied.

4. Conclusion

In this study I examine the association between labor force participation of females and health indicators. I use subjective health and disability statuses as health variables. The data set is Turkstat Panel Survey of Income and Living Conditions (SILC) 2012-1015. In order to overcome possible selection bias, I use PSM for the estimation process. The results of the study are as the following: Health is positively related with female labor force participation. Findings suggest that females with bad health and with disabilities have lower labor force participation rates. I both observe gradients in health status and disability status. Propensity matching eliminates the differences between control and treatment groups. PSM estimations results show that females with bad health and with disabilities has less tendency to participate in the labor force.

This study also has some limitations. Firstly, I do not make a differentiation between agricultural and non-agricultural sectors which can lead diversified results. Secondly, household types (e.g.with or without heads) could be important in terms of labor force participation decisions of females.Thirdly macroeconomic indicators and regional differences also can effect the association between health indicators and labor market outcomes.

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