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# Disability and Labor Force Participation: Evidence from Turkish Males

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# Disability and Labor Force Participation: Evidence from Turkish Males

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**Abstract**

This paper attempts to examine the influence of disability status on labor force participation of males aged between 25 and 64. Our attention is only on males in order to avoid complications arising from gender differences in disability and labor force participation. The data is from Turkish Health Survey (THS) for the year 2012 prepared by Turkish Statistical Institute (TURKSTAT). We believe that revealing the differences in labor outcomes that can be attributed to disability status of individuals would be important to understand labor market dynamics of a developing and young populated country; Turkey. We define disability as an impairment of long term health conditions that lasts more than six months which restricts individual in daily activities and categorize individuals as non-disabled, disabled with no limitations, disabled with some limitations and disabled with severe limitations by controlling work related disabilities. In the first part of the study we provide descriptive analysis on the relationship between disability status and labor market states. We observe that higher share of disabled individuals with severe limitations are out of labor force in every age and low educated individuals experience more disabilities. In the second part, we first estimate probit equations in order to see the relationship between disability and labor force participation, then we implement propensity score matching (PSM) techniques in order to overcome selection bias. PSM results indicate that severe disability prevents males from entering into the labor force, whereas being non-disabled increases the probability of being in the labor force.

*Keywords:disability, labor force participation, probit, propensity score matching*

*JEL Classification: I12, J21, J24, C31, C34*

# 1 Introduction

Disability is one of the key determinants of labor force participation. Approximately, 15 per cent of world population lives with some form of disability (World Bank, 2013). In most studies, it is stated that disability is significantly related to the lower participation rates (Kidd et al. (2000), Gannon(2005), Bound et al. (1999)),lower employment rates (Baldwin and Johnson (1994)), lower education levels (Perri (1984), Karmel and Nguyen(2008)), lower wages(Kidd et al. (2000), Baldwin and Johnson(1994), Johnson and Lambrinos (1985), Haveman and Wolfe (1990), Luft (1985)), higher medical expenditures (Rice and LaPlante (1994)) and lower economic well-being (Mitra et al., (2012), Haveman and Wolfe (1990)). In this respect, knowing labor force participation of disabled individuals is important especially in developing countries since disability has occupied very minor role in policies.

Previous literature on developed countries points out the negative association between disability and labor force participation. For instance, Kidd et al. (2000) show that men with disability are less likely to participate in the labor force and their wages are less than their non-disabled counterparts by using 1996 British Labor Force data set. Gannon (2009) finds similar results for Ireland by applying dynamic panel models with the Irish part of European Community Household Panel Survey. Gannon (2009) controls the individuals both current and previous disability statuses as well as the previous labor force participation and finds that disability prevents the individuals from fully participating in the labor market. Bound et al. (1999) show that poor health status induces the older workers to leave the labor force in the USA. In that study, the authors also point out the fact that half of the individuals who leave the labor force apply for disability insurance. Next, Bound et a. show that individuals may attempt to change their jobs, rather than leaving the labor force if their health decline over time. Campolieti (2002) also suggests that disability status has significantly negative effects on labor force participation of older males living in Canada. In a recent study, Webber and Bjelland (2015) observe that individuals with work limiting disability are very likely to leave the labor force in the USA.

The major part of the literature focuses on the developed countries, however, few studies investigate the effect of disability on labor market outcomes in developing countries. For example, Mitra and Sambamoorthi (2008) investigate the differences in employment status and wages between disabled and non-disabled males living in Tail Nadu, India. Although they find that the wages of disabled and non-disabled males do not significantly differ from each other, they state that disability is a barrier to employment. Mizunga and Mitra (2012) test the effect of being disabled on employment rates for 15 developing countries[1] by using World Health Survey. They find that disabled persons have lower employment rates compared to the non-disabled in 9 of those countries.[2]

In the light of above discussion, the main objective of this paper is to examine

[1]The countries they consider are: Burkina Faso, Ghena, Kenya, Malawi, Mauritius, Zambia, Zimbabbwe, Bangladesh, Lao PDR, Pakistan, Phillipinnes, Brazil, Dominican Republic, Mexico, Paraguay.

[2]Burkina Faso, Ghena, Mauritius, Bangladesh, Pakistan, Phillipinnes, Brazil, Mexico, Paraguay.

the effect of disability status on labor force participation of working age males (25-64) in Turkey, a middle income, developing country. By the end of February 2016, unemployment rate is 10.9 per cent in Turkey. Unemployment rate is considerably higher relative to developed countries. 50.8 per cent of working age population participates in the labor force. Labor force participation rate is 31.1 per cent among females and 70.9 per cent among males (TURKSTAT (February 2016)). In order to avoid complications arising from gender differences in disability, and due the huge gap between labor force participation rates by gender, in this study, we limit our attention to males only. We believe that revealing the differences in labor force participation that can be attributed to disability status would be important to understand labor market dynamics of a developing and young populated country; Turkey.

We use Turkish Health Survey (THS) data set for the year 2012. THS has questions on demographic factors (such as age, education level, region, marital status) and labor market outcomes, as well as a variety set of health related questions. This is the first study that examines the impact of disability status on labor force participation of working age males in Turkey, by using a rich micro data set. Previously, Duzgun-Oncel and Karaoglan (forthcoming 2016a) make a descriptive analysis that shows the association between the degree of disability and labor market outcomes of working age men in Turkey. We have 8953 observations for males between 25 and 64 years old in 2012 THS data set. In fact, Turkey establishes a good setting in order to discuss policies on disabled individuals. For instance, according to 2012 THS data set approximately 20 per cent of working age males state that they are not employed and not seeking for work, because they are disabled.

In the paper, we first present a descriptive analysis on the disability prevalence among working age males and labor market outcomes across disability status. In this part, we also examine the variations among other socioeconomic indicators, such as age, education level, marital status and region. We use self-reported measures of disability and divide the individuals according to their disability status. By following Gannon(2009) we construct four groups of working age males according to disability status: Non-disabled, disabled with no limitations, disabled with some limitations and disabled with severe limitations. Descriptive evidence shows that having disability problems prevents working age males from entering into the labor force.

Second, we test the effect of being disabled on labor force participation of males by implementing probit estimation techniques. Our results suggest that the probability of participating into the labor force decreases as the degree of disability rises. Probit results also indicate that the individuals education level significantly affects the labor force participation decision of males: Males with higher levels of education participate in the labor force more than the males with lower education levels.

However probit estimation imposes two restrictions: First, the effect of being disabled on labor force participation is constant across all males in the sample. Second, non-disabled and disabled individuals with different levels of disability are included in the same estimation sample. In order to overcome the possible biases resulting from these two restrictions, we apply Propensity Score Matching techniques (PSM) following

Rosenbaum and Rubin (1983). By implementing PSM methodology, we are able to calculate the average treatment on treated (ATT) by grouping the similar individuals in one sample. PSM results also suggest that having severe degrees of disability prevents the working age males from participating in the labor force.

The organization of the paper is as follows: Section two gives information about data and methodology. Section three presents the results from descriptive statistics and regression analyses. Finally, section four concludes.

# 2 Data and Methodology

## 2.1 Data

We use Turkish Health Survey 2012 (THS) data set conducted by Turkish Statistical Institute (TURKSTAT) in order to examine the relationship between disability level and labor force status of the males aged between 25 and 64 years old in Turkey. THS is a rich micro data set which consists of 8953 observations for the men who are between 25 and 64 years in Turkey. . Apart from having a rich set of health related questions, in THS we are able to observe the demographic factors of the respondents such as reported age, marital status, region as well as education level and labor market indicators. This paper is the first study that examines the impact of disability status on labor force participation of working age males in Turkey, by using a rich micro data set.

From THS data set, we can define individuals disability status based on the answer of the following questions:

*"Do you have an illness/ a health problem that lasts more than/is expected to last more than 6 months or longer"*

The answers to this question are: *Yes/No/Does not know/Does not want to answer this question.*

If the individual reports *"Yes"* to the previous question and if he reports that he has health problems such as coronary illnesses, hypertension, osteoarthritis, musculoskeletal disorders, diabetes, asthma, chronic depression and anxiety, then the individual is considered as disabled.

We can detect the severity of disability according to the answer of the following question:

*"How can you define severity of the restriction of your life-time activities due to your illness/health problem in the last 6 months?"*

The answers to this question are as follows: *Severely restricted/ Restricted but not severely/Not Restricted/ Does not know/ Does not want to answer this question.*

Additionally, in order to overcome reverse causality, we control for work related injuries or disabilities. For instance, those with low levels of education are more likely to obtain manual jobs in which there may be a higher probability of work-related disability both because of the higher incidence of injury and higher probability that any injury will affect their ability to work (Kidd et al.,2000). Thus, we exclude individuals who report that they have had work related injuries or limitations in daily activities from the disabled sample.

In THS, the respondents are asked whether they are working in a job or not. If the respondent does not work in a job, then he is asked why he is not working. For males, there are seven different answers to these questions, they are: *"Looking for work, Seasonal Worker, Enrolled in Education, Pensioner, Has other Income Sources, Unable to Work and Other Reasons"*. Based on these answers in the paper, we classify the labor force status of the individuals into two groups: "Out of labor force" and "In labor force". The males who state that they are seasonal workers, students, pensioners, the individuals who have other income resources and the individuals who are unable to work are considered as out of labor force. The respondents who are working in a regular job is referred as "employed", whereas the individuals who are not working but seeking for job is considered as "unemployed".

For employed males, we can observe the employment type. THS categorizes employment into four different types: Employee, Employer, Self-employed and Unpaid family worker. In addition, we can observe whether the individual is employed full-time or part-time. Last, we can also observe the continuity of employment. The individual can be full-time worker, part-time worker, and seasonal worker. It is important to stress that we consider seasonal workers as they are out of labor force, based on TURKSTATs labor force participation definition.

In THS we are able to observe the demographic factors of the respondents such as age, gender, marital status, region (urban/rural) and education. Age of an individual is a continous variable in the survey year. Regarding marital status, in THS we observe whether the individual is married, single, widowed or divorced. In the analysis, we categorize the marital status of the respondents into 3 groups: Married, single and widowed/divorced. The respondent is referred as widowed if his wife is dead and he is considered as divorced if he is legally separated from his wife. Since widowed and divorced individuals have similar history (are married before but now live alone) we combine these two subgroups and form one group (Widowed/Divorced Group). Next, in THS data set, education is classified into 6 groups: Illiterate, Not illiterate but do not finish school(we simply define it as Non-Graduate), primary school graduate, middle school graduate, high school graduate and has university or higher degree. In the empirical analysis, we categorize the individuals education level in the same manner.

## 2.2 Descriptive Analysis

In the paper, we first present a population-weighted descriptive analysis on the disability prevalence among working age males and labor market outcomes across disability status. In that part, we also examine the variations among other socioeconomic indicators, such as age, education level, marital status and region Descriptive evidence shows that having disability problems prevents working age males from entering into the labor force.

## 2.3 Probit Estimation

In the empirical analysis, we first test the effect of being disabled on labor force participation of males by using probit model of the form:

$$(1) \qquad Pr(Y_i = 1) = \phi(\beta_0 + \beta_1 D_i + \mathbf{X_i'}\beta_2)$$

Here $Y_i$ is a binary variable for labor force participation, $D_i$ shows the disability status of individual $i$ and the Vector $\mathbf{X_i}$ contains age, region, marital status and education controls. $\psi(.)$ refers to the standard normal density function. There are four different disability status: Non-Disabled, Disabled with no limitations, disabled with some limitations and disabled with severe limitations which constitute four different vectors (dummy variables) and the last disability category is the omitted category in the estimation process. The reference category is the individuals without any type of disability.

## 2.4 Propensity Score Matching Estimation

The marginal effects calculated from the probit regression measures the average treatment effect on treated (ATT). In our study, it measures the average effect of being disabled (for different disability criteria) on labor force participation. However, probit estimation results impose two restrictions: First, the effect of being disabled on labor force participation is constant across all males in the sample. Second, non-disabled and disabled individuals with different levels of disability are included in the same estimation sample. However, other control factors such as age, region, education, marital status of individuals belong to different disability groups may differ from each other. In order to overcome the possible biases resulting from these two restrictions, we apply propensity score matching techniques (PSM) following Rosenbaum and Rubin (1983) in order to see reveal the causal effect. In other words, grouping the similar individuals in one sample and calculating the average treatment effect on treated (ATT) will let us to see the exact impact of being disabled on labor force participation more clearly since the other controls are very similar in the same group.

We establish two different treatment models to test the effect of being disabled on labor force participation. In the first model, treatment group consists of disabled individuals with severe limitations, and the control group includes the non-disabled

individuals as well as the disabled individuals with no/some limitations. In the second model, our treatment group includes non- disabled individuals and the control group includes individuals with different levels of limitations. Based on these two models, we calculate ATT in the following manner:

$$ATT = E(Y_i(1) - Y_i(0)/D_i = 1) = E(Y_i(1)/D_i = 1) - E(Y_i(0)/D_i(1)) \quad (2)$$

For the first model, Equation (2) shows the difference between labor force status of working age male who is disabled with severe limitation $(Y_i(1)/D_i = 1)$ and his potential labor force status if he were not disabled with severe limitations. ATT is defined in the similar way for the second model. It is important to note that we cannot observe the potential outcomes of different models. However, we can calculate the outcome for control groups, which can be defined as$E(Y_i(0)/D_i = 0)$. Hence, a selection bias may occur when we calculate the ATT. The bias is defined in the following way:

$$B(ATT) = E(Y_i(0)/D_i = 1) - E(Y_i(0)/D_i = 0) \quad (3)$$

However, if treated and control groups have the same observable and non-observable features, the bias defined in equation (3) will be equal to zero as Dehajia and Wahba (2002) suggests. Since we group the individuals with the same propensity score (i.e. with the similar characteristics) by applying PSM methodology, we expect to find unbiased ATTs.

# 3 Results

## 3.1 Descriptive Results

Table 1 shows the distribution of labor market outcomes of working age males by disability status. Although our main focus is on the effect of disability status on labor force participation, presenting a general picture would serve as a precursor analysis to such relationship. The values are in percentages and the values in paranthesis are 95% confidence intervals. Consistent with the previous literature, we find that males are more likely to be out of labor force if they are disabled. The likelihood increases even more as the severity of disability increases. Our findings suggest that 83.77 per cent of non-disabled males are in the labor force, whereas this number is only 44.72 percent for individuals with severe disability. The findings also point out the fact that the prevalence of being employed is lowest among the males who are disabled with severe limitations, and it is highest among the non-disabled males.[3] Similarly, the likelihood of being employed is lower among disabled individuals with no limitation or with some limitation relative to non-disabled males. Descriptive statistics also indicate that the prevalence of unemployment is highest among non-disabled males, which implies that non-disabled males continue to look for work if they do not have regular job.

[3]The employment category "disabled" refers to the males who state that they do not work and they do not seek for work since they are disabled. In fact, the descriptive statistics confirm that 17.45 per cent of disabled individuals with severe limitation state that they do not look for work because they are disabled.

Table 1: Sample Weighted and Clustered Distribution of Labor Market Indicators by Type of Disability (%, 95% confidence interval)

| | non-disabled | disabled with no limitations | disabled with some limitations | disabled with severe limitations |
|---|---|---|---|---|
| **labor force status** | | | | |
| out of labor force | 16.21 (15.35, 17.10) | 32.35 (28.44, 36.53) | 31.50 (28.38, 34.80) | 55.27 (50.02, 60.40) |
| in the labor force | 83.78 (82.89, 84.64) | 67.64 (63.46, 71.55) | 68.49 (65.19, 71.61) | 44.72 (39.59, 49.97) |
| **employment** | | | | |
| employed | 77.69 (76.69, 78.65) | 65.44 (61.23, 69.42) | 64.31 (60.94, 67.54) | 37.66 (32.86, 42.73) |
| unemployed | 5.51 (4.99, 6.07) | 1.54 (0.77, 3.05) | 3.84 (2.71, 5.41) | 4.87 (3.09, 7.61) |
| disabled | 1.30 (1.06, 1.60) | 0.96 (0.40, 2.29) | 2.35 (1.50, 3.66) | 17.61 (14.05, 21.85) |
| **employment type** | | | | |
| employee | 77.16 (76.14, 78.15) | 74.11 (70.13, 77.73) | 69.93 (66.65, 73.02) | 70.91 (65.83, 75.52) |
| employer | 3.61 (3.19, 4.09) | 4.31 (2.85, 6.46) | 3.14 (2.13, 4.61) | 2.67 (1.39, 5.05) |
| self employed | 18.21 (17.30, 19.15) | 20.98 (17.66, 24.73) | 25.91 (22.98, 29.07) | 25.22 (20.86, 30.14) |
| unpaid family worker | 1.00 (0.78, 1.27) | 0.05 (0.01, 1.80) | 1.00 (0.05, 2.00) | 1.18 (0.04, 3.12) |
| **employment condition** | | | | |
| full-time | 95.62 (95.10, 96.08) | 97.25 (95.41, 98.36) | 94.33 (92.50, 95.74) | 94.36 (91.32, 96.37) |
| part-time | 4.37 (3.91, 4.89) | 2.74 (1.63, 4.58) | 5.66 (4.25, 7.49) | 5.63 (3.62, 8.67) |
| **employment continuity** | | | | |
| permanent | 89.42 (88.66, 90.13) | 92.94 (90.36, 94.86) | 86.28 (83.71, 88.51) | 82.49 (78.05, 86.19) |
| temporary | 6.50 (5.93, 7.11) | 4.11 (2.69, 6.23) | 6.66 (5.12, 8.62) | 11.86 (8.82, 15.78) |
| seasonal | 4.07 (3.63, 4.58) | 2.94 (1.77, 4.82 ) | 7.04 (5.45, 9.45) | 5.63 (3.62, 8.67) |

Source: TURKSTAT Health Survey 2012 and authors calculations. Work related injuries are controlled. Confidence intervals are shown in parenthesis.

We then group the employed individuals according to their employment type. We observe that probability of being self-employed is highest among the individuals who are considered to be disabled with some limitation (25.91 per cent). This percentage is also high for disabled males with severe limitations (25.22 per cent) compared to the non-disabled males and disabled males with some limitations. In addition, the probability of being an employee decreases with the level of disability. These two findings may imply that disabled individuals with some or severe limitations prefer to be self-employed rather than working as employee which could be related to the insufficiency of policies for disabled individuals in Turkey. [4] Regarding employment condition, we observe that disabled males with severe limitations are more likely to be part-time worker. Moreover, we find that the percentage of being a temporary worker is highest among the disabled individuals with severe limitations and the percentage of being a permanent worker decreases as the level of disability increases.

Table 2 provides a descriptive analysis of demographic variables that may affect the labor market outcomes of the individual by his disability status. The values are in percentages and the values in paranthesis are 95% confidence intervals. We observe that probability of disability raises with age. For instance, 31.34 per cent of disabled males are in 25-34 age group, where as the ratio falls to 13.88 per cen in 55-64 age group. We also observe that the highest percentage of reporting disability with severe limitation also belongs to the 55-64 age group. Descriptive statistics also indicate that disabled individuals have lower education levels. In addition, level of education decreases even more among disable individuals with some or severe limitations. We observe that 19.27

[4] In another study, Duzgun-Oncel and Karaoglan (2016b) examine the effect of disability policies on labor market outcomes for Turkey.

per cent of non-disabled males have university or higher degree, whereas this percentage is only 10.02 per cent for disabled males with severe limitations. Furthermore, we monitor that the majority of males in the sample live in urban areas. The statistics show that 77.40 per cent of non-disabled males live in urban areas. However, the percentage of individuals who live in urban areas is lower among disabled groups, only 67.20 per cent of disabled with severe limitations live in urban areas. Finally, we observe that disability status and health status are positively associated with each other. The statistics indicate that non-disabled males are less likely to report bad health and the prevalence of bad health increases with the level of disability.

Table 2: Sample Weighted and Clustered Distribution of Demographic Variables by Type of Disability (%, 95% confidence interval)

| | non-disabled | disabled with no limitations | disabled with some limitations | disabled with severe limitations |
|---|---|---|---|---|
| **age** | | | | |
| 25-34 | 31.34 (30.26, 32.45) | 8.30 (6.21, 11.01) | 11.02 (9.04, 13.38) | 9.21 (6.65, 12.62) |
| 35-44 | 30.24 (29.17, 31.33) | 20.65 (17.38, 24.36) | 20.19 (17.56, 23.11) | 20.86 (17.01, 25.32) |
| 45-54 | 24.52 (23.52, 25.55) | 31.36 (27.79, 35.79) | 33.95 (30.76, 37.29) | 28.45 (24.07, 33.28) |
| 55-64 | 13.88 (13.08, 14.71) | 39.38 (35.25, 43.66) | 34.82 (31.60, 38.17) | 41.46 (36.53, 46.56) |
| **education** | | | | |
| primary or less | 47.37 (46.19, 48.55) | 45.94 (41.96, 50.26) | 56.62 (53.18, 60.01) | 68.83 (63.91, 73.36) |
| secondary | 33.34 (32.24, 34.47) | 31.85 (27.97, 35.99) | 28.87 (25.84, 32.09) | 21.13 (17.26, 25.60) |
| university or higher | 19.27 (18.36, 20.22) | 22.20 (18.82, 25.98) | 14.49 (12.23, 17.10) | 10.02 (7.34, 13.54) |
| **area** | | | | |
| urban | 77.40 (76.39, 78.37) | 76.64 (72.79, 80.08) | 69.88 (66.62, 72.95) | 67.20 (62.24, 71.81) |
| **marital status** | | | | |
| married | 84.47 (83.60, 85.31) | 94.59 (92.27, 96.24) | 92.44 (90.40, 94.07) | 88.34 (84.64, 91.24) |
| **health** | | | | |
| good | 85.12 (84.28, 85.93) | 65.86 (61.76, 69.74) | 38.47 (35.30, 41.74) | 14.75 (11.69, 18.44) |
| bad | 14.87 (14.86, 15.71) | 34.13 (30.25, 38.23) | 61.52 (58.25, 64.69) | 85.24 (81.55, 88.30) |

Source: TURKSTAT Health Survey 2012 and authors calculations. Work related injuries are controlled. Confidence intervals are shown in parenthesis.

## 3.2 Probit Regression Results

Table 3 below presents the marginal effects from probit regressions. In Table 3, we present 4 columns. The first column shows the effects of being disabled, by different levels of disability on labor force participation status of males, without controlling for other demographic factors and individuals education level. In the second column we control for individuals age. In the third column we include region and marital status and in the last column we also control for individuals education level.

The first column of Table 3 clearly indicates that disabled males for all levels of disability are less likely to participate in the labor force compared to non-disabled counterparts. Being disabled with some degree negatively and significantly affect the labor force participation of males. We observe that the probability of participating in the labor force decreases by 14 percentage points if the individual is disabled with no limitation, it decreases by 13 percentage points if the individual is disabled with some limitation. We observe labor force participation decision of the individual decreases by

28 percentage points if he is disabled with severe limitations. This percentage is two times as high as those of other two disability groups. Therefore, we conclude that severe levels of disability prevent the working age males from entering into the labor force.

Table 3: Marginal Effects from Probit

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Controls | None | Age | Col.(2) and demographic controls | Col.(3) and education controls |
| disabled with no limit. | -0.14*** | 0.009 | 0.008 | 0.004 |
| | (0.02) | (0.01) | (0.01) | (0.01) |
| disabled with some limit. | -0.13*** | -0.004 | -0.006 | -0.007 |
| | (0.01) | (0.01) | (0.01) | (0.01) |
| disabled with severe limit. | -0.28*** | -0.13*** | -0.13*** | -0.12*** |
| | (0.02) | (0.02) | (0.01) | (0.01) |

Notes: $***p < 0.01$, $**p < 0.005$, $*p < 0.1$. Data is from TURKSTAT Health Survey 2012. Table reports treatment effects in a regression with the indicated controls. Heteroscedasticity consistent standard errors are in parentheses. Sample weights are applied.

Next, we add individuals age controls (age and square of age) into equation (1). Although we observe that the impact of being disabled with severe limitations decreases when we control for age, the effect is still negative and highly significant. Probit results suggest that the probability of individuals labor force participation decreases by 13 percentage points if he is disabled with severe limitation. Our results also indicate that labor force participation decision of the disabled individuals with no limitations do not significantly differ from the non-disabled individual. The significant effect of being disabled with some limitations on the tendency of participating in the labor force also disappear when we control for age. These results remain to be valid when we control for region, marital status and education level. Hence, the general interpretation from probit estimation results can be stated as follows: Being disabled with no or some limitation do not significantly affect the labor force participation decision of working age males. However, having severe degrees of disability prevents them from entering in the labor force.

The marginal effects for the other control variables are not reported in Table 3 but the main findings can be summarized as follows: First, we observe that there is a concave relationship between the individuals age and labor force participation status. We also find that individuals who live in rural areas tend to participate in the labor force more in Turkey. For marital status, we conclude that labor force participation of the single individuals is significantly less than the married and/or widowed/divorced males. For education level, our results are in conformity with the previous studies: More educated individuals are more likely to participate in the labor force. For instance, the probability of labor force participation of certain male increases by 14 percentage points if he has

university or higher degree. Therefore, we can conclude that higher levels of education induce the males to participate in the labor force.

### 3.3 Propensity Score Matching Results

We establish propensity score matching estimation setting following Rosenbaum and Rubin (1983). The authors describe the propensity score as the conditional probability of receiving treatment (being disabled) given pre-treatment characteristics, where

$$P_i(Z_i) \equiv Pr(D_i = 1/Z_i) = E(D_i/Z_i) \tag{4}$$

$D_i = 0, 1$ is the indicator of treatment and, $Z_i$ is the vector of covariates on which we make the matching process. For our purposes, the propensity score $P_i(Z_i)$ is computed from a probit regression where the dependent variable is a binary variable that indicates whether the individual is disabled with severe limitations or not (In the second model, it shows whether the individual is non-disabled or not). In the probit regressions, the vector of covariates includes the individuals age, region, education controls and marital status. In addition, following Dehajia and Wahba (2002), we also include the higher powers of certain explanatory variables into the probit specifications in order to satisfy the balancing property of PSM algorithm.

After calculating the propensity scores, we match the large group of treated individuals to non- treated ones. (In the first model, the treated group contains disabled males with severe limitations, and the control group contains the non-disabled individuals and disabled individuals with no/some limitations). Next, we compare the means of the explanatory variables in both matched and unmatched group in order to see whether the matching procedure is effective or not. We call the sample that contains the males with similar demographic factors and education level as "Matched Sample", and we call the sample in which demographic factors and education levels of males can be different as "Unmatched Sample". Therefore, in the matched sample, for the first model, males in treatment and control groups differ from each other only in the sense that one of them is disabled with severe limitations, while the other does not (the difference between the individuals is defined in the similar way for the second model). However, in the unmatched sample, for both models, working age males in treatment and control groups can vary.

Table 4 shows differences between the means of the control variables in the matched and unmatched sample. The results clearly indicate that there are significant differences between the control variables before the matching procedure, and matching eliminates those significant differences. For instance, the difference observed in the mean age between non-disabled and disabled with different degrees of limitations is 0.77 before matching, whereas this difference turns out to be approximately zero after matching. In addition, these differences turn out to be insignificant after matching with t-ratios -28.57 for the unmatched sample, and 0.02 for the matched sample. The result is the same for the remaining covariates with some exceptions.

Table 4: Comparison of Treatment and Control Groups: Unmatched vs. Matched

| Model 1 | | | | | | |
|---|---|---|---|---|---|---|
| | Treatment group:disabled males with severe limitations<br>Control group:non-disabled males, disabled males with no/some limitations | | | | | |
| | Unmatched Sample | | | Matched Sample | | |
| | disabled with severe limit. | non-disabled and disabled with no/some limit. | t-test for the mean differences | disabled with severe limit. | non-disabled and disabled with no/some limit. | t-test for the mean differences |
| age | 4.95 | 4.26 | 13.09 | 4.98 | 5.00 | -0.32 |
| age$^2$ | 2.56 | 1.93 | 13.49 | 2.58 | 2.61 | -0.35 |
| urban | 0.67 | 0.76 | -4.40 | 0.66 | 0.65 | 0.30 |
| married | 0.88 | 0.86 | 1.33 | 0.89 | 0.92 | -1.46 |
| single | 0.08 | 0.11 | -1.66 | 0.08 | 0.05 | 1.54 |
| illeterate | 0.04 | 0.01 | 2.87 | 0.04 | 0.05 | -0.86 |
| primary | 0.58 | 0.42 | 6.49 | 0.58 | 0.57 | 0.28 |
| middle | 0.12 | 0. 14 | -1.03 | 0.12 | 0.13 | -0.21 |
| high | 0.12 | 0.22 | -4.76 | 0.12 | 0.12 | 0.11 |
| university | 0.09 | 0.19 | -5.04 | 0.10 | 0.10 | 0.00 |
| Model 2 | | | | | | |
| | Treatment group:non-disabled males<br>Control group:disabled males with different degrees of limitations | | | | | |
| | Unmatched Sample | | | Matched Sample | | |
| | disabled with severe limit. | non-disabled and disabled with no/some limit. | t-test for the mean differences | disabled with severe limit. | non-disabled and disabled with no/some limit. | t-test for the mean differences |
| age | 4.14 | 4.91 | -28.57 | 4.14 | 4.14 | 0.02 |
| age$^2$ | 1.82 | 2.51 | -29.03 | 1.82 | 1.82 | 0.04 |
| urban | 0.77 | 0.71 | 5.62 | 0.77 | 0.78 | -0.34 |
| married | 0.85 | 0.92 | -8.20 | 0.85 | 0.86 | -2.76 |
| single | 0.13 | 0.05 | 9.69 | 0.13 | 0.12 | 0.89 |
| illeterate | 0.02 | 0.03 | -2.59 | 0.02 | 0.01 | 2.57 |
| primary | 0.41 | 0.49 | -6.10 | 0.41 | 0.42 | -1.40 |
| middle | 0.14 | 0.13 | 1.07 | 0.14 | 0.14 | 0.22 |
| high | 0.23 | 0.17 | 5.05 | 0.23 | 0.23 | -0.12 |
| university | 0.19 | 0.15 | 3.58 | 0.19 | 0.18 | 1.04 |

Notes: Source: Turkstat THS 2012 and authors' calculations.

Finally, we calculate ATT by using several matching techniques on common support. They are: Nearest Neighbour (NN) matching, Stratification Matching, Kernel Matching and Radius Matching (Becker and Ichino, 2002). The resulting ATT shows whether having different degrees of disability has effect on labor force participation of working age males in Turkey. If we find that, for instance, ATT is negatively significant for the first model, we can conclude that having high levels of disability prevents the males from entering into the labor force.

Table 5 presents the PSM estimates of average treatment effects on treated (ATT) males (in the first model, treated group are the males who are disabled with severe

limitations and in the second model the treated group consists of non-disabled males).

Table 5: PSM Estimates (Outcome: Labor Force Participation)

| | NN Matching | Stratification Matching | Kernel Matching | Radius Matching |
|---|---|---|---|---|
| Model 1 | | | | |
| ATT | -0.19*** | -0.19*** | -0.24*** | -0.18*** |
| | (0.02) | (0.02) | (0.03) | (0.05) |
| No. of obs. (treated) | 427 | 427 | 406 | 406 |
| No. of obs (control) | 5171 | 8511 | 8460 | 8460 |
| Model 2 | | | | |
| ATT | 0.04** | 0.04*** | 0.05*** | 0.04** |
| | (0.02) | (0.01) | (0.009) | (0.02) |
| No. of obs. (treated) | 7101 | 7101 | 7101 | 7052 |
| No. of obs (control) | 1767 | 1845 | 1845 | 1815 |

Notes: $***p < 0.01$, $**p < 0.005$, $*p < 0.1$. Data is from TURKSTAT Health Survey 2012. Heteroscedasticity consistent standard errors are in parentheses. Sample weights are applied.

Propensity score matching results clearly show that being disabled with severe limitations prevent the males from participating in the labor force. The ATTs from all matching procedures are negative and strongly significant. For instance, both nearest neighbor and stratification matching results indicate that being disabled with severe limitations reduces the probability of participating in the labor force by 19 percentage points. The percentage amounts to 24 and 18 for kernel and radius matchings respectively.

Regarding the second model, we observe that being non-disabled increases the probability of labor force participation between 4 and 5 percentage points. These ATTs are 8 percentage points lower than the marginal effects from probit regression. The matching results from the second model support our findings from both descriptive statistics and probit regression: Males with no disability tend to participate in the labor force significantly more than the disabled individuals.

# 4 Conclusion

This paper is the first empirical paper that examines the impact of disability on labor force participation of working age males in Turkey. We use Turkish Health Survey (THS) data set for 2012 in our empirical analysis. Based on the questions related to individuals self-reported health problems, limitations due to those health problems and self-reported chronic illnesses, we have four disability groups: ”Non-disabled”, ”Disabled without

limitation", "Disabled with some limitation" and "Disabled with severe limitation". Those are subjective measures of the individuals disability status.

At first, we make a descriptive statistics analysis and find out some important implications regarding the association between disability and labor force participation of working age males in Turkey. First, consistent with the previous literature, we find that disability is an important obstacle for labor force participation of working age males. In addition, the results suggest that the probability of leaving the labor force rises with the degree of disability. We also find that a majority of non-disabled males (approximately 84 per cent) are employed. The prevalence of being employed decreases with the level of disability and is lowest among disabled males with severe limitations (approximately 45 per cent). Next, we observe that probability of being self-employed is highest among the individuals who are considered to be disabled with some limitation. In addition, our results suggest that as the level of disability increases, the probability of being employee decreases. We also find that disability reduces the probability of being a permanent worker.

In the regression analyses, first we implement probit estimation methods. Our results suggest that non-disabled males with severe limitations have less tendency to participate in the labor force relative to non-disabled males or disabled males with no or some limitations. In this part we have also stress the fact that higher levels of education induce the males to participate in the labor force.

It is important to note that probit estimation assumes that the effect of being disabled on labor force participation is constant across all males in the sample. In addition, in the probit regression, non-disabled and disabled individuals with different levels of disability are involved in the same estimation sample. In order to overcome the possible biases resulting from these two restrictions, in the second part of the empirical analysis we apply propensity score matching techniques (PSM). The PSM results are consistent with probit regression results: Higher degrees of disability prevent the males from entering into the labor force in Turkey. Likewise, non-disabled males have more tendency to participate in the labor force.

The first limitation of the study comes from the design of the THS data set. It is a cross-sectional data set, therefore we cannot observe the variation in labor force participation of males over time (for instance, due to the change in the disability status). The second limitation of the study is all health related answers are self-reported. It is important to note that individuals may report disability different than their true disability status due to economic or psychological incentives (Gannon, (2009), Campolieti (2002)). In addition, true disability status is continuous variable and generally in the questionnaires, the researchers observe only categorical disability measures which makes true disability status unobservable. Therefore, there can be measurement errors during the analyses. Despite these limitations, we believe that the study makes an important contribution to the literature in the sense that it is the first empirical study that investigates the association between disability and labor market outcomes in Turkey, a middle income, developing and young populated country by using a rich and recent data set on health and labor market outcomes. We both apply probit estimation and PSM in order to overcome the

problems due to the restrictions of probit estimation. We find out that the results from two estimation processes are consistent with each other. Our results are also consistent with previous literature.

In short, disability is barrier to entering the labor force for working age males in Turkey, like in other developed and developing countries. In order to promote the labor force participation of disabled males, the government should propose alternative employment policy suggestions. For instance, the government can increase the quotas for disabled individuals in work places, or several tax incentives may be given to firms or other business organizations for disabled employees. Further research is needed for alternative policies.

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