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Impacts of Policy Changes on Female Labor Force Participation: An Application for the Turkish Labor Market

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ABSTRACT

The Turkish government implemented a policy to increase female labor force participation in July 2008. The policy included an insurance incentive for employers that hired additional female workers (over 18 years old) and male workers who are between 18 and 29 years old. Workers' insurance would be paid by the government's unemployment funding agency for 5 years at a decreasing rate of 100%, 80%, 60%, 40%, 20%, respectively under the condition of hiring female or young male workers. Therefore, the objective of this study is to examine how the policy changes affected labor force participation. For this purpose, a nonlinear Difference in Difference Method (DID) is applied to Income and Living Condition Survey results (ILCS) from 2006 to 2011. Also logit analysis is applied on a dummy dependent variable using STATA 12.0. This study represents crucial information about how a policy impact with a dummy dependent variable can be analyzed using DID. It is important since there are only a few studies about nonlinear DID model application. Even though the new insurance policy seems to motivate employers to recruitments of additional female workers, the results indicate very low impact of the policy depending on the regions.

***Key words**: gender discrimination, labor market analysis, nonlinear difference in difference, policy impact.*

INTRODUCTION

In Turkey, labor force participation (LFP) for female workers has been consistently low in comparison to male workers for over centuries. The most recent labor statistics from Turkish Statistics Institute (TSI) show that over all, female labor force participation was 26.7%, while the rate for male workers was 64.8% in 2014. Among different age groups, the highest LFP was 95.4% for male workers in the 35-39 age group, while the highest rate for female workers in the 25-29 age group was 38% (TSI, 2014). The LFP rate for male workers was as almost 3 times as higher than their female counterparts. Moreover, Turkey has the lowest female LFP among the European Union (EU)[i] and the candidate countries of the EU (TSI, 2014). Also, in comparison to OECD countries, for instance female labor force participation was 71.2% in Australia, 74.2% in Canada and 67.3 in France in 2015, and LFP rate was considerably low in the Turkish Labor market.

There are many reasons behind the low rate of female labor force participation comparison to male workers, such as male-dominated society, unskilled labors dropped off after migration from rural to urban, maternity, and females' responsibility of housework. Another reason was the 2007 Great Recession caused one of the deepest downturn in the labor market in the long

run (Elsby, et. al. 2010). In depth and decline in economic activity have led financial market recession and then real market down in the USA, after that the real markets in European countries and rest of the world were negatively affected.

In the light of all the given information, the Turkish government implemented a new policy in July 2008. It purposed to increase women's work participation and create a more equal work place environment. This policy was announced[ii] on 26 May 2008 and administered on the first of July 2008. It was planned to be valid until the 30th of June 2009, but it was extended until the 30th of June 2010. In this policy, the employers' liability insurance would be paid by the unemployment insurance fund (UIF) under the following conditions:

- If employers hire additional male workers between July 2008 and June 2010 who are between 18 and 29 years old.
- If employers hire additional female workers between July 2008 and June 2010 who are older than 18 years old.

Employees can also benefit from the policy only if they hired additional workers, thus it was not valid for previous workers who were hired before July 2008. Under the given conditions, workers' liability insurance would be paid in full by the unemployment insurance fund but only the equivalent portion of minimum wage would be paid in the first year. Then, the following years the liability insurance would be covered at 80%, 60%, 40%, 20% equivalent portion of minimum wage, respectively.

The net monthly minimum wage paid to a worker was 527.13 Turkish Liras (TL) in 2008, as an example, while the gross wage was 809.19 TL. The difference between gross and real wages (809.19-527.13 = 282.06 TL) are paid by employers as insurance payment in regular circumstances. The differences, 282.06 TL (monthly insurance) would be paid by the unemployment insurance fund (UIF) to employers who hired additional young male or female workers after the policy implementation aforementioned. The yearly around 3384.72 TL (282,06 X 12 months) amount would be covered by the unemployment insurance fund for the following 5 years for one additional worker by reducing gradually. On the other hand, if workers were paid more than minimum wages, employers had to cover the remain portion of the insurance. For example, if workers' salary was 1500TL, then employers might only obtain 282.06TL which was equivalent of insurance payments to the part of minimum wages from UIF, but remaining portion of insurance would not be covered by UIF. Since the policy gives incentives to employers, I expect that number of hired female workers and young male workers may increase. Specifically, it could increase the number of workers who generally had lower levels education and thus willing to accept minimum wages. In the light of all these information, the following hypotheses are constructed:

1. Ho: Employers are indifferent hiring between female and male workers after the policy implementation.
   H_A: Employers are different hiring between female and male workers after the policy implementation.
2. H_0: Employers are indifferent hiring between different age groups after the policy implementation. (men 18-29 age group versus men over 30)[iii]
   H_A: Employers are different hiring between different age groups after the policy implementation. (men 18-29 versus over 30)

The rest of the paper is organized as follows: in Section II the methodology is given and the data are described in Section III. Then analyses results are represented in the Section IV. Section V provides the concluding comments.

METHODOLOGY

To examine the hypotheses, various modeling are used in the literature. Heckman type selection model is an example which has a selection and an outcome equation jointly estimated assuming a bivariate normal error term (Goldberger 1972, based on Heckman's 1976). Another highly popular method is propensity score matching using nonparametric matching techniques (Schneider and Buckley, 2003). In this study, I prefer to apply difference in difference model with micro level data which is the most prominent identification strategy in policy analysis (Athey and Imbens, 2006; Puhani, 2012). The DID is explained and applied using 2006 (pre-treatment term) and 2011 (post-treatment term) Income and Living Condition Survey (ILCS) results to estimate the policy impacts.

In the DID method, the treatment effect is modeled by estimating the differences between outcomes measured at different times (or different points) for both the treated and control observations (those not in the program), then comparing the difference between groups. A linear regression is used in policy analysis when a treatment and a control group and at least two time periods (before and after) involvement. I start by presenting simple linear difference-in-differences models for a continuous outcome using a similar way in Athey and Imbens (2006) and Puhani (2012). Simple linear DID model follows;

$$y = X\beta + \beta_1 T + \beta_2 D + \beta_{12}(T \times D) + u \qquad (1)$$

Where D is a dummy variable equals to one if the individuals is from treatment group, zero otherwise (control group). T is a binary time period, if an individual from post treatment period gets 1, zero otherwise (pre-treatment period). X represents some additional explanatory variables including constant term. In this paper, 2006, and 2011 are pre-treatment and post-treatment periods in sequences.

$$E(y|X, D = 0, T = 0) = X\beta$$
$$E(y|X, D = 0, T = 1) = X\beta + \beta_1$$
$$E(y|X, D = 1, T = 0) = X\beta + \beta_2$$
$$E(y|X, D = 1, T = 1) = X\beta + \beta_1 + \beta_2 + \beta_{12}$$

Where $\beta_1$is a difference in expected outcome from post and pre-treatment period for control group. The difference E(y|x) from the pre-treatment period to post-treatment period for the treatment group is $\beta_1 + \beta_2$. Then β_{12} shows the DID in E(y|x) between control and treatment group across the two periods (Karaca-Mandic, et al., 2012). β_{12} shows estimation for treatment effect on treated.

The DID aforementioned is a linear model with continuous outcome. On the other hand, in this paper the outcome which is an individual works or not is a binary (see data section for

detailed information about variables). Thus, the linear DID cannot be used. In a nonlinear DID, such as model with limited dependent variables like logit, and probit, the treatment effect cannot be constant across the treated group because the outcome variable is bounded (Ai and Norton, 2003; Athey and Imbens, 2006). Applying logit or probit model as examples of nonlinear models let the conditional probability that y=1 can be explained using equation-1.

$$P(y = 1|x) = X\beta + \beta_1 T + \beta_2 D + \beta_{12}(T \times D) \quad (2)$$

Similarly in the linear model, a nonlinear DID model can be explained as follows;

$$P(y = 1|X, D = 0, T = 0) = F(X\beta)$$
$$P(y = 1|X, D = 0, T = 1) = F(X\beta + \beta_1)$$
$$P(y = 1|X, D = 1, T = 0) = F(X\beta + \beta_2)$$
$$P(y = 1|X, D = 1, T = 1) = F(X\beta + \beta_1 + \beta_2 + \beta_{12})$$

where β_{12} as an estimation of difference in difference allows a measure of treatment effect on treated. β_{12} lets the linear index to be different in post-treatment period and so the P(y=1|x) conditional probability is different over and above "*the difference attributable to the nonlinearity of the model subjects in the treatment group versus control group*" (Karaca-Mandic et al., 2012). It is the additional differences giving a measure of the treatment effect on the treated. To clarify that in the non-linear model because the movement from *D=1* to *D=0*, (or D=0 to D=1*)*, induces a change in $^{\Delta F}/_{\Delta T}$.

To isolate the true difference $^{\Delta F}/_{\Delta T}$for the treatment group in a non-linear model, it is necessary to calculate the value of $[F(\beta_1 + \beta_2 + \beta_{12}) - F(\beta_2)] - [F(\beta_1) - F(0)]$ holding *D* equal to one (for the effect of the treatment on the treated) while changing *T=1 x D=1* from zero to one. That expression is:

$$(DID|D = 1) = [F(\beta + \beta_1 + \beta_2 + \beta_{12}) - F(\beta_2)] - [F(\beta_1) - F(0)] -$$
$$[F(\beta_1 + \beta_2) - F(\beta_2)] - [F(\beta_1) - F(0)]$$
$$(DID|D = 1) = F(\beta_1 + \beta_2 + \beta_{12}) - F(\beta_1 + \beta_2) \quad (3)$$

In the 3rd equation β_{12} provides a test that the treatment effect on the treated is different from zero. $F(\beta_1 + \beta_2) - F(\beta_2)$implies that *T=1* and *D=1*, but D *x T= 0*. Equation 3 is equal to zero if and only if β_{12} is equal to zero. Thus, a test that β_{12} is equal to zero provides a test that the treatment effect on the treated is different from zero.

In a nonlinear DID model, the treatment effect is not equal to the cross differences of observed outcome; however "*it is the difference between two cross differences; the cross differences of the conditional expectation of the observed outcome minus the cross differences of the conditional expectation of the potential outcome without treatment*" (Puhani, 2012). This difference in cross differences expresses to the incremental impact of interaction coefficient (Karaca-Mandic, et al, 2012). The differences in a non linear DID model with a strictly monotonic transformation function of logit model follows the sign of the interaction term coefficient in a linear model (Athey and Imbens, 2006).

In this paper nonlinear DID model is formulated using a logit model. Logit models can be explained by using odds ratio instead of marginal effect (Kleinman and Norton 2009) Logit

model without any interactions can be interpreted by the natural logarithm of the odds ratio. If I explain simple logit model with an interaction term which is age (or age category) and gender where *x* denotes the vector of covariates, the log odds are:

$$ln(odds|x) = ln\left(\frac{P(y=1|x)}{P(y=0|x)}\right) = \beta_1 x_1 + \beta_2 x_2 + \beta_{12}(x_1 \times x_2) \quad (4)$$

β_{12} in equation shows the coefficient of interaction term and it can be explained by the natural logarithm of two odds ratios obtained by holding x_2 at 0 (or 1) and incrementing x_1 by one unit. The β_{12}, the coefficient on the interaction term may be explained as follows;

If x_2 =0, then $ln\left(\frac{P(y=1|x)}{P(y=0|x)}\right) = \beta_1 x_1$

If x_2=1, then $ln\left(\frac{P(y=1|x)}{P(y=0|x}\right) = \beta_2 + (\beta_1 + \beta_{12})x_1$.

When x_2 equals 0, a unit change of changes in x_1, the log odds ratio in β_1, while the corresponding change is $(\beta_1 + \beta_{12})$ when x_2 equals 1.

DATA

In this study, Income and Living Condition Survey Results (ILCS) are used. ILCS[iv] is a micro level data sets and cover income distribution between individuals and households, measuring the living conditions of the people, social exclusion and poverty with the income dimension, determining the profile and some information about labor TSI (TSI 2015). For instance, it includes information about economic activity of workers, such as employment status, occupation, hours worked, number of worker in a work place. Moreover, it is possible to produce estimation on Turkey's RS Level-1 (12 NUTS[v]) from ILCS data.

The ILCS data set for 2006 and 2011 years are used in this study. The 2006 ILCS includes 30,187 interviewed persons while in 2011, the ILCS sample size is 40,680. Age variable is restricted over 18 since the policy impacted on only those ages. To test the policy, I created a youth dummy variable for individual workers who are between 18 and 29 years old. A gender dummy variable is also created, if the individual is male gets 1, 0 otherwise. Since the policy specifically purposed to increase number of young workers who are 18-29 years old, the following interaction term also is created; y.male (male*young). Y.male gets 1 if gender variable equals 1 and young variable equals 1. The interaction term helps to compare the magnitude of policy affect between different age groups. For instance, male workers who are 18-29 versus over 30 can be comparable by interpretation of Y.male interaction variable.

Moreover, some additional explanatory variables are used in the model such as marriage status, education (completed degree), experiences of individuals (completed years), income including any type of resources, NUTS, and type of settlement of individuals (urban or rural). Since individuals' income level has impact on persons' labor force participation decision, I included all type of income. The income variable shows individuals' total yearly income including salary and other types of income, such as rents, dependents' benefits, or others. Marriage status is categorized as: (1) single, (2) married, (3) widowed, and (4) divorced. Educational attainment is categorized as: (1) primary school diploma, (2) a high school diploma, (3) technical high school diploma, (4) college (or university) diploma, (5) graduate degree or professional qualification. I also created a dummy for settlement of individuals; if a person lives in an urban[vi] area gets 1, zero otherwise. In the ILCS data set there are 12

defined NUTS denoted by a categorical variable created for these districts. These districts[vii] are Istanbul, West Marmara, East Marmara, Aegean, West Anatolia, Mediterranean, Central Anatolia, East Black Sea, West Black Sea, South East Anatolia, North East Anatolia, Central East Anatolia. I used a binary outcome variable that if an individual is working during the survey period or not. If individual is employed gets 1and 0 otherwise. 2006 ILCS data set is pre-treatment (untreated control group) while 2011 ILCS data set is post-treatment(treated group).

ANALYSIS RESULTS

Table 1: Descriptive Statistics

Variable	N	Mean	Std. Dev.	Min	Max
Work condition (y)	40210	0.657134	0.474673	0	1
Experience	40210	21.93012	14.54044	0	47
Primary school	40210	0.305688	0.460704	0	1
A high school degree	40210	0.166024	0.372107	0	1
Technical High school degree	40210	0.124643	0.330317	0	1
Collage or Undergraduate Degree	40210	0.136754	0.343591	0	1
Graduate degree	40210	0.266892	0.442341	0	1
Single	40210	0.246077	0.430729	0	1
Married	40210	0.698466	0.45893	0	1
Widowed	40210	0.022805	0.149282	0	1
Divorced	40210	0.032653	0.177728	0	1
Urban	40210	0.849842	0.357231	0	1
Male	40210	0.76872	0.421656	0	1
Young (age 18-29)	40210	0.231902	0.422052	0	1
Age-square	40210	1620.123	897.1211	324	4225
Istanbul	40210	0.150456	0.357523	0	1
East Marmara	40210	0.072368	0.2591	0	1
West Marmara	40210	0.134714	0.341423	0	1
Aegean	40210	0.108677	0.311237	0	1
East Anatolia	40210	0.146676	0.353787	0	1
Mediterranean	40210	0.118425	0.323115	0	1
Central Anatolia	40210	0.047002	0.211646	0	1
East Black Sea	40210	0.050185	0.21833	0	1
West Black Sea	40210	0.048096	0.213972	0	1
South East Anatolia	40210	0.042426	0.201562	0	1
North East Anatolia	40210	0.028351	0.165974	0	1
Central East Anatolia	40210	0.052622	0.223281	0	1

First of all, the individuals who are under 18 are removed since the policy is effective only for workers who are over 18 years old. Then, I had 20,105 for each year (40,210 observation as total). In Table-1 descriptive statistics are represented.

For estimation of the policy impact between genders and age groups, first logit model is applied. The logit model helps to explain whether or not the interaction term and independent variables are goodness of fit in the model. The detail of logit model is given in the section-2 and in the equation-4. According to logistic regression results (see Table-2), income has negative significant impact on y which is a person involved in a job or not after treatment. Age has statistically significant impact on outcome, while gender of individual does not come up with significant effects. Only 6 of the 12 regions have statistically significant and positive coefficients which are Istanbul, East Marmara, West Marmara, Aegean, Mediterranean, and Central Anatolia. Since the policy specifically purposed to increase the number of young workers (male or female), I created a young dummy variable which includes 18-29 years old. The young dummy has statistically significant and negative impact on works' condition. For interaction term between gender and young (young*male), the z-statistics indicate that this variable explains much variation in the dependent variable. Even if most of the coefficients of dependent variable are significant, the estimated coefficients cannot be interpreted directly as they are not showing the marginal effects. Therefore, I have reported marginal effects of independent variables on the conditional expected value of dependent variable which is working condition of employees. However calculation of logit regression is a necessary step before calculating the marginal impacts of independent variables.

Table 2:Logistic Regression Results

Logistic regression LR chi2(12)= 764.35 Prob> chi2 = 0.0000
Log likelihood = -319.4356 Pseudo R2 = 0.7003

variables	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval
age	0.086*	0.011	7.980	0.000	0.065	0.108
Age square	-0.001*	0.000	-6.420	0.000	-0.001	-0.001
gender	0.203*	0.031	6.620	0.000	0.143	0.262
young	-0.488*	0.023	-21.510	0.000	-0.543	-0.332
young*male	-0.193*	0.057	-3.381	0.000	-0.414	-0.181
inc	-0.091*	0.003	-30.307	0.000	-0.010	-0.001
exp	0.135*	0.019	7.105	0.000	0.054	0.217
urban	0.161*	0.034	4.781	0.000	0.102	0.171
Single	0.097*	0.021	4.615	0.000	0.092	0.225
Married	0.081*	0.019	4.264	0.000	0.071	0.145
Widowed	0.078*	0.023	3.392	0.000	0.073	0.153
Primary school	0.148*	0.034	4.328	0.000	0.581	0.714
A high school degree	0.156*	0.039	4.007	0.000	0.118	0.193
Technical High school	0.184*	0.042	4.432	0.000	0.145	0.277
Collage or	0.134*	0.026	5.156	0.000	0.125	0.253
Istanbul	0.174*	0.019	9.154	0.000	0.140	0.281
East Marmara	0.189*	0.037	5.109	0.000	0.179	0.241
West Marmara	0.117*	0.014	8.357	0.000	0.105	0.233
Aegean	0.124*	0.031	3.934	0.000	0.037	0.204
Central Anatolia	0.029	0.059	0.488	0.625	-0.087	0.145
Mediterranean	0.095*	0.026	3.660	0.000	0.033	0.204

East Anatolia	0.064*	0.010	6.678	0.000	0.061	0.093
East Black Sea	0.006	0.072	0.087	0.822	-0.125	0.158
West Black Sea	0.123	0.082	1.506	0.092	-0.020	0.266
South East Anatolia	-0.005	0.076	-0.070	0.945	-0.154	0.144
North East Anatolia	-0.007	0.086	-0.086	0.931	-0.176	0.161
_cons	-4.284*	0.151	-28.382	0.000	-4.580	-3.989

* shows the variable is significant at 0.05 alpha level. Graduate degree, divorced and Central East Anatolia are omitted to use as base levels. If an individual's age is between 18 and 29 then, young gets1, zero otherwise.

In the Table-3, marginal effects of independent variables and interaction terms are represented. The interaction effect with young female is negative and statistically significant. It means that young female labors are 22% less probable to be hired after treatment in comparison to female who are over 30. Similarly of the young female, other interaction effect between male and young variables, presented 16% negative results. In other words, workers who are 18-29 years old are 16% less probable to be hired versus male workers who are over 30.

Income has 11% negative impact while experience has 4% positive effect on workers being hired after the policy implementation. Having a technical high school degree has 19% which is the highest impact among other degrees. While having a high school degree has 16% positive impact on to be hired after the policy implementation, having a college or university degree has a positive impact on 9.5% on dependent variable. It means that worker who has a high school or technical high school degree is more probable to be hired after the policy implementation comparison to based category.

Moreover, the NUTS marginal impacts is showing only 6 of the 12 them have come up with statistically significant and positive which are East Marmara, Istanbul, West Marmara, Aegean, West Anatolia, and Mediterranean. It is logical since many factories are located in Istanbul, Kocaeli and Bursa provinces and these provinces are highly populated. On the other hand, 6 regions are not statistically significant and these NUTS are unfortunately less developed areas. In Figure-1, the magnitude of impacts of NUTS is represented for illustration. The darkest red indicates the highest impact which is in East Marmara, whereas the lightest red represents the lowest impact which is in West Anatolia.

The urban dummy is also statistically significant and individuals who lived in urban areas had 19.6% more chance to be hired after policy implementation than workers in rural areas. This also supports that some highly populated provinces (urban areas) such as Antalya, and Izmir in Mediterranean and Aegean regions respectively, located in NUTS came statistically significant after the policy implementation. Even if some provinces have high population and some developed industrial environment, the NUTS of this provinces are not significant. South East Anatolia as for example, women generally work as unpaid labor in which is the culture of the society in this area. Marriage status categories, all of the categories are significant and positive impact. All of the marriage status has positive impact and approximately 8% positively affects employment working conditions and there are not any big differences among them. Single, marriage, widowed people have 8.7%, 9% and 8% more chance respectively to being hired have possibilities after policy implementation compared to based category.

Table 3: Marginal Effects In The Model

Expression : Pr(outcome), predict() /Delta-method

	dy/dx	Std.Err.	z	P>z	95% Conf.	Interval
age	0.091*	0.010	9.106	0.000	0.065	0.108
Age square	0.000*	0.000	-6.415	0.000	0.000	0.000
Gender	0.194*	0.024	8.258	0.001	0.067	0.267
Young	-0.008	0.010	-0.810	0.418	-0.027	0.011
Young*male	-0.163*	0.037	-4.394	0.000	-0.214	-0.113
inc	-0.119*	0.032	-3.743	0.000	-0.188	-0.020
exp	0.041*	0.008	5.125	0.000	0.033	0.077
urban	0.196*	0.042	4.661	0.000	0.157	0.285
Single	0.087*	0.015	5.875	0.000	0.058	0.105
Married	0.091*	0.015	6.071	0.000	0.063	0.109
Widowed	0.080*	0.018	4.451	0.000	0.055	0.093
Primary school	0.135*	0.016	8.276	0.000	0.110	0.174
A high school degree	0.160*	0.009	16.134	0.000	0.106	0.182
Technical High school	0.193*	0.011	18.246	0.000	0.178	0.208
Collage or Undergraduate	0.095*	0.015	6.007	0.000	0.090	0.242
Istanbul	0.190*	0.054	3.052	0.000	0.188	0.311
East Marmara	0.213*	0.047	4.526	0.000	0.221	0.399
West Marmara	0.157*	0.020	7.914	0.000	0.104	0.188
Aegean	0.098*	0.021	4.647	0.000	0.088	0.133
Central Anatolia	0.005	0.018	0.295	0.960	-0.021	0.022
Mediterranean	0.110*	0.009	12.295	0.000	0.097	0.220
East Anatolia	0.073*	0.021	3.650	0.694	0.032	0.101
East Black Sea	0.000	0.013	-0.011	0.992	-0.026	0.026
West Black Sea	0.019	0.020	0.929	0.157	-0.007	0.045
South East Anatolia	-0.004	0.014	-0.291	0.771	-0.031	0.023
North East Anatolia	-0.001	0.016	-0.049	0.961	-0.032	0.030

*Shows that variable is significant at 0.05 alpha level. dy/dx for factor levels is the discrete change from the base level. Graduate degree, divorced and Central East Anatolia are omitted to use as base levels.

The question what is the marginal effect of dependent variable on the conditional expected value of y, when the interaction between age and genders are the most crucial issue to evaluate. Therefore, I calculate, the correct marginal impacts of gender (female versus male) and incremental effect of age is calculated and represented Table-4.

The average change in the predicted conditional probability that outcome equals 1, which means individuals involved in a job after treatment, for 1 year increase in age differs between female and male by 2.3 [0.034-0.011] percentage points with male having higher marginal effects of age on average. To put in a different way, the average change in the predicted conditional probability that for 1 year increase on age 0.011 (0.034) percentage point increase the chance of female (male) being hired.

Table-4, Average marginal effects for different ages

margins, dydx (age) at (gender=(0 1) post

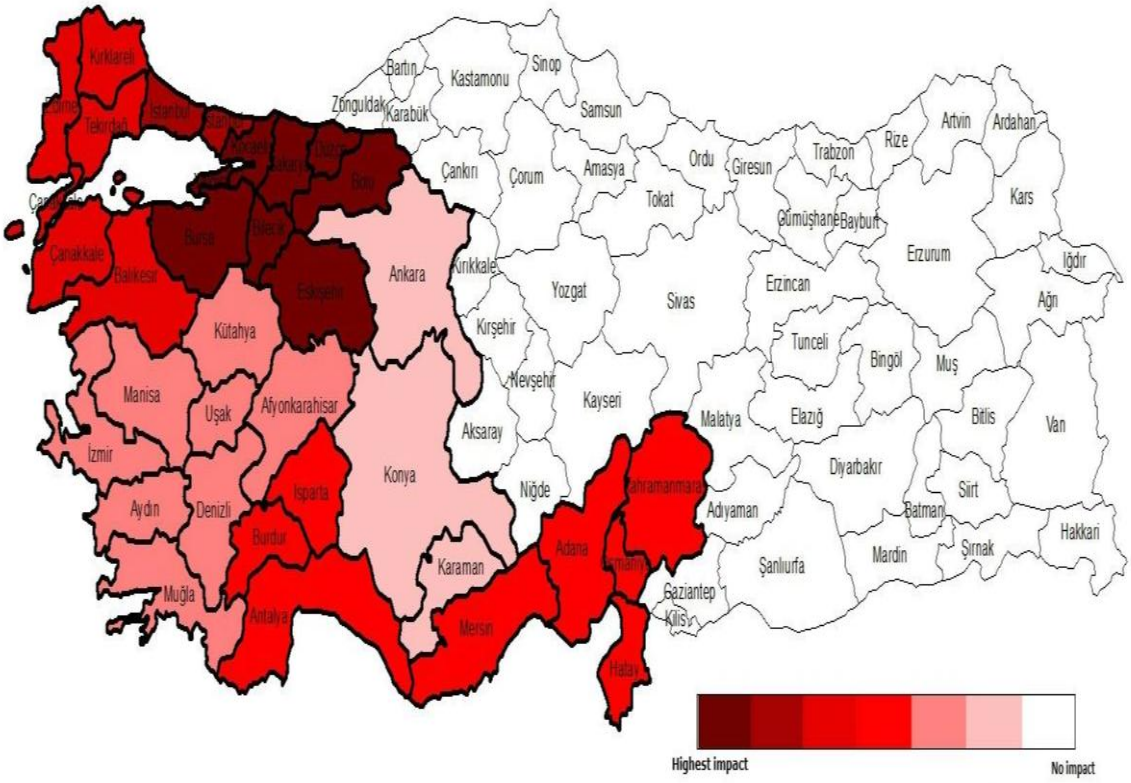
Expression : Pr (outcome), predict()
dy/dx w.r.t. : age

1._at : gender (female) = 0

2._at : gender (male) =1

Delta-method							
		dy/dx	Std. Err.	z	P>z	[95% Conf.	Interval]
age							
	_at						
	1	0.011*	0.000	6.220	0.000	0.010	0.031
	2	0.034*	0.000	17.250	0.000	0.016	0.077

TURKEY'S NUTS MAP



C

CONCLUSION

The objective of this paper was to estimate the effects of a new policy on labor force participation. Taking advantage of the nice features of the micro level data results (ILCS), two groups of workers were constructed. The treatment group comprises of workers who received advantage of the policy (or treatment) and the control group was made of workers who did not receive treatment. First, I matched the micro level data set using pre-treatment which was before policy implementation (2006 ILCS) and post-treatment which was after the policy implementation (2011 ILCS). As outcome variable, I used a binary choice which is a person works or not. Since the outcome is not a continues variable for estimation, a nonlinear DID model was more suitable instead of a linear ones. The policy specifically purposed to increase the number of young male or female workers in all ages, so an interaction term was created to examine how this policy effective between difference age and gender groups. Since the logit model does not allow to understand the effect of interaction term, I also reported marginal impact of independent variables including interactions between young, female and male.

The results showed that male workers were almost 20% more possible to being hired after the policy implementation comparison to female. The interaction terms are the most crucial part of this study which are negative and statistically significant. For young females, who are 18 to 29 years old, are 22% less probable compared to female workers who are over 30 years old. When the young male workers (18-29) compared with male workers who are over 30 years old, the first group was 16% less probable to being hired after the treatment compared to others. Unfortunately the results show that this policy was not effective since it purposed to increase the number of young male workers.

I have also examined the incremental effect of age variable on genders in Table-4. The results show the average change in the predicted conditional probability that after treatment (for outcome=1) for 1 year increase in age differs between female and male workers by 23% points. Male workers have higher marginal effects of age on average after the policy implementation.

Another interesting outcome of this study is half of the regions did not advantage from this policy as shown Figure-1. In other words, 6 of the 12 NUTS did not show any statistically significant results. It means that this policy was also ineffective in these areas such as Central Anatolia, Central East Anatolia, East Black Sea, West Black Sea, South East Anatolia, North East Anatolia. I believe that the policy could not cover the structure of local people in these areas. For example, in East Black Sea and West Black Sea, labors are generally employed in agriculture or fisheries, and they work seasonally. Also, South East Anatolia and North East Anatolia still have been struggling with terrorism activities. Therefore, in these areas people either migrate to other regions or work for local business instead of working for big companies. In addition, the policy ruled out the custom of the Turkey, especially in rural areas. Female labors have not been involved in labor force because of their responsibilities in family, such as maternity, childcare, or elderly care. Even though the policy gives incentive for female labors to be hired unfortunately, there has not been any other alternatives for female workers. To put it in another way, there has not been any sufficient day care and elderly care options in every regions of Turkey. Even if some regions have these options for

female labors, because of the traditions, some regions could not allow female labor force participation.

To conclude, I consider that policy maker should revise this policy since it was not able to fully correspond the reality of Turkish society. That kind of labor force incentive should be considered more local based on the needs of regions. Another issue is the interaction impacts among other policies should be evaluated by policy makers. For instance, there was another labor policy which was implemented in 2004, and this policy was valid until 2012. This policy gave 100% insurance incentive to employers in industrial business and 80% insurance incentive to employers in other type of business, under condition if business had more than 10 workers and hired additional female and male workers in 49 provinces[viii] in Turkey. This policy unfortunately may decrease the magnitude of other policies since it also includes all male workers without age restrictions. I believe this policy almost eliminated the insurance incentive for female workers.

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REFERENCES

i. Ai, Chunrong, and Edward C. Norton. "Interaction terms in logit and probit models." *Economics letters* 80.1 (2003): 123-129.

ii. Athey, Susan, and Guido W. Imbens. "Identification and inference in nonlinear difference-in-differences models." *Econometrica* 74.2 (2006): 431-497.

iii. Başlevent, Cem, and Özlem Onaran. "The effect of export-oriented growth on female labor market outcomes in Turkey." *World Development* 32.8 (2004): 1375-1393.

iv. Elsby, Michael W., Bart Hobijn, and Aysegul Sahin. *The labor market in the Great Recession*. No. w15979. National Bureau of Economic Research, 2010.

v. Goldberger, Arthur Stanley. *Selection bias in evaluating treatment effects: Some formal illustrations*. University of Wisconsin--Madison, 1972.

vi. Heckman, James J. "The common structure of statistical models of truncation, sample selection and limited dependent variables and a simple estimator for such models." *Annals of Economic and Social Measurement, Volume 5, number 4*. NBER, 1976. 475-492.

vii. Karaca-Mandic, Pinar, Edward C. Norton, and Bryan Dowd. "Interaction terms in nonlinear models." *Health services research* 47.1pt1 (2012): 255-274.

viii. Kleinman, Lawrence C., and Edward C. Norton. "What's the risk? A simple approach for estimating adjusted risk measures from nonlinear models including logistic regression." *Health services research* 44.1 (2009): 288-302.

ix. Income and Living Condition Survey, Turkish Statistics Institute, http://www.tuik.gov.tr/UstMenu.do?metod=bilgiTalebi

x. Organization for Economic and Cooperation Development, OECD Labor Force statistics by gender. (2015) https://stats.oecd.org/Index.aspx? DataSetCode=lfs_sex

xi. Puhani, Patrick A. "The treatment effect, the cross difference, and the interaction term in nonlinear "difference-in-differences" models." *Economics Letters* 115.1 (2012): 85-87.

xii. Schneider, Mark, and Jack Buckley. "Making the grade: Comparing DC charter schools to other DC public schools." *Educational Evaluation and Policy Analysis* 25.2 (2003): 203-215.

ENDNOTES

[i] See the link : http://ec.europa.eu/eurostat/statistics-explained/index.php/Gender_statistics

[ii] 4447 is the number of Unemployment Insurance Law and 5763 is the number of article.

[iii] Female age group did not include in the study (18-29 versus over 30) because the policy affected all females who are over 18 years old.

[iv] ILCS provides both panel and cross section data set option.

[v] NUTS is Nomenclature of Units for Territorial Statistics. NUTs represent a geographical code standard for referencing the subdivisions of Turkey for statistical purposes

[vi] if the regional population is lower than 20,000, the area called rural, otherwise is urban.

[vii] The provinces of the regions are represented as follows;
Istanbul is just Istanbul province.
East Marmara is Bursa, Eskisehir, Bilecik, Sakarya, Duzce, Bolu, Yalova and Kocaeli.
West Marmara is Tekirdag, Edirne, Kirklareli,Balikesir and Canakkale.
Aegean is Izmir, Aydin, Denizli, Mugla, Afyonkarahisar, Kutahya, Usak and Manisa.
West Anatolia is Ankara, Konya, and Karaman.
Mediterranean is Antalya, Isparta, Burdur, Mersin, Hatay, Kahramanmaras, Osmaniye, and Adana.
Central Anatolia is Kirikkale, Aksaray, Nigde, Nevsehir, Kirsehir, Kayseri, Sivas, Yozgat.
East Black Sea is Trabzon, Ordu, Giresun, Rize, Artvin, Gumushane.
West Black Sea is Zonguldak, Karabuk, Bartin, Kastamonu, Cankiri, Sinop, Samsun, Tokat, Corum, and Amasya.
South East Anatolia is Gaziantep, Adiyaman, Kilis, Sanliurfa, Diyarbakir, Mardin, Batman, Sirnak and Siirt.
North East Anatolia is Erzurum, Erzincan, Bayburt, Agri, Kars, Igdir, and Ardahan.
Central East Anatolia is Malatya, Elazig, Bingol, Tunceli, Van, Mus, Hakkari and Bitlis.

[viii] The rule number 5048 and the policy was valid in the following provinces; Adiyaman, Afyon, Agri, Aksaray, Amasya, Ardahan, Batman, Bartin, Bayburt, Bingol, Bitlis, Cankiri, Diyarbakir, Duzce, Elazig, Erzincan, Erzuru, Giresun, Gumushane, Hakkari, Igdir, Kars, Kilis, Karaman, Kastamonu Kirsehir, Malatya, Mardin, Mus, Ordu, Osmaniye, Siirt, Ainop, Sivas, Sanliurfa, Sirnak, Tokat, Usak, Van, Tunceli, Nigde, Kahramanmaras, Corum, Artvin, Kutahya, Trabzon, Rize, Nevsehir. On 04.01.2005 business in Gokceada and Bozcaada were included with the rule number 5568.