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Abstract

This paper investigates the employment effects of the employment subsidy programs implemented in Turkey since 2008. The Turkish Government put into practice active labor market programs to generate new employment for all women and younger men, the relatively disadvantaged groups in the Turkish labor market. We use a nationally representative micro-level dataset and a difference-in-differences approach to estimate these programs' causal effects. Although these incentive programs are relatively costly, they impact the gender division of labor, especially in the low-skilled blue-collar jobs and high-skilled white-collar jobs. These wage subsidies result, on average, a 1.2 ppt increase, and at most, a 3.5 ppt increase in the share of women in newly hired workers in high-skilled white-collar jobs.

Keywords: Difference-in-differences, employability, gender division of labor, micro-level data, and subsidy programs.

JEL Classifications: D63, J16, J24, J46, H20.

Introduction

The division of labor refers to the way the work is divided among women and men within society. This division does not necessarily concern only paid employment, but generally, a task or duty is assigned among women and men. The division of labor involves underlying demand and supply-side forces. On the supply side, human capital plays a key role. The reduction in gender gaps in human capital accumulation results in improving women's labor market outcomes (Erten and Keskin, 2018). A child's responsibility is another key driver of the continuing gender gap (Petrongolo and Ronchi, 2020). In addition to these, culture may affect women's labor supply (Akyol and Ökten, 2019). On the demand side –the focus of this analysis –, employers hire based on ethnicity and gender (Wright and Ellis, 2000), which usually refers to employment discrimination. Employment discrimination exists when minority or female employees are treated differently than similarly productive whites or men (Gwartney et al., 2014). This discrimination restricts employment and earnings opportunities compared to others of similar productivity. The employment gender gap appears in wages and hiring decisions (Reuben et al., 2014). Via anti-discrimination legislation, governments put in the effort to undertake hiring discrimination. For instance, in Norway, a 2006 Law imposed a 40 percent gender quota for women as listed companies' director position (Beaurain and Masclet, 2016).

Recently, almost in all advanced economies, there exists a gradual gender convergence in wages and earnings, and the share of women increases in traditionally men-dominated sectors (Petrongolo and Ronchi, 2020). The employment gender gap is still an issue in the Turkish labor market. The division of labor externalize women outside the labor force. The entry of women to the labor market appears mostly in the informal sector or low-paid occupations. In 2004, Turkey's female employment rate at 20.8% was the lowest -still the lowest- among OECD countries, while the employment rate of men was 62.7%. While 22.5 percent of the informal sector consisted of women, this rate was only 8.9 percent in the formal sector.

In July 2008, the Turkish Government initiated an active labor market program (Law 4447 Provisional Article 7, 2008) to subsidize the employers' social security contributions for all women above 18 years old and young men aged 18 and 29. The Government applies this incentive for up to 5 years to eligible firms.³ In February 2011, a new incentive program was initiated by Law 4447 (Provisional Article 10) with a new arrangement that included some of the men over 29 years of age. These revised incentives also include positive discrimination

³ Four conditions must be held for eligibility. (1) The firm should be a private-sector workplace. (2) The average number of insured notified to the Authority between 2007/July and 2008/June must be exceeded. It is calculated as follows whether the average number of insured notified to the Authority between 2007/July and 2008/June has been exceeded. For example; the total number of insured persons whose monthly premium and service certificate were given to the Authority by the firm between 2007/July and 2008/June is 84, the monthly average; $84/12 = 7$ are insured. Assuming that the firm employs four insured persons with the necessary conditions in 2008/October and the total number of insured persons working with the insured in that month is 10 (since there will be an Additional Insured = $10 - 7 = 3$), the incentive will be available for three insured persons. (3) Incentive period monthly premium and service certificate should be given to the Authority within the legal period. (4) Incentive period premiums of the month must be paid.

against women and younger men. Namely, they provide social security premium cut for relatively extended periods to firms employing women and youth.

In this paper, we center attention on wage subsidies, whether these subsidies affect the gender division of labor in paid employment or not. Estimating the precise impact of these wage subsidies requires constructing counterfactuals of what would have been the share of women in newly hired workers in the absence of the subsidies. The novelty of this research is that different from the existing literature; we consider women in the informal sector as a control group. Most of the studies analyzing employment incentives' effect consider older men (of age 30 and above) as a control group in a difference-in-differences (DD) setup; however, using men as a control group is problematic. Assume that men and women are inputs in production. When a woman's wage decreases to the employer due to a subsidy, one input becomes relatively cheaper. The substitution effect implies that employers should substitute women for men. However, when one input becomes cheaper, there is also a scale effect because the marginal cost of production decreases and a firm will increase both inputs. Therefore, a firm will increase its demand for women. However, the subsidy's effect on men's employment is ambiguous since the substitution effect implies that men's employment should decrease. The scale effect implies that the employment of men should increase. Hence, using men as a control group is problematic since men's employment is also affected by the subsidy and in an ambiguous way. We assume that the labor supply is elastic, and the input prices remain constant in the informal sector.⁴ These assumptions imply that the gender composition among newly hired workers does not change with the subsidies. Therefore, we can test whether women's share in the newly hired workers increases after the employment subsidies.

These wage subsidy programs are types of active labor market programs that are "employer-side hiring subsidies." For this aim, unlike the current literature in Turkey, we reach this issue from the labor demand side. We control job characteristics and firm characteristics to analyze the subsidy programs' effect on women's formal job accessibility. To achieve our primary goal, we perform a DD estimation strategy. The subsidy programs' design looks like a natural experiment that puts women in the formal sector into the treatment group and women in the informal sector into the control group.

The DD estimates show significant effects of the subsidy programs on the gender division of labor. We have found that the incentives given by Law 4447 Provisional Articles 7 and 10 impact the gender division of labor, especially in the low-skilled blue-collar and high-skilled white-collar jobs. We have found that these wage subsidies result, on average, a 1.2 ppt increase, and at most, a 3.5 ppt increase in the share of women in newly hired workers in high-skilled white-collar jobs.

The structure of the paper is as follows: we review related literature in Section 2. We document employment subsidy programs in Turkey in Section 3. In Section 4, we present the dataset that

⁴ The Figures 1-4 in Appendix B support our assumption that the supply of labor is elastic.

we used. Then we introduce our model in Section 5. In Section 6, we show our empirical results. In the last section, we conclude.

1. Related Literature

Active labor market policies aim to reduce the gaps in employment rates between men and women by subsidizing employers' costs of new hires from the female working-age population. The theoretical literature mostly agrees that this type of employer-side subsidies should be practical (Phelps, 1994; Snower, 1994; Katz, 1998). However, empirical research is relatively sparse and gives mixed results. Literature provides research studying the effects of affirmative-action programs in the literature (e.g., Ashenfelter and Heckman, 1976; Rodgers and Spriggs, 1996; Holzer and Neumark, 1999). Most of the studies conclude that affirmative-action programs are successful in increasing minority and female employment.

A growing literature studies the effects on the labor market of employment subsidy schema in Turkey. Betcherman et al. (2012) examine the incentives given by Law 5084 (2004) and by Law 5350 (2005). They implement a DD methodology. They find significant net increases in the registered jobs in the eligible provinces. Additionally, their results suggest that these subsidies do not create new economic activity.

The following studies deserve to be mentioned as they analyze the same set of employment subsidies on the Turkish labor market. First, Uysal (2013) uses the Turkish Household Labor Force Survey (HLFS) macro data and compares the target group's employment status and men under 30 years of age with a DD method over time. She finds that incentives affect positively the registered employment of married women who are not high school graduates. She also draws attention to the fact that large firms that operate in the industrial sector benefit from the incentives. Similarly, Balkan et al. (2014) analyze whether the incentive program implemented in 2008 influences the target group's employment chance using the HLFS micro data set covering the 2004-2011 period. In the study design, older men (of age 30 and above) who are not eligible for an employment subsidy are the control group, and the rest (i.e., the target groups) are in the treatment group. They perform a DD estimation strategy and find that employment subsidies do not effectively increase women's employment probabilities but have an insignificant effect on targeted groups' informality. Unlike these two studies, Balkan et al. (2016) use the Survey of Income and Living Conditions (SILC) panel data set covering the 2006-2012 period. Using the data's panel dimension, they suggest that employment subsidies help women transition into the formal sector. Moreover, using data set covering the 2006-2010 period in a DD setup, they propose that employment subsidies increase women's likelihood in employment and decrease their informality and unemployment probability.

The second strand of the related literature is that of the gender discrimination studies. The existing literature mainly studies gender discrimination in the wage gap⁵ context (Yamak and Topbaş, 2004; Tansel, 2005). Like our perspective, Balkan and Cilasun (2018) try to identify gender discrimination at the firms' hiring decisions. They employ a correspondence audit methodology. Although their results suggest weak but positive discrimination against women application, this discrimination is not the reason for the low level of female participation in the labor market.

We employ the estimation strategy is theoretically similar to the method employed by Holzer and Ihlantfeldt (1998).⁶ They investigate the effects of customer discrimination on the employment of minorities, especially blacks. They show a strong association between a firm's customers' racial composition and the race of those hired, especially in the contact job. In our paper, women correspond to blacks, the subsidy programs correspond to varieties of the racial composition of a firm's customers, and the formality of a firm corresponds to the involvement of direct contact with customers.

2. Background

Turkish Government put the insurance premium incentives into practice to increase registered workers' employment and increase the employment of disadvantaged groups such as women, youth, and disabled people, and encourage strategic investments with regional and large-scale investments. The main incentives in Turkey are the following:

- i.) Additional Employment Support (Law 4447 Provisional Article 7)
- ii.) Five-Point Discount (Law 5510)
- iii.) Incentives to Employers Recruiting Unemployment Beneficiaries (Law 5921)
- iv.) Incentive for Young and Women's Employment and Men's Employment with Professional Certificate (Law 4447 Provisional Article 10)
- v.) Incentive of Disabled Employment (Law 4857)
- vi.) R&D Insurance Premium Incentive (Law 5746)
- vii.) Insurance Premium Incentive for Cultural Investments and Initiatives (Law No. 5225)

The following incentives need to be mentioned as these are supposed to have the most considerable impact on the labor market. In July 2008, incentives by Law 4447 Provisional Article 7 were introduced to create additional employment and were targeted women and younger men (15-29 years old). The Government designed these incentives to reduce firms' contributions to new workers' social security payments for five years. For the first year, incentives reduced the full amount, and then the reduction ratio gradually decreased through the following four years by 20%. Turkish Government planned to end these incentives in July

⁵ The Figures 1-4 in the Appendix B point that in the post-policy period, most probably with the help of the employment subsidies, women in the formal sector were affected less from the 2009 crisis compared to women in the informal sector and men.

⁶ Raphael et al. (2006) and Holzer et al. (2006) also used the same estimation strategy.

2014. While the incentives by Law 4447 Provisional Article 7 were law in force, in October 2008, Law 5510 offered the five-percentage-point discount to firms. Private-sector employers working under 4/1-a coverage can benefit from these incentives. The aim was to keep existing workers be employed. The program was designed not to reduce the impact of the incentives by Law 4447 Provisional Article 7. However, in practice, firms may choose older men benefited from the five-percentage-point discount over women or younger men. Lastly, in March 2011, similar to Law 4447 Provisional Article 7, incentives by Law 4447 Provisional Article 10 were announced. In addition to the former one, this program included older men who have an occupational document.

Table 1: Data on Beneficiaries of Some Incentive Laws

		2008	2009	2010	2011	2012	2013
Law 5510	<i>Workplace</i>	632,280	749,196	858,674	989,367	1,050,731	1,174,209
	<i>Male</i>	3,806,139	4,214,019	4,883,944	5,092,488	5,380,789	6,437,338
	<i>Woman</i>	1,153,270	1,272,175	1,474,566	1,709,299	1,884,739	2,262,463
Law 4447/7	<i>Workplace</i>	11,172	22,619	26,878	15,740	9,059	5,521
	<i>Male</i>	16,090	30,133	29,835	14,457	7,478	4,391
	<i>Woman</i>	15,652	31,482	33,395	18,012	9,471	5,311
Law 4447/10	<i>Workplace</i>	-	-	-	65,258	102,974	129,185
	<i>Male</i>	-	-	-	74,167	100,567	112,058
	<i>Woman</i>	-	-	-	73,424	118,705	145,991
Law 5225	<i>Workplace</i>	-	-	-	13	14	18
	<i>Male</i>	-	-	-	177	173	212
	<i>Woman</i>	-	-	-	213	233	250
Law 5746	<i>Workplace</i>	540	828	1,119	1,586	1,810	2,135
	<i>Male</i>	7,017	13,077	16,295	21,248	24,813	24,410
	<i>Woman</i>	1,875	3,584	4,360	5,588	6,713	7,232

Table 1 reports the number of employees and firms benefiting from the insurance premium incentives at the end of the corresponding year. Note that the beneficiaries of the incentives by Law 5510 are the largest group, and firms benefited more from these subsidies compared to other available incentives. Besides, most of the beneficiaries of incentives by Law 4447 Provisional Articles 7 and 10 were women. Although Law 4447 Provisional Article 10 contains older men, women benefited from the incentive relatively more than men did.

Implementing similar incentives in the same period, especially Law 5510, may result in an undesired impact of the women-oriented incentives. Consequently, this may underestimate our conclusion about the effect of incentives on the gender division of labor.

Table 2: Insurance Premium Incentives Accrual Amounts, Million TL

	2008	2009	2010	2011	2012	2013
Law 5510	692.1	3,296.6	4,073.7	4,732.2	5,549.7	7,180.9
Law 4447/7	14.3	69.0	145.4	54.5	17.5	7.8
Law 4447/10	120.1	334.5	496.7			
Law 5225	0.5	0.7	0.8			
Law 5746	12.6	48.4	70.0	76.3	89.3	102.8

Table 2 indicates that the share of the five-percentage-point discount program was relatively high. This incentive's main objective was to encourage workers' registration, especially the sectors in which informal employment is widespread. However, this incentive is thought to have an indirect effect on job creation.

3. Data

This study uses the HLFS data compiled and published by the Turkish Statistical Institute (TURKSTAT). HLFS is the primary data source that provides information about those employed; economic activity, occupation, employment status, and working hours, while the unemployed; search for job search time. The HLFS has been applied in each month since 2000 to the households selected according to the two-stage stratified clustered probability sample involving eight subsamples. Based on the address, HLFS forms a rotation pattern to ensure a 50 percent overlap between two consecutive periods and in the same periods of the two consecutive years. HLFS uses eight subsamples at each period. The households, which are the final sampling unit, have been visited four times in 18 months. The monthly sample size of the survey is approximately 13,000. The HLFS covers all private households living in the Republic of Turkey's territory. The data set does not cover residents of schools, dormitories, kindergartens, rest homes for elderly persons, hospitals, military barracks, and recreation quarters for officers.

We restrict the data set for this analysis to the period 2004-2013. We had two reasons for this restriction. First, the Government launched the incentives by Law 4447 Provisional Article 7 at the end of 2008.⁷ This restriction gives us observations of five years each for the periods before and after the incentives. Second is the Syrian Refugee Crisis that has the labor market effects, especially after 2013.⁸ After excluding the people who are not newly employed, our final sample covers 229,587 people. By using frequency weights provided by TURKSTAT, we have 36 million people for ten years.⁹

⁷ We assume that the adaptation of the policy by the firm takes at least five or six months from the approval of the regulation by the government. Thus, this makes the year 2008 as a pre-policy period.

⁸ Aşık (2018) reviews the literature that provides evidence on the labor market effects of Syrian refugees in Turkey. See Akgündüz et al. (2015), Del Carpio et al. (2015), Tümen (2016), and Ceritoğlu (2017) for detail information.

⁹ Weighting is a method used to obtain parameters from the data set resulting from sampling to represent the universe. In the study, while reaching the final weight, the design weights have been calculated depending on the selection criteria; have been controlled for external distribution and corrected for non-responses. In weighting, age group, gender, NUTS Level 2, urban-rural, and household size are based on external control.

The survey asks, "What is the employment status in the same month of the previous year?" We use this information to examine whether the person is a newly hired worker. We also calculate the share of school graduation types within location, sector, occupation, and firm size for each year to determine a particular job's hiring requirements. We also compute women's share in this particular job to control women's employability associated with women's high shares (network effect).

4. Model

The differential treatment of the subsidy programs in the post-policy period to the women working in the formal sector allows us to assess the subsidies' effects by employing a DD strategy. Some of the results that we present below obtained from estimating equations with the following general form:

$$G_i = \alpha + \beta S_i \times F_i + \gamma X + \lambda_1 Time + \lambda_2 Time \times i + \varepsilon_i \quad (1)$$

where G is the gender of the last hired worker i . We have three types of gender: young (1), women (2), and men (3). S takes value 1 for the observations in the subsidy period or zero otherwise. F denotes the formality of a job. X is a vector of occupation dummies, the formality of a job, and various variables for hiring requirements of jobs. The hiring requirements of a job are characteristics that former workers working in this firm have. These include the share of school graduation types. The same vector also includes a one-digit industry, firm size, and geographic location of the job. We also control for the 2009 crisis in our model. Despite the controls described above, our results still might be driven by occupation-specific unobserved factors. To deal with this, we include interactions between subsidy period and occupation in some of our estimated equations:

$$G_i = \alpha + \beta S_i + \rho_1 S_i \times F_i + \rho_2 S_i \times O_i + \gamma X_i + \lambda_1 Time + \lambda_2 Time \times i + \varepsilon_i \quad (2)$$

where O represents a dummy variable for occupation dummies.

If we assume that any effects of subsidy policy on hiring into informal jobs reflect only unobserved heterogeneity and not policy effect, and then the coefficient of $S_i \times F_i$ yields an estimate of the effect of subsidy policy on the hiring of women in the formal sector. This DD estimate is unbiased if there are no unobservable formality variables correlated with the subsidy policy period.

We also compare the policy effects across occupations by assuming that the policy effect on hiring in unskilled blue-collar jobs reflects only unobserved heterogeneity. Again, the DD estimate is unbiased only if there is no correlation between occupation-specific unobservable

variables and the subsidy policy. In theory, this assumption should be valid because there is no occupation-specific term in the subsidy policy.

Finally, we can have a "difference-in-differences-in-differences" (DDD) estimates from the coefficient on the interaction between subsidy, formality, and occupation:

$$G_i = \alpha + \beta S_i + \rho_1 S_i \times F_i + \rho_2 S_i \times O_i + \rho_3 O_i \times F_i + \gamma X_i + \lambda_1 Time + \lambda_2 Time \times i + \varepsilon_i \quad (3)$$

5. Empirical Results

Table 3 presents sample weighted means on the percentages of newly hired women workers for the different policy periods. We also calculate the average percentages of newly hired women workers by the formality of a job. The differences in women's employment rates between registered jobs and unregistered jobs present DD estimates between subsidy program periods and a job's formality. Note that these DD estimates are unadjusted for other covariates.

The results show that the hiring of women rises with the introduction of subsidy policies. Specifically, women's share in newly hired workers rises from 7 percent to 10.1 percent in the formal sector. Furthermore, these differentials by periods are quite similar in both formal and informal sectors. There exist small but statistically significant DD estimates. At first sight, the DD estimates suggest no deviation in the gender division of labor. We will analyze whether this dis-improvement still exists after controlling for unobserved heterogeneity across jobs and firms.

Table 3: The Share of Women in Newly Hired Workers: Means (Standard Errors)

	Pre-Policy	Post-Policy	Difference
All jobs	0.0968	0.1262	0.0294*** (0.0003)
By Registration of Firm:			
Informal	0.1212	0.1580	0.0368*** (0.0005)
Formal	0.0700	0.1070	0.0370*** (0.0005)
Difference	-0.0512*** (0.0005)	-0.0510*** (0.0004)	0.0002 (0.0002)

Notes: (1) All means are sample-weighted. (2) Standard errors appear in parentheses. (3) The sample size is 229,587. (4) * significant at the .1 level, ** significant at the .05 level, *** significant at the .01 level or lower.

We expect the employment cost reduction by the wage incentives to matter for hiring women into formal jobs. Tables 4-5 present the DD estimates of the effects of the wage incentives on

employment for Eqs. (1) - (2) above.¹⁰ While Eq. (1) includes only interaction between the dummy variable for the subsidy period and formality of a job, Eq. (2) also includes the interaction between the dummy variable for the subsidy period and occupation. In each table, column 1 estimates include controls for firm size, hiring requirements (the share of education levels), occupation dummies, sector dummies, and location dummies. Column 2 estimates exclude only sector dummies from controls.

Table 4: Effect of Subsidy Policy on Gender of the Last Hire: By Formality (DD Estimates)

	Young		Women		Men	
	1	2	1	2	1	2
subsidy	-0.038*** (0.0006)	-0.038*** (0.0007)	-0.019*** (0.0004)	-0.022*** (0.0004)	0.057*** (0.0006)	0.060*** (0.0006)
formality	0.075*** (0.0008)	0.098*** (0.0008)	-0.052*** (0.0004)	-0.070*** (0.0005)	-0.023*** (0.0007)	-0.028*** (0.0007)
subsidy × formality	0.005*** (0.0005)	0.003*** (0.0005)	0.011*** (0.0003)	0.013*** (0.0004)	-0.016*** (0.0005)	-0.016*** (0.0005)
R ²	0.105		0.065			

Notes: (1) All means are sample-weighted. (2) Standard errors appear in parentheses. (3) The sample size is 229,587. (4) * significant at the .1 level, ** significant at the .05 level, *** significant at the .01 level or lower.

Table 4 shows DD estimates based on interactions between the dummy variable for the job's subsidy period and formality. DD estimates are both statistically significant. We observe that the introduction of wage subsidies that promote women and young has a significant positive effect on hiring women into registered employment compared to unregistered employment. The effect of wage subsidy remains low for young workers. Notably, in a registered job hiring decision, firms prefer women in the subsidy period more than the pre-policy period. DD estimates for young show a small significant effect of the wage subsidies on the hiring of young.

¹⁰ Estimated equations in Tables 4-6 are sample-weighted. In Appendix A, we present estimated equations that are not sample-weighted in Tables 7-9.

Table 5: Effect of Subsidy Policy on Gender of the Last Hire: By Formality or Occupation

	Young		Women		Men	
	1	2	1	2	1	2
<i>subsidy</i>	-0.028*** (0.0007)	-0.027*** (0.0007)	-0.019*** (0.0004)	-0.025*** (0.0005)	0.048*** (0.0006)	0.052*** (0.0006)
<i>formality</i>	0.078*** (0.0008)	0.103*** (0.0008)	-0.050*** (0.0005)	-0.067*** (0.0005)	-0.028*** (0.0007)	-0.036*** (0.0007)
<i>subsidy × formality</i>	0.002 *** (0.0005)	0.000 (0.0006)	0.010 *** (0.0003)	0.010 *** (0.0004)	-0.012 *** (0.0005)	-0.009 *** (0.0005)
subsidy × occupation:						
<i>high skilled white collar</i>	0.007*** (0.0008)	0.014*** (0.0008)	0.004*** (0.0005)	0.012*** (0.0006)	-0.011*** (0.0008)	-0.026*** (0.0008)
<i>low skilled white collar</i>	-0.002*** (0.0006)	0.000 (0.0006)	0.014*** (0.0004)	0.025*** (0.0004)	-0.011*** (0.0006)	-0.025*** (0.0006)
<i>high skilled blue collar</i>	-0.027*** (0.0007)	-0.032*** (0.0007)	-0.021*** (0.0003)	-0.025*** (0.0004)	0.048*** (0.0006)	0.057*** (0.0006)
occupation:						
<i>high skilled white collar</i>	0.145*** (0.0007)	0.180*** (0.0007)	-0.066*** (0.0003)	-0.077*** (0.0003)	-0.080*** (0.0007)	-0.103*** (0.0006)
<i>low skilled white collar</i>	0.199*** (0.0005)	0.218*** (0.0004)	-0.036*** (0.0002)	-0.052*** (0.0003)	-0.163*** (0.0004)	-0.166*** (0.0004)
<i>high skilled blue collar</i>	0.072*** (0.0005)	0.089*** (0.0005)	-0.041*** (0.0002)	-0.070*** (0.0002)	-0.031*** (0.0004)	-0.019*** (0.0004)
R ²	0.106	0.065				

Notes: (1) All means are sample-weighted. (2) Standard errors appear in parentheses. (3) The sample size is 229,587. (4) The reference category is low-skilled blue-collar. (5) * significant at the .1 level, ** significant at the .05 level, *** significant at the .01 level or lower.

The estimates in Table 5 also show a significant positive effect on the hiring of women in the formal sector compared to the informal sector. Note that the non-interacted formality and occupational variables in these equations represent the effects of formal job accessibility on women's hiring in the pre-policy period. We would expect to find the negative effects of these variables when there is discrimination against women in the pre-policy period. If there is positive discrimination against women in the formal sector in the post-policy period, we would expect that the sum of a DD estimate and the corresponding formality or occupation non-interacted effect would be positive in the post-policy period.

In Table 5, the estimated coefficients on the non-interacted occupation dummies show that the hiring of women in the pre-policy period is lower in all jobs in comparison to low-skilled blue-collar jobs. The addition of these estimates to the DD estimates shows that women's hiring in the post-policy period is lower in all jobs than low-skilled blue-collar jobs. The absence of symmetry in hiring into jobs other than low-skilled blue-collar jobs suggests that discrimination toward women exists in a job other than low-skilled blue-collar jobs.

Table 6: Effect of Subsidy Policy on Gender of the Last Hire: By Formality and Occupation

	Young		Women		Men	
	1	2	1	2	1	2
<i>subsidy</i>	-0.011*** (0.0008)	-0.011*** (0.0008)	-0.028*** (0.0004)	-0.034*** (0.0005)	0.038*** (0.0007)	0.045*** (0.0007)
<i>formality</i>	0.104*** (0.0010)	0.137*** (0.0010)	-0.056*** (0.0006)	-0.076*** (0.0007)	-0.047*** (0.0009)	-0.061*** (0.0009)
<i>subsidy × formality</i>	-0.030*** (0.0008)	-0.031*** (0.0008)	0.024*** (0.0005)	0.030*** (0.0005)	0.006*** (0.0007)	0.001 (0.0007)
subsidy × occupation:						
<i>high skilled white collar</i>	-0.003 (0.0015)	0.002 (0.0015)	-0.007*** (0.0008)	0.001 (0.0011)	0.010*** (0.0014)	-0.004* (0.0014)
<i>low skilled white collar</i>	-0.032*** (0.0008)	-0.028*** (0.0008)	0.025*** (0.0005)	0.041*** (0.0006)	0.007*** (0.0008)	-0.013*** (0.0008)
<i>high skilled blue collar</i>	-0.050*** (0.0008)	-0.049*** (0.0009)	-0.006*** (0.0004)	-0.008*** (0.0005)	0.056*** (0.0008)	0.057*** (0.0008)
occupation:						
<i>high skilled white collar</i>	0.154*** (0.0008)	0.187*** (0.0008)	-0.067*** (0.0003)	-0.079*** (0.0004)	-0.087*** (0.0008)	-0.108*** (0.0007)
<i>low skilled white collar</i>	0.208*** (0.0005)	0.230*** (0.0005)	-0.036*** (0.0003)	-0.055*** (0.0003)	-0.171*** (0.0005)	-0.175*** (0.0005)
<i>high skilled blue collar</i>	0.068*** (0.0006)	0.088*** (0.0006)	-0.035*** (0.0003)	-0.068*** (0.0003)	-0.033*** (0.0005)	-0.020*** (0.0005)
formality × occupation:						
<i>high skilled white collar</i>	-0.263*** (0.0045)	-0.235*** (0.0045)	0.218*** (0.0055)	0.166*** (0.0051)	0.044*** (0.0046)	0.069*** (0.0047)
<i>low skilled white collar</i>	-0.150*** (0.0027)	-0.182*** (0.0027)	0.067*** (0.0021)	0.046*** (0.0021)	0.083*** (0.0028)	0.136*** (0.0029)
<i>high skilled blue collar</i>	0.022*** (0.0011)	0.014*** (0.0012)	-0.028*** (0.0006)	-0.012*** (0.0008)	0.006*** (0.0010)	-0.002*** (0.0010)
formality × subsidy × occupation:						
<i>high skilled white collar</i>	0.023*** (0.0018)	0.029*** (0.0018)	0.011*** (0.0012)	0.005*** (0.0013)	-0.034*** (0.0016)	-0.034*** (0.0016)
<i>low skilled white collar</i>	0.067*** (0.0012)	0.068*** (0.0012)	-0.023*** (0.0005)	-0.034*** (0.0006)	-0.044*** (0.0011)	-0.034*** (0.0011)
<i>high skilled blue collar</i>	0.050*** (0.0012)	0.041*** (0.0013)	-0.035*** (0.0006)	-0.045*** (0.0008)	-0.015*** (0.0011)	0.003* (0.0012)
R ²	0.106	0.066				

Notes: (1) All means are sample-weighted. (2) Standard errors appear in parentheses. (3) The sample size is 229,587. (4) The reference category is low-skilled blue-collar. (5) * significant at the .1 level, ** significant at the .05 level, *** significant at the .01 level or lower.

The DDD estimates appear in Table 6 are obtained by estimating Eq. (3). These estimates compare women's hiring between the formal and informal sectors within the occupation and different policy periods. These wage subsidies result at most a 3.5 ppt increase in women's share in newly hired workers in the high-skilled white-collar job. The DDD estimates indicate that the gender gap becomes wider only in high-skilled blue-collar, and in some cases in low skilled white-collar. One can rationalize this result as follows. In general, women do not prefer high-skilled blue-collar jobs, and most of the jobs in the low-skilled white-collar sector are informal.

6. Conclusion

In this paper, we have investigated the gender division of labor in Turkey by analyzing the pre-policy and post-policy periods. First, we have examined the differences in women's skills and labor market outcomes compared to the rest of the newly hired workers in the labor market. We have concluded that women can get a job in the low-skilled but formal sector with an increasing rate in the post-policy period. The low education level of women is also a reason why women can get a job in the low-skilled or informal sector.

We center attention on wage subsidies, whether these subsidies affect the gender division of labor in paid employment or not. We have exploited the DD estimation strategy to analyze subsidy programs' effect on the gender division of labor in the labor market. We have concluded that the DD estimates show significant effects of the subsidy programs on the gender division of labor from both models. We have found that the incentives given by Law 4447 Provisional Articles 7 and 10 impact the gender division of labor, especially in the low-skilled blue-collar and high-skilled white-collar jobs. We have found that these wage subsidies result, on average, a 1.2 ppt increase and, at most, a 3.5 ppt increase in the share of women in newly hired workers. Our results seem to be parallel with the existing literature in Turkey. Like them, the formal job accessibility of women increased with the introduction of the employment subsidy programs.

Our results suggest that implementing incentive programs to create a job for women and younger men is relatively costly. Besides, additional advantages such as a more diverse gender division of labor and more social welfare may support the implementation of such vulnerable group-oriented incentives.

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A. Unweighted Estimates

Table 7: Effect of Subsidy Policy on Gender of the Last Hire: By Formality (DD Estimates)

	Young		Women		Men	
	1	2	1	2	1	2
<i>subsidy</i>	-0.027** (0.0082)	-0.025** (0.0083)	-0.022*** (0.0046)	-0.026*** (0.0055)	0.049*** (0.0075)	0.051*** (0.0073)
<i>formality</i>	0.070*** (0.0096)	0.094*** (0.0096)	-0.054*** (0.0056)	-0.073*** (0.0066)	-0.016 (0.0089)	-0.021 (0.0086)
<i>subsidy × formality</i>	0.004 (0.0068)	-0.001 (0.0069)	0.012** (0.0040)	0.014** (0.0048)	-0.016 (0.0063)	-0.014 (0.0062)
R ²	0.114		0.069			

Notes: (1) Standard errors appear in parentheses. (2) The sample size is 229,587. (3) Omitted occupation is low-skilled blue-collar. (4) * significant at the .1 level, ** significant at the .05 level, *** significant at the .01 level or lower.

Table 8: Effect of Subsidy Policy on Gender of the Last Hire: By Formality or Occupation

	Young		Women		Men	
	1	2	1	2	1	2
<i>subsidy</i>	-0.016 (0.0090)	-0.012 (0.0091)	-0.023*** (0.0050)	-0.031*** (0.0059)	0.039*** (0.0082)	0.043*** (0.0079)
<i>formality</i>	0.073*** (0.0097)	0.098*** (0.0098)	-0.052*** (0.0057)	-0.070*** (0.0068)	-0.021 (0.0090)	-0.028** (0.0087)
<i>subsidy × formality</i>	0.002 (0.0069)	-0.004 (0.0070)	0.011* (0.0041)	0.011 (0.0048)	-0.013 (0.0064)	-0.008 (0.0062)
subsidy × occupation:						
<i>high skilled white collar</i>	0.002 (0.0108)	0.007 (0.0109)	0.005 (0.0065)	0.015 (0.0082)	-0.007 (0.0103)	-0.023 (0.0099)
<i>low skilled white collar</i>	-0.006 (0.0079)	-0.003 (0.0079)	0.014* (0.0044)	0.028*** (0.0054)	-0.008 (0.0075)	-0.025** (0.0072)
<i>high skilled blue collar</i>	-0.029*** (0.0082)	-0.033*** (0.0083)	-0.018*** (0.0044)	-0.021*** (0.0054)	0.047*** (0.0077)	0.054*** (0.0075)
occupation:						
<i>high skilled white collar</i>	0.150*** (0.0092)	0.191*** (0.0086)	-0.075*** (0.0034)	-0.089*** (0.0042)	-0.075*** (0.0088)	-0.103*** (0.0078)
<i>low skilled white collar</i>	0.206*** (0.0059)	0.230*** (0.0056)	-0.040*** (0.0031)	-0.056*** (0.0034)	-0.167*** (0.0054)	-0.173*** (0.0050)
<i>high skilled blue collar</i>	0.075*** (0.0060)	0.093*** (0.0060)	-0.043*** (0.0031)	-0.076*** (0.0032)	-0.032*** (0.0056)	-0.017** (0.0054)
R ²	0.114		0.069			

Notes: (1) Standard errors appear in parentheses. (2) The sample size is 229,587. (3) The reference category is low-skilled blue-collar. (4) * significant at the .1 level, ** significant at the .05 level, *** significant at the .01 level or lower.

Table 9: Effect of Subsidy Policy on Gender of the Last Hire: By Formality and Occupation

	Young		Women		Men	
	1	2	1	2	1	2
<i>subsidy</i>	0.003 (0.0095)	0.005 (0.0096)	-0.032*** (0.0053)	-0.041*** (0.0062)	0.029** (0.0087)	0.036*** (0.0084)
<i>formality</i>	0.098*** (0.0123)	0.133*** (0.0123)	-0.059*** (0.0070)	-0.080*** (0.0083)	-0.039** (0.0114)	-0.053*** (0.0110)
<i>subsidy × formality</i>	-0.037*** (0.0101)	-0.041*** (0.0102)	0.030*** (0.0060)	0.038*** (0.0071)	0.007 (0.0091)	0.004 (0.0088)
subsidy × occupation:						
<i>high skilled white collar</i>	-0.014 (0.0193)	-0.011 (0.0196)	-0.004 (0.0113)	0.007 (0.0147)	0.018 (0.0184)	0.004 (0.0176)
<i>low skilled white collar</i>	-0.037*** (0.0105)	-0.034** (0.0104)	0.027*** (0.0058)	0.047*** (0.0071)	0.010 (0.0101)	-0.013 (0.0095)
<i>high skilled blue collar</i>	-0.057*** (0.0106)	-0.056*** (0.0106)	-0.001 (0.0058)	-0.001 (0.0069)	0.059*** (0.0099)	0.056*** (0.0095)
occupation:						
<i>high skilled white collar</i>	0.161*** (0.0109)	0.201*** (0.0104)	-0.077*** (0.0042)	-0.092*** (0.0053)	-0.083*** (0.0105)	-0.109*** (0.0094)
<i>low skilled white collar</i>	0.215*** (0.0067)	0.243*** (0.0064)	-0.040*** (0.0035)	-0.060*** (0.0038)	-0.175*** (0.0061)	-0.183*** (0.0057)
<i>high skilled blue collar</i>	0.074*** (0.0072)	0.096*** (0.0071)	-0.038*** (0.0035)	-0.075*** (0.0036)	-0.036*** (0.0066)	-0.020** (0.0064)
formality × occupation:						
<i>high skilled white collar</i>	-0.233*** (0.0581)	-0.196** (0.0570)	0.231** (0.0709)	0.161 (0.0651)	0.002 (0.0560)	0.035 (0.0570)
<i>low skilled white collar</i>	-0.130*** (0.0348)	-0.159*** (0.0344)	0.068 (0.0268)	0.038 (0.0268)	0.062 (0.0348)	0.121** (0.0360)
<i>high skilled blue collar</i>	0.011 (0.0143)	0.000 (0.0149)	-0.023* (0.0080)	-0.004 (0.0115)	0.011 (0.0134)	0.003 (0.0129)
formality × subsidy × occupation:						
<i>high skilled white collar</i>	0.035 (0.0226)	0.043 (0.0230)	0.007 (0.0147)	-0.002 (0.0167)	-0.042 (0.0203)	-0.041 (0.0200)
<i>low skilled white collar</i>	0.073*** (0.0149)	0.076*** (0.0152)	-0.027*** (0.0068)	-0.040*** (0.0079)	-0.045** (0.0142)	-0.036 (0.0142)
<i>high skilled blue collar</i>	0.065*** (0.0155)	0.057*** (0.0162)	-0.043*** (0.0075)	-0.055*** (0.0090)	-0.022 (0.0144)	-0.001 (0.0146)
R ²	0.115	0.070				

Notes: (1) Standard errors appear in parentheses. (2) The sample size is 229,587. (3) The reference category is low-skilled blue-collar. (4) * significant at the .1 level, ** significant at the .05 level, *** significant at the .01 level or lower.

B. Wage Elasticities of Labor Supply in Pre- and Post-Policy Period

Figure 1: Wage elasticity of labor supply, Registered Women Workers

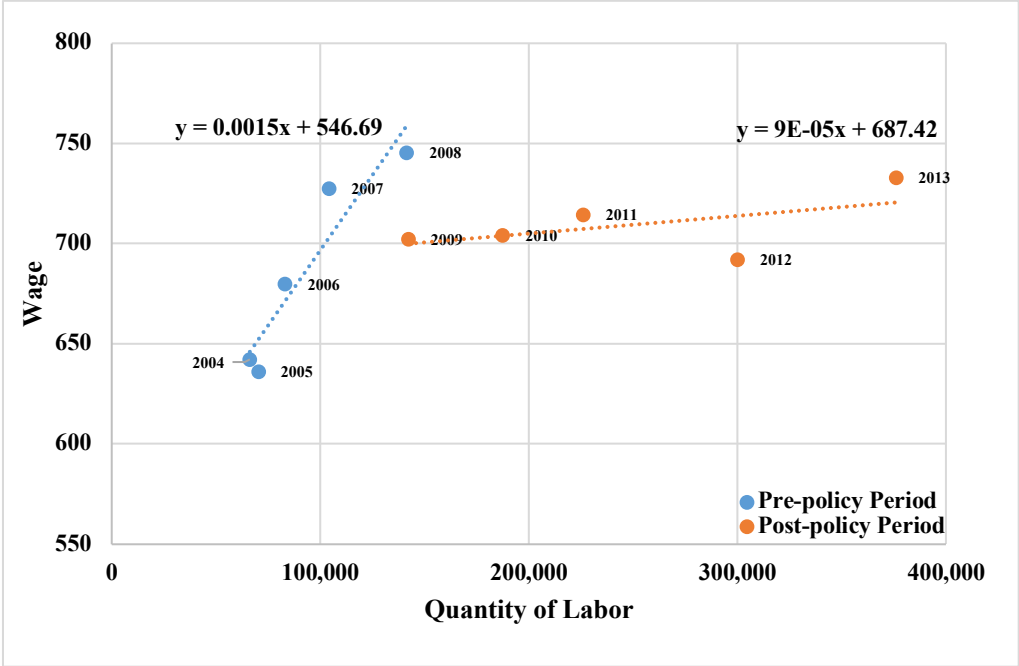


Figure 2: Wage elasticity of labor supply, Registered Men Workers

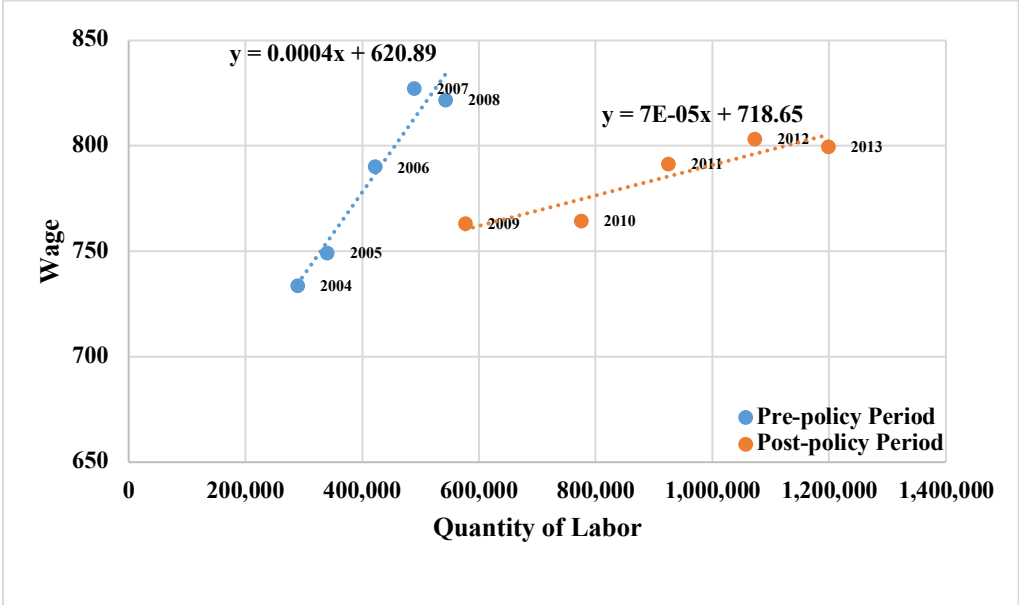


Figure 3: Wage elasticity of labor supply, Unregistered Women Workers

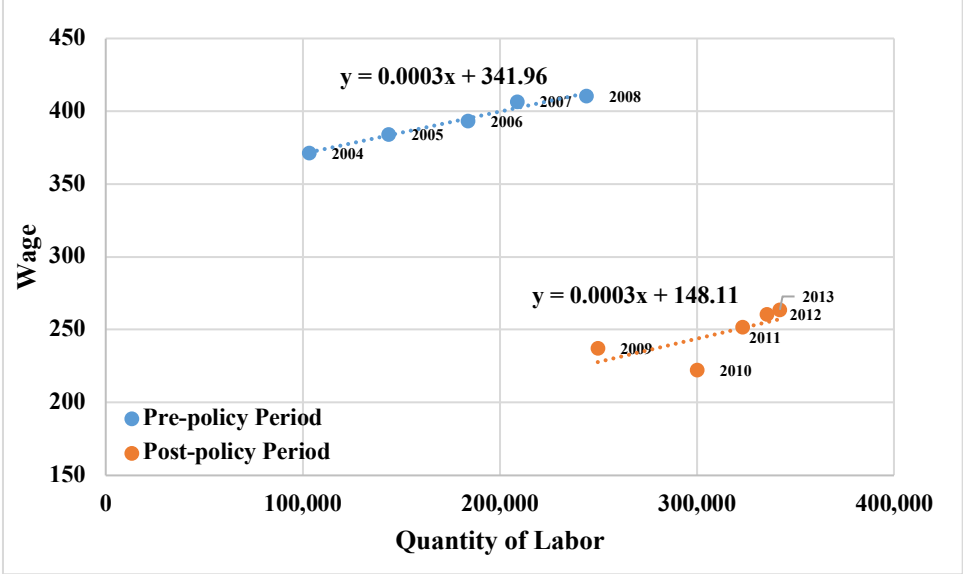


Figure 4: Wage elasticity of labor supply, Unregistered Men Workers

