THE EFFECT OF THE 2008 EMPLOYMENT SUBSIDY PROGRAM IN TURKEY

EMRE İNAN

BOĞAZİÇİ UNIVERSITY

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THE EFFECT OF THE 2008 EMPLOYMENT SUBSIDY PROGRAM IN TURKEY

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Emre İnan

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DECLARATION OF ORIGINALITY

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ABSTRACT

The Effect of the 2008 Employment Subsidy Program in Turkey

This study examines the effect of an employment subsidy program initiated in 2008 on labor market outcomes of women. Since one of the recent problems in Turkish labor market is low female employment rate, it is important to analyze whether employment subsidy programs are effective policy instruments to generate employment gains for female workers. Although there are many empirical studies on this subject, this is the first study in the literature that exploits the variation in the treatment effect of the program at NUTS2-level due to the presence of regionally targeted employment subsidies introduced in 2004 for workers in certain provinces until the end of 2012. Using difference-in-differences methodology, I find that the program increases the formal employment of women as wage workers while it leads to a decrease in informal employment levels and informal hourly wages of female workers through a substitution effect. The program has differential effects on female employments due to the heterogeneity in individual characteristics of women. Women aged 45 or above and women with at most primary or middle school diploma experience the highest increase in formal employment. There is also an evidence that the program has no substitution effect on formal employment of men aged 30 or above but it has a negative substitution effect on their informal employment levels and informal hourly wages.

ÖZET

Türkiye'deki 2008 İstihdam Teşvik Programının Etkileri

Bu çalışma 2008 yılında başlatılan istihdam teşvik programının kadınların işgücü piyasası sonuçları üzerindeki etkilerini incelemektedir. Kadınların düşük istihdam oranı Türk işgücü piyasasının güncel sorunlarından biri olduğundan, istihdam teşvik programlarının kadın istihdamını arttırmada etkili bir politika aracı olup olmadığının analizi önem taşımaktadır. Bu konu üzerinde birçok ampirik çalışma olmasına karşın bu çalışma, 2004 yılında başlatılan ve 2012'ye kadar devam eden bölgesel istihdam teşviklerinin sebep olduğu NUTS-2 seviyesindeki varyasyonu program etkisini belirlerken kullanması açısından literatürdeki ilk çalışma olma özelliğini taşımaktadır. Farkların farkı yöntemi kullanılarak, programın kadın ücretli işçilerin resmi istihdamını arttırırken kayıtdışı istihdamını ve kayıtdışı saatlik ücretlerini ikame etkisi nedeniyle düşürdüğü saptanmaktadır. Kadınların heterojen kişilik özellikleri nedeniyle programın kadın istihdamı üzerindeki etkileri farklılıklar göstermektedir. Resmi istihdamdaki en yüksek artışlar 45 yaş ve üzeri kadınlar ile eğitim seviyesi en fazla ilkokul veya ortaokul mezunu olan kadın grupları için gözlenmektedir. Programın 30 yaş ve üzeri erkeklerin resmi istihdamı üzerinde ikame etkisi olmamasına karşın kayıtdışı istihdam seviyelerinde ve kayıtdışı saatlik ücretlerinde negatif ikame etkisi olduğu tespit edilmiştir.

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CHAPTER 1

INTRODUCTION

As a macroeconomic indicator, unemployment rate is widely used to evaluate the performance of national economies. However, the recent discussions in the literature also evolve around gender-related discrepancies in unemployment rates, which has implications for economic growth and development. According to National Action Plan Gender Equality 2008-2013 (2008), increasing the female employment is closely linked to empowerment of women in the society while higher female employment is essential for economic growth and poverty reduction. However, Turkey is ranked among the lowest in international comparisons regarding gender and total workforce statistics because of the low female participation rate and high levels of female unemployment (Uysal, 2013). Therefore, the policy makers have started to implement active labor market policies concerning female employment. Also, Kırdar and Dayıoğlu (2010) states that due to decline in agriculture and family-run establishments, the significance of wage work among working women has been increasing. The 2008 employment subsidy program is an example of such policies which provides hiring subsidies to employers' share in social security contributions for formal employment of women and youths.

The theoretical explanation for using hiring subsidies to generate employment gains for the target group is to increase the labor demand for the subsidized workers by decreasing the cost of an additional employment. The decreasing cost of an additional employment leads to an upward shift in the labor demand curve which results in higher levels of formal employment and higher levels of formal wage in the

equilibrium. Whether the effect of the subsidy program is more pronounced for wage levels or employment levels depends on the elasticity of the labor supply and labor demand curves.

The effectiveness of a hiring subsidy policy on generating employment for those who are regarded as disadvantaged ones in the labor market is examined empirically in many studies. The results are mixed in these studies in the sense that some studies find significant effect of hiring subsidies while some studies find no effect of hiring subsidies on generating employment gains for the target group. Katz (1996) investigates the effect of the US wage subsidy program on employment levels of economically disadvantaged youths, which is called Targeted Jobs Tax Credit (TJTC) and introduced in 1978. He uses difference-in-difference-in-differences methodology (DDD) and exploits the change in the age criteria of being in the target group which removes disadvantaged youths aged 23 or 24 from the policy's scope. He finds 4.3 percentage points decrease in the employment probability of disadvantaged youths aged 23 or 24 due to the removal from the target group, which is equivalent to estimate the TJTC policy effect on disadvantaged youths. Boockmann, Zwick and Ammermüller (2012) studies the effect of German hiring subsidy program, which is called EGZ and introduced in 1998, on labor market status of employees who are aged 50 or above. The authors employ difference-in-differences methodology to study the program effect on older workers to exit from unemployment status thanks to the EGZ. Their estimation results yield that there is no effect of the program on the unemployment spells of older workers. However, when the heterogeneity is taken into account, they conclude that women in East Germany are the only group who experiences 6 percentage points improvement in the likelihood of the exit from unemployment thanks to the program. Betcherman,

Daysal and Pages (2008) examines the effect of the regionally targeted employment subsidies on provincial employment levels which were initiated in 1998 and modified in 2004 and 2005 to extend its scope. They use difference-in-differences methodology to estimate the effect of the employment subsidies and find that employment subsidies were effective in increasing the provincial employment levels. The 2008 employment subsidy program targeting all women and men aged 18 to 29 is studied by Uysal (2013), Ayhan (2013), Balkan, Cilasun and Turan (2014) and Balkan, Baskaya and Tumen (2016). Different than the other studies, Uysal (2013) uses monthly macro level data and employs the methodology of difference-in-differences statistics to compare the employment status of women who benefits from the incentives with that of men who could not benefit from the incentives. The main finding of Uysal (2013) is that the policy was effective in increasing the relative employment of older women with skilled manual labor in formal labor market. She also shows that the effect of the 2008 policy vanishes after the employment subsidy policies without gender criteria became effective. Ayhan (2013) uses quarterly micro level data from 2006 to 2010 and employs the difference-in-difference-in-differences methodology. She finds that there is a significant quarter-year specific effect of the policy such that the probability of being hired for women aged 30 to 44 was increased by 1.4 percentage points in the third quarter of 2008 and 2009 and by 1.6 percentage points in the fourth quarter of 2009. She concludes that women aged 30 to 44 in services sector experiences an increase in their employment probability, but this increasing effect of the policy is also differential in quarters. Balkan, Cilasun and Turan (2014) use rotating panel data from 2006 to 2012, which is obtained from Turkish Income and Living Conditions Survey (SILC). They use difference-in-differences methodology and the sample from 2006 to 2010. Different than other

studies, they look at the effect of the policy on female wage earners. They find that compared to men above 30 years old, the policy decreases the probability of informal employment of women by 2.9 percentage points and increases that of formal employment of women by 3.6 percentage points in overall sample. Balkan, Baskaya and Tumen (2016) elaborates the studies on the effect of 2018 employment subsidy program by looking at narrower age groups, education groups and predicted wage groups. They use cross sectional annual micro-level dataset obtained from THLFS and employ difference-in-differences methodology for which they define the treatment group as men of age between 18 and 29 and all women who can benefit from the subsidy and the control group as men of age 30 and above. With the full controls for group-level differential time trends and region-year effects, they find that the policy was only effective in increasing the employment probability of women of age 30 or above by 2.5 percentage points relative to men of the same age group. After accounting for further layer of heterogeneity, they conclude that the effect mostly comes from the older women with at most primary school degrees while the policy effect follows monotonically decreasing trend over higher predicted wage quartiles.

This paper examines the effect of the 2008 employment subsidy policy on labor market outcomes of women of working age with difference-in-differences methodology. The estimation strategy exploits the variation in the treatment intensity of the policy on women due to the presence of regionally targeted employment subsidies which was introduced in 2004 and remained effective until the end of 2012. Since the policy subsidize the formal employment of wage workers, I also make a distinction in labor market outcomes in terms of formal and informal employment. In other words, labor market outcomes that I use as dependent variables in the

regression analysis includes employed as wage workers, hourly wages, employed as formal wage workers, formal hourly wages, employed as informal wage workers and informal hourly wages. To be able to control for individual covariates that could affect the labor market outcomes such as age, gender, educational attainments and marital status, the annually micro-level dataset obtained from Turkish Household Labor Force Survey (THLFS) provided by Turkish Statistical Institute (TURKSTAT) from 2004 to 2015 is used. However, the observations belonging to 2004 is omitted since the regional incentives reach its final version in 2005 with law #5350. I also drop the observations from 2008 since the policy is introduced on July 2008 but the dataset is provided at annual frequency. Finally, the years after 2012 are also omitted from the analysis due to the extension of employment subsidies for all workers around Turkey in December 2012. Additionally, the provincial population dataset belonging to 2007 from Turkish Statistical Institute is also used to calculate the intensity of the treatment effect of the policy at NUTS2-level.

I find that the policy increases formality of women as wage workers but no policy effect on formal hourly wages is present. No change in hourly wages in formal market could be attributable to the calculation of employment subsidies based on lower threshold of base income subject to premium which favors minimum wage workers most. The substitution effect decreases the informal employment and informal hourly wages of women. The year-specific policy effects reveal that the policy has increasing effect in all years in the post-treatment period. This could be associated with an increasing use of the subsidy program thanks to the series of legal arrangements enabling new entries to the subsidy program. I also find that there is a differential effect of the policy on age and education subgroups of women. The analysis of the policy effect by subgroups reveals that the effects are stronger for

women who are older than 30 years of age while the negative substitution effect of the policy on informal employment of women is mainly due to the substitution of women in age group 18-29. Also, women with at most primary or middle school diploma experiences the highest employment gains in formal employment. Lastly, the policy does not lead to displacement of formally employed men who are older than 30 years of age through substitution effect, but it rather decreases their informality coupled with lower levels of informal hourly wages. This eliminates the concerns about the displacement cost of the 2008 policy regarding formal employment.

This study contributes to the literature by incorporating the regionally targeted employment subsidies into the econometric analysis of the 2008 employment subsidy program. The existence of the employment subsidies in certain regions until the end of 2012 changes the definition of the treatment and the control group of the 2008 policy for its first 4 years. The new definition of the treatment and the control groups helps us to conduct the analysis by comparing the difference in the labor market outcomes of women from different regions. Thus, the assumption made in this paper that women in the treatment group and women in the control group would follow the same trends in the absence of the 2008 policy is more flexible than the assumption made in the other studies that women in the treatment group and men in the control group would follow the same trend in the absence of the 2008 policy.

This paper continues with the definition of policy environment related to the 2008 employment subsidy program in Chapter 2, the explanation of conceptual framework concerning the theory of employment subsidies in Chapter 3, the literature review on relevant studies in Chapter 4, the summary of data and descriptive statistics in Chapter 5. The paper ends with the interpretation of the

estimation results and their implications for the Turkish female labor market in Chapter 6 and the concluding remarks on the effectiveness of the 2008 employment subsidy program on Chapter 7.

CHAPTER 2

POLICY ENVIRONMENT

In this section, the intention is to become familiar with the policy environment in which the 2008 employment subsidy policy was introduced. This chapter starts with the summary of Turkish social security system and non-wage costs of employment. It continues with description of the 2008 employment subsidy policy and other employment subsidies interacted with the 2008 policy in a historical order.

2.1 The social security system and non-wage costs in Turkey

Until the early 2000s, Turkish social security system was composed of three separate schemes; Emekli Sandigi (ES), Bag-Kur and SSK which ensures the provision of the social security services to civil servants, self-employed individuals and all other workers in private and public sectors, respectively. These three schemes were integrated into a single system with the establishment of Social Security Institution (SGK) after the enactment of law #5510[1] in June 2006, which is formally known as the Social Security and General Health Insurance Law.

The share of an employer, an employee and the state in the social security premium payments are calculated and determined with respect to the Article 81 of the Social Security and General Health Insurance Law. According to the Taxing Wages 2007-2008 (2008), until the 4th quarter of 2008, the shares of an employer and an employee in the social security contributions were 18.5% and 14% of the

[1] See http://www.resmigazete.gov.tr/eskiler/2006/06/20060616-1.htm

gross wage, respectively while an employer's contribution would increase by 5.5% depending on the occupational risk level. In October 2008, an employer's contribution was updated as 13.5% of the gross wage by the enactment of the law #5763.

2.2. The 2008 employment subsidy policy and related subsidy programs

Table 1 below presents the legal arrangements related to the employment subsidy schemes and their interaction with 2008 subsidy policy in historical order, which is explained in detail in the following sub-sections.

Table 1. Legal Amendments Related to the 2008 Employment Subsidy Policy

Date	**Law No**	**Policy Type**	**Content/Change**
29.01.2004	Law #5084	The Regional Incentives	36 provinces were granted incentives
12.05.2005	Law #5350	The Regional Incentives	13 new provinces were added
15.05.2008	Law #5763	The 2008 Policy	All women, men aged 18 to 29
18.02.2009	Law #5838	The 2008 Policy	Application period was extended until July 2010
13.02.2011	Law #6111	The 2008 Policy	Men older than 29 years of age with vocational education/certificates.
19.12.2012	Decision #2012/3305	The Regional Incentives	Regions were re-defined
21.12.2015	Decision #2015/8321	The 2008 Policy	Employment subsidy program was extended

For the sake of the analysis, the history of employment subsidy policies related with the 2008 employment subsidy package starts in January 2004. As the ultimate objective of the employment subsidy policies remained the same, the scope and the conditions of the policies had changed/evolved with the waves of legal arrangements.

2.2.1 The regional incentives

While the 2008 employment subsidy package is the first example of the employer's side subsidy to increase the employment probability of those in disadvantaged group, there were also so called regional incentives in 49 provinces[2] disadvantage on finding jobs in Turkish labor market. In order to have an idea on the evolution of the regional incentives, consistent with the legal arrangements, I will start with the description of the primitive version of the regional incentives first and then close the subsection with the final version of the regional incentives which is supposed to affect the 2008 employment subsidy package.

In early 2000s, the Turkish labor market witnessed a series of legal arrangements in the form of regional incentives to encourage investments and to increase employment opportunities in low-income provinces. The regional incentives were initiated in 36 provinces with the enactment of law #5084 in 2004 and were extended to cover 13 additional provinces with law #5350 in 2005[3]. These 49 provinces in total were qualified to receive the incentives either if the GDP per capita

[2] For the list of provinces, see Table A2 in Appendix A.
[3] See Table A2 in Appendix A for the list of provinces introduced by law #5084 and #5350.

at province level was $1500 or below in 2001 or if the socio-economic development index calculated by the State Planning Organization was negative in 2003.

A firm located in one of the 49 provinces could benefit from four types of incentives; i) incentives on income tax withholding, ii) energy subsidies, iii) land subsidies and iv) subsidies on employer's share of social security contributions. Among these incentives, subsides on social security contributions reduce the non-wage costs of existing workers and that of additional employment so it has a direct effect on the treatment effect of the 2008 employment subsidy package.

While the employment incentives were available for all firms in 49 provinces, the percentage of employment subsidies depends on the location of a workplace. For workplaces located in organized industrial zones; 100% of an employer's contribution to social security premiums and for workplaces located elsewhere; 80% of an employer's contribution would be covered by the Treasury.

The regional incentives remained in force until December 2012. It means that during the first 4 years of the 2008 employment subsidy policy, the presence of regional incentives mitigates the effect of the 2008 policy in 49 provinces. However, after the regional incentives expired, new set of incentives were defined, and 81 provinces were divided into 6 categories with the decision #2012/3305 of the Council of Ministers.

2.2.2 The 2008 employment subsidy policy

With the enactment of law #5763, the 2008 employment subsidy package became effective in July 2008. The policy introduces an employer-side hiring subsidy which covers an employer's share in social security contributions of an additional

employment of those who are either male of age between 18 and 29 and all women above 18 for 5 years in a monotonically decreasing manner.

Beside gender and age criteria, those in the target group should also meet the following two conditions to benefit from the subsidy;

i) the potential employee should not be employed as a tax-registered worker in last 6 months before the effective date of the policy

ii) the potential employee should be hired as an additional worker to the existing workers in the workplace and should remain employed within one year after the policy announcement.

Given that a new employee is in the target group and meets all conditions, 100% of an employer's contribution to social security premiums would be paid from the Unemployment Insurance Fund in the first year while the percentage of the coverage would decrease by 20 percentage points each year. In other words, 100% of an employer's contribution would be covered in the first year, where the coverage is updated as 80 % in the second year, 60% in the third year, 40 % in the fourth year and 20% in the fifth year of the program. The portion of the coverage regarding the employer's share in contributions to social security premiums are calculated from the lower threshold of the base income subject to premium.

With the enactment of law #5838 on February 2009, the application period for 2008 employment subsidy program was extended until July 2010. Later, the law #6111 extended the scope and the duration of the 2008 subsidy program, which is explained in detail in the following subsection.

2.2.3 The extension of employment subsidies

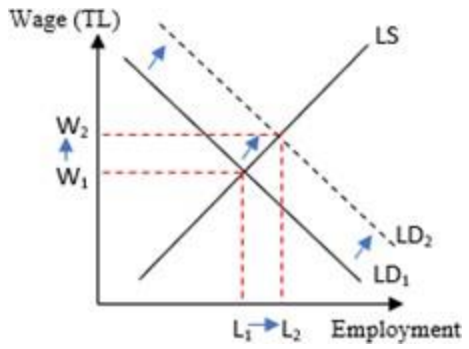
In 2011, the law #6111 extended the scope of employment subsidies on social security contributions which was initiated by the 2008 employment subsidy policy[4]. According to Article 74 of the law #6111, an employer's contribution to social security premiums of men over 29 years of age would also be covered from the Unemployment Insurance Fund, but the duration of the coverage varies from 6 months to 24 months for men aged 30 or above, which depends on the educational and/or vocational qualifications. The coverage is 24 months at most for employment of men aged 30 or above who hold vocational qualification certificates or diploma from secondary or higher degree vocational/technical education institution. However, for employment of all women and men aged 18 to 29 with vocational or technical certificates or diploma, the law provides subsidy to an employer's contribution to social security premiums up to 48 months. Therefore, hiring a woman or a young man is still more advantageous for an employer. Moreover, the law also grants the 6 months coverage for employment of those who have no vocational certificate and/or education at all but registered as unemployed at the Turkish Unemployment Organization (İŞKUR).

[4] See http://www.resmigazete.gov.tr/eskiler/2011/02/20110225M1-1.htm for the details.

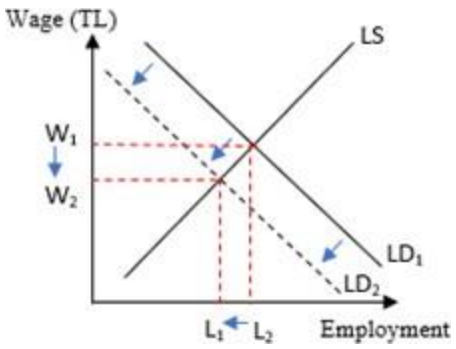
CHAPTER 3

CONCEPTUAL FRAMEWORK

The 2008 employment subsidy policy decreases the cost of hiring female wage workers for employers through a subsidy on an employer's share of social security contributions. From a theoretical perspective, an employment subsidy induces employers to hire more workers from the target group due to a decrease in hiring costs, which results in higher levels of employment and wage in the equilibrium because of an upward shift in the labor demand curve (Borjas, 2013, p.152). The shifts in the labor demand curve of corresponding labor markets are depicted in Figure 1 below.



Graph 1. The policy effect on labor market



Graph 2. The substitution effect of the policy

Figure 1. The policy effect on formal and informal labor markets

As depicted in Graph 1 in Figure 1, we observe an upward shift in labor demand for female wage workers in formal market thanks to the subsidy package, which would bring equilibrium employment from L1 to L2 and equilibrium wage from W1 to W2. On the other hand, the 2008 policy is also supposed to affect labor demand for female wage workers in informal market through a substitution effect.

Since the 2008 policy lowers the cost of formal employment of female wage workers, the relative cost of informal employment of female wage workers in terms of formal employment also goes up. Thus, as depicted in Graph 2, we expect a downward shift in the demand for female wage workers in informal market, that would lead to a lower equilibrium wage and lower employment levels in informal female labor market.

As we assert that the 2008 policy could result in a substitution between formal and informal employment of female wage workers, one can also claim that the policy could also lead to a substitution of male wage workers aged 30 or above with female wage workers. As it was the case for informal employment of female wage workers, the relative cost of an employment of men aged 30 or above in terms of an employment of female wage workers also goes up. Therefore, we anticipate a decrease in the demand for male wage workers aged 30 or above both in formal and informal labor market, which can be also illustrated by a downward shift in the demand curve depicted in Graph 2.

The impact of the 2008 employment subsidy policy, i.e. the effect of shifts in labor demand curves, on employment and wage levels in all markets depends on the elasticities of the labor supply and the labor demand curves. (Borjas, p.157). Furthermore, the policy effect on men aged 30 or above is contingent on the elasticity of substitution between male and female workers.[5]

[5] See De Giorgi et al. (2013) and Acemoglu et al. (2004) for the elasticity of substitution between male and female workers.

CHAPTER 4

LITERATURE REVIEW

The 2008 employment subsidy policy is the first example of active labor market policies in Turkey which targets to create employment opportunities for women and young men who are relatively disadvantaged in Turkish labor market. Therefore, there are numbers of studies by Turkish scholars which empirically analyzes whether the 2008 policy was effective in increasing the employment prospects of the target group. First, I mention about the prominent studies on hiring subsidies and the papers studying the effect of 2008 employment subsidy policy. Lastly, I explain what contribution our paper makes to the literature.

Katz (1996) studies empirically the effect of the US wage subsidy program Targeted Jobs Tax Credit (TJTC). The program was designed for economically disadvantaged individuals and was effective from 1979 to 1994. Under TJTC program, employers who hired certified individuals in the target group could get tax credit of 50 percent of the first year and 25 percent of the second-year wages up to $6000. The target group consisted of economically disadvantaged youths, disabled individuals, welfare recipients and so on. In 1980s, the subsidy amount and the definition of the target group went through several modifications. Katz (1996) takes an advantage of the change in eligibility rule on January 1989 to estimate the program effect, which rule out disadvantaged youths of age 23-24 from target group who could benefit from the TJTC program before. He asserts that if the program was successful for those in the target group, then the removal of certain individuals from the target group must result in the deterioration in their employment status. He uses

difference-in-differences-in-differences (DDD) methodology to estimate the effect of the program by comparing the difference in the employment status of disadvantaged youths aged 23-24 who were not in the target group anymore with that of other youths aged 23-24 who are still in the target group in before/after periods of the change in eligibility rule. The second difference in DDD which compares employment rate of disadvantaged youths aged 18-22 and aged 25-29 with the non-disadvantaged youths of the same age group is to eliminate non-TJTC factors that might also affect the labor market outcomes of the target group. He finds that the effect of the removal from the target group is estimated as 4.3 percentage points decrease in the employment probability of disadvantaged youths aged 23-24. Additionally, he repeats the analysis with a linear probability model for employment to control for observed individual characteristics. He concludes that the effect of the legislative change is estimated as 3.4 percentage point decrease in the employment probability of disadvantaged youths aged 23-24, which is also equivalent to say that the TJTC program increased the likelihood of disadvantaged youths aged 23-24 being hired by 3.4 percentage points.

In 1998, the Integration Supplement (Einglied-erungszuschuss, EGZ) was introduced in German labor market to promote employment of workers with unfavorable labor market characteristics such as those adapting to a new job, those with placement difficulties and older workers. Boockman et al (2012) examines the impact of the EGZ on older employee's labor market status. Under the EGZ for older workers, an employer who hires workers older than the age of 50 receives a subsidy as a percentage of the gross wage rate (from 50% up to 70%) and an allowance for employer contributions to social security premium. The EGZ for older workers underwent two major changes in 2002 and in 2004. In 2002, the requirement of being

registered as unemployed for at least 6 months was removed. In 2004, the separate EGZ for older workers was ended and the subsidy program for older workers were integrated into the general EGZ program. Since the changes can be regarded as natural experiments and the age as an eligibility criterion allows for determining the treatment and the control groups, the authors employ difference-in-differences methodology to study the program effect on older workers to exit from unemployment status for each natural experiment. In order to estimate the treatment effects, they use the Kaplan Meier survivor function which estimates the probability of remaining in unemployment status for a given period. They define two distinct groups for both the treatment and the control group. At the time of entering unemployment, the treatment group consists of workers aged 50 to 50 plus six months whereas the control group consists of workers aged between 49 and 49 plus six months. Regarding the first natural experiment in 2002 that changes the admission criteria, they find that the estimated effect on the duration in unemployment spell is negative but statistically insignificant. Regarding the second natural experiment in 2004 that ends the separate program EGZ for older workers program, their analysis yields a positive treatment effect on the duration of unemployment spell but again the estimated coefficient is statistically insignificant. However, when the heterogeneity is taken into account, they conclude that women in East Germany are the only group who experiences 6 percentage points improvement in likelihood of exiting from unemployment thanks to the change in 2002.

The regional incentives, which reached its final version with the enactment of law #5084 and law #5350, are empirically studied by Betcherman, Daysal and Pages (2008) as an example of employment subsidy schemes in Turkish labor market. The study exploits the fact that the regional incentives were first initiated by law #4325 in

22 provinces in 1998, and 14 new provinces were added to list in 2004 and 13 additional provinces were introduced into the program's scope in 2005 by law #5084 and law #5350, respectively. The regional incentives consist of employment subsidies and other forms of subsidies, which are explained in detail in the overview of policy environment. Therefore, they use difference-in-differences methodology to study the individual treatment effects of the law #5084 and law #5350 where treatment group consists of the provinces introduced by the respective policy. They use monthly panel of province level data from April 2002 to December 2005, which is derived from multiple sources such as SSK, Turkish Treasury and TURKSTAT. They conduct the analysis by allowing for differential time trends at province level and find that both law #5084 and law #5350 increased the employment levels in provinces where the regional incentives including the employment subsidies were given.

One of the empirical studies concerning the 2008 employment subsidy program is Uysal (2013) which also provides valuable information about legal arrangements related to the subsidy program. To capture the differential effects of the policy around the announcements of related policies, she uses monthly macro level data from January 2005 to September 2011, which is obtained from Turkish Household Labor Force Survey (THLFS) and published by the Turkish Statistical Institute (TURKSTAT). She employs the methodology of difference-in-differences statistics to compare the employment status of women who benefits from the incentives with that of men who could not benefit from the incentives. She restricts the sample to include women and men of age between 30 and 44. She also conducts the analysis with respect to educational, sectoral, professional subgroups as well as marital status. The main finding of Uysal (2013) is that the policy was effective in

increasing the employment of older women with skilled manual labor in formal labor market. She also shows that the effect of the subsidy program vanishes after the extension of employment subsidy policies to men aged 30 or above took place. She also asserts that the presence of regional incentives and the extension of the employment subsidy to everyone might mitigate the policy's effect.

Ayhan (2013) also studies the effect of the 2008 employment subsidy program. She uses quarterly micro level data from 2006 to 2010 which is obtained from THLFS and provided by the TURKSTAT. The dataset contains information on labor market outcomes and demographic characteristics of individuals such as education, age, marital status and employment status. She generates hiring and separation flow variables to find out the role of the policy on transition from unemployment to employment, from inactivity to employment and vice versa. She first uses the standard difference-in-differences methodology by comparing the employment status of women of age 30-34 with that of men of the same age group before and after the policy. Since her identification with the DID methodology implies negative effect of the policy on women's hiring flow variables, she claims that DID is unable to eliminate the confounding effect of the economic crisis.

Therefore, she employs the difference-in-difference-in-differences methodology where the second double difference is obtained to eliminate the crisis effect by comparing the employment status of women of age 24-29 with that of men of the same age group before and after the policy. Common trend assumption of treatment and control group is validated by graphical illustration of employment rates of women and men. The analysis is repeated for years before the policy intervention as a placebo test and no significant effect is found. While no significant effect of the policy was found in year specific analysis, there is a significant quarter-year specific

effect of the policy such that the probability of being hired for women aged 30 to 44 was increased by 1.4 percentage points in the third quarter of 2008 and 2009 and by 1.6 percentage points in the fourth quarter of 2009, which mostly comes from the flows from unemployment to employment rather than from inactivity to employment. Furthermore, she concludes that women aged 30 to 44 in services sector benefits from the policy and their employment probability was increased by 6.2 percentage points in the third quarter of 2008 and by 4 percentage points in the third and fourth quarter of 2009 whereas there is no significant effect in other sectors.

Another study on the 2008 employment subsidy program is conducted by Balkan, Cilasun and Turan (2014). They use rotating panel data from 2006 to 2012, which is obtained from Turkish Income and Living Conditions Survey (SILC) and published by the TURKSTAT. The rich dataset which tracks individuals for 4 consecutive years provides information on demographic characteristics and labor market outcomes of individuals as well as information their living and socio-economic conditions. They use difference-in-differences methodology together with Markov transition analysis after restricting the sample from 2006 to 2010, which is justified by the extension of incentives to include men older than 29 in 2011. Different than other studies, they look at the effect of the policy on female wage earners to exclude those who cannot benefit from the subsidy in practice as a self-employed or a civil servant. While the treatment group consists of women aged 18-64, the control group consists of men aged 30 or above. They conduct the analysis for 4 fixed effect estimation equations with employment, unemployment, formality, informality and not in labor force (NILF) as dependent variables. Another difference between their study and related works on the 2008 policy is that their identification allows differential trend for men and women in the labor market. In other words,

they control for gender-specific time trend in regression analysis. As a robustness check, they make a pseudo regression analysis for years before the policy announcement and find no significant policy effect. In the Markov transition analysis, they find that the probability of female workers finding a formal job increased from 5.56% in 2007-2008 to 6.31% in 2008-2009 while that of male workers finding a formal job decreased from 14.47% in 2007-2008 to 7.91% in 2008-2009. The results of fixed effect regression analysis are also in line with the Markov transition analysis. They find no statistically and economically significant coefficient for the policy effect on transition in employment, unemployment and NILF. However, it is found that compared to men aged 30 or above, the policy decreases the probability of informal employment of women by 2.9 percentage points and increases that of formal employment of women by 3.6 percentage points in overall sample. The results are also robust in age subgroups. Therefore, they conclude that the policy was effective in increasing the social security coverage of women rather than generating new employment opportunities.

Finally, Balkan, Baskaya and Tumen (2016) elaborates the studies on the effect of 2008 employment subsidy program by looking at narrower age groups, education groups and predicted wage groups. However, their analysis is restricted to the policy effect on the employment probability of the target group. In other words, they do not make formal-informal distinction while estimation the program effect on employment status. They use cross sectional annual micro-level dataset, which is obtained from THLFS and released by the TURKSTAT. Their sample covers the period from 2004 to 2012 and the individuals aged 18 to 55. They also employ difference-in-differences methodology for which they define the treatment group as men aged 18 to 29 and all women who can benefit from the subsidy and the control

group as men aged 30 or above. It is worth noting that their study allows for the differential time trend between the treatment and the target groups and uses regional unemployment rates to capture the effect of 2008-2009 global economic crisis. With the full controls for group-level differential time trends and region-year effects, they find that the policy was only effective in increasing the employment probability of women aged 30 or above by 2.5 percentage points relative to men of the same age group. After accounting for further layer of heterogeneity, they conclude that the effect mostly comes from the older women with at most primary school degrees while the policy exhibits decreasing effect over higher predicted wage quartiles.

In terms of the methodology and the type of dataset, Balkan, Baskaya and Tumen (2016) is the closest to our paper. We also adopt difference-in-differences methodology to conduct our analysis with a micro-level dataset. However, this paper distinguish itself from the previous studies mentioned above in two aspects. First, the previous studies do not consider the presence of the 2004 regional incentives before and during the period of the 2008 employment subsidy program while determining the treatment and control groups. Women in the provinces with regional incentives were not actually treated by the 2008 policy. This is because the regional incentives also provide subsidies to an employer's share in social security contributions for both existing workers and new employments with a higher coverage rate for a longer period[6]. Therefore, we define women from the provinces with regional incentives as the treatment group and women from the provinces with no regional incentives as the control group of the 2008 policy. Second, the previous studies rely on the assumption that the labor market outcomes of women in the treatment group and that of men in the control group would have the same trend in the absence of the policy. This is a

[6] See Policy Environment section for the details.

strong assumption that requires an equal treatment of women and men in the labor market. Having defined the treatment and the control group out of female observations only, we do not need to make such strong assumption in our empirical analysis. The empirical analysis in this paper rather exploits the variation in the treatment effect of the policy on women from different regions and compares their labor market outcomes. Last but not least, there is also no need to control for any gender-specific trends in our identification.

CHAPTER 5

DATA AND DESCRIPTIVE STATISTICS

For all the empirical analysis conducted in this study, I use the nationally representative micro level dataset obtained from Turkish Household Labor Force Surveys (THLFS) which is compiled and published by Turkish Statistical Institute (TURKSTAT) at an annual frequency. THLFS is a yearly cross-sectional dataset which provides a detailed information on labor market outcomes and personal characteristics of individuals such as employment status, social security coverage, occupation, sector, wage, age, education, gender, residential area and so on. This rich dataset consists of around 4.5 million observations from 2004 to 2015, which means that there are approximately 350 thousand observations per year. The dataset starts from 2004 simply because THLFS was started to be conducted as of 2004. Furthermore, the dataset does not provide residential information of individuals at province level but provide NUTS-1 and NUTS-2 region level information where Turkey is divided into 12 subregions at NUTS-1 level and 26 subregions at NUTS-2 level[7].

For the empirical analysis, I restricted the sample to consist of women of working age who are between the age of 18 and 64 since our main objective is to detect the effect of the 2008 policy on working age population in Turkish labor market. Note that the 2008 employment subsidy policy was enacted in July 2008 and the dataset is annually repeated cross sectional, we drop the observations belonging to year 2008. While regional incentives were introduced with law #5084 in 2004 but

[7] For NUTS-2 level classifications of regions in Turkey, see Table A1 in Appendix A.

reached its final version with law #5350 in 2005 so we exclude all observations from 2004. Furthermore, due to the extension of employment subsidies to everyone in December 2012, we also exclude the years after 2012 from the analysis. As a result, we are left with 932,522 observations for women in total.

The 2004 regional incentives as hiring subsidy were provided on provincial basis so the fact that our THLFS micro-level dataset does not contain any information at provincial level led us to define the treatment intensity of the 2008 employment subsidy program at NUTS-2 level. For that purpose, we use 2007 provincial population dataset obtained from TURKSTAT. We generate treatment intensity variable for each observation at NUTS-2 level where intensity is calculated as the ratio of the sum of provincial population in a NUTS-2 level subregion not affected by the regional incentives to the total population of the NUTS-2 level subregion. To be more concrete, if all provinces in a NUTS-2 level subregion were covered by the regional incentives, the treatment intensity variable takes value of 0 whereas if none of the provinces in a subregion is covered by the regional incentives, the treatment intensity variable takes value of 1. For any cases in-between, the treatment intensity variable takes values between 0 and 1. The equation (5.1) summarizes the derivation of the treatment intensity variable;

$$I_r = \frac{P_r - P_{r,2004}}{P_r} \text{ for each } r \in [1,26] \qquad (5.1)$$

where Ir stands for the treatment intensity of the 2008 employment subsidy program for NUTS-2 level subregion r, Pr stands for the total population of NUTS-2 level subregion r in 2007 and Pr,2004 stands for the total population of the provinces with regional incentives in NUTS-2 level subregion r in 2007.

Table 2 below presents the descriptive statistics of the sample that is used in the empirical analysis. We see that 75% of the women in the sample are married. The mean age in female sample is 38. The variables related to labor market status reveal that 12.8 % of the female observations are employed either as formal or informal wage worker. The decomposition of employment shows that 9.4 % of the women in the sample are employed as a formal wage worker while 3.5 % of them are employed as an informal wage worker. In total, 12.5% of the female observations are wage earners either as formal or informal wage workers.

Table 2. Descriptive Statistics

Variable	# of Obs	Mean	Std. Dev.	Min	Max
Policy	932,522	0.343	0.443	0	1
Year	932,522	2008.580	2.627	2005	2012
Marital Status	932,521	0.749	0.434	0	1
Age	932,522	38.018	12.758	18	64
Wage Worker	932,522	0.128	0.334	0	1
Formal Wage Worker	932,522	0.094	0.291	0	1
Informal Wage Worker	932,522	0.035	0.183	0	1
Hourly Wage	119,680	5.548	5.635	0	438.7209
Formal Hourly Wage	87,237	6.802	5.689	0	315.3488
Informal Hourly Wage	32,443	2.176	3.808	0	438.7209
Educational Attainment					
illiterate or literate but no diploma	932,522	0.237	0.425	0	1
primary or middle school diploma	932,522	0.523	0.499	0	1
any high school diploma	932,522	0.159	0.365	0	1
college or university diploma	932,522	0.082	0.274	0	1
Urban	932,522	0.709	0.454	0	1
Regional Unemployment Rate	932,522	0.048	0.014	0.016	0.088

Furthermore, regarding the educational attainments, 23.7 % of women are either illiterate or literate without any diploma, 52.3% of them are either primary or middle school graduates, 15.9 % of them have high school diploma and 8.2% of them are university graduates. Around 75 % than half of the women have educational attainments lower than high school diploma. If we look at the urban-rural distinction, 70% of the female observations live in urban areas while the rest live in rural areas. The highest unemployment rate calculated at NUTS2 level in all periods is 8.8 % whereas the lowest is 1.6 %.

CHAPTER 6

EMPIRICAL STRATEGY

In this section, I present and explain the methodology and identification strategy that are used estimate the effect of the 2008 employment subsidy policy in this paper.

6.1 Methodology and estimating equation

The presence of 2004 regional incentives in some provinces lead to the differential treatment of women by the 2008 policy. While the women in the provinces with no regional incentives constitute the treatment group, the women in the provinces with regional incentives constitute the control group. Thus, one can estimate the treatment effect of the 2008 policy on the likelihood of women being hired with the difference-in-differences (DID) methodology. However, the lack of provincial information of observations in the THLFS dataset leads us to define treatment intensity variable "intensity" at NUTS2-level to capture the variation in the treatment effects of the 2008 policy. Our identification relies on the variation in the intensity variable. We use the following estimating equation to estimate the treatment effect of the 2008 policy:

$$\mathcal{Y}_{i,r,t} = \alpha + \beta\,(I_r * S_t) + X^{T}_{i,r,t}\,\Gamma + \theta_r + \theta_t + u_{i,r,t} \tag{6.1}$$

$$\mathcal{Y}_{i,r,t} = \alpha + \sum_{2010}^{2012}\{\beta_n[\,I_r * D(year = n)]\} + X^{T}_{i,r,t}\,\Gamma + \theta_r + \theta_t + u_{i,r,t} \tag{6.2}$$

In Equation (6.1), $\mathcal{Y}_{i,r,t}$ is a binary variable for labor market outcome of an individual i, in subregion r, in year t. The variable I_r stands for treatment intensity at NUTS2-level and equal to the ratio of the population in a subregion r treated by the

regional incentives to total population of the subregion r. The variable I_r is equal to 1 if a subregion r is never treated by the regional incentives and equal to 0 if a subregion r is fully treated by the regional incentives and takes values in the interval (0,1) otherwise. The variable S_t is a binary variable equal to 1 for the years after 2008 and 0 otherwise. The parameter of interest is β obtained from the interaction of I_r with S_t which captures the treatment effect of the 2008 policy on the labor market outcomes of a woman. The variable $X^T_{i,r,t}$ contains individual-level control variables which are age categories, education categories, marital status, urban-rural status and the full interaction of these variables with each other. The age groups are formed as intervals of 18-20, 20-22, 23-25, 26-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, and 60-64. The education levels of individuals which are similar to each other in terms of labor market dynamics are clustered into 4 education categories as (i) illiterate or literate but no diploma, (ii) primary school or middle school diploma, (iii) any high school diploma (iv) college or university diploma. Lastly, θr stands for the subregion fixed effects while θt stands for the year fixed effects.

The only difference between Equation (6.1) and Equation (6.2) is the disaggregation of the period-specific policy effect β to year-specific policy effects β_n's . In Equation (6.2), D(year=n) is a binary variable equal to 1 for year n and 0 otherwise. βn's are the variables of interest which captures the year-specific treatment effect of the 2008 policy on the employment probability of a woman for all n € [2010, 2012]. For example, β_{2010} is the treatment effect of the 2008 policy in year 2010 only and β_{2011} is the treatment effect of the 2008 policy in year 2011 only and so on.

6.2 Common trend

The key assumption in difference-in-differences methodology is that a parallel trend would have been observed in the outcomes of treatment and control groups if there was no policy effect at all. This assumption is called common trend and it is conventionally tested by the graphical illustration of the outcomes of treatment and control groups in pre-policy period as it is depicted in Figure 2 below.

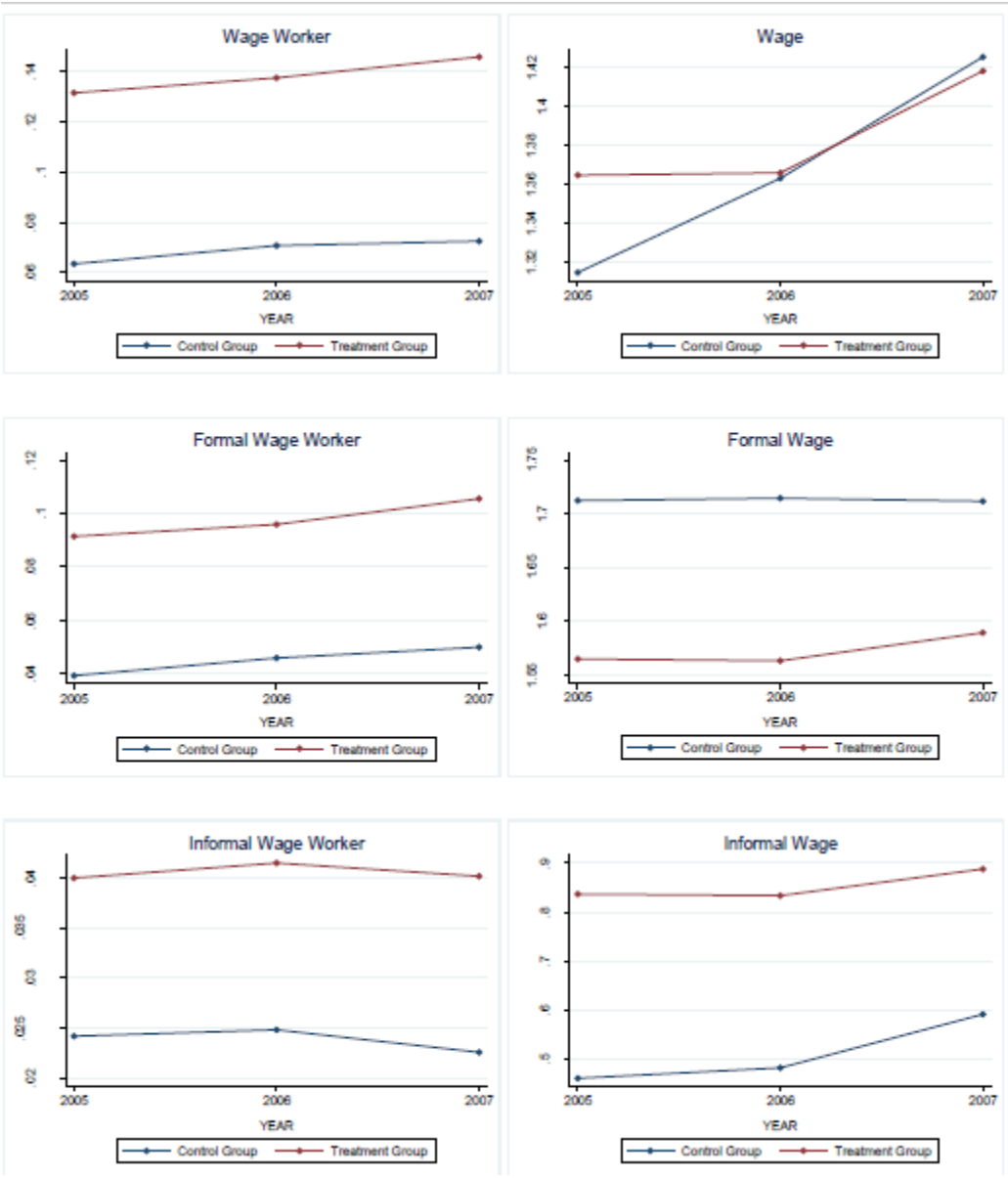


Figure 2. The trends in the labor market dynamics of the treatment and control groups in the pre-policy period – (Female wage workers). *Source:* Author's own calculation based on micro-level data from THLFS provided by TURKSTAT. *Note:* The treatment group consists of those with intensity >0.5 and the control group consists of those with intensity ≤ 0.5

If common trend assumption holds, the treatment effect can be estimated by the difference-in-differences methodology, which is equivalent to the shift in the outcome of treatment group due to the policy. The graphs in the first row of Figure 2, the graphs in the second row and the graphs in the third row illustrates the trends for general labor market, formal labor market and informal labor market, respectively. From the graphical illustration, we see that the treatment and control groups follow the same trend regarding the employment rates as wage workers and hourly wages in the pre-policy period, especially for formal and informal labor markets. Therefore, we can conclude that the common trend assumption holds, and we can proceed to our analysis with difference-in-differences methodology to find the casual effect of the 2008 employment subsidy policy on the labor market dynamics of female wage workers.

CHAPTER 7

RESULTS AND DISCUSSION

In this section, I present and discuss the estimated effect of the 2008 employment subsidy program on labor market outcomes of women of working age. Since the 2008 policy subsidize formal employment of wage earners by design, the policy effects are estimated separately for formal and informal labor market in addition to their joint effects on female labor market in general. Two specifications are used to capture the effect of the policy; the first specification that takes "wage worker" as a dependent variable investigates the policy effect on the probability of employed as formal wage workers, the second specification that takes "natural logarithm of hourly wage" as a dependent variable investigates the policy effect on hourly wages of women. The estimated coefficients obtained from these two specifications can help us to grasp the full picture of the policy effect on the labor market outcomes, which depends on the elasticity of labor supply and labor demand as well as on the substitutability of workers.[8]

The estimated coefficients for the 2008 policy effect which comes from separate OLS regressions are presented in each cell in accordance with the following format. Column 1 specifies the labels of the dependent variables in OLS regressions for the two separate specifications. Columns labeled as "Model" presents the estimated coefficients for the 2008 policy effect together with standard errors presented in parenthesis. All standard errors are clustered at NUTS-2 region level.

[8] See Conceptual Framework section for the details.

Columns labeled as "Baseline" reports the mean values for dependent variables for each labor market types. Baseline values are essential to compare estimated policy effects in terms of economic significance. In other words, comparison of the estimated policy effects is economically meaningful if the magnitude of the effects relative to baseline values are considered.

In the following subsections, the estimation results for the effect of the 2008 employment subsidy program on labor market outcomes of women are presented.

7.1 The results for the policy effect on female employment

For the policy effect on female employment, we use Equation 6.1 which treats post-policy years 2010, 2011 and 2012 as a single post-treatment period. Therefore, the estimated coefficients obtained from Equation 6.1 gives the composite effect of the 2008 policy in post-policy years. Table 3 summarizes the estimation results for the 2008 policy effect on the female wage workers.

Table 3. The Policy Effect on Female Employment - OLS Estimates

	Labor Market		Formal Labor Market		Informal Labor Market	
Dependent Variable	Model	Baseline	Model	Baseline	Model	Baseline
A) Wage Worker	0.006	0.139	0.015***	0.103	-0.009*	0.036
	(0.005)		(0.004)		(0.005)	
# of Obs.	932,521		932,521		932,521	
B) Wage	-0.049	5.585	-0.001	6.749	-0.173***	2.309
	(0.034)		(0.029)		(0.050)	
# of Obs.	109,647		84,446		25,201	

Notes: The sample includes data from 2005-2007 and 2010-2012 rounds of Turkish Household Labor Force Survey. Each cell shows the estimates for the key variable of interest (policy effect) in a separate OLS regression of the dependent variable, specified in column (1), effects. Individual-specific control variables include full interaction of marital status, eleven age categories, urban-rural areas and four education categories. The age groups are 18-20, 20-22, 23-25, 26-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, and 60-64. The education categories are (i) illiterate and literate but no diploma, (ii) primary school or middle school diploma, (iii) any high school diploma, (iv) college or university diploma. The wage worker generates a binary variable that takes value of 1 if an individual is a wage earner and 0 otherwise. The wage variable is the natural logarithm of individual's reported hourly wage. Standard errors, given in parentheses, are clustered at the NUTS-2 region level. *, **, or *** indicates significance at the 10%, 5% and 1% levels, respectively, on the key variable of interest, a set of individual-specific control variables, the NUTS2-level region fixed effects and the year fixed effects.

In the first row of Table 3, the estimated policy effects on employment probability of female wage workers along with the corresponding baseline values are presented. The policy has no effect on the probability of employed as wage workers whereas we have an evidence that the full treatment effect of the policy is 1.5 percentage points increase in the likelihood of being formally employed and 0.9 percentage points decrease in the likelihood of being informally employed. These estimated coefficients account for the difference between the employment probability of female wage workers in fully treated subregions (intensity=1) and that of female wage workers in never treated subregions (intensity=0) due to the 2008 policy. Negative policy effect on informal employment of female wage workers can be explained by the substitution of informal wage workers with formal wage workers.

In the second row, the estimated policy effects on the wages of female wage workers are presented. The estimation results imply that the policy has no statistically significant effect on wages in female labor market. Even though we estimated a positive policy effect on formal employment, there is no policy effect on wages of women in formal labor market. This could be explained by the fact that the subsidy to employer's contribution to social security premiums are calculated from the lower threshold of the base income subject to premium, which favors employment of minimum wage workers most. Then, we could expect no change in wages of female workers even if the policy leads to an increase in the demand for formal female wage workers. However, this explanation requires a further investigation.

The negative policy effect on informal employment of female wage workers is accompanied by a decrease in wages of women in informal labor market. For informal labor market, we have an evidence that the policy leads to 17.3 percent

decrease in the wages of women in fully treated subregions compared to the wages of women in never treated subregions. The reason behind such big effect on wages in informal labor market could be explained by the possibility that females on the top of wage distribution were more likely to benefit from transition from informal to formal employment thanks to the policy.

7.2 Robustness checks

As a robustness test, I check whether the estimation results in our original setup is robust to a modification in sample size or to an additional control for a regional covariate.

First, we re-estimate the policy effect with selection of different samples sizes. Table 4 shows the estimation results for the samples of different size which are obtained by dropping equal number of years from the pre-policy and post-policy periods. Section 2 in Table 4 shows the estimation results for the policy effect using the sample obtained by dropping the observations belonging to year 2005 and to year 2012. Section 3 in Table 4 shows the estimation results for the sample including observations from 2005 and 2012 only.

Comparing the results, we see that the policy effect on formal and informal employment of women as wage workers are robust to the change in the length of pre and post-policy periods. Even with the shortest sample covering 2007 and 2010 of THLFS, the policy effects on formal and informal employment levels remains statistically significant. The effect on informal hourly wages vanishes only for the shortest sample in the third section. However, using short sample leads us to lose information which were already available to us while rule-of thumb is to use larger

samples. This is because smaller sample size (n) means higher variance and this deteriorates the precision of our estimation results.

Table 4. The Policy Effect on Female Employment - for Different Sample Sizes - OLS Estimates

	Labor Market	Formal Labor Market	Informal Labor Market
Dependent Variable	Model	Model	Model
1) 2005-2007 & 2010-2012			
A) Wage Worker	0.006	0.015***	-0.009*
	(0.005)	(0.004)	(0.005)
# of Obs.	932,521	932,521	932,521
B) Wage	-0.049	-0.001	-0.173***
	(0.034)	(0.029)	(0.050)
# of Obs.	109,647	84,446	25,201
2) 2006-2007 & 2010-2011			
A) Wage Worker	0.003	0.011***	-0.008*
	(0.005)	(0.003)	(0.005)
# of Obs.	623,350	623,350	623,350
B) Wage	-0.032	-0.001	-0.137**
	(0.036)	(0.033)	(0.050)
# of Obs.	72,088	55,372	16,716
3) 2007 & 2010			
A) Wage Worker	-0.001	0.010**	-0.010**
	(0.006)	(0.004)	(0.005)
# of Obs.	309,904	309,904	309,904
B) Wage	-0.001	0.019	-0.084
	(0.031)	(0.030)	(0.052)
# of Obs.	35,199	27,310	7,889

Notes: Each cell shows the estimates for the key variable of interest (policy effect) in a separate OLS regression of the dependent variable, specified in column (1), on the key variable of interest, a set of individual-specific control variables, the NUTS2-level region fixed effects and the year fixed effects. Individual-specific control variables include full interaction of marital status, eleven age categories, urban-rural areas and four education categories. The age groups are 18-20, 20-22, 23-25, 26-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, and 60-64. The education categories are (i) illiterate and literate but no diploma, (ii) primary school or middle school diploma, (iii) any high school diploma, (iv) college or university diploma. The wage worker generates a binary variable that takes value of 1 if an individual is a wage earner and 0 otherwise. The wage variable is the natural logarithm of individual's reported hourly wage. Standard errors, given in parentheses, are clustered at the NUTS-2 region level. *, **, or *** indicates significance at the 10%, 5% and 1% levels, respectively.

Second, Table 5 below summarizes the estimation results for the policy effect with an additional control for regional unemployment rates as a regional covariate. We observe that the sign and statistical significance of the estimated coefficients

remains the same whereas the estimated effects decrease in absolute terms if we control for regional unemployment rates, but the decrease is not economically significant. Therefore, we can conclude that our identification is also robust to an additional control for a regional covariate.

Table 5. The Policy Effect on Female Employment With the Regional Covariate - OLS Estimates

	Labor Market		Formal Labor Market		Informal Labor Market	
Dependent Variable	Model	Baseline	Model	Baseline	Model	Baseline
A) Wage Worker	0.005	0.139	0.014***	0.103	-0.009*	0.036
	(0.005)		(0.004)		(0.005)	
# of Obs.	932,521		932,521		932,521	
B) Wage	-0.040	5.585	-0.002	6.749	-0.149***	2.309
	(0.030)		(0.029)		(0.043)	
# of Obs.	109,647		84,446		25,201	

Notes: The sample includes data from 2005-2007 and 2010-12 rounds of Turkish Household Labor Force Survey. Each cell shows the estimates for the key variable of interest (policy effect) in a separate OLS regression of the dependent variable, specified in column (1), effects. Individual-specific control variables include full interaction of marital status, eleven age categories, urban-rural areas and four education categories. The age groups are 18-20, 20-22, 23-25, 26-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, and 60-64. The education categories are (i) illiterate and literate but no diploma, (ii) primary school or middle school diploma, (iii) any high school diploma, (iv) college or university diploma. The wage worker generates a binary variable that takes value of 1 if an individual is a wage earner and 0 otherwise. The wage variable is the natural logarithm of individual's reported hourly wage. Standard errors, given in parentheses, are clustered at the NUTS-2 region level. *, **, or *** indicates significance at the 10%, 5% and 1% levels, respectively, on the key variable of interest, a set of individual-specific control variables, the NUTS2-level region fixed effects and the year fixed effects.

7.3 The results for year-specific policy effects

Table 6 below indicates the estimation results for the year-specific treatment effects of the 2008 subsidy policy. Year-specific results are obtained using the Equation (6.2) which disaggregates the policy treatment effect into years. The disaggregation of the policy effect enables us to see whether the policy was more effective in specific years or the effect is evenly distributed over years.

From Table 6, we see that the policy is effective in promoting formal employment and discouraging informality of female wage workers in all post-treatment years. It has an increasing effect in absolute terms on labor market

outcomes over the years in the post-treatment period. Increasing trend in the policy effect can be explained by the fact that the period of application to the subsidy package was extended with law #5838 on February 2009 and law #6111 on February 2011. Since the application period was extended, employers could benefit from the hiring subsidy for new employments even after the announcement of the 2008 employment subsidy program.

Table 6. The Year-Specific Policy Effect on Female Employment - OLS Estimates

	Labor Market	Formal Labor Market	Informal Labor Market
Dependent Variable	Model	Model	Model
A) Wage Worker			
2010	0.001	0.011***	-0.010*
	(0.005)	(0.003)	(0.005)
2011	0.006	0.012***	-0.006
	(0.005)	(0.004)	(0.005)
2012	0.010	0.022***	-0.012**
	(0.007)	(0.006)	(0.006)
B) Wage			
2010	-0.030	0.006	-0.137**
	(0.035)	(0.028)	(0.054)
2011	-0.053	-0.009	-0.165***
	(0.039)	(0.031)	(0.050)
2012	-0.060	-0.001	-0.211***
	(0.036)	(0.033)	(0.065)

Notes: The sample includes data from 2005-2007 and 2010-2012 rounds of Turkish Household Labor Force Survey. Each cell shows the estimates for the key variable of interest (policy effect) in a separate OLS regression of the dependent variable, specified in column (1), effects. Individual-specific control variables include full interaction of marital status, eleven age categories, urban-rural areas and four education categories. The age groups are 18-20, 20-22, 23-25, 26-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, and 60-64. The education categories are (i) illiterate and literate but no diploma, (ii) primary school or middle school diploma, (iii) any high school diploma, (iv) college or university diploma. The wage worker generates a binary variable that takes value of 1 if an individual is a wage earner and 0 otherwise. The wage variable is the natural logarithm of individual's reported hourly wage. Standard errors, given in parentheses, are clustered at the NUTS-2 region level. *, **, or *** indicates significance at the 10%, 5% and 1% levels, respectively, on the key variable of interest, a set of individual-specific control variables, the NUTS2-level region fixed effects and the year fixed effects.

7.4 The policy effects by age and education subgroups

So far, we estimated the policy effect by using all women in the sample, but the sample covers all women of working age between 18 to 64 with different educational backgrounds. First concern about the estimation with the whole sample is that there could be age-related and/or education-related unobserved heterogeneity within the sample which cannot be controlled by our model but affects employment outcomes. Second, we are concerned about whether the policy addresses all women in the target group as intended or the effects are more pronounced for specific age and education groups. Therefore, forming age and education groups can also help us to make further inferences about the effectiveness of the 2008 policy.

7.4.1 The results for age groups

Once age-related unobserved heterogeneity is considered, it is obvious that a woman in her twenties is substantially different from a woman in her fifties in terms of labor market prospects. Therefore, I divide the sample into three age categories as those aged 18 to 29, those aged 30 to 44 and those aged 45 to 64. This division helps us to claim that women in the same age category are more homogenous in terms of unobserved factors affecting employment outcomes.

Table 7 presents the estimation results for the 2008 policy effect on female employment by age groups. For women in age group 18-29, we see that the full treatment effect of the policy is 1.4 percentage points increase in formal employment and 1.7 percentage points decrease in informal employment. However, there is an evidence that women aged 18 to 29 experiences up to 17.3 percent decrease in wages

in informal labor market due to the policy effect whereas no policy effect on hourly wages of formal female workers is detected.

Women in age group 30-44 experiences employment gains up to 1.4 percentage points and improvements in formal employment up to 2.3 percentage points depending on the treatment intensity. The only policy effect on wages of women aged 30 to 44 is detected for informal labor market, which amounts to 16 percent decrease for those in full treatment subregions.

Table 7. The Policy Effect on Female Employment - by Age Groups - OLS Estimates

	Labor Market		Formal Labor Market		Informal Labor Market	
Dependent Variable	Model	Baseline	Model	Baseline	Model	Baseline
A) Wage Worker						
1) 18-29	-0.003	0.184	0.014**	0.137	-0.017***	0.047
	(0.007)		(0.005)		(0.005)	
# of Obs.	289,768		289,768		289,768	
2) 30-44	0.014*	0.169	0.023***	0.130	-0.009	0.039
	(0.007)		(0.007)		(0.007)	
# of Obs.	336,383		336,383		336,383	
3) 45-64	0.010**	0.053	0.011***	0.031	-0.000	0.021
	(0.004)		(0.002)		(0.004)	
# of Obs.	306,370		306,370		306,370	
B) Wage						
1) 18-29	-0.066	4.392	-0.009	5.159	-0.137***	2.170
	(0.046)		(0.040)		(0.048)	
# of Obs.	45,937		35,458		10,479	
2) 30-44	-0.014	6.585	0.003	7.848	-0.160**	2.371
	(0.029)		(0.028)		(0.068)	
# of Obs.	50,104		40,259		9,845	
3) 45-64	-0.086*	6.305	0.016	8.876	-0.268***	2.512
	(0.044)		(0.041)		(0.076)	
# of Obs.	13,606		8,729		4,877	

Notes: Each cell shows the estimates for the key variable of interest (policy effect) in a separate OLS regression of the dependent variable, specified in column (1), on the key variable of interest, a set of individual-specific control varibles, the NUTS2-level region fixed effects and the year fixed effects. Individual-specific control variables include full interaction of marital status, eleven age categories, urban-rural areas and four education categories. The age groups are 18-20, 20-22, 23-25, 26-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, and 60-64. The education categories are (i) illiterate and literate but no diploma, (ii) primary school or middle school diploma, (iii) any high school diploma, (iv) college or university diploma. The wage worker generates a binary variable that takes value of 1 if an individual is a wage earner and 0 otherwise. The wage variable is the natural logarithm of individual's reported hourly wage . Standard errors, given in parentheses, are clustered at the NUTS-2 region level. *, **, or *** indicates significance at the 10%, 5% and 1% levels, respectively.

For women aged 45 to 64, there is an evidence that the policy leads to employment gains as well as improvements in formality. Similar to the results for those in age group 30-44, the only statistically significant effect of the policy is estimated for wages in informal labor market of women aged 45 to 64. The estimated policy effect is a 26.8 percent decrease in informal wages of those in full treatment subregions.

In terms of baseline values, the treatment effects of the policy on labor market dynamics are more pronounced for women in age group 45-64. They experience the highest employment gains and the highest increase in formality as well as the highest decrease in informal wages. The effect on informal labor market is contingent on labor supply characteristics of women from different education groups. For informal sector, we could assume that elasticity of labor supply in informal market is inversely related to the age of an employee. However, this assumption needs further investigations.

7.4.2 The results for education groups

In order to have more homogenous sub-samples for the analysis, I divide the sample into four education categories; 1. illiterate but literate but no diploma, 2. primary and middle school diploma, 3. high school diploma or above. Education groups determined based on the similarities of employment prospects and labor market characteristics of female wage workers. Thus, women in the same education group become more homogenous in terms of labor market dynamics. The estimation procedure is repeated for each education groups separately.

In Table 8, we have the estimation results for differential effects of the policy on education groups. For formal labor market of women with different educational attainments, the policy effects are persistent for all education groups except for women with high school diploma or above. Compared to the baseline values of each education groups, the most economically significant effect is estimated on women who are either illiterate or literate but with no diploma.

Table 8. The Policy Effect on Female Employment - by Education Groups - OLS Estimates

	Labor Market		Formal Labor Market		Informal Labor Market	
Dependent Variable	Model	Baseline	Model	Baseline	Model	Baseline
A) Wage Worker						
Illiterate or literate but no diploma	0.006	0.038	0.009***	0.008	-0.003	0.030
	(0.006)		(0.003)		(0.008)	
# of Obs.	220,975		220,975		220,975	
Primary or middle school diploma	0.006	0.086	0.015***	0.044	-0.009	0.041
	(0.007)		(0.005)		(0.007)	
# of Obs.	487,269		487,269		487,269	
High School diploma or above	-0.004	0.338	0.004	0.306	-0.008**	0.031
	(0.007)		(0.007)		(0.003)	
# of Obs.	224,277		224,277		224,277	
B) Wage						
Illiterate or literate but no diploma	-0.188***	2.099	0.023	2.963	-0.236***	1.865
	(0.066)		(0.070)		(0.056)	
# of Obs.	5,685		1,398		4,287	
Primary or middle school diploma	-0.134**	2.719	-0.020	3.226	-0.197***	2.181
	(0.056)		(0.028)		(0.067)	
# of Obs.	33,932		18,934		14,998	
High School diploma or above	-0.017	7.416	-0.006	7.874	-0.045	3.020
	(0.036)		(0.036)		(0.046)	
# of Obs.	70,030		64.114		5.916	

Notes: The sample includes data from 2005-2007 and 2010-2012 rounds of Turkish Household Labor Force Survey. Each cell shows the estimates for the key variable of interest (policy effect) in a separate OLS regression of the dependent variable, specified in column (1), effects. Individual-specific control variables include full interaction of marital status, eleven age categories, urban-rural areas and four education categories. The age groups are 18-20, 20-22, 23-25, 26-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, and 60-64. The education categories are (i) illiterate and literate but no diploma, (ii) primary school or middle school diploma, (iii) any high school diploma, (iv) college or university diploma. The wage worker generates a binary variable that takes value of 1 if an individual is a wage earner and 0 otherwise. The wage variable is the natural logarithm of individual's reported hourly wage. Standard errors, given in parentheses, are clustered at the NUTS-2 region level. *, **, or *** indicates significance at the 10%, 5% and 1% levels, respectively, on the key variable of interest, a set of individual-specific control variables, the NUTS2-level region fixed effects and the year fixed effects.

The effect is estimated as 0.9 percentage points increase in the probability of formally employed as wage workers while the average formal employment as wage workers is 0.8 percent among women in this group. It means that the policy doubles the formal employment of illiterate women or women with no diploma. The policy effect on women with primary or middle school diploma is also remarkable and estimated as 1.5 percentage points increase in the likelihood of formally employed as a wage worker while the formal employment level as wage workers among these women is 4.4 percent. However, we observe no effect on their formal hourly wages, which could again be the result of an increase in formal employment of minimum wage earners.

For informal labor market, we see that without any change in employment levels, the policy leads to a substantial percentage decrease in the informal wages of women with at most primary or middle school diploma. An explanation for around 20 percent decrease in informal wages of women with low educational attainments might be that those with highest informal hourly wages are the ones whose informal employment become least advantageous alternative to formal employment from employers' perspective due to the subsidy program. Thus, a decrease in labor demand for informal employment of women with low educational attainments leads to decrease in informal hourly wages without a decrease in employment levels. For women with low educational attainments, we could expect their labor supply to be almost inelastic since they are the most disadvantaged ones in the labor market in terms of employment opportunities. In other words, whatever the wage level is, their supply of labor in informal market stays almost constant. Furthermore, we observe that the policy leads to a decrease in informal employment of women with high school diploma or above without any effect on their informal hourly wages. This

might be because that women with high educational attainments are likely to have very elastic labor supply in informal sector since they do not need to work informally whatever the wage level is. They have more employment opportunities in labor market than those with low educational attainments and women with high educational attainments are more likely to come from more prosperous families.

7.5 The results for the policy effect on men aged 30 or above

It is worth recalling that men aged 30 or above are not in the target group of the 2008 employment subsidy policy. However, while the policy decreases the cost of employment of those in the target group, it implicitly means that relative cost of employment of older men with respect to the target group goes up. In order to explore whether there is a substitution effect of the policy between male and female workers, we replicate the estimation procedure using the sample of men aged 30 or above and obtain the estimation results for the policy effect in Table 9.

Table 9. The Policy Effect on Men Aged 30 or Above - OLS Estimates

	Labor Market		Formal Labor Market		Informal Labor Market	
Dependent Variable	Model	Baseline	Model	Baseline	Model	Baseline
A) Wage Worker	-0.016	0.440	0.012	0.341	-0.028**	0.099
	(0.010)		(0.010)		(0.011)	
# of Obs.	574,207		574,207		574,207	
B) Wage	-0.006	5.948	0.035	6.849	-0.133**	2.864
	(0.032)		(0.024)		(0.049)	
# of Obs.	229,751		183,217		46,533	

Notes: The sample includes data from 2005-2007 and 2010-2012 rounds of Turkish Household Labor Force Survey. Each cell shows the estimates for the key variable of interest (policy effect) in a separate OLS regression of the dependent variable, specified in column (1), effects. Individual-specific control variables include full interaction of marital status, eleven age categories, urban-rural areas and four education categories. The age groups are 18-20, 20-22, 23-25, 26-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, and 60-64. The education categories are (i) illiterate and literate but no diploma, (ii) primary school or middle school diploma, (iii) any high school diploma, (iv) college or university diploma. The wage worker generates a binary variable that takes value of 1 if an individual is a wage earner and 0 otherwise. The wage variable is the natural logarithm of individual's reported hourly wage. Standard errors, given in parentheses, are clustered at the NUTS-2 region level. *, **, or *** indicates significance at the 10%, 5% and 1% levels, respectively, on the key variable of interest, a set of individual-specific control variables, the NUTS2-level region fixed effects and the year fixed effects.

In Table 9, we see that there is a substitution effect of the policy on informal employment of male wage workers but there is no evidence of any effect on formal employment. The difference between the policy's substitution effect on formal and informal employment can be explained by the fact that there is a cost of replacing formal wage workers whereas there is no monetary cost of replacing informal wage workers

. According to Article 14 of labor law #1475, an employer has to pay the severance allowance to fire a formal worker arbitrarily if the worker is employed at least for one year and if he/she does not violate any conditions on the labor contract. Considering the coverage and the duration of subsidies, it is economically more advantageous strategy for an employer to substitute informal male workers aged 30 or above with female wage workers. This also prevents any displacement cost of the subsidy program, which could stem from laying off existing formal workers to hire subsidized workers.

7.6 Placebo test

As a validity check of DID methodology, I also conduct a placebo test on identification strategy. A placebo test helps us to ensure that our identification strategy does not yield any policy effect when there is no policy treatment at all. For that purpose, we use the data from the pre-policy period including 2004-2005 as pre-policy years and 2006 -2007 as post-policy years. In other words, we define a pseudo treatment as if the policy became active in 2006.

Table 10 below shows the estimation results for the placebo test. We see that estimated coefficients for the pseudo treatment effect are small (economically insignificant) even if we consider the baseline values for employment levels and neither of them are statistically significant. Therefore, we can conclude that our identification strategy passes the placebo test.

Table 10. The Placebo Policy Effect on Female Employment - OLS Estimates

	Labor Market		Formal Labor Market		Informal Labor Market	
Dependent Variable	Model	Baseline	Model	Baseline	Model	Baseline
A) Wage Worker	0.003	0.119	0.003	0.083	0.000	0.036
	(0.004)		(0.003)		(0.003)	
# of Obs.	594,444		594,443		594,443	
B) Wage	-0.003	4.954	0.012	6.099	0.019	2.304
	(0.027)		(0.024)		(0.038)	
# of Obs.	59,203		43,169		16,034	

Notes: The sample includes data from 2004-2005 and 2006-07 rounds of Turkish Household Labor Force Survey. Each cell shows the estimates for the key variable of interest (policy effect) in a separate OLS regression of the dependent variable, specified in column (1), effects. Individual-specific control variables include full interaction of marital status, eleven age categories, urban-rural areas and four education categories. The age groups are 18-20, 20-22, 23-25, 26-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, and 60-64. The education categories are (i) illiterate and literate but no diploma, (ii) primary school or middle school diploma, (iii) any high school diploma, (iv) college or university diploma. The wage worker generates a binary variable that takes value of 1 if an individual is a wage earner and 0 otherwise. The wage variable is the natural logarithm of individual's reported hourly wage. Standard errors, given in parentheses, are clustered at the NUTS-2 region level. *, **, or *** indicates significance at the 10%, 5% and 1% levels, respectively, on the key variable of interest, a set of individual-specific control variables, the NUTS2-level region fixed effects and the year fixed effects.

CHAPTER 8

CONCLUSION

Turkish labor market is characterized by low female labor participation rate and low levels of female employment in the last two decades. The 2008 employment subsidy policy is an example of a hiring subsidy targeting relatively disadvantaged groups, namely all women and young men, in Turkey. The policy was intended to generate employment for those in the target group all over the country by subsidizing an employer's contribution to social security premium for a period of 5 years, which means a reduction in non-wage costs of an employment. In practice, the 2008 policy was not actually effective countrywide since employer's contribution to social security premiums had already been subsidized in 49 provinces (out of 81 provinces) which were covered by the regional incentives until the end of 2012. This paper examines the casual effect of the 2008 policy on female employment and contributes to the literature by being the first study which incorporates the impact of regional incentives on the treatment effect of the 2008 policy into the econometric analysis.

This paper employs difference-in-differences (DID) methodology where treatment and control groups are determined by the variation in the treatment intensity of women at NUTS-2 level due to the regional incentives. Nationally representative micro-level dataset THLFS provided by TURKSTAT is used from year 2005 to 2012 except 2008 and 2009. The internal validity of identification strategy is tested with various robustness checks and with the placebo test

I find that the policy increases the formal employment of women as wage workers but no policy effect on hourly wages is estimated. Since the decrease in the

costs of an employment is relatively larger for employment of minimum wage workers thanks to the policy, an increase in the formal employment without any wage effects could be explained by an increase in the employment of minimum wage workers. The informal employment of female wage workers and informal hourly wages go down due to the substitution effect of the policy. Disaggregating the policy effect over years, we see that the policy has an increasing effect in all years belonging to the post-treatment period. Stronger effect of the policy over years could be associated with an increasing use of the subsidy program where new entries to the program were made possible with the series of legal arrangements. Moreover, the policy was effective in increasing formal employment of women as wage workers in all age groups, but the effects are stronger for women who are older than 30 years of age. While the substitution effect of the policy on informal employment of women mostly stems from the substitution of women in age group 18-29, the effect on informality is contingent on the wage elasticity of women in different age groups. Furthermore, the policy effect on formal employment is more pronounced for women with at most primary or middle school diploma. Lastly, from the policy effect on labor market outcomes of men aged 30 or above, we can infer that substitution does not take place between formal employees, so we do not have to worry about displacement cost of the 2008 policy for formal employments.

To summarize, I estimate the casual effect of the 2008 employment subsidy policy on women's labor market outcome while also accounting for the presence of regionally targeted employment subsidies. The policy was successful in encouraging formality of female workers in Turkish labor market but there is a differential effect of the policy on female workers with different labor characteristics. Since the policy effects are economically significant for older women and women with low

educational attainments, future studies could investigate whether this gains in formality of female workers are temporary or not after the employment subsidy program ends.

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APPENDIX A

SUPPLEMENTARY TABLES

Table A1. The Classification of Statistical Regions in Turkey at NUTS-2 Level

Region No	Region	Region Code	Corresponding Provinces
1	Istanbul	TR10	Istanbul
2	Tekirdag	TR21	Tekirdag, Edirne, Kirklareli
3	Balikesir	TR22	Balikesir, Canakkale
4	Izmir	TR31	Izmir
5	Aydin	TR32	Aydin, Denizli, Mugla
6	Manisa	TR33	Manisa, Afyonkarahisar, Kutahya, Usak
7	Bursa	TR41	Bursa, Eskisehir, Bilecik
8	Kocaeli	TR42	Kocaeli, Sakarya, Düzce, Bolu, Yalova
9	Ankara	TR51	Ankara
10	Konya	TR52	Konya, Karaman
11	Antalya	TR61	Antalya, Isparta, Burdur
12	Adana	TR62	Adana, Mersin
13	Hatay	TR63	Hatay, Kahramanmaras, Osmaniye
14	Kirikkale	TR71	Kirikkale, Aksaray, Nigde, Nevsehir, Kirsehir
15	Kayseri	TR72	Kayseri, Sivas, Yozgat
16	Zonguldak	TR81	Zonguldak, Karabuk, Bartin
17	Kastamonu	TR82	Kastamonu, Cankiri, Sinop
18	Samsun	TR83	Samsun, Tokat, Corum, Amasya
19	Trabzon	TR90	Trabzon, Ordu, Giresun, Rize, Artvin, Gumushane
20	Erzurum	TRA1	Erzurum, Erzincan, Bayburt
21	Agri	TRA2	Agri, Kars, Igdir, Ardahan
22	Malatya	TRB1	Malatya, Elazig, Bingol, Tunceli
23	Van	TRB2	Van, Mus, Bitlis, Hakkari
24	Gaziantep	TRC1	Gaziantep, Adiyaman, Kilis
25	Sanliurfa	TRC2	Sanliurfa, Diyarbakir
26	Mardin	TRC3	Mardin, Batman, Sirnak, Siirt

Table A2. The Targeted Provinces by Employment Subsidy Programs

Province	Regional Incentives		2008 Policy
	Law #5084	Law #5350	Law #5763
Adana			x
Adiyaman	x		
Afyonkarahisar	x		
Agri	x		
Amasya	x		
Ankara			x
Antalya			x
Artvin		x	
Aydin			x
Balikesir			x
Bilecik			x
Bingol	x		
Bitlis	x		
Bolu			x
Burdur			x
Bursa			x
Canakkale			x
Cankiri	x		
Corum		x	
Denizli			x
Diyarbakir	x		
Edirne			x
Elazig		x	
Erzincan	x		
Erzurum	x		
Eskisehir			x
Gaziantep			x
Giresun	x		
Gumushane	x		
Hakkari	x		
Hatay			x
Isparta			x
Icel			x
Istanbul			x
Izmir			x
Kars	x		
Kastamonu		x	
Kayseri			x

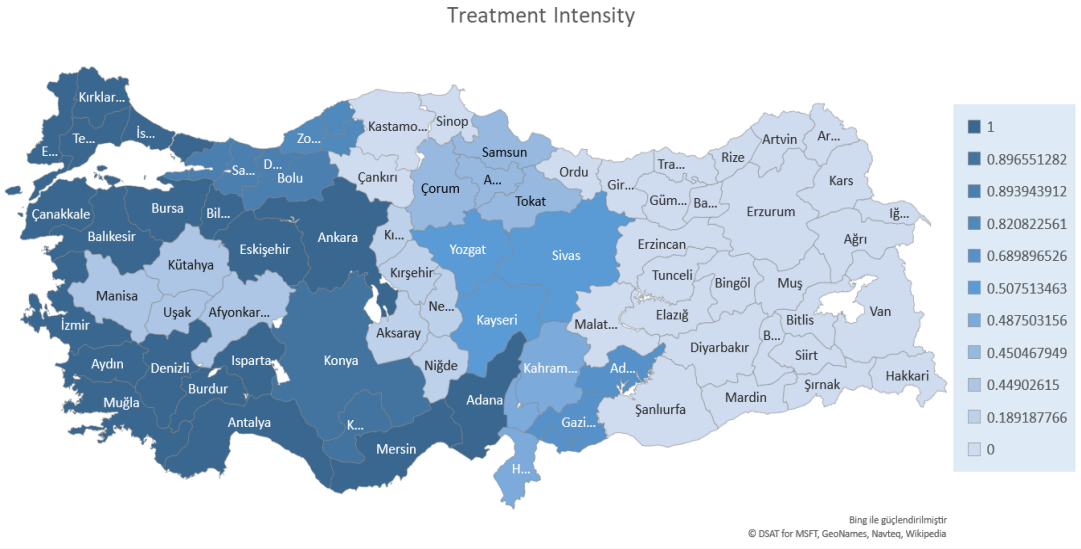
Province	Regional Incentives		2008 Policy
	Law #5084	Law #5350	Law #5763
Kirklareli			x
Kirsehir	x		
Kocaeli			x
Konya			x
Kutahya		x	
Malatya	x		
Manisa			x
Kahramanmaras		x	
Mardin	x		
Mugla			x
Mus	x		
Nevsehir		x	
Nigde		x	
Ordu	x		
Rize		x	
Sakarya			x
Samsun			x
Siirt	x		
Sinop	x		
Sivas	x		
Tekirdag			x
Tokat	x		
Trabzon		x	
Tunceli		x	
Sanliurfa	x		
Usak	x		
Van	x		
Yozgat	x		
Zonguldak			x
Aksaray	x		
Bayburt	x		
Karaman		x	
Kirikkale			x
Batman	x		
Sirnak	x		
Bartin	x		
Ardahan	x		
Igdir	x		
Yalova			x
Karabuk			x
Kilis		x	
Osmaniye	x		
Duzce	x		

Table A3. Descriptive Statistics - Men Aged 30 or Above

Variable	# of Obs	Mean	Std. Dev.	Min	Max
Policy	574,208	0.344	0.444	0	1
Year	574,208	2008.513	2.619	2005	2012
Marital Status	574,207	0.937	0.242	0	1
Age	574,208	45.554	9.184	30	64
Wage Worker	574,208	0.424	0.494	0	1
Formal Wage Worker	574,207	0.328	0.469	0	1
Informal Wage Worker	574,207	0.097	0.295	0	1
Hourly Wage	243,718	5.973	5.684	0	676.8837
Formal Hourly Wage	188,304	6.923	5.889	0	676.8837
Informal Hourly Wage	55,413	2.744	3.278	0	165.1163
Educational Attainment					
illiterate or literate but no diploma	574,208	0.070	0.255	0	1
primary or middle school diploma	574,208	0.632	0.482	0	1
any high school diploma	574,208	0.173	0.379	0	1
college or university diploma	574,208	0.125	0.330	0	1
Urban	574,208	0.704	0.457	0	1
Regional Unemployment Rate	574,208	0.047	0.014	0.016	0.088

APPENDIX B

TREATMENT INTENSITY VALUES AT NUTS-2 LEVEL



Source*:* Author's own calculation based on 2007 provincial population data provided by TURKSTAT.

APPENDIX C

DEFINITION OF VARIABLES

- Education Category: There are 7 categories in the Turkish Household Labor Force Survey dataset : 1) illiterate , 2) literate but no diploma, 3) primary school diploma, 4) middle school diploma, 5) general high school diploma, 6) vocational or technical high school diploma, 7) college or university diploma. In this study, I define new education categories in 4 groups as 1) illiterate and literate but no diploma, 2) primary or middle school diploma, 3) any high school diploma, 4) college or university diploma.
- Formal Wage Worker: A binary variable that takes value of 1 if an individual is employed as a wage earner and is registered to social security instutition and 0 otherwise.
- Informal Wage Worker: A binary variable that takes value of 1 if an individual is employed as a wage earner but has no social security coverage and 0 otherwise.
- Intensity: A continuous variable calculated as the ratio of the sum of provincial populations in a NUTS-2 level subregion not affected by the regional incentives to the total population of that subregion.
- Marital Status: A binary variable that takes value of 1 if an individual is married and 0 otherwise.
- Regional Unemployment Rate: A continuous variable calculated at NUTS-2 level for each year as the ratio of number of unemployed observations in a

subregion to number of total observations in that subregion by using observation weights in the dataset.

- Subsidy: A binary variable that takes value of 1 for 2010-2012 and 0 for 2005-2007.
- Wage Worker: A binary variable that takes value of 1 if an individual is employed as a wage earner and 0 otherwise.