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Analysis of the Effect of Reduced Corporate Income Tax Implementation on Employment in Turkey *

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Abstract

This paper investigates the effect of regional differences in corporate income tax reduction rates on employment within the scope of the reduced corporate income tax implementation put into effect in 2009. The implementation aims to encourage and increase investments, production, employment, and large-scale investments to increase international competitiveness, foreign direct investment and support Research and Development (R&D) activities, and eliminate regional development differences by reducing corporate income tax rates by region. This paper focuses on employment outcome in particular. The analysis relies on the "TurkStat Household Labor Force Survey Micro Dataset" in 2004-2021 for Turkey. Difference in Differences (DID) and Difference in Differences with Propensity Score Matching (DID-PSM) methods were used in the impact analysis of the tax policy discussed in the study. We employ DID and DID-PSM methods, designating respondents in regions with the highest corporate income tax reduction rates as treated subjects, and those with the lowest corporate income tax reduction rates as control subjects. The effects of regional differences in corporate income tax reduction rates on employment have been empirically demonstrated. The findings show that the regional differences in corporate income tax reduction rates on employment significantly and positively affect employment.

Keywords: Reduced Corporate Income Tax, Difference-in-Differences, Propensity Score Matching, Regional Tax Policies, Employment Outcomes, Household Labor Force Survey.

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1. INTRODUCTION

Factors such as regional disparities and insufficient investments have a negative impact on employment at a regional level (Taylor and Bradley,1997; Arestis and Mariscal,1998). In relatively underdeveloped regions, fostering employment and investments requires the implementation of selective macroeconomic policies (Toktaş et al., 2013). Recently, macroeconomic policies aimed at addressing the lack of investment and alleviating development disparities between regions, with the aim of fostering employment, have become increasingly significant. Tax incentives designed to enhance employment and investments are also categorized as part of these macroeconomic policies (Porsse et al., 2014).

In recent years, Turkey has implemented various policies to promote employment and facilitate investments. One such policy is the reduced corporate income tax, introduced through Article 9 of Law No. 5838 on February 18, 2009. One of the aims of this policy is to enhance employment. In this study, we aim to uncover the impact of regional differences in the corporate income tax reduction rates on employment within the scope of the reduced corporate income tax implementation. In the research conducted by the Republic of Turkey Ministry of Industry and Technology, General Directorate of Development Agencies, known as the "Socio-Economic Development Ranking of Provinces and Regions (2017)," provinces are classified into 6 regions based on their socio-economic development levels in Turkey. In the study, provinces from Region 1 and Region 6, where the corporate income tax reduction rate is implemented at the highest and lowest levels among the regions determined in the socio-economic development ranking research, are incorporated into the analysis. The underlying hypothesis suggests that the impact on the employment level is most pronounced when the reduction rate difference among regions is at its maximum level.

The paper is organized as follows after the introduction. In section 2, the framework of reduced corporate income tax implementation is briefly summarized. Section 3 reviews the earlier studies on employment incentive programs, including tax incentives. In Section 4, comprehensively outlines the methodology. Subsequently, in Section 5 we provide a description of the dataset and equation used in the empirical analysis. Empirical results are presented in Section 6. Eventually, section 7 discusses the main findings, constraints, and suggestions for further studies.

2. THE FRAMEWORK OF REDUCED CORPORATE INCOME TAX IMPLEMENTATION

Reduced corporate income tax implementation forms an essential component of the investment incentive system. The investment incentive system has a structure that considers the characteristics and potentials of the provinces, is regionally graded, and is supported by various incentive tools (Yavan, 2011, pp. 79-80). Below we delve into the regions involved in the reduced corporate income tax implementation, the reduction rates, and the discrepancies in these rates among the various regions.

Table 1. Classification of Provinces by Region (2017)

Region 1	Region 2	Region 3	Region 4	Region 5	Region 6
Ankara	Aydın	Adana	Afyonkarahisar	Bayburt	Ağrı
Antalya	Balıkesir	Burdur	Aksaray	Çankırı	Adıyaman
Bursa	Bilecik	Düzce	Amasya	Erzurum	Ardahan
Eskişehir	Bolu	Gaziantep	Artvin	Giresun	Batman
İstanbul	Çanakkale (Except Bozcaada and Gökçeada districts)*	Karaman	Bartın	Gümüşhane	Bingöl
İzmir	Denizli	Kırıkkale	Çorum	Kahramanmaraş	Bitlis
Kocaeli	Edirne	Kütahya	Elazığ	Kilis	Diyarbakır
Muğla	Isparta	Mersin	Erzincan	Niğde	Hakkari
Tekirdağ	Karabük	Rize	Hatay	Ordu	Iğdır
	Kayseri	Samsun	Kastamonu	Osmaniye	Kars
	Kırklareli	Trabzon	Kırşehir	Sinop	Mardin
	Konya	Uşak	Malatya	Tokat	Muş
	Manisa	Zonguldak	Nevşehir	Tunceli	Siirt
	Sakarya		Sivas	Yozgat	Şanlıurfa
	Yalova				Şırnak
					Van

Source: Republic of Turkey Ministry of Industry and Technology, General Directorate of Development Agencies (2019), "Socio-Economic development ranking of provinces and regions (2017)".

Within the reduced corporate income tax implementation, the degree to which the corporate income tax rate is reduced for investments varies based on regions. Table 1 illustrates the regions formed based on the provinces' socioeconomic development rankings, and identifies the provinces included within these regions.

Table 2. Investment Contribution Rates and Corporate Income Tax Reduction Rates in the Incentive System (Year 2012)

Started investing after 31/12/2013				
	Regional Incentive Implementations		**Large Scale Investments**	
Regions	Investment Contribution Rate (%)	Corporate Income Tax Reduction Rate (%)	Investment Contribution Rate (%)	Corporate Income Tax Reduction Rate (%)
1	10	30	20	30
2	15	40	25	40
3	20	50	30	50
4	25	60	35	60
5	30	70	40	70
6	35	90	45	90
Started investing until 31/12/2013				
	Regional Incentive Implementations		**Large Scale Investments**	
Regions	Investment Contribution Rate (%)	Corporate Income Tax Reduction Rate (%)	Investment Contribution Rate (%)	Corporate Income Tax Reduction Rate (%)
1	15	50	25	50
2	20	55	30	55
3	25	60	35	60
4	30	70	40	70
5	40	80	50	80
6	50	90	60	90

Source: Council of Minister's Decree No. 2012/3305 on Government Subsidies for Investments.

Table 2 contains the corporate income tax reduction rates to be applied and investment contribution rates for investments to be executed within the scope of large-scale investments and regional incentive practices. As indicated in Table 2, the highest reduction rate is applied in Region 6, identified as the relatively least developed region, while the lowest reduction rate is implemented in Region 1, recognized as the most developed region.

3. LITERATURE REVIEW

There are many studies investigating the effects of public policies such as tax or investment incentive programs. As we discussed in our study, some of them are also focused on tax policies (Giovanis et al. 2021; Hazman and Büyükben, 2020; Turner and Blagg, 2018; Ranchhod and Finn, 2016; Ljungqvist and Smolyansky,2014; Shuai and Chmura, 2013), while the others investigate the investment effects (Öz and Buyrukoğlu, 2017; Selim et al., 2014; Yavuz, 2010; Akan and Arslan, 2008; Bondonio and Greenbaum; 2006; Schalk and Untiedt, 2000). Many of the studies focus on the effects of policies on employment, in common.

In the literature review, it is evident that this subject had not previously undergone analysis utilizing advanced microeconometric methods. Additionally, there is a scarcity of research employing microeconometric methods to assess the impact of tax policies in Turkey. Following the literature review, it became evident that there were relatively few studies directly addressing the research topic. The studies by Shuai and Chmura (2013) and Ljungqvist and Smolyansky (2014) bear resemblance to our study.

Ljungqvist and Smolyansky (2014) conducted an analysis of the effects of changes in corporate income tax rates in the USA between 1969 and 2010 on employment and wages. They employed the DID method, which includes the spatial discontinuity approach. The findings revealed that during the period between 1969 and 2010, increases in corporate income tax rates were associated with notable declines in both employment and wage income. On the other hand, corporate income tax reductions were found to stimulate economic activity only when implemented during economic recessions.

Shuai and Chmura (2013) conducted a comparison of employment changes between states that enacted corporate income tax reductions and those that did not, for the period from 1990 to 2012 in USA. They employed the fixed-effect panel regression model method. The authors found that the employment growth rate in the states that implemented reduced corporate income tax rates during the period examined in the analysis is greater than that in states without such reductions.

Giovanis et al. (2021) investigated the effects of employment subsidy programs (income tax withholding allowance and social security premium support) on employment, wages, working hours and labor force participation by using DID and DID-PSM methods in Turkey for the 2008-2016 period. Findings show that these employment subsidy programs have a significant and positive effect on emphasized employment outcomes.

Turner and Blagg (2018) examined the effect of personal income tax changes, implemented in Kansas State compared to border neighboring states, on private sector employment using the DID method with 2004:1Q-2014:4Q quarterly data. Findings showed that the income tax changes made in Kansas State don't have a statistically significant effect on employment in the short term compared to border neighboring states.

Schalk and Untiedt (2000) aimed to analyze the effects of regional investment incentives on regional factor demand (investment and workforce), economic growth and income per capita between 1978-1989 using the panel time series method in West Germany. Consequently, findings showed that regional investment incentive practices have a positive effect on investments as well as increasing employment. However, the effects of regional investment incentives on economic growth and income per capita determined were insignificant.

Bondonio and Greenbaum (2006) investigated the effect of commercial investment incentives, granted by the European Regional Development Fund, on employment in northern and middle Italy between 1984-1998. DID method was used in their study. The authors found that these incentives have a positive and significant effect on employment.

Akan and Arslan (2008) examined the effects of investment incentives on sectoral employment levels using the time series analysis method between 1980-2006 in Turkey. They found that there is a linear and positive relationship between investment incentives and employment.

Yavuz (2010) discussed the impact of investment incentives on private sector investments and employment using the time series regression analysis method for the 1980-2008 period in Turkey. Findings indicate that the investment incentive policies have a positive and significant effect on employment.

Selim et al. (2014) aimed to analyze the effect of investment incentive certificates and fixed investments on employment using a panel regression model at the provincial level for the 2001-2012 period in Turkey. According to findings, it was revealed that both fixed investments and the number of investment incentive certificates have a statistically significant and positive effect on employment.

Balkan et al. (2016) examined the impact of the employment program implemented in 2008, with the objective of boosting registered employment among young men (aged 18-29) and women over 18 years old in Turkey. They used the DID method in their study. The study's findings indicated that the employment program led to a greater increase in the employment probability of women when compared to the control group.

Ranchhod and Finn (2016) examined the effect of "Employment Tax Incentive" on youth unemployment using the DID method with the 2011:1Q-2014:2Q quarterly data in South Africa. The findings show that "Employment Tax Incentive" does not have a statistically significant effect on youth employment in the short run.

Öz and Buyrukoğlu (2017) conducted an analysis of the influence of investment incentive policies that were implemented in Turkey from 1980 to 2012 on various macroeconomic variables. They employed the Vector Autoregressive Model method in their study. The authors concluded that the investment incentive policies carried out in Turkey between 1980 and 2012 had a significant and positive impact on both employment and economic growth.

Hazman and Büyükben (2020) investigated the impact of tax incentives applied in the provinces in the TR33 region in Turkey (Afyonkarahisar, Kütahya, Manisa, Uşak) between 2004 and 2017 on local economic growth and employment. The authors employed a panel regression model in their study. The results indicated that the VAT exemption has a positive effect on local economic growth, while customs duty exemption doesn't have a statistically significant effect. In terms of employment, it was observed that neither VAT exemption nor customs duty exemption has a statistically significant effect.

Reaching a consensus among the outcomes of studies examining the effects of tax and investment incentive programs on factors such as employment and economic growth can be challenging. However, upon reviewing the studies included in the literature, it is generally evident that the impact of tax and investment incentives on factors like employment and economic growth in Turkey is statistically significant and positive. The literature highlights a scarcity of studies that illuminate the economic consequences of tax incentives. Within this context, it is anticipated that this study may offer a valuable contribution to both the existing literature and policymakers.

4. METHODOLOGY

Evaluating the achievement of objectives through impact assessments of public policies, programs, or projects is highly significant from various aspects. The choice of impact assessment method depends on factors like the type of data, the temporal aspect, and how the observational units are integrated into the program. Impact assessment methods are categorized into two groups in basic: qualitative and quantitative methods. Among quantitative methods, there are two main divisions: pre-program and post-program methods. Pre-program methods encompass micro simulations, while post-program methods are classified into experimental and non-experimental methods. (Polat and Aktakke, 2017, p. 22). The DID and DID-PSM methods employed in this study are included in the category of post-program, non-experimental quantitative methods. The utilization of both methods in the study serves the purpose of validating the obtained results and ensuring the reliability and robustness of the findings.

The DID method has become one of the most popular research methods utilized to evaluate the causal effects of policy interventions. In its standard format, there are two different time periods and two different groups (treatment and control). In the first period, the relevant policy is not implemented in any of the groups. In the second period, while the policy is applied in one of the groups (treatment), the policy is not implemented in the other group (control). The DID method is based on comparing the

difference between the mean value of any variable belonging to the treatment and control groups in the pre-policy period and the difference in the post-policy period from each other (Callaway and Sant'Anna, 2021, p. 200).

Table 3. DID Estimator

	Before	After	After - Before
Control	β_0	$\beta_0 + \delta_0$	δ_0
Treatment	$\beta_0 + \beta_1$	$\beta_0 + \delta_0 + \beta_1 + \delta_1$	$\delta_0 + \delta_1$
Treatment - Control	β_1	$\beta_1 + \delta_1$	δ_1

Source: Wooldridge, 2013:457.

Table 3 above illustrates the calculation of the DID estimator, which characterizes the impact of the policy in the DID method. The coefficients δ0 for the control group and δ0+δ1 for the treatment group are estimated by calculating the differences between the post-policy observations and their pre-policy values for both treatment and control groups. The difference between these coefficients is denoted as δ1 and is referred to as the DID estimator.

The Propensity Score Matching (PSM) method is widely used in non-experimental studies to reduce selection bias. First introduced by Rosenbaum and Rubin in 1983, the PSM method aims to stabilize the treatment and control groups based on several fundamental characteristics. This process helps make the observations in the treatment and control groups as similar as possible (Stuart et al., 2014, p. 171). Heckman et al. (1997) demonstrate that limiting the sample with propensity scores provides eradicates the selection bias problem and provides robust results.

If the dependent variable is a Bernoulli random variable consisting of values 1 and 0, it will be appropriate to use logit or probit regression. There are no restrictions on independent variables in these models. Since logit and probit models are estimated with the maximum likelihood estimation method, assumptions such as a normal distribution of residuals, constant error variance, or linearity are not required. While "logistic odds" is used in the logit model, the "Gaussian" distribution function is used in the probit model (Mert, 2016, p. 180). The origins of the logit model date back to the 19th century. Belgian mathematician Verhulst used this model to explain the population calculations of countries in three articles published between 1838 and 1847 (Cramer, 2003, p. 4).

The logit model is based on the logistic cumulative distribution. Odds ratios or marginal effects are used to interpret the coefficients of variables in the logit model. In the logit model, the marginal effects obtained from estimation are interpreted as probabilities (Emeç, 2021, pp. 49-55). The function used in the logit model is given in the equation below.

$$P_i = \frac{1}{1 + e^{-z_i}} = \frac{e^z}{1 + e^z} \quad (1)$$

In the equation, while z_i can assume values within the range of $-\infty$ to $+\infty$, P_i takes values in a range between 0 and 1. A non-linear relationship exists between P_i and z_i. The equation above indicates the probability of an event occurring. The probability of an event not occurring is shown as $(1 - P_i)$. According to the equation provided earlier, the probability of an event not occurring can be derived as shown in the following equation:

$$(1 - P_i) = \frac{1}{1 + e^{z_i}} \tag{2}$$

In the logistic model, the ratio of the probability of an event occurring to the probability of it not occurring shows the odds ratio and is formulated as in equation 3.

$$\frac{P_i}{1 - P_i} = \frac{1 + e^{z_i}}{1 + e^{-z_i}} \tag{3}$$

The equation employed to estimate the logit model is presented in equation 4 below.

$$L_i = ln\left(\frac{P_i}{1 - P_i}\right) = \beta_1 + \beta_2 X_i + u_i \tag{4}$$

The logarithm of the odds ratio is a linear function of the coefficients in the equation. It is significant here that the coefficients, not the variables, are linear (Gujurati and Porter, 2014, pp. 553-558).

In the probit model, which is grounded in utility theory and the rational choice approach, the normal cumulative distribution function is employed (Cebeci, 2012, p. 130). The probit model is a cumulative distribution function utilized to explain the behavior of binary dependent variables, just like the logit model. In the logit model, the logistic cumulative distribution function is employed, whereas in the probit model, the basis is the normal cumulative distribution function (Gujurati and Porter, 2014, p. 566). Equation 5 presents the normal cumulative distribution function employed in the probit model, assuming that the variable z follows a normal distribution with a mean μ and a variance of σ^2(Tarı, 2016, p. 252):

$$F_{(Z)} = \int_{-\infty}^{Z_0} \frac{1}{\sqrt{2\pi\sigma}} e^{-(z-\mu)/2\sigma^2} \tag{5}$$

5. DATASET AND MODEL

TURKSTAT-HLFS data is employed in the empirical analysis, for the period 2004-2021 The research includes data from 2004 onwards because the HLFS has been published annually at the Nomenclature of Territorial Units for Statistics (NUTS) 2 level since 2004. We employ repeated cross-sectional surveys. Pooled cross-sectional data is very important for assessing the impact of a policy. It

is possible to measure the impact of the policy with two cross-sectional data sets collected before and after the policy (Wooldridge, 2013, p. 454). The survey includes a comprehensive set of questions that capture significant individual characteristics. In the study, both individual and regional-level control variables are used which may have an impact on employment. Within these variables, gender, age, marital status, and education are indicators of individual characteristics. Labor force participation rate and inflation rate are included in as regional variables at the NUTS 2 level.

Table 4. Variable Definitions

Variables	Variable Definitions	Source
Employment	A dummy variable that takes value 1 if the individual is employed and 0 if the individual is unemployed.	TURKSTAT- HLFS (2004-2021)
Gender	A dummy variable taking values 1 for males and 2 for females	
Age	A continuous variable taking values between 15-64	
Marital Status	A categorical variable taking values 1 for singles, 2 for married, 3 for divorced and 4 for widowed.	
Education	A categorical variable that takes values between 1-6 and indicates the individual's education level gradually.	
Labor Force Participation Rate	Ratio of the labor force to the total working age population	Central Bank of the Republic of Turkey, Electronic Data Delivery System
Inflation Rate	The rate of increase in prices over a given period of time	

Given that the dependent variable employment is binary, logit and probit models are suitable for estimation. The equation is estimated with the DID method using logit and probit models.

$$\text{Emp}_{i,j,t} = \beta_0 + \beta_1 \text{Treat}_{i,j,t} + \beta_2 \text{Post}_{j,t} + \beta_3 \text{Treat}_{i,j,t} * \text{Post}_{j,t} + \beta_4 X + \Phi_j + \Psi_t + u_{i,j,t} \qquad (6)$$

In equation (6) Emp represents the employment status of individuals. The employment variable in the equation above is a dummy variable that takes values 1 and 0, expressing the employment status of individuals. It takes the value 1 if the individual is employed and 0 if unemployed. In the sample obtained from the data set, there is data for each individual i living in region j at time t. Post variable indicates the policy period. And taking value 1 for the period of post reduced corporate income tax implementation, in particular in 2009 and after. However, for the pre-period of reduced corporate income tax implementation, takes a value 0. Treat variable takes value 1 whether the individual lives in one of the provinces of Region 6 illustrated in Table 5. Otherwise, if an individual lives in one of the provinces of Region 1 demonstrated in Table 5, takes a value of 0. The treat*post variable is an interaction term formed by multiplying the treat and post variables. The coefficient of the treat*post variable in the equation is described as the DID estimator. When assessing the effectiveness of reduced corporate income tax implementation, the coefficient of the treat*post variable is considered. Sets Φ_j

denote the province-region fixed effects, on the other hand Ψ_t represents the time-year fixed effects. Within the equation, the term u_{ijt} represents the error term. In the equation, the variable X is a vector of explanatory variables that could influence employment independently of the policy's effect. These explanatory variables include socio-demographic factors like gender, age, marital status, and education, as well as macro-level variables such as the inflation rate and labor force participation rate.

We choose the provinces with the highest and lowest reduction rates among the provinces at the NUTS 2 level, under the reduced corporate income tax implementation. Thus, it is aimed to evaluate explicitly possible effects of the change in corporate income tax reduction rate by selecting the provinces with the highest and lowest discount rates in the reduced corporate income tax implementation.

Within the regions listed in Table 2, it is the provinces in the region 1 that receive the lowest reduction rate. Among the provinces in the region 1, only Istanbul, Izmir, and Ankara are included in the study. This is because the other provinces in the region 1 implement different reduction rates for provinces within their group based on the NUTS 2 classification. Likewise, Adıyaman and Bingöl provinces, which are part of the provinces in region 6 with the highest corporate income tax reduction rates, are excluded from the study for the same reason. The provinces in the treatment and control groups are listed in the Table 5 below.

Table 5. Treatment and Control Groups

Treatment		**Control**
Region 6		**Region 1**
Ağrı	Kars	Ankara
Ardahan	Mardin	İstanbul
Batman	Muş	İzmir
Bitlis	Siirt	
Diyarbakır	Şanlıurfa	
Hakkâri	Şırnak	
Iğdır	Van	

Source: Council of Minister's Decree No. 2012/3305 on Government Subsidies for Investments.

Even though the reduction rate for the reduced corporate income tax implementation is regionally determined, our study aims to analyze its effects on individuals' employment. Nevertheless, factors beyond the region or province of residence may also play a role in enhancing the employment prospects of individuals. The assumption is that the individual characteristics of those who benefit from the reduced corporate income tax implementation remain constant. PSM method is employed to mitigate any potential selection bias that may persist, even when demographic and socioeconomic conditions are considered in the selection of provinces for the control and treatment groups. Subsequently, we generate a new sample from individuals in both the control and experimental groups which exhibits greater similarity in their characteristics. Then we estimate the equation with this refined sample for robust results.

6.EMPIRICAL RESULTS

Analyses are conducted using DID and DID-PSM methods. Logit and probit model estimates of DID and DID-PSM methods are presented in the table below.

Table 6. DID and DID-PSM Estimates (Logit and Probit)

	DID		**DID-PSM**	
Dependent Variable: Employment	Logit	Probit	Logit	Probit
Treat	-0.2192***	-0.1402***	-0.3494***	-0.2082***
	(0.0151)	(0.0089)	(0.0396)	(0.0232)
Post	-0.3015***	-0.1785***	-0.5963***	-0.3647***
	(0.0235)	(0.0139)	(0.0631)	(0.0371)
Treat*Post	**0.1568*** **	**0.1021*** **	**0.2953*** **	**0.1862*** **
	(0.0095)	**(0.0056)**	**(0.0425)**	**(0.0248)**
Gender (Reference: Male)	-2.0185***	-1.1912***	-1.9932***	-1.1741***
	(0.0039)	(0.0022)	(0.0068)	(0.0039)
Age	0.3225***	0.1851***	0.2233***	0.1287***
	(0.0011)	(0.0006)	(0.0017)	(0.0010)
Marital Status (Reference: Single)				
Married	0.0178***	0.0073**	0.3138***	0.1670***
	(0.0059)	(0.0034)	(0.0098)	(0.0056)
Divorced	0.3225***	0.1739***	0.2438***	0.1213***
	(0.0135)	(0.0078)	(0.0369)	(0.0209)
Widowed	-0.1033***	-0.0576***	-0.0244	-0.0383**
	(0.0172)	(0.0096)	(0.0281)	(0.0157)
Education (Reference: Literate but not graduated from any educational institution)				
Primary School	-0.0173***	-0.0224***	-0.0189**	-0.0071
	(0.0062)	(0.0036)	(0.0084)	(0.0049)
Secondary School	0.1141***	0.0536***	0.0392***	0.0145**
	(0.0070)	(0.0041)	(0.0010)	(0.0057)
High School	0.0717***	0.0368***	0.0609***	0.0376***
	(0.0073)	(0.0043)	(0.0107)	(0.0064)
Vocational High School	0.4845***	0.2836***	0.3333***	0.2062***
	(0.0085)	(0.0049)	(0.0157)	(0.0092)
Higher Education	1.1202***	0.6337***	1.0519***	0.6168***
	(0.0075)	(0.0043)	(0.0134)	(0.0076)
Labor Force Participation Rate	0.0333***	0.0197***	0.0362***	0.0220***
	(0.0009)	(0.0005)	(0.0001)	(0.0006)
Inflation Rate	-3.5011***	-2.1297***	-4.6161***	-2.7755***
	(0.2208)	(0.1305)	(0.5001)	(0.2951)
Number of Obs,	1,924,030	1,924,030	680,588	680,588
Wald Test	371,903.55	425,869.54	130579.05	146439.55
Pseudo R-Square	0.2316	0.2293	0.2180	0.2165

Note: Robust standard errors are within parentheses. *** and ** indicate significance levels at 1% and 5% respectively.

Based on the estimations, it's evident that the regional differences in corporate income tax reduction rates have a positive and statistically significant effect on employment. While the study mainly focuses on the effects of reduced corporate tax implementation on employment outcomes, we also present the estimates for the individual and regional level control variables. In the study, it is observed that females are less likely to be employed compared to males in all cases. When assessing the relationship between age and employment, it is observed that individuals' aging has a positive impact on their likelihood of being employed. When examining the impact of marital status on the employment

variable, it becomes apparent that married and divorced individuals are more likely to be employed compared to those who are single. On the other hand, individuals who are widowed are less likely to be employed in comparison to those who are single. Education is another control variable that represents the individuals' education level. We find that higher levels of educational attainment are linked with a higher likelihood of being employed, except for primary school. Moreover, it is found that the higher the education level, the more likely the individual is to be employed.

While the control variables above represent individual characteristics, the labor force participation rate and inflation rate are macro-level variables. According to the findings, the labor force participation rate has a positive effect on employment, while the inflation rate has a negative effect on employment.

Table 7. Marginal Effects of the DID and DID-PSM Estimation (Logit and Probit)

	DID		DID-PSM	
Dependent Variable: Employment	Logit	Probit	Logit	Probit
Treat	-0.0521***	-0.0541***	-0.0772***	-0.0762***
	(0.0036)	(0.0034)	(0.0088)	(0.0085)
Post	-0.0717***	-0.0689***	-0.1318***	-0.1335***
	(0.0056)	(0.0054)	(0.0140)	(0.0136)
Treat*Post	**0.0373*** **	**0.0394*** **	**0.0653*** **	**0.0682*** **
	(0.0023)	**(0.0022)**	**(0.0094)**	**(0.0091)**
Gender (Reference: Male)	-0.4800***	-0.4594***	-0.4406***	-0.4298***
	(0.0009)	(0.0008)	(0.0015)	(0.0014)
Age	0.0767***	0.0714***	0.0493***	0.0471***
	(0.0002)	(0.0002)	(0.0004)	(0.0004)
Marital Status (Reference: Single)				
Married	0.0042***	0.0028**	0.0694***	0.0611***
	(0.0014)	(0.0013)	(0.0021)	(0.0020)
Divorced	0.0767***	0.0671***	0.0539***	0.0444***
	(0.0032)	(0.0030)	(0.0082)	(0.0077)
Widowed	-0.0246***	-0.0222***	-0.0054	-0.0140**
	(0.0041)	(0.0037)	(0.0062)	(0.0057)
Education (Reference: Literate but not graduated from any educational institution)				
Primary School	-0.0041***	-0.0086***	-0.0042**	-0.0026
	(0.0015)	(0.0014)	(0.0018)	(0.0018)
Secondary School	0.0271***	0.0207***	0.0087***	0.0053**
	(0.0016)	(0.0016)	(0.0021)	(0.0021)
High School	0.0170***	0.0142***	0.0135***	0.0138***
	(0.0017)	(0.0016)	(0.0024)	(0.0023)
Vocational High School	0.1152***	0.1094***	0.0737***	0.0755***
	(0.0020)	(0.0019)	(0.0035)	(0.0034)
Higher Education	0.2663***	0.2444***	0.2325***	0.2258***
	(0.0018)	(0.0017)	(0.0030)	(0.0028)
Labor Force Participation Rate	0.0079***	0.0076***	0.0080***	0.0080***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Inflation Rate	-0.8324***	-0.8214***	-1.0204***	-1.0161***
	(0.0525)	(0.0503)	(0.1105)	(0.1080)
Number of Obs, Pseudo R-Square	1,924,030 0.2316	1,924,030 0.2293	680,588 0.2180	680,588 0.2165

Note: Robust standard errors are within parentheses. *** and ** indicate significance levels at 1% and 5% respectively.

In Table 6, both logit and probit model estimates are illustrated for DID and DID-PSM methods. Furthermore, we report marginal effects of the DID and DID-PSM estimates in Table 7 both for logit and probit models. As the study focuses on uncovering the effects of the reduced corporate income tax implementation, only the interpretations of the marginal effects of the treat*post variable are provided below.

Based on the estimates, considering the marginal effects from both logit and probit analyses using the DID and DID-PSM methods, it is evident that the regional differences in corporate income tax reduction rates have a positive and statistically significant impact on employment. Marginal effects are estimated through logit and probit models using the DID method. According to estimates, individuals residing in the provinces in the treatment group are 3.73% and 3.94%, respectively, more likely to be employed in comparison to individuals living in the provinces in the control group. Marginal effects are also estimated through logit and probit models using the DID-PSM method. According to estimates, individuals residing in the provinces in the treatment group are 6.53% and 6.82%, respectively, more likely to be employed in comparison to individuals living in the provinces in the control group.

According to the findings, it is evident that the average employment difference between individuals living in provinces from Region 6 and Region 1 decreased after the reduced corporate income tax implementation, as compared to the pre-implementation period. The findings indicate that this implementation is effective in improving the employment status of individuals residing in Region 6. The findings of the study are in line with other former studies (Ljungqvist and Smolyansky, 2014; Shuai and Chmura, 2013), which also investigate the effects of regional differences in corporate income tax reductions on employment. According to the findings, it is verified that the reduction in the corporate tax rate affects the employment outcome positively in treated regions.

7. CONCLUSION

Evaluating the impact of public policies is crucial in ensuring that public resources are allocated to the most appropriate policies. As a result of policy evaluation, if the intended objectives are not met, the policy may be terminated, and public sources could be allocated to enable more efficient and effective ones. Given the significance of policy evaluation, it is anticipated that establishing measurable objectives for the reduced corporate income tax implementation and consistently assessing the outcomes based on a predetermined schedule may enhance the evaluation process.

The reduced corporate tax implementation is expected to have a positive impact on both investment and employment, in line with the basic thesis of the supply-side economics view. When the previous studies are evaluated, it can be seen that the findings are compatible with the expectations. In the study, it is aimed to reveal the effect of differences in corporate tax reduction rates on employment between the provinces selected in Region 1 and Region 6 within the scope of reduced corporate tax implementation. Based on the findings from both DID and DID-PSM methods, it is determined that

variations in reduction rates among regions have a positive and statistically significant impact on employment from 2004 to 2021. According to the study, individuals who reside in provinces in Region 6, where a higher corporate income tax reduction rate is implemented, are more likely to be employed than individuals who reside in Region 1.

It is derived from the impact assessment results of the reduced corporate tax implementation that it increases the employment level and has positive effects on the income and living conditions of the region. Another aim of reduced corporate tax implementation is to reduce the development gap between regions in terms of investment, employment, income distribution and living conditions. In order to enhance the effectiveness of the implementation for achieving predetermined goals; increasing infrastructure investments, providing energy support and land support, etc. thought to be useful to carry out supportive policies in conformity. On the other hand, rather than policies based solely on region-based differentiation, it is thought that selective policy practices could be more effective by increasing the competitiveness of regions. Besides, resources could be allocated to more efficient policies by comparing the benefits of current policies with alternative ones.

The study is constrained by the fact that it is based on repeated cross-sectional data. Due to the data structure, we are unable to assess the long-term effects of the reduced corporate income tax implementation on employment outcomes. It is expected that the panel data format may be advantageous for future studies analyzing the long-term effects of reduced corporate income tax implementation on employment.

The study does not necessitate Ethics Committee permission.

The study has been crafted in adherence to the principles of research and publication ethics.

The author declares that there exists no financial conflict of interest involving any institution, organization, or individual(s) associated with the article.

The entire work was carried out by its only, stated author.

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