# The Causal Effect of 2012 Compulsory Education Law on NEET in Türkiye: A Regression Discontinuity Design

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# THE CAUSAL EFFECT OF 2012 COMPULSORY EDUCATION LAW ON NEET IN TÜRKIYE: A REGRESSION DISCONTINUITY DESIGN

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**Abstract**

In 2012, the Turkish government extended compulsory education from eight to twelve years. This article aims to examine the effects of a 2012 compulsory education law that made high school completion mandatory for youth with NEET (not in education, employment or training) status. The causal impact of the compulsory education reform is examined using a Regression Discontinuity Design. The study uses a pooled cross-sectional dataset created by merging the Turkish Statistical Institute (TURKSTAT) Household Labor Force Survey (HLFS) data from 2015 to 2023. The findings show that the 2012 Compulsory Education Reform increases NEET rates among youth aged 15-29 in Türkiye. This increase is particularly evident for females and in economically disadvantaged regions. Gender-specific effects reveal that the reform causes a significant rise in NEET rates among women, with the impact being more pronounced in the eastern regions, where traditional cultural norms are stronger. On the other hand, while the reform increases NEET rates for males in the South-eastern Anatolia (TRC) region, it does not lead to significant changes for males in other regions.

**Keywords**: Compulsory Education Reform; Gender Disparities in Education; Not in Education, Employment, or Training; Regression Discontinuity Design; Youth Unemployment

**JEL Classifications**: I28, J13, J21, J24

**ملخص**

في عام 2012، مددت الحكومة التركية التعليم الإلزامي من ثماني سنوات إلى اثنتي عشرة سنة. تهدف هذه الورقة إلى دراسة آثار قانون التعليم الإلزامي لعام 2012 الذي جعل إكمال المدرسة الثانوية إلزاميًا للشباب الذين يعانون من حالة NEET (غير متعلمين أو موظفين أو متدربين). يتم فحص التأثير السببي لإصلاح التعليم الإلزامي باستخدام تصميم انقطاع الانحدار. تستخدم الدراسة مجموعة بيانات مقطعية مجمعة تم إنشاؤها عن طريق دمج بيانات مسح القوى العاملة للأسر (HLFS) التابع للمعهد الإحصائي التركي (TURKSTAT) من عام 2015 إلى عام 2023. تُظهر النتائج أن إصلاح التعليم الإلزامي لعام 2012 يزيد من معدلات NEET بين الشباب الذين تتراوح أعمارهم بين 15 و 29 عامًا في تركيا. هذه الزيادة واضحة بشكل خاص للإناث وفي المناطق المحرومة اقتصاديًا. تكشف الآثار الخاصة بالجنسين أن الإصلاح يتسبب في ارتفاع كبير في معدلات NEET بين النساء، مع أن التأثير يكون أكثر وضوحًا في المناطق الشرقية، حيث تكون المعايير الثقافية التقليدية أقوى. ومن ناحية أخرى، في حين أن الإصلاح يزيد من معدلات البطالة بين الذكور في منطقة جنوب شرق الأناضول، فإنه لا يؤدي إلى تغييرات كبيرة بين الذكور في المناطق الأخرى.

# 1. Introduction

Unemployment remains a pressing issue that profoundly affects individuals, families, societies, and the overall economic condition of nations. Unemployment among young people is a major concern for policymakers worldwide, especially in developing countries like Türkiye, where youth often face structural barriers to accessing education and employment. However, traditional labor market indicators are often criticized for their limited relevance to the youth demographic. These indicators do not fully reflect the situation of young people in the labor force. Many young individuals are classified as being outside the labor force due to their student status, which prevents unemployment and employment data from accurately reflecting their true position in the labor market. Consequently, there is a growing need for more comprehensive, youth-specific indicators to assess youth unemployment accurately (Eurofound, 2011). In this context, the concept of NEET (Not in Education, Employment, or Training) has gained prominence as a critical policy metric in recent years, highlighting the increasing complexity and multifaceted nature of this issue.

The acronym NEET is used to describe young people who are not integrated into either the labor market or the education system, meaning those who are "Not in Education, Employment, or Training", regardless of their educational levels. Originating in the United Kingdom in the 1990s, the term was introduced during discussions on reintegrating 16-18-year-olds who had dropped out of education and were not participating in the labor force. The term was used in the "Youth on the Move" initiative of the Europe 2020 strategy, initially covering the age group of 15-24, and later expanded to include the 15-29 age group. The NEET indicator is an important tool for more comprehensively assessing the level of youth participation in the labor market and the risk of social exclusion (Eurofound, 2016). High NEET rates also represent potential economic costs due to lost productivity and increased welfare dependency. These costs extend beyond unemployment, as individuals who are not engaged in any productive activity do not contribute to the economy and may rely on public assistance. Prolonged periods of inactivity can lead to the erosion of skills and work habits, making it more difficult for individuals to re-enter the labor market or education later. Young people who are NEET are at a higher risk of long-term unemployment and underemployment. This can affect their career trajectories and earning potential over their lifetimes.

This regional and educational disparity in NEET rates highlights the importance of understanding the role of education policies in shaping labor market outcomes. One such policy, the 2012 Compulsory Education Law, was implemented to reform and enhance the Turkish education system. The 2012 Compulsory Education Law was accepted with Law No. 6287 on March 30, 2012. The 2012 Compulsory Education Law have brought a new system called the "4+4+4 system" which restructures the Turkish education system into three tiers, each consisting of four years of schooling. Those tiers are primary school, secondary school and high school, respectively. Through the implementation of this legislation, high school education was made mandatory for the first time, resulting in an extension of obligatory education from 8 years to 12 years (MEB, 2012). Consequently, our primary concern is whether

the completion of high school education results in an increase in university enrolment, training, and youth employment, all of which help to decrease NEET rates.

The aim of this paper is to examine the causal impact of the 2012 compulsory schooling law on NEET status in Türkiye using a fuzzy regression discontinuity design (RDD) applied to pooled cross-sectional data from the 2015-2023 Household Labor Force Survey. This study contributes to the literature by focusing on the broader 15-29 age group, which aligns with the official NEET definition used by Eurostat and the OECD (Eurostat, 2022; OECD, 2022). This age group allows us to examine youth at critical stages: secondary school, university, and early labor market entry. In contrast, Erten and Keskin (2019) restrict their analysis to adolescents aged 15-20, thereby omitting older youth who are at critical transitions between education, early career employment, and training. By expanding the age scope, we provide a more comprehensive assessment of the reform's impact across the full spectrum of youth development. This broader perspective also allows us to capture gender and regional disparities that become more visible beyond adolescence, yielding findings that are more aligned with international policy frameworks and more generalizable for youth-oriented employment and education interventions.

Our findings reveal a surprising and policy-relevant reversal, whereas Erten and Keskin (2019) found a decrease in NEET incidence among girls aged 15-20, our study shows a significant increase in NEET rates among women aged 15-29. This key divergence is not only age-driven but also suggests deeper structural issues linked to gender norms, labor market access, and regional disparities. By covering a broader and policy-relevant age group, using a large dataset, and conducting region- and gender-specific analyses, our study provides a more comprehensive evaluation of the reform's impact. We show that, while educational attainment increased, this did not translate into reduced NEET rates. In fact, the reform may have widened gender and regional inequalities in labor market outcomes.

The structure of the paper is as follows: Section 2 presents the background of the study, and Section 3, provides a review of the literature and discusses recent empirical studies. Section 4 outlines the data and methodology used. Section 5 presents the findings, and Section 6 discusses the concluding remarks of our findings.

## 2. Background

In 2023, the NEET rates in Türkiye were significantly higher compared to European Union (EU) countries. The NEET rate in Türkiye for youth aged 15-29 is approximately 25.8%. The rate is particularly high among young women, with approximately 36% of women in this age group being NEET, compared to 15.6% of young men (Eurostat, 2022). According to 2022 OECD data, the average NEET rate among member countries was 12.6%, while Türkiye reported a staggering 27.9%, the highest rate among OECD members (OECD, 2024). The relevant statistics are shown in Figure 1.

Türkiye's higher NEET rates compared to other countries, along with the significant gender gap, highlight the need to eliminate barriers, particularly for women, and promote gender equality in the labor market. This situation highlights the urgent need for targeted policies aimed at improving access to education, vocational training, and employment opportunities. Therefore, the aim of our study is to examine the impact of Türkiye's 2012 Compulsory Education Law on NEET and analyze the effects of the 4+4+4 compulsory education policy across different dimensions, such as gender and region.

In this context, the NEET rates were analyzed in terms of regions and education levels by selecting one year before and one year after the implementation of the 2012 compulsory education policy, and the results are presented in Table 1.

For 2023, the NEET rate in the Southeast Anatolia region (16.80%) is higher compared to other regions, followed by Central East Anatolia (10.84%) and West Black Sea (10.50%). Similarly, for 2010, the NEET rate in the Southeast Anatolia region (15.98%) stands out as the highest among regions, followed by West Anatolia (11.26%) and the Mediterranean region (10.58%). An analysis by education level shows that in 2023, the NEET rate for high school graduates stands at 41.40%, followed by primary and secondary school graduates. In 2010, the NEET rate was highest among those not finishing school at 28.23%, followed by secondary school and individuals with a Bachelor's, Master's, or PhD degree.

**Figure 1. NEET rates by OECD countries in 2022**



Youth not in employment, education or training (%) (NEET) %
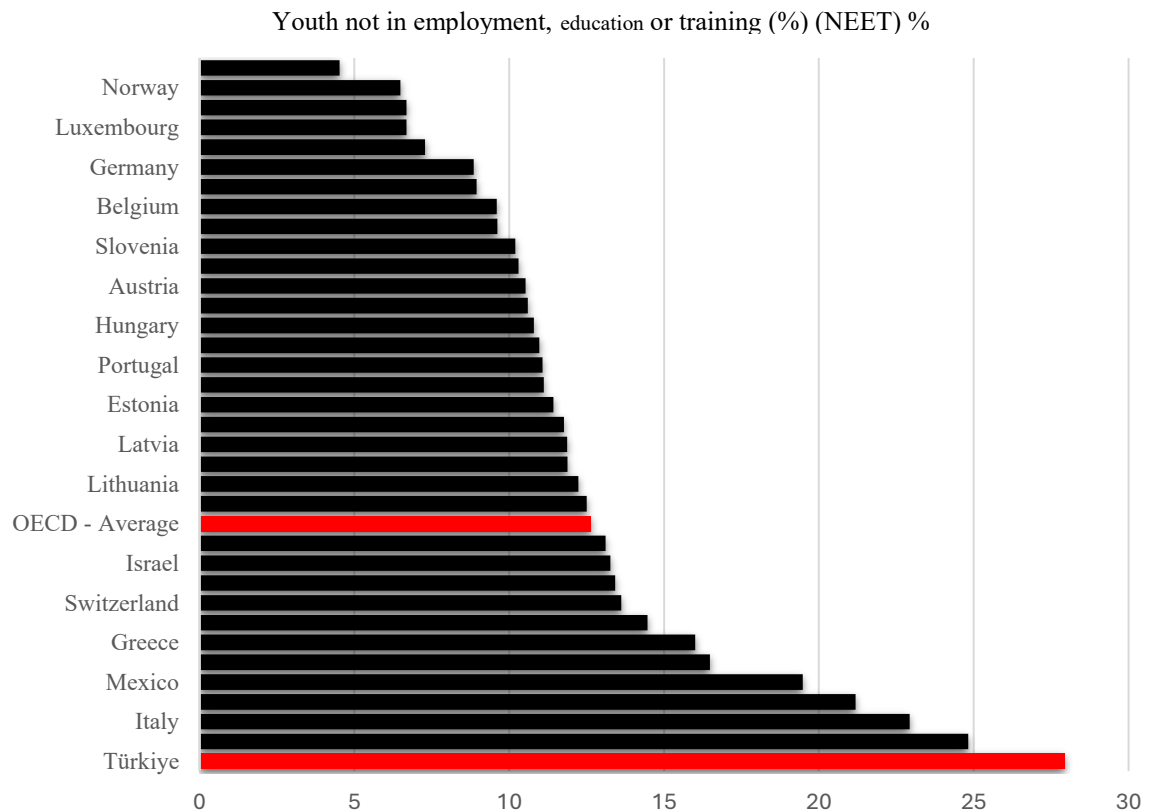
*Note: The data for China, South Korea, and Chile are not available in the OECD database for 2022, and therefore are not included.*

**Table 1. NEET rates by region and education level in 2010 and 2023**

| NEET Rates for 15-29 Age Group | | | | | | | |
|---|---|---|---|---|---|---|---|
| **2010** | | | | **2023** | | | |
| **IBBS-1 Regions** | **%** | **Education Level** | **%** | **IBBS-1 Regions** | **%** | **Education Level** | **%** |
| **TR-1 (İstanbul)** | 4.14 | **Not Finishing a school** | 28.23 | **TR-1 (İstanbul)** | 5.58 | **Not Finishing a school** | 0.70 |
| **TR-2 (West Marmara)** | 5.78 | **Education-Primary school** | 7.98 | **TR-2 (West Marmara)** | 4.04 | **Education-Primary school** | 25.11 |
| **TR-3 (Aegean)** | 3.89 | **Education-Secondary school** | 23.74 | **TR-3 (Aegean)** | 7.85 | **Education-Secondary school** | 20.02 |
| **TR-4 (East Marmara)** | 9.99 | **Education-High school** | 19.26 | **TR-4 (East Marmara)** | 9.62 | **Education-High school** | 41.40 |
| **TR-5 (West Anatolia)** | 11.26 | **Education-Bachelor/ Master/PhD** | 20.79 | **TR-5 (West Anatolia)** | 9.18 | **Education-Bachelor/** | 3.56 |
| **TR-6 (Mediterranean)** | 10.58 | | | **TR-6 (Mediterranean)** | 6.31 | **Education-Master/PhD** | 9.21 |
| **TR-7 (Central Anatolia)** | 7.49 | | | **TR-7 (Central Anatolia)** | 3.88 | | |
| **TR-8 (West Black Sea)** | 10.25 | | | **TR-8 (West Black Sea)** | 10.50 | | |
| **TR-9 (East Black Sea)** | 6.06 | | | **TR-9 (East Black Sea)** | 7.08 | | |
| **TR-A (Northeast Anatolia)** | 6.68 | | | **TR-A (Northeast Anatolia)** | 8.32 | | |
| **TR-B (Central East Anatolia)** | 7.90 | | | **TR-B (Central East Anatolia)** | 10.84 | | |
| **TR-C (Southeast Anatolia)** | 15.98 | | | **TR-C (Southeast Anatolia)** | 16.80 | | |

*Note: The calculations were carried out by the authors. In the 2010 survey, university and Master/PhD levels are grouped under the same category.*

## 3. Literature review

Compulsory education reforms are a widely studied topic in academic circles. Numerous empirical studies from developed countries examine the effects of such reforms on education and employment outcomes (Harmon and Walker 1995; Oreopoulos, 2006; Angrist and Krueger, 1991; Grenet, 2013). Individuals excluded from education and training face greater challenges in participating in or competing within the labor market, which further restricts their access to employment opportunities. Therefore, individuals deprived of education and training are often at risk of falling into NEET status. The NEET phenomenon is among the fundamental issues significantly impacting economic and social development worldwide. Therefore, it emerges as a concept that has garnered attention from numerous researchers. Literature reviews indicate there are numerous factors influencing the transition into NEET status. These studies analyze the profiles of NEET youth by examining factors such as gender (Kelly and McGuinness, 2013; Ranzani and Rosati, 2013; De Lannoy and Mudiriza, 2019; Quintano et al., 2018; Pattinasarany, 2019; Salvà-Mut et al., 2018; Abayasekara and Gunasekara, 2020; Yang, 2020), age (De Lannoy and Mudiriza, 2019; Vancea and Utzet, 2018; Kelly and

McGuinness, 2013; Wickremeratne and Dunusinghe, 2018; Erdoğan et al., 2017), marital status (Tamesberger and Bacher, 2014; Wickremeratne and Dunusinghe, 2018; Pattinasarany, 2019; Caroleo et al., 2020), education level (Genda, 2007; Kelly and McGuinness, 2013; Kılıç, 2014; Susanlı, 2016; Karyda and Jenkins, 2018; Yang, 2020), health status (Bacher et al., 2014; Feng et al., 2018; Wong, 2016; De Lannoy and Mudiriza, 2019), early school leaving (De Luca et al., 2020; Tamesberger and Bacher, 2014), income level (Genda, 2007; De Lannoy and Mudiriza, 2019; Pattinasarany, 2019; Zuccotti and O'Reilly, 2019), among others. In addition, a few studies evaluating the effectiveness of policies on NEET can also be found in the literature in Türkiye (Erten and Keskin, 2019; Dayıoğlu et al., 2022).

Within this framework, in the first stage, the focus is directed towards studies on NEET determinants. Among these, the study conducted by Kelly and McGuinness (2013) examines the determinants of NEET youth in Ireland, utilizing data from the Quarterly National Household Survey for 2006 and 2011. The findings derived from the probit model for 2006 indicate that being female, belonging to the 20–24 age group compared to the 15–19 age group, and having a low level of education increase the likelihood of being NEET. Additionally, the region where individuals reside is identified as another significant factor influencing the probability of being NEET. Another study on NEET in Austria is conducted by Tamesberger and Bacher (2014). This study focuses on young people aged 16–24 and performed the analyses using data from the Austrian Labor Force Survey for 2008–2010. The findings reveal that women with low education levels, immigrant backgrounds, those in a relationship, and those living in urban areas are more likely to fall into the NEET category.

Furthermore, these individuals were found to have a higher likelihood of having children and to have parents with lower levels of education. Wickremeratne and Dunusinghe (2018) have performed logit model estimations using cross-sectional data from the 2015 Sri Lanka Labor Force Survey (SLFS). The study results show that gender, age, marital status and urban-rural discrimination are significant determinants of NEET. The analysis indicates that being female, being married or widowed, living in rural areas and older age increase the probability of being NEET. They have concluded that young people with no education have the highest NEET rate.

Similarly, De Lannoy and Mudiriza (2019) find that being male, living in an urban area, and having a higher level of education decrease the likelihood of being NEET. They also find that young people in the 20-24 and 25-29 age groups are more likely to be NEET compared to those in the 15-19 age group. Additionally, De Lannoy and Mudiriza (2019), who also consider health and income factors in their study, find that having health problems and living in low-income households increase the likelihood of being NEET. De Luca et al. (2020) focus on the determinants of NEET status and, in particular, the consequences of early school leaving in their study covering the period from 2007 to 2017 in Italy and Spain. According to their findings, in Spain, NEET status is more strongly associated with unemployment, whereas in Italy, the inactivity component plays a significant role. Additionally, the study reveals that, in both Spain and Italy, women are more likely to be NEET than men in the context of school dropout.

In a study examining why young people aged 15-24 in Indonesia are NEET, Pattinasarany (2019) aims to reveal the prevalence of NEET status among youth. The results of logistic regression analysis show that women are more likely to be NEET than men. Having a household member under the age of 5 or over 60 increases the likelihood of women being NEET, but it decreases the likelihood for men. Additionally, living in rural areas and having a low household income increases the probability of young people being NEET. The probability of being NEET increases with age, while a higher level of education decreases the likelihood of being NEET. When analyzed in terms of marital status, it is concluded that single men are less likely to be NEET than married men, while married women are more likely to be NEET. Salvà-Mut et al. (2018), who conducted a similar study in Spain, examined young people with NEET status aged 25-29. The regression results analyzing the determinants of being NEET reveal that having a low level of education, the parents' low level of education, having children at an early age, being an immigrant, and poor economic conditions of the household increase the likelihood of being NEET.

In the study examining the determinants of NEET status in Sri Lanka, analyses are conducted using the Binomial Logit model and multinomial logit model. The findings show that being a woman, being married, having young children, and being between the ages of 20-24 (compared to the ages of 15-19) increase the probability of being NEET but high household income decreases the likelihood of being NEET (Abayasekara and Gunasekara, 2020). Yang (2020) reveals in his study that gender is an important determinant of NEET status, consistent with other studies. The findings show that being a married woman or being a female immigrant increases the probability of being NEET. Additionally, it is emphasized that education for women has a reducing and preventive effect on the risk of being NEET.

In Türkiye, Susanlı (2016), Erdoğan et al. (2017), Bingöl (2020), and Özdemir et al. (2023) aim to comprehensively address the situation of NEET youth in Türkiye in their studies. Özdemir et al. (2023) evaluate the Household Labor Force Survey data for 2014-2020 using logit analysis to examine the determinants of NEET youth in Türkiye. In the study, the factors affecting NEET status are analyzed by estimating separate logit models for the age groups 15-24, 15-29, and 25-29. The findings show that in all three age groups, women are more likely to be NEET than men, and married individuals are more likely to be NEET compared to singles. It is determined that low education levels increase the probability of being NEET in the 15-29 and 25-29 age groups.

Additionally, it is found that the Southeastern Anatolia, Central Eastern Anatolia, Mediterranean, Eastern Black Sea, and Central Anatolia regions are among the areas with a high probability of NEET. On the other hand, Susanlı (2016) examines the determinants of NEET status in Türkiye and conducts the study with a similar approach to other studies. The probit analysis, conducted using the Household Labor Force Survey data for the period 2004-2013, reveals that gender, marital status, and education level have significant effects on NEET status. Additionally, it is found that an increase in the number of working individuals within the household reduces the likelihood of being NEET. Another study by Erdoğan et al. (2017)

examines the determinants of NEET status through an analysis based on the Household Sample Survey. The results of the Generalized Linear Model (GLM) analysis used in the study reveal that gender, age, marital status, ethnicity, household income, individual education level, and parent's education level are significant determinants of NEET status. When the analysis results are examined in detail, it is observed that being female, being in the 18-19 age range, being married, being of Kurdish ethnicity, having a low household income, having a low education level, and having parents with low education levels all increase the likelihood of being NEET. Bingöl (2020) examines the impact of macroeconomic indicators on the NEET population in the BRICS countries (Brazil, India, Indonesia, South Africa, and Türkiye) and Russia, which distinguishes this study from others. Using Driscoll and Kraay estimators, the study covers the period from 2005 to 2018 and reveals that the Human Development Index (HDI) and Foreign Direct Investments (FDI) contribute to an increase in the NEET population, while Gross Domestic Product (GDP) and savings for education expenditures (S) lead to a decrease in the NEET population.

The first study on policy effectiveness in Türkiye is conducted by Erten and Keskin (2019). They examine the heterogeneous effects of the compulsory education reform, which mandates completing high school, on adolescents aged 15-20. To measure the impact of high school attendance on labor market outcomes, they apply a fuzzy regression discontinuity design. The analysis utilizes data from the 2015 Türkiye Household Labor Force Survey (HLFS). The findings indicate that the compulsory education reform increases high school attendance for both boys and girls. However, the positive effect of the reform on girls' high school attendance is observed only in more religiously conservative regions. Furthermore, in these regions, the reform also leads to a reduction in the likelihood of girls being in NEET status. In the second study, Dayıoğlu et al. (2022) investigate the causal effects of minimum wage increases on youth employment and education using a regression discontinuity design. Utilizing data from the Turkish Statistical Institute's Income and Living Conditions Survey, the study evaluates the impact of the minimum wage policy on employment, unemployment, labor force participation, school enrollment, and NEET status. The analysis is restricted to males aged 15-16. The findings reveal that while minimum wage increases do not lead to a significant change in high school enrollment, they substantially reduce the employment of young males and increase the likelihood of transitioning into NEET status.

Examining studies addressing the 2012 compulsory education policy, Yıldız (2012) analyzes the impact of the 2012 education reform on the schooling outcomes of individuals aged 17-28 using a Regression Discontinuity Design. The findings indicate that the reform increased the proportion of individuals continuing to high school. Notably, the reform has a more positive effect on high school continuation rates among women and individuals born in rural areas or villages. Zayim and Kayaoglu (2024) examined the impact of the 2012 Compulsory Education Reform on maternal labor supply. The results indicate that the reform did not lead to any significant change in mothers' labor supply behavior.

This paper aims to investigate the effect of the 2012 Compulsory Education Law in Türkiye on NEET (Not in Education, Employment, or Training) for the youth aged between 15 and 29 years old in Türkiye. A review of the existing literature highlights the emphasis on education's influence on NEET status; however, most studies address this relationship at a correlational level, falling short of establishing causal links. However, although some non-causal studies are using other methods in Türkiye, to the best of our knowledge, there is only one study examining NEET outcomes using a regression discontinuity design (Erten and Keskin, 2019). However, Erten and Keskin (2019) investigate the causal effects of education policies, their analysis is confined to adolescents aged 15-20.

In this context, the present study makes several significant contributions to the literature. First, it encompasses a broader age group, focusing on individuals aged 15-29. This inclusive approach facilitates a detailed examination of the profiles of young people in NEET status during high school, university, and post-university periods, thereby offering a more comprehensive evaluation of policy effectiveness. Second, the reliability and robustness of the findings are strengthened through the repetition of analyses using various bandwidths. Finally, the study uses a significantly larger dataset than previous research, aiming to produce more precise and generalizable results. Furthermore, this study aims to provide a deeper understanding of the impact of the compulsory education law on different demographic groups by considering regional and gender differences, thereby addressing significant gaps in the literature on NEET status and policy effectiveness.

## 4. Data and methodology

### 4.1. Data

The Turkish government increased the compulsory school age from eight to twelve years in 2012. This article aims to examine the NEET impacts of a Turkish law mandating high school completion on the nation's education system. After being optional prior to the 2012 reform, students who completed lower secondary school in the 2011–2012 school year are now required to complete upper secondary education.

The reform took into account a 6-year-old as the starting age for school and an eight-year basic education as the length of time for students born in 1998 and later. People, who were born a year apart, either before or after January 1998, are identical with the exception of their exposure to the 12-year compulsory education law, according to our fundamental assumption.

We use Regression Discontinuity Design (RDD) considering individuals as treated born after January 1998. Our data is pooled cross-sectional data obtained merging yearly Household Labor Force Survey (HLFS) from 2015 to 2023, which includes over 1 million observations for people aged 15-29. The NEET calculation is evaluated between the ages of 15 and 29 by the OECD and Eurostat (Eurostat, 2022; OECD, 2022) so our sample consists of individuals

aged between 15 and 29. HLFS has been available since 2000, due to the age range of our sample from 15 to 29; we have used the HLFS from 2015 to 2023. The sample is both stratified and clustered, and the data is nationally representative for Türkiye, and the survey encompasses questions targeting individuals above 15 years old. The primary aim of the HLFS is to gather detailed insights into the country's labor force structure. This includes data on economic activities, occupations, employment status, and education status. NEET status is generated for each individual using the information of the attendance to school, formal education institution or open education ending with reference week within the last 4 weeks and the labor force status of the individual. HLFS has several advantages over other household surveys in Türkiye. First, the HLFS include information at NUTS-1 and NUTS-2 levels which allow us to investigate the impact of policy in different regions in Türkiye. Second, there is information on current education status covering any training such as open (distance) education and employment status. This question is useful to generate the NEET status of the individuals.

We focus on the causal impact of the 2012 compulsory high school education law on individuals' NEET status. The law stipulates that children born before January 1998 could leave school after completing eight years, while those born after January 1998 were required to complete twelve years of education. To enforce this regulation, parents are fined 15 TL for each day their child does not attend school, escalating to an administrative fine of 500 TL if noncompliance continues. Despite these penalties, a significant number of children remain excluded from education. According to the 2022 Education Reform Initiative Report, using population data from the Turkish Statistical Institute (TURKSTAT) for the 2021-2022 academic year, approximately 82,902 children aged 6-9, 82,929 children aged 10-13, and 404,463 children aged 14-17 were not attending school (Tunca et. al, 2022). This suggests that the assumption of confoundedness regarding treatment receipt is likely violated in this context. Additionally, individuals in the control group, born before 1998 and not required to complete high school, may choose to attend high school afterwards. In other words, some individuals assigned to the treatment group, mandated to attend high school, fail to comply, while those in the control group, born before the cut-off date, can receive the intervention. Indeed Figure 2 shows that the average educational attainment of the control group is higher than the treated for both men and women. The figure suggests that the Sharp RD design is not appropriate for estimating the causal effect of the 2012 Compulsory Schooling Law.

**Figure 2. Average educational attainment of control and treated by gender**
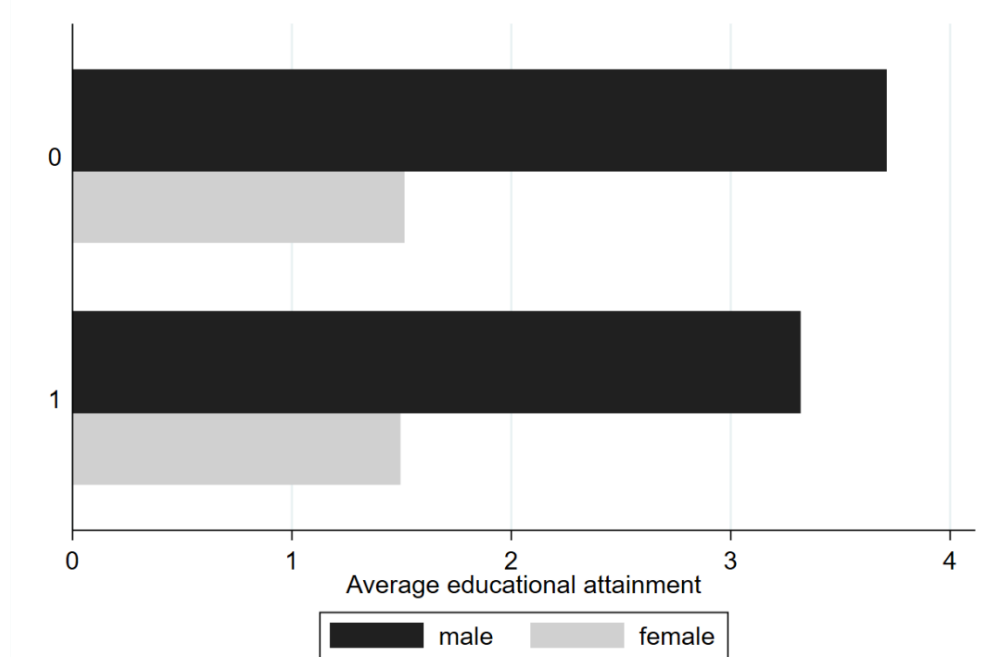


*Source: Authors' estimation*

### *4.2. Methodology*

To address the issue of crossover or non-compliance, where not all individuals in the treated group received the treatment, and some individuals in the control group did, we implement a fuzzy regression discontinuity design (RDD). Specifically, some treated individuals born after January 1998 did not complete compulsory high school and thus did not comply, while some control individuals born before January 1998 did complete high school, resulting in crossover into the treatment group. Therefore, we utilize the following equations and apply the two-stage least squares (2SLS) method, using exposure to the reform as an instrumental variable for completing high school education or higher.

$$TREAT_i = \alpha_1 + \alpha_2 D_i + \alpha_3(X_i - c) + \alpha_4(D_i * (X_i - c)^p) + \varepsilon_i$$

$$NEET_i = \beta_1 + \beta_2 TREAT_i + \beta_3(X_i - c) + \beta_4(D_i * (X_i - c)^p) + \vartheta_i$$

The first equation presents the relationship between receiving the intervention and completing high school education or higher. $TREAT_i$ is assigned a value of 1 if the individual has completed high school or higher education, and 0 if the individual completed only secondary school or lower education and never attended high school. $D_i$ is the treatment status takes 1 if the individual was born after January 1998 and 0 otherwise. $(X_i - c)$ is the forcing variable where c is the cut-off point. The forcing variable is calculated as the difference between the implied maximum age of receiving treatment and the age of the individual in a given survey year. In the context of pooled cross-sectional data, the maximum eligible age for receiving treatment varies across survey years, determined by the criterion that individuals must be born

in 1998 or later to qualify for treatment. For instance, $c$ is 18 in 2015, 19 years and older does not receive the treatment while 18 years old and under are exposed to the reform. Thus, $(X_i - c)$ is positive for the individuals who do not receive the intervention, but it is negative who are exposed to the reform. $D_i * (X_i - c)$ is the interaction variable of the forcing variable and exposure to the compulsory schooling law.

The second equation describes the relationship between completing high school education and NEET status which takes value 1 if an individual is not in education, training or employment and 0 otherwise. We have estimated different RDD estimations for each bandwidth from 3 to 7. In total, we use 5 different samples for robustness checks whether the effect of policy changes based on each different bandwidth from 3 to 7. In Fuzzy RDD estimates, we did not control any covariate however to check robustness we run regressions with the Sharp RDD estimates (see Appendix).

## 5. Empirical results

### 5.1. Descriptive statistics

Table 2 presents summary statistics for young individuals from the 2015-2023 pooled cross-sectional data of HLFS. We provide summary statistics for individuals between the ages of 15 and 29. The descriptive statistics for individuals aged 15-29, derived from the 2015-2023 pooled cross-sectional data of HLFS, reveal significant insights. Regarding educational attainment, 6.03% of individuals have not completed school, while only 2.26% have completed primary school. The majority, 45.34%, have completed secondary school, followed by 28.58% who have graduated from high school. A smaller proportion, 17.01%, holds a bachelor's degree, and a mere 0.79% have attained a master's or doctoral degree. In terms of gender distribution, females and males are nearly evenly represented, accounting for 50.28% and 49.72% of the sample, respectively. The NEET status indicates that 32.60% of the sample is disengaged with the labor market, while 67.40% are either employed or in education and training. For continuous variables, the average age of the individuals is 21.55 years, with a standard deviation of 4.45 years. The age range is between 15 and 29 years, aligning with the targeted demographic of the analysis. These statistics highlight key trends in educational attainment, gender distribution, and NEET status, providing a comprehensive overview of the youth demographic. The data suggests substantial engagement in education and work for a majority, although a notable proportion remains excluded.

**Table 2. Descriptive statistics**

| Categorical Variables | | | |
|---|---|---|---|
| **Variables** | **Proportions** | **Variables** | **Proportions** |
| **Education** | | | |
| Education- Not finishing a school | 6.03 | Education- High school | 28.58 |
| Education- Primary school | 2.26 | Education- Bachelor | 17.01 |
| Education- Secondary school | 45.34 | Education- Master/PhD | 0.79 |
| **N=1,008,173** | | | |
| **Gender** | | | |
| Gender-Females | 50.28 | Gender-Males | 49.72 |
| **N=1,010,008** | | | |
| **NEET** | | | |
| NEET-No | 67.40 | NEET-Yes | 32.60 |
| **N=943,092** | | | |
| | Continuous Variables | | |
| **Variables** | **Mean** | **Standard Deviation** | **Min-Max** |
| Age | 21.55 | 4.45 | 15-29 |
| **N=1,010,008** | | | |

*Note: N represents number of observations.*

## 5.2. RDD graphs

Figure 3 plots the NEET rates by gender before and after the treatment. These graphs suggest that exposure to the compulsory schooling reform had no impact on the NEET ratio of males, but there is a positive significant jump for females and young in general, indicating an increase in NEET ratios for female. Across a range of bandwidths, estimates show similar results, but we present the related graphs drawn based on the 3-year bandwidth. Using the 3-year bandwidth for both male and female, Figure 3 rules out NEET does not change for males with the high school compulsory law but increases for the females and the whole sample is supported with the other bandwidths ranging from 3 to 7. Figure 4 represents RDD graphs for different NUTS-1 regions that provide insights into the impact of the compulsory high school education law on NEET rates. The observations from the graphs for specific regions are summarized below, highlighting trends and possible explanations for the observed effects.

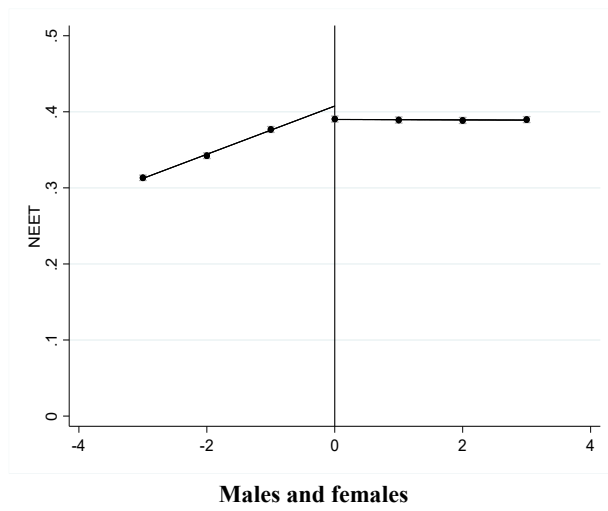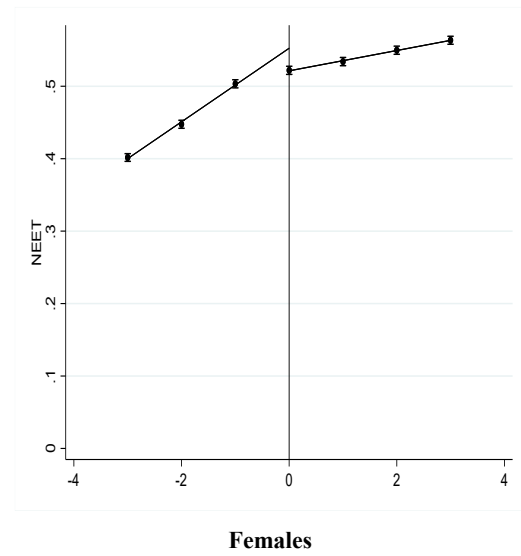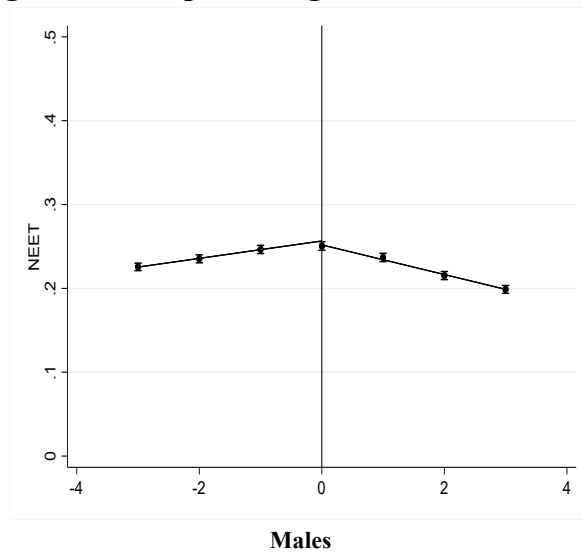**Figure 3. RDD plots for gender**



**Males**



**Females**



**Males and females**

**Figure 4. RDD plots for NUTS-1 regions**
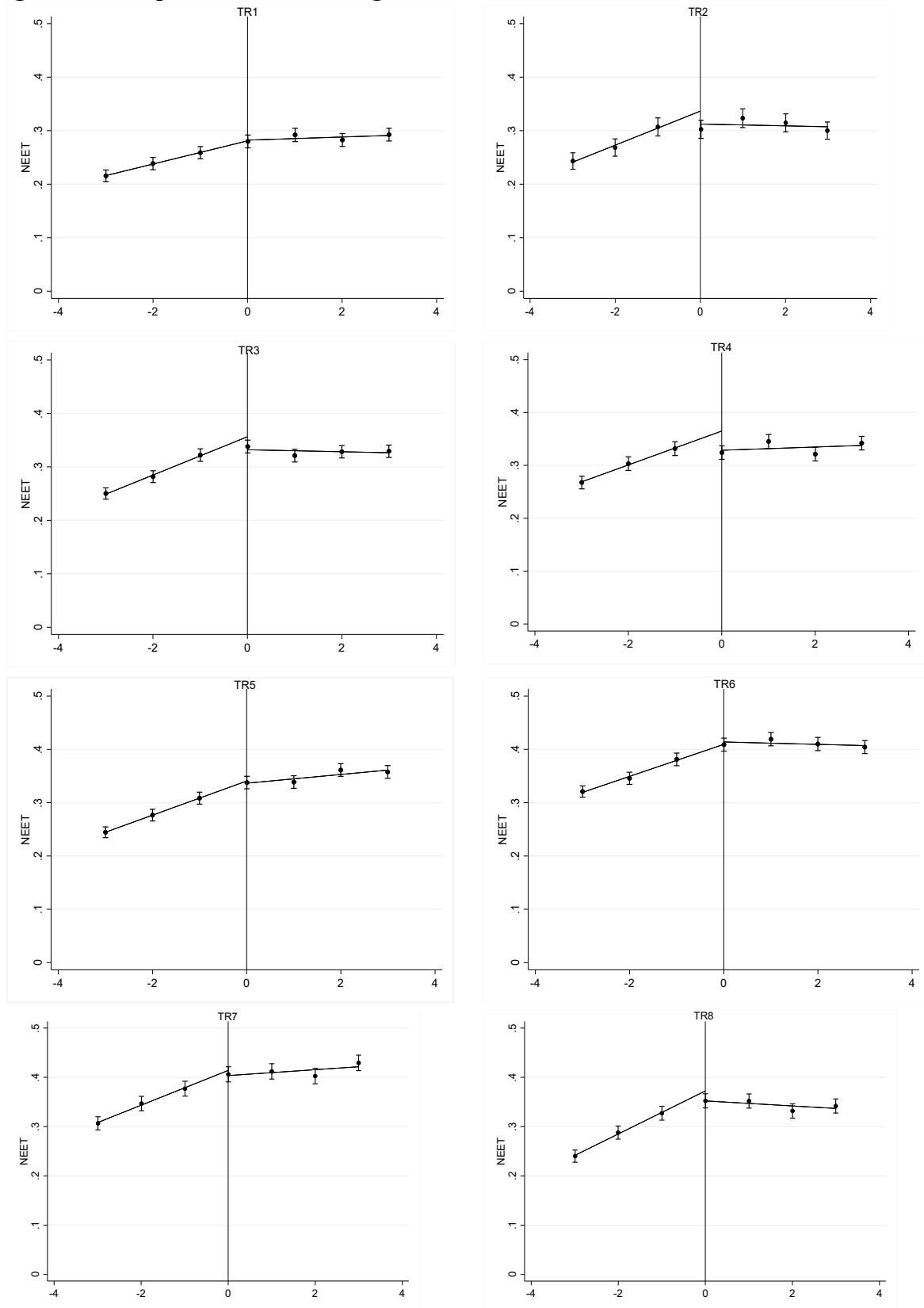
**Figure 4. RDD plots for NUTS-1 regions (Continued)**
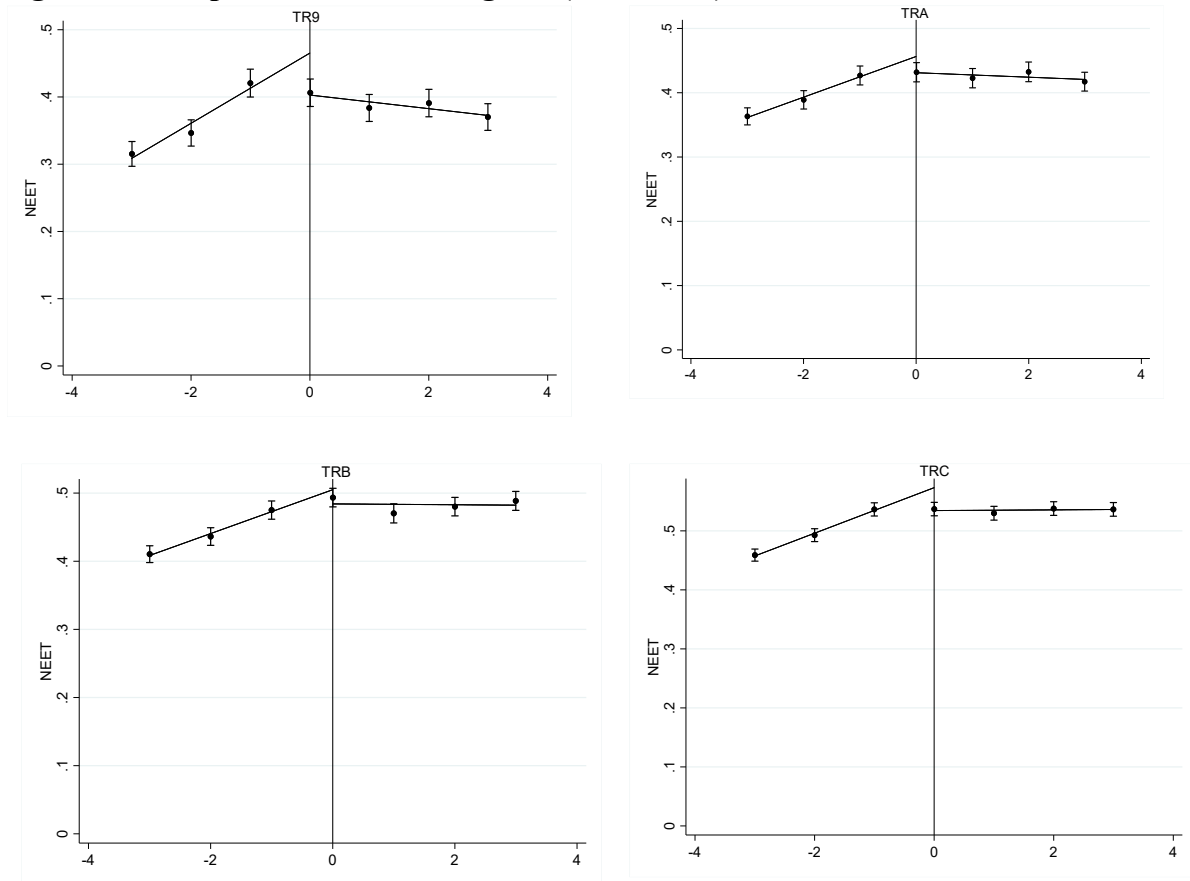


From the above figure, TR1, TR2, TR3, TR4, TR5, TR6, TR7, TR8, TR9, TRA, TRB, and TRC represent İstanbul, West Marmara, Aegean, East Marmara, West Anatolia, Mediterranean, Central Anatolia, West Black Sea, East Black Sea, Northeast Anatolia, Central east Anatolia, and Southeast Anatolia respectively. Regions with Increasing NEET Rates are TR2 (West Marmara), TR3 (Aegean), TR4 (East Marmara), TR9 (East Black Sea), TRA (Northeast Anatolia), TRC (Southeast Anatolia). The graph shows a noticeable increase in NEET rates in these regions post-reform. The discontinuity indicates that the law may have inadvertently resulted in reduced transitions to employment or further education, possibly due to economic or cultural factors prevalent in these regions.

This increase suggests that the compulsory schooling reform might have imposed barriers for certain demographics, potentially due to a mismatch between education policies and regional labor market needs. Moreover, in some regions, the effect could reflect the region's limited opportunities for youth employment and training, exacerbating the NEET problem.

A substantial increase in NEET rates is observed in the eastern regions (TRA and TRC), indicating that the reform may not have effectively addressed the unique socio-economic challenges of this region. Cultural norms and limited labor market absorption could be contributing factors. The reform's impact might have been hindered by socio-economic disparities and limited access to quality education or vocational opportunities in the region.

### 5.3. RDD estimates

The impact of the 2012 compulsory schooling law on NEET rates in Türkiye has been the subject of extensive analysis in the related literature (e.g. Zayim and Kayaoglu, 2024; Erten and Keskin, 2019). Compulsory education reforms aimed at enhancing educational outcomes and labor market participation, often generate complex effects, especially when intersecting with regional, gender, and socio-economic factors. Table 3 reports the fuzzy RDD treatment effects of the 2012 compulsory schooling law on NEET status estimated using different bandwidths for all individuals aged between 15 and 29.

**Table 3. Fuzzy RDD results (general young population aged between 15 and 29)**

|  | Linear-Uniform | Linear-Triangular |
|---|---|---|
| 3 bandwidth | 0.329*** | 0.494*** |
|  | (0.068) | (0.127) |
| 4 bandwidth | 0.598*** | 0.355*** |
|  | (0.070) | (0.074) |
| 5 bandwidth | 0.714*** | 0.482*** |
|  | (0.107) | (0.069) |
| 6 bandwidth | 0.629*** | 0.545*** |
|  | (0.119) | (0.077) |
| 7 bandwidth | 0.395*** | 0.554*** |
|  | (0.096) | (0.086) |
| **N=941,257** |  |  |

*Notes: Data is the 2015-2023 pooled cross-sectional data from Household Labor Force Survey of Türkiye. Each raw reports a fuzzy RDD treatment effect of being exposed to compulsory schooling law using the observations within a certain bandwidth and using weights defined based on some kernel such as uniform and triangular. The dependent variable is a dummy variable equal to one if the respondent is not in education, training or employment, zero otherwise. Robust standard errors are presented in parentheses. \*\*\* denotes significance at the 1 percent levels respectively. N represents the "Number of Observations".*

Similar results with smaller magnitudes are obtained using the sharp RDD design, and we present the relevant findings in the appendix. Our findings for individuals aged 15 to 29 indicate that extending compulsory schooling in Türkiye has unintentionally contributed to an increase in NEET rates. High NEET rates generally arise when young people face limited employment opportunities, low school completion rates, or high dropout rates. Previous research in Türkiye has primarily examined the impact of compulsory schooling laws on high school attendance and completion rates. For instance, Kırdar et al. (2018) have found that the 1997 law mandating eight years of compulsory education has significantly increased high school completion rates, which were not mandatory at the time.

Similarly, Erten and Keskin (2019) have shown that the 2012 compulsory schooling reform raised high school attendance by approximately 5 percentage points overall, with slightly larger benefits for males. Yıldız (2022) further demonstrated that the 2012 reform significantly boosted high school attendance by 7.52% and increased grade completion rates for grades 9 to 12 by 6.30%, 4.97%, 6.57%, and 13.36%, respectively. While these studies highlight the positive educational outcomes of the 2012 reform, the rising NEET rates may be attributed to the lack of foundational support for employability, such as insufficient knowledge, work experience and professional skills, which leads to disengagement from the labor market. Moreover, traditional and conservative attitudes as form of cultural and social norms, along

with the economic and regional labor market conditions, can play a significant role in youth unemployment and, therefore lead to high NEET rates. Hodgson (2019) argues that policies focused solely on increasing years of compulsory schooling without considering individual or regional economic contexts can lead to "myopic outcomes" that fail to align education with employment opportunities. This is echoed in research by Bacher et al. (2017), which emphasizes how region-specific labor market conditions significantly influence the transition from school to work for young people.

Table 4 displays the findings separately for females and males, as well as the estimated effects for individuals residing in various NUTS-1 regions. Within narrower bandwidths, where the individuals are predominantly of school age, the compulsory schooling law leads to an increase in NEET rates for females but not for males. In contrast, in wider bandwidths that includes older individuals of working age among the treated and control groups, the NEET rates for both females and males rise as a result of the education law.

The reform's effects are markedly heterogeneous across the NUTS-1 regions, reflecting Türkiye's diverse socio-economic landscape. Regions such as Southeast Anatolia (TRC) and Northeast Anatolia (TRA), which are economically disadvantaged and characterized by traditional social norms, experienced significant increases in NEET rates. The data suggests that these areas struggled due to structural economic limitations and cultural barriers that hindered transitions from education to employment or further training. For example, the NEET rate increase in TRA and TRC regions can be attributed to the limited availability of quality secondary schools and vocational training centres, as well as scarce local employment opportunities. These regions also tend to have higher rates of informal labor, which may deter families from supporting extended schooling. RDD models for these regions consistently showed significant coefficients across bandwidths, indicating a robust and adverse policy impact on youth engagement.

## Table 4. Fuzzy RDD results by gender and different NUTS-1 regions

| Young Population (15-29 years old) | 3 bandwidths | 4 bandwidths | 5 bandwidths | 6 bandwidths | 7 bandwidths | N of Obs |
|---|---|---|---|---|---|---|
| Males | 0.156 | 0.123 | 0.342*** | 0.586*** | 0.968*** | N=462,671 |
| | (0.154) | (0.109) | (0.116) | (0.171) | (0.294) | |
| Females | 0.851*** | 0.542*** | 0.585*** | 0.575*** | 0.499*** | N=478,586 |
| | (0.212) | (0.100) | (0.082) | (0.083) | (0.082) | |
| TR-1 | -0.081 | -0.039 | 0.197 | 0.225 | 0.141 | N=82,034 |
| | (0.437) | (0.260) | (0.200) | (0.183) | (0.180) | |
| TR-2 | 0.418* | 0.291* | 0.281** | 0.342** | 0.387** | N=46,124 |
| | (0.230) | (0.154) | (0.135) | (0.155) | (0.190) | |
| TR-3 | 1.599 | 0.854* | 0.681** | 0.662** | 0.675** | N=96,034 |
| | (1.669) | (0.517) | (0.337) | (0.320) | (0.323) | |
| TR-4 | 0.472* | 0.562*** | 0.724*** | 0.938*** | 0.985*** | N=79,628 |
| | (0.261) | (0.216) | (0.222) | (0.297) | (0.334) | |
| TR-5 | 0.080 | 0.064 | 0.029 | -0.044 | -0.132 | N=98,384 |
| | (0.230) | (0.148) | (0.133) | (0.132) | (0.141)) | |
| TR-6 | 0.107 | -0.030 | 0.223 | 0.276 | 0.251 | N=102,999 |
| | (0.289) | (0.181) | (0.166) | (0.194) | (0.221) | |
| TR-7 | -0.015 | 0.195 | 0.407 | 0.554 | 0.471 | N=62,108 |
| | (0.839) | (0.393) | (0.388) | (0.594) | (0.734) | |
| TR-8 | 0.270 | 0.361 | 0.345 | 0.265 | 0.173 | N=66,595 |
| | (0.404) | (0.282) | (0.284) | (0.349) | (0.376) | |
| TR-9 | 1.417** | 0.955*** | 0.827*** | 0.904*** | 0.979*** | N=36,098 |
| | (0.616) | (0.329) | (0.230) | (0.261) | (0.301) | |
| TR-A | 1.200 | 0.475* | 0.564** | 0.507** | 0.440** | N=68,103 |
| | (1.001) | (0.260) | (0.219) | (0.205) | (0.190) | |
| TR-B | 1.982 | 0.896 | 1.100 | 2.013 | 11.577 | N=82,863 |
| | (3.149) | (0.749) | (0.676) | (1.970) | (64.742) | |
| TR-C | 1.157** | 0.869*** | 1.149*** | 1.261*** | 1.303*** | N=120,285 |
| | (0.535) | (0.292) | (0.308) | (0.334) | (0.356) | |

*Notes: Data is the 2015-2023 pooled cross-sectional data from Household Labor Force Survey of Türkiye. For females, males and individuals in different NUTS-1 regions, each raw reports a fuzzy RDD treatment effect of being exposed to compulsory schooling law using the observations within a certain bandwidth and using weights defined based on triangular kernel function. The dependent variable is a dummy variable equal to one if the respondent is not in education, training or employment, zero otherwise. Robust standard errors are presented in parentheses. \*\*\*,\*\*,and \* denote significance at the 1, 5,and 10 percent levels respectively. "N of Obs" represents the "Number of Observations".*

The increased effect of the policy on NEET rates in relatively developed regions such as TR2 (West Marmara), TR3 (Aegean), and TR4 (East Marmara) despite their advanced socio-economic status highlights potential mismatches between education and labor market needs. Zudina (2022) highlights that NEET unemployment may indicate a disconnect between the qualifications of graduates and the skills demanded by the labor market, often resulting from the growing number of graduates who have obtained higher education from low-quality universities. This can cause students who complete compulsory schooling to struggle in finding jobs suitable for their qualifications. Our analysis of the dataset reveals that higher levels of education correlate with elevated NEET rates in Türkiye. Specifically, NEET rates are 35% among high school graduates, 54% among bachelor's degree holders, and 74% among those with Master's or PhD degrees. Developed regions often have highly competitive labor markets. The influx of new graduates from extended schooling reforms may saturate job availability, leaving many youths without immediate opportunities for employment or training.

Additionally, compulsory schooling reforms often prioritize academic curricula over vocational training pathways, which are crucial for facilitating students' transition into the workforce, particularly in developed regions. As Kupets (2016) notes, advanced academic

education does not necessarily translate into the practical, productive skills required by the private sector. Considering Marmara and Aegean regions. The Marmara and Aegean regions are the areas in Türkiye with the highest number of Organized Industrial Zones (OIZs) and free zones, resulting in a significant demand for intermediate-level personnel in these regions. However, since academic education institutions outnumber vocational schools that train intermediate-level workers, many sectors and industries operating in the Marmara and Aegean regions face a shortage of skilled intermediate personnel. In these relatively developed regions, youth may pursue further education more compared to the other regions due to increased education opportunities with the newly opened universities. This can create delays in the workforce and increased NEET rates as a consequence of extended schooling reform. Although it is also an economically developed region, reform does not increase NEET rates in the Istanbul region. Istanbul is a province that benefitted from better educational infrastructure compared to the rest of the world. Higher education schools and universities in Istanbul are the leading institutions and it has a more dynamic labor market, facilitating smoother transitions from school to employment compared to other regions. Polat (2017) also highlights that Istanbul exhibits the highest marginal returns to post-secondary education which reinforces the argument that highly educated individuals tend to stay and work in Istanbul, Türkiye's largest metropolis. The findings suggest that existing regional disparities in economic development and infrastructure amplify the differential effects of nationwide educational policies on NEET rates. Table 5 and Table 6 present the findings separately for females and males who live in different NUTS-1 regions.

The results clearly reveal the gender-specific effects of the 2012 compulsory schooling law across different regions in Türkiye, underscoring the complexity of its outcomes. For females, the policy resulted in a substantial and statistically significant increase in NEET rates across almost all regions. This can be linked to persistent gender norms, which often limit women's participation in formal employment. The sharp increase in female NEET rates was particularly pronounced in the eastern regions, where traditional cultural expectations often discourage extended schooling for girls. The linear-triangular RDD estimates showed consistently high coefficients for females, especially in bandwidths ranging from 3 to 7 years.

The rise in female NEET rates was not limited to the eastern regions but was also observed in industrially developed areas, such as TR2-West Marmara and TR4-East Marmara. Maguire (2021) points to structural challenges for females, even in developed regions, where societal expectations or workplace inflexibility can exacerbate the difficulty of transitioning from education to employment. Women are significantly more likely to be classified as economically inactive, primarily due to their responsibilities related to caregiving and household tasks (OECD, 2017).

## Table 5. Fuzzy RDD results for females in different NUTS-1 regions

| Females (15-29 years old) | 3 bandwidths | 4 bandwidths | 5 bandwidths | 6 bandwidths | 7 bandwidths | N of Obs |
|---|---|---|---|---|---|---|
| TR-1 | 0.070 | -0.003 | 0.122 | 0.070 | -0.091 | N=41,411 |
| | (0.593) | (0.317) | (0.258) | (0.251) | (0.237) | |
| TR-2 | 0.796* | 0.463* | 0.432** | 0.467** | 0.455** | N=22,388 |
| | (0.451) | (0.244) | (0.193) | (0.203) | (0.219) | |
| TR-3 | 0.429 | 0.347 | 0.285 | 0.238 | 0.168 | N=47,685 |
| | (0.372) | (0.259) | (0.199) | (0.171) | (0.165) | |
| TR-4 | 0.723** | 0.789*** | 0.860*** | 1.005*** | 0.964*** | N=39,870 |
| | (0.367) | (0.298) | (0.259) | (0.292) | (0.290) | |
| TR-5 | 0.098 | -0.000 | -0.062 | -0.130 | -0.222* | N=50,560 |
| | (0.279) | (0.172) | (0.140) | (0.131) | (0.130) | |
| TR-6 | 0.460 | 0.288 | 0.461** | 0.527** | 0.471* | N=52,165 |
| | (0.380) | (0.224) | (0.206) | (0.247) | (0.275) | |
| TR-7 | 8.932 | 0.103 | 0.452 | 0.399 | 0.130 | N=31,758 |
| | (158.903) | (1.086) | (0.653) | (0.609) | (0.470) | |
| TR-8 | 0.917 | 0.761** | 0.590** | 0.465** | 0.343 | N=33,631 |
| | (0.817) | (0.350) | (0.246) | (0.236) | (0.224) | |
| TR-9 | 3.341 | 1.118*** | 0.910*** | 0.824*** | 0.734*** | N=18,020 |
| | (2.796) | (0.390) | (0.258) | (0.241) | (0.245) | |
| TR-A | -3.060 | 1.561 | 1.076* | 0.874** | 0.766** | N=34,878 |
| | (4.532) | (1.510) | (0.607) | (0.434) | (0.375) | |
| TR-B | 2.423 | 1.183* | 1.125** | 1.355** | 1.609 | N=43,049 |
| | (3.047) | (0.617) | (0.454) | (0.648) | (0.988) | |
| TR-C | 0.674* | 0.762** | 1.190*** | 1.347*** | 1.355*** | N=63,171 |
| | (0.408) | (0.316) | (0.412) | (0.483) | (0.487) | |

*Notes: Data is the 2015-2023 pooled cross-sectional data from Household Labor Force Survey of Türkiye. For young women aged 15 to 29, each raw reports a fuzzy RDD treatment effect of being exposed to compulsory schooling law using the observations within a certain bandwidth and using weights defined based on triangular kernel function. The dependent variable is a dummy variable equal to one if the respondent is not in education, training or employment, zero otherwise. Robust standard errors are presented in parentheses. \*\*\*,\*\*,and \* denote significance at the 1, 5,and 10 percent levels respectively. "N of Obs" represents the "Number of Observations".*

## Table 6. Fuzzy RDD results for males in different NUTS-1 regions

| Males (15-29 years old) | 3 bandwidths | 4 bandwidths | 5 bandwidths | 6 bandwidths | 7 bandwidths | N of Obs |
|---|---|---|---|---|---|---|
| TR-1 | -0.013 | 0.066 | 0.376 | 0.445* | 0.455 | N=40,623 |
| | (0.593) | (0.409) | (0.305) | (0.263) | (0.278) | |
| TR-2 | 0.183 | 0.096 | 0.066 | 0.126 | 0.242 | N=23,736 |
| | (0.233) | (0.183) | (0.176) | (0.224) | (0.330) | |
| TR-3 | -1.692 | -5.922 | -20.324 | -4.107 | -3.885 | N=48,351 |
| | (1.549) | (13.845) | (147.462) | (6.140) | (4.994) | |
| TR-4 | 0.146 | 0.304 | 0.605 | 1.028 | 1.723 | N=39,758 |
| | (0.371) | (0.312) | (0.423) | (0.936) | (2.089) | |
| TR-5 | 0.313 | 0.411 | 0.554* | 0.655* | 0.905 | N=47,824 |
| | (0.367) | (0.262) | (0.311) | (0.387) | (0.609) | |
| TR-6 | -0.439 | -0.582 | -0.232 | -0.161 | -0.075 | N=50,834 |
| | (0.562) | (0.388) | (0.310) | (0.350) | (0.392) | |
| TR-7 | -0.432 | -0.060 | 0.007 | -0.051 | 0.085 | N=30,350 |
| | (0.599) | (0.336) | (0.423) | (1.215) | (4.005) | |
| TR-8 | 0.063 | -0.266 | -1.817 | 0.937 | 0.323 | N=32,964 |
| | (0.445) | (0.593) | (6.135) | (1.978) | (0.869) | |
| TR-9 | 0.551 | 0.654 | 0.652 | 1.150 | 2.033 | N=18,078 |
| | (0.420) | (0.561) | (0.432) | (0.830) | (1.684) | |
| TR-A | 0.124 | 0.040 | 0.149 | 0.138 | 0.149 | N=33,225 |
| | (0.292) | (0.183) | (0.182) | (0.195) | (0.195) | |
| TR-B | 21.433 | 4.849 | 1.093 | 0.268 | 0.110 | N=39,814 |
| | (838.232) | (22.978) | (2.458) | (0.719) | (0.465) | |
| TR-C | 1.463 | 0.691 | 0.868** | 1.048** | 1.244** | N=57,114 |
| | (1.650) | (0.480) | (0.398) | (0.417) | (0.513) | |

*Notes: Data is the 2015-2023 pooled cross-sectional data from Household Labor Force Survey of Türkiye. For young men aged 15 to 29, each raw reports a fuzzy RDD treatment effect of being exposed to compulsory schooling law using the observations within a certain bandwidth and using weights defined based on triangular kernel function. The dependent variable is a dummy variable equal to one if the respondent is not in education, training or employment, zero otherwise. Robust standard errors are presented in parentheses. \*\* and \* denote significance at the 5,and 10 percent levels respectively. "N of Obs" represents the "Number of Observations".*

On the other hand, the reform leads to an increase in NEET rates among males in TRC-South-eastern Anatolia across nearly all bandwidths. However, the largely insignificant results for males in most other regions suggest that the policy did not meaningfully improve their NEET status. While it did not exacerbate the situation for males as it did for females, it also failed to yield meaningful benefits for young men. This outcome may reflect a persistent labor market preference for males, which shields them from the full impact of policy-induced challenges. Regional and gendered variations play a pivotal role in the outcomes of compulsory schooling policies. Our findings reveal substantial heterogeneity in NEET outcomes between females and males and across NUTS-1 regions, highlighting the need for tailored policy interventions to address these disparities effectively.

Despite the strengths of our empirical approach and extensive dataset, this study has various limitations. First, the issue of non-compliance poses a methodological challenge, where not all individuals born after the reform (treated group) completed high school as mandated, while some in the control group did, violating the assumptions of a sharp regression discontinuity design. To address this, we applied a fuzzy RDD, but residual measurement error in treatment status may persist. Second, while we account for observable characteristics across regions, unobserved regional heterogeneity, such as differences in school quality, informal labor markets, or enforcement of the reform, may still confound the estimates. Third, our analysis cannot disentangle the underlying mechanisms behind the observed increase in NEET rates, such as whether the effect is driven by cultural norms and values, lack of labor demand, or insufficient vocational pathways. Fourth, we rely on cross-sectional survey data, which limits the ability to track individual transitions over time. Finally, while the regression discontinuity framework provides strong internal validity near the cutoff, the external validity of the results may be limited, particularly for individuals far from the threshold age.

## 6. Conclusions

The existing literature suggests that while compulsory schooling laws are a powerful tool for enhancing educational attainment and reducing early school leaving, their impact on NEET rates is multifaceted and often contingent on contextual factors. Policymakers are encouraged to adopt holistic approaches that integrate educational reforms with labor market policies and regional development initiatives to address these challenges effectively.

Our findings suggest that extending compulsory education alone is insufficient to reduce NEET rates, particularly for young women. While the reform increased school attainment, it did not adequately address the barriers to labor market integration. This highlights the need for complementary policies that bridge education and employment, including access to vocational training, job placement services, and support for women's labor force participation. In regions where traditional norms restrict female employment, efforts must also focus on shifting cultural attitudes and improving childcare and social services. Finally, addressing regional disparities

in school quality and labor market demand is essential to ensure that educational reforms translate into meaningful economic opportunities.

Thus, our findings underscore the need for targeted, region-specific interventions to address the unintended consequences of the reform. In economically disadvantaged regions, local labor market development is essential to mitigate the rise in NEET rates. Our region-specific findings highlight the critical importance of tailoring nationwide policies to local contexts, ensuring that reforms achieve their intended objectives without exacerbating existing inequalities. Tailored interventions, such as vocational training programs and partnerships with local employers, are crucial for aligning education with the needs of the workforce. These initiatives can help reduce the rise in NEET rates by providing students with practical skills and direct pathways into employment.

Upgrading educational infrastructure and aligning curricula with labor market demands are particularly important in regions experiencing the highest NEET rates. Such measures can address the mismatch between the skills taught in schools and those required by employers, fostering better transitions from education to employment.

Considering our gender-specific results, policies should focus on overcoming cultural barriers and promoting gender equality through awareness campaigns and expanded access to male/female-centric vocational training programs. Cultural considerations must be addressed, particularly in Southeast and Northeast Anatolia, where traditional norms often hinder educational and employment opportunities. Efforts to overcome these barriers, including awareness campaigns, initiatives to promote gender equality, and community engagement, can significantly enhance the impact of the reform. By fostering a supportive environment, these measures can improve participation and inclusion in both education and the labor market. In summary, these recommendations aim to ensure that the compulsory schooling law achieves its objectives, reducing NEET rates and promoting successful transitions into employment and further education across Türkiye.

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# Appendix

## Table A1. Sharp RDD results (general young population aged between 15 and 29)

| 3 bandwidths | 4 bandwidths | 5 bandwidths |
|---|---|---|
| Linear-Triangular | Linear-Triangular | Linear-Triangular |
| 0.021*** | 0.018*** | 0.024*** |
| (0.005) | (0.004 ) | (0.003) |
| **6 bandwidths** | **7 bandwidths** | |
| Linear-Triangular | Linear-Triangular | |
| 0.022*** | 0.019*** | |
| (0.003) | (0.003) | |
| **N=943,092** | | |

*Notes: Data is the 2015-2023 pooled cross-sectional data from Household Labor Force Survey of Türkiye. For general young population aged 15 to 29, Table reports sharp RDD treatment effects of being exposed to compulsory schooling law using the observations within a certain bandwidth and using weights defined based on triangular kernel function. Estimates using uniform kernel function provide similar results even though we did not report them in the table. The dependent variable is a dummy variable equal to one if the respondent is not in education, training or employment, zero otherwise. Robust standard errors are presented in parentheses. \*\*\* denotes significance at the 1 percent levels respectively. N represents the "Number of Observations".*

## Table A2. Sharp RDD results by gender and different NUTS-1 regions

| Young Population (15- 29 years old) | 3 bandwidths | 4 bandwidths | 5 bandwidths | 6 bandwidths | 7 bandwidths | N of Obs |
|---|---|---|---|---|---|---|
| Males | 0.006 | 0.005 | 0.012*** | 0.014*** | 0.015*** | N=463,654 |
| | (0.006) | (0.005) | (0.004) | (0.003) | (0.003) | |
| Females | 0.038*** | 0.033*** | 0.037*** | 0.033*** | 0.025*** | N=479,438 |
| | (0.007) | (0.005) | (0.004) | (0.004) | (0.004) | |
| TR-1 | 0.003 | 0.002 | 0.009 | 0.011 | 0.006 | N=82,036 |
| | (0.014) | (0.011) | (0.009) | (0.008) | (0.007) | |
| TR-2 | 0.040* | 0.030* | 0.028** | 0.027** | 0.023** | N=46,253 |
| | (0.021) | (0.015) | (0.013) | (0.012) | (0.011) | |
| TR-3 | 0.027* | 0.024** | 0.023** | 0.021** | 0.019*** | N=96,242 |
| | (0.014) | (0.017) | (0.009) | (0.008) | (0.007) | |
| TR-4 | 0.032** | 0.035*** | 0.040*** | 0.039*** | 0.034*** | N=79,884 |
| | (0.016) | (0.012) | (0.010) | (0.009) | (0.008) | |
| TR-5 | 0.005 | 0.005 | 0.002 | 0.003 | 0.007 | N=98,471 |
| | (0.014) | (0.010) | (0.009) | (0.008) | (0.007) | |
| TR-6 | 0.006 | 0.012 | 0.013 | 0.013 | 0.010 | N=103,272 |
| | (0.015) | (0.011) | (0.009) | (0.008) | (0.008) | |
| TR-7 | -0.001 | 0.007 | 0.013 | 0.011 | 0.007 | N=62,256 |
| | (0.019) | (0.014) | (0.012) | (0.010) | (0.010) | |
| TR-8 | 0.012 | 0.018 | 0.014 | 0.008 | 0.004 | N=66,730 |
| | (0.018) | (0.013) | (0.011) | (0.010) | (0.009) | |
| TR-9 | 0.092*** | 0.070*** | 0.068*** | 0.061*** | 0.055*** | N=36,207 |
| | (0.025) | (0.019) | (0.016) | (0.014) | (0.013) | |
| TR-A | 0.035* | 0.028** | 0.035*** | 0.029*** | 0.025*** | N=68,275 |
| | (0.018) | (0.013) | (0.011) | (0.010) | (0.009) | |
| TR-B | 0.024 | 0.020 | 0.025** | 0.022** | 0.018** | N=82,984 |
| | (0.017) | (0.012) | (0.010) | (0.009) | (0.009) | |
| TR-C | 0.045*** | 0.040*** | 0.049*** | 0.047*** | 0.043*** | N=120,482 |
| | (0.014) | (0.010) | (0.009) | (0.008) | (0.007) | |

*Notes: Data is the 2015-2023 pooled cross-sectional data from Household Labor Force Survey of Türkiye. For females, males and individuals in different NUTS-1 regions, each raw reports a sharp RDD treatment effect of being exposed to compulsory schooling law using the observations within a certain bandwidth and using weights defined based on triangular kernel function. The dependent variable is a dummy variable equal to one if the respondent is not in education, training or employment, zero otherwise. Robust standard errors are presented in parentheses. \*\*\*,\*\*, and \* denote significance at the 1, 5,and 10 percent levels respectively. "N of Obs" represents the "Number of Observations".*

**Table A3. Sharp RDD results for females in different NUTS-1 regions**

| Females (15-29 years old) | 3 bandwidths | 4 bandwidths | 5 bandwidths | 6 bandwidths | 7 bandwidths | N of Obs |
|---|---|---|---|---|---|---|
| TR-1 | 0.003 | -0.000 | 0.007 | 0.004 | -0.004 | N=41,412 |
|  | (0.022) | (0.016) | (0.014) | (0.012) | (0.011) |  |
| TR-2 | 0.072** | 0.051** | 0.050** | 0.047** | 0.039** | N=22,447 |
|  | (0.033) | (0.024) | (0.020) | (0.018) | (0.017) |  |
| TR-3 | 0.028 | 0.024 | 0.021 | 0.018 | 0.012 | N=47,783 |
|  | (0.022) | (0.016) | (0.014) | (0.012) | (0.011) |  |
| TR-4 | 0.057** | 0.060*** | 0.066*** | 0.065*** | 0.057*** | N=39,983 |
|  | (0.025) | (0.018) | (0.015) | (0.013) | (0.012) |  |
| TR-5 | 0.006 | -0.000 | -0.006 | -0.012 | -0.018* | N=50,598 |
|  | (0.021) | (0.015) | (0.013) | (0.012) | (0.010) |  |
| TR-6 | 0.029 | 0.021 | 0.034** | 0.030** | 0.022** | N=52,287 |
|  | (0.021) | (0.016) | (0.013) | (0.012) | (0.011) |  |
| TR-7 | 0.012 | 0.001 | 0.012 | 0.010 | 0.004 | N=31,830 |
|  | (0.027) | (0.020) | (0.017) | (0.015) | (0.014) |  |
| TR-8 | 0.040 | 0.053*** | 0.046*** | 0.032** | 0.022 | N=33,687 |
|  | (0.026) | (0.020) | (0.016) | (0.015) | (0.013) |  |
| TR-9 | 0.131*** | 0.106*** | 0.101*** | 0.085*** | 0.066*** | N=18,070 |
|  | (0.036) | (0.027) | (0.022) | (0.020) | (0.018) |  |
| TR-A | 0.051** | 0.037** | 0.044*** | 0.040*** | 0.036*** | N=34,974 |
|  | (0.025) | (0.019) | (0.016) | (0.014) | (0.013) |  |
| TR-B | 0.049** | 0.052*** | 0.056*** | 0.047*** | 0.038*** | N=43,107 |
|  | (0.022) | (0.016) | (0.014) | (0.012) | (0.011) |  |
| TR-C | 0.036** | 0.042*** | 0.055*** | 0.051*** | 0.047*** | N=63,260 |
|  | (0.018) | (0.013) | (0.011) | (0.010) | (0.009) |  |

*Notes: Data is the 2015-2023 pooled cross-sectional data from Household Labor Force Survey of Türkiye. For young women aged 15 to 29, each raw reports a sharp RDD treatment effect of being exposed to compulsory schooling law using the observations within a certain bandwidth and using weights defined based on triangular kernel function. The dependent variable is a dummy variable equal to one if the respondent is not in education, training or employment, zero otherwise. Robust standard errors are presented in parentheses. \*\*\*,\*\*,and \* denote significance at the 1, 5,and 10 percent levels respectively. "N of Obs" represents the "Number of Observations".*

**Table A4. Sharp RDD results for males in different NUTS-1 regions**

| Males (15-29 years old) | 3 bandwidths | 4 bandwidths | 5 bandwidths | 6 bandwidths | 7 bandwidths | N of Obs |
|---|---|---|---|---|---|---|
| TR-1 | -0.000 | 0.002 | 0.015 | 0.020* | 0.017* | N=40,624 |
| | (0.018) | (0.013) | (0.011) | (0.010) | (0.009) | |
| TR-2 | 0.019 | 0.009 | 0.005 | 0.008 | 0.009 | N=23,806 |
| | (0.024) | (0.018) | (0.015) | (0.014) | (0.012) | |
| TR-3 | 0.043** | 0.040*** | 0.037*** | 0.033*** | 0.034*** | N=48,459 |
| | (0.017) | (0.013) | (0.011) | (0.010) | (0.009) | |
| TR-4 | 0.008 | 0.015 | 0.021* | 0.018* | 0.018* | N=39,901 |
| | (0.020) | (0.015) | (0.012) | (0.011) | (0.010) | |
| TR-5 | 0.015 | 0.022* | 0.022** | 0.020** | 0.019** | N=47,873 |
| | (0.017) | (0.012) | (0.011) | (0.009) | (0.009) | |
| TR-6 | -0.016 | -0.024* | -0.008 | -0.004 | -0.001 | N=50,985 |
| | (0.019) | (0.014) | (0.012) | (0.010) | (0.010) | |
| TR-7 | -0.019 | -0.002 | 0.001 | -0.000 | 0.000 | N=30,426 |
| | (0.023) | (0.017) | (0.014) | (0.013) | (0.012) | |
| TR-8 | 0.003 | -0.007 | -0.009 | -0.008 | -0.004 | N=33,043 |
| | (0.021) | (0.016) | (0.013) | (0.012) | (0.011) | |
| TR-9 | 0.048 | 0.033 | 0.036* | 0.037** | 0.045*** | N=18,137 |
| | (0.033) | (0.025) | (0.021) | (0.019) | (0.017) | |
| TR-A | 0.010 | 0.004 | 0.013 | 0.010 | 0.010 | N=33,301 |
| | (0.024) | (0.017) | (0.015) | (0.013) | (0.012) | |
| TR-B | -0.013 | -0.018 | -0.009 | -0.005 | -0.003 | N=39,877 |
| | (0.022) | (0.017) | (0.014) | (0.013) | (0.012) | |
| TR-C | 0.029 | 0.024* | 0.034*** | 0.038*** | 0.038*** | N=57,222 |
| | (0.019) | (0.014) | (0.012) | (0.011) | (0.010) | |

*Notes: Data is the 2015-2023 pooled cross-sectional data from Household Labor Force Survey of Türkiye. For young men aged 15 to 29, each raw reports a sharp RDD treatment effect of being exposed to compulsory schooling law using the observations within a certain bandwidth and using weights defined based on triangular kernel function. The dependent variable is a dummy variable equal to one if the respondent is not in education, training or employment, zero otherwise. Robust standard errors are presented in parentheses. \*\*\*,\*\*,and \* denote significance at the 1, 5,and 10 percent levels respectively. "N of Obs" represents the "Number of Observations".*