The Impact of Age-Specific Minimum Wages on Youth Employment and Education: A Regression Discontinuity Analysis

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Outline of Presentation

- Motivation
- Research Questions
- Contribution
- Literature Review
- Institutional Setting
- Data and Identification
- Empirical Results and Discussions

Motivation

- Impact of minimum pay policies on labour markets in developing economies is less studied.
- Distorted view of minimum wage impact
  - Studies typically focus on: How much a particular increase would lower *overall* employment?
  - Shift in the composition of workforce is ignored

Aim: Analyze effects of age-specific minimum wages on labour market and education outcomes of young males in Turkey.

Research Questions

- Does youth minimum wage policy significantly affect employment for young males in Turkey? If so, what is the direction and magnitude?
- Does minimum wage worsen young males' unemployment?
- How does labour force participation behavior of young males change after a rise in the minimum wage?
- Does a higher minimum wage push male students out of school towards labour market? Or, does it lead young males to enroll more in school?
- Are there any significant effects of the minimum pay policy on the share of young males who are neither in employment nor in education?

Contribution

- The literature is relatively scarce in developing countries (Broecke at al., 2015; Belman and Wolfson, 2014)
- Effects of minimum pay policy have not been fully revealed:
  - Impact of the minimum wage in developing countries might differ--high informality and high levels of minimum wages (Broecke at al., 2017)
- Fewer studies on less skilled young in emerging economies
- Studies mainly focus on labor markets (less emphasize on education) (e.g. Pereira, 2003)

Related Literature

Age-Specific Minimum Wage Policies:

Difference-in-differences (DID): Pereira (2003), Portugal and Cardoso (2006), Hyslop and Stillman (2007), Shannon (2011), Yannelis (2014)

Regression Discontinuity (RD): Olssen (2011), Dickens et al. (2014), Kabatek (2015), Kreiner et al. (2017), Fidrmuc and Tena (2018)

Schooling Impact: Neumark and Wascher (1995, 2003), Pacheco and Cruickshank (2007), Campolieti (2005), Crofton et al. (2009), Smith (2014)

Developing Economies: Lemos (2009), Boeri et al. (2011), Broecke et al. (2017), Del Carpio and Pabon (2017)

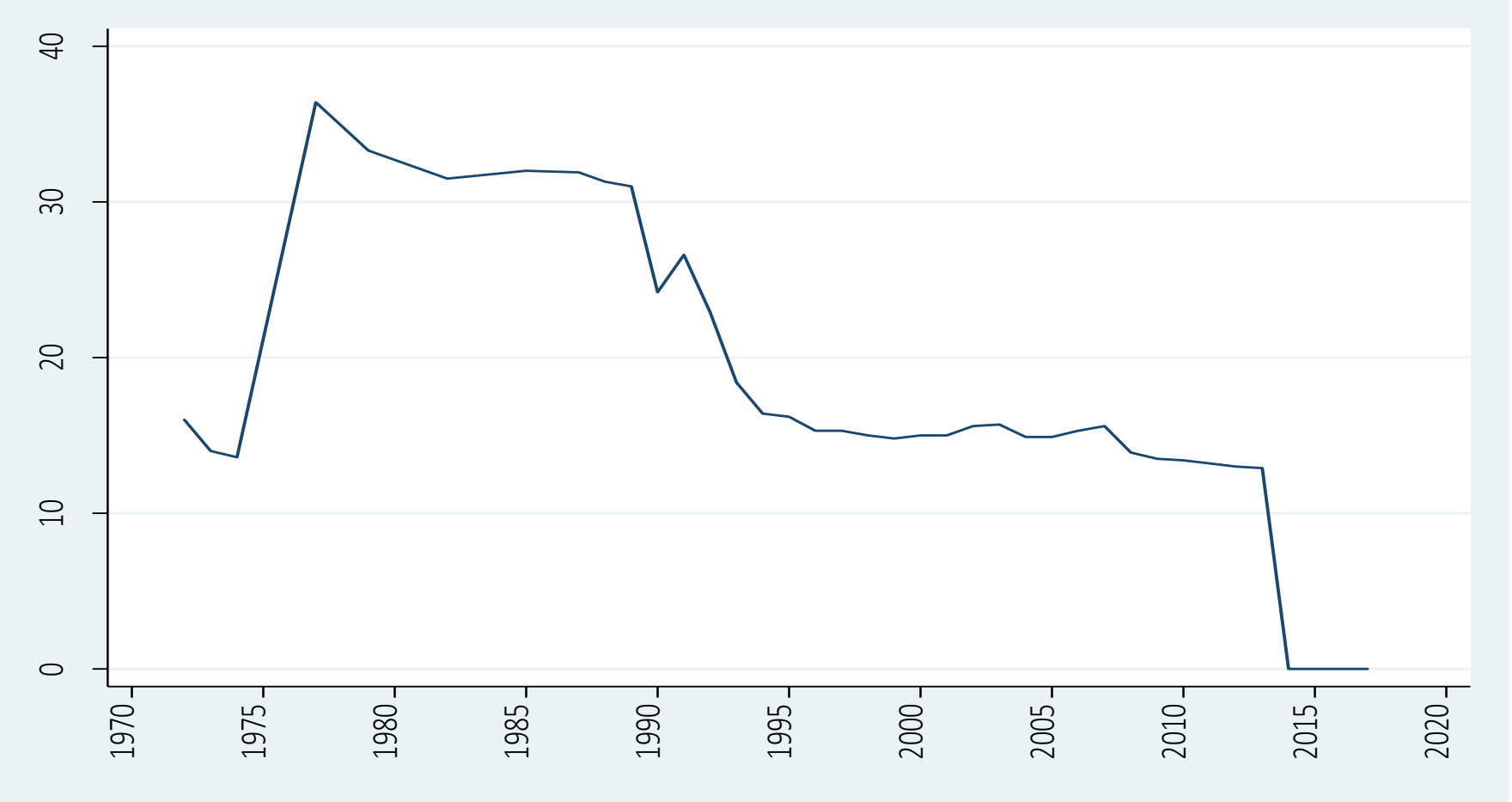
Turkey: Korkmaz and Çoban (2006), Akgeyik and Yavuz (2006), Güven et al. (2011), Papps (2012), Pelek (2015), Gürcihan-Yüncüler and Yüncüler (2016), Bakıs et al. (2015)

Institutional Setting

- Until January 2014, age-specific minimum wage policy was applied.
  - Workers who were below 16 years old received a lower rate (youth rate).
- Age-specific minimum wage was abolished after then.
  - This change was announced on 31 December, 2013
  - New rule applies from 1 January, 2014
  - After one month negotiations
  - No media debate or discussion were made before

Minimum Wage in Turkey

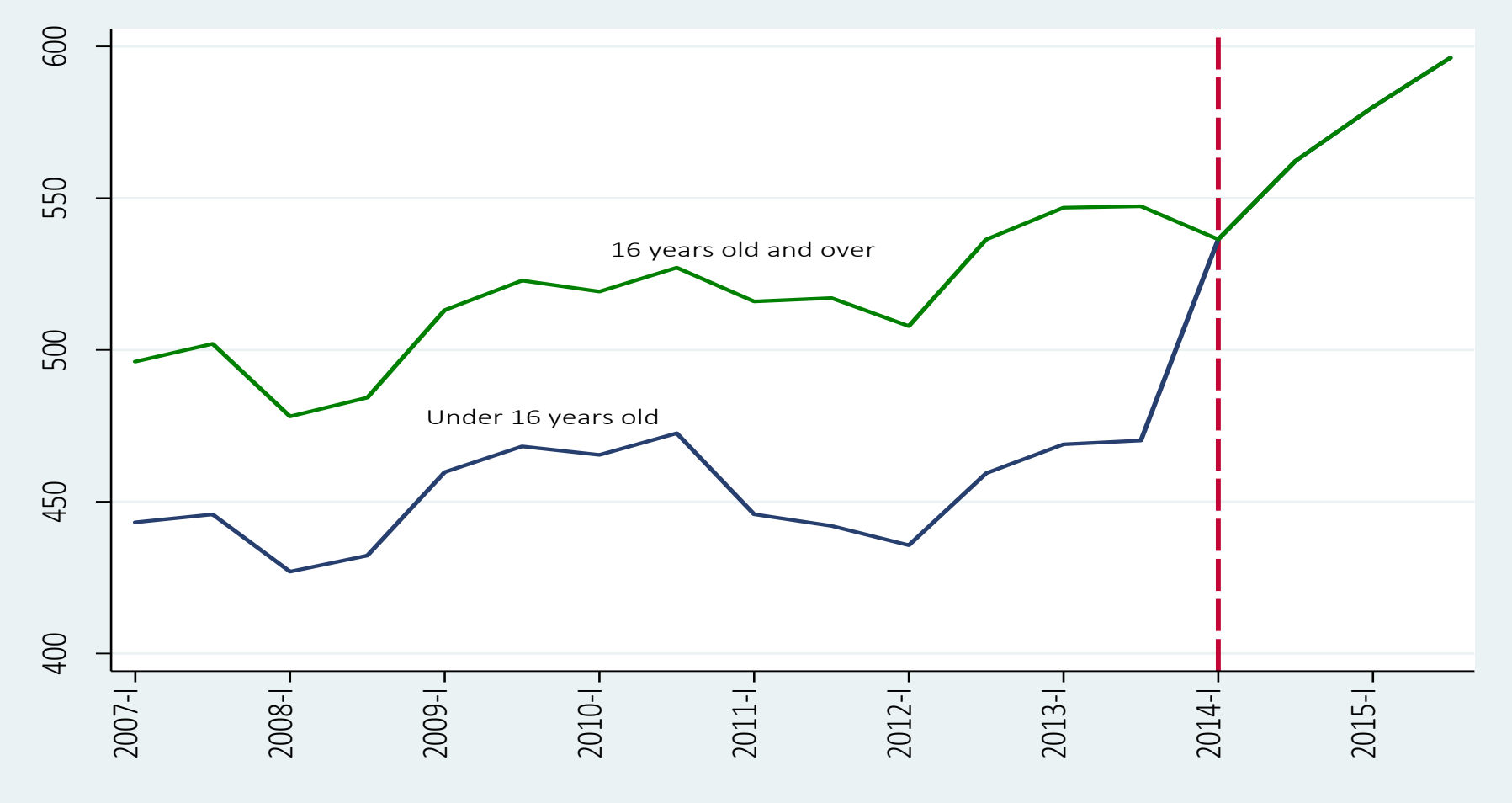
Figure 1: Gap Between Youth and Adult Minimum Wage (% of Adult Minimum Wage,1972-2017).



Source: Minimum Wage Determination Commission (1972-1995), and Ministry of Family, Labor, and Social Services (1996-2017)

Minimum Wage in Turkey

Figure 2: Real Cost of Minimum Wage by Age (From the first half of 2007 to the end of the second half of 2015)



Notes: PPI is used to deflate the nominal figures (2007 is the base year).

Source: Ministry of Family, Labor, and Social Services.

DATA: Survey of Income and Living Conditions (SILC)

- A representative longitudinal survey, includes individual and household characteristics
- It includes retrospective information on the monthly main activity of individuals aged 15 years old and over (i.e. The monthly individual activity compiled in a given year refers to the previous year's information)
- Age is available in months
- 2012-2015 wave of SILC is used. In particular, 2014-2015 part of this panel (before and after the change in policy)
- Focus on males: Female's behavior might differ from that of the males in regards to labour force participation. Social and cultural factors might be more influential than economics factors in labour supply decision of young females

Summary Statistics (Males, 2013)

	Age 16	Age 15
Years of Education	7.6	7.6
Years of Job Tenure	1.4	1.1
Household size	4.1	4.2
Log real monthly wage	5.4	5.3
Employed	0.17	0.12
In education	0.70	0.78
Neither in employment nor in education	0.13	0.10
Unemployed	0.10	0.07
In labour force	0.27	0.19
In good health	0.92	0.91
Hours of work (1)	50.43	43.80
# of observations	7,012	7,244

Notes: (1) Corresponds to average hours of work in the main job during the reference week.
Source: Own calculations using SILC.

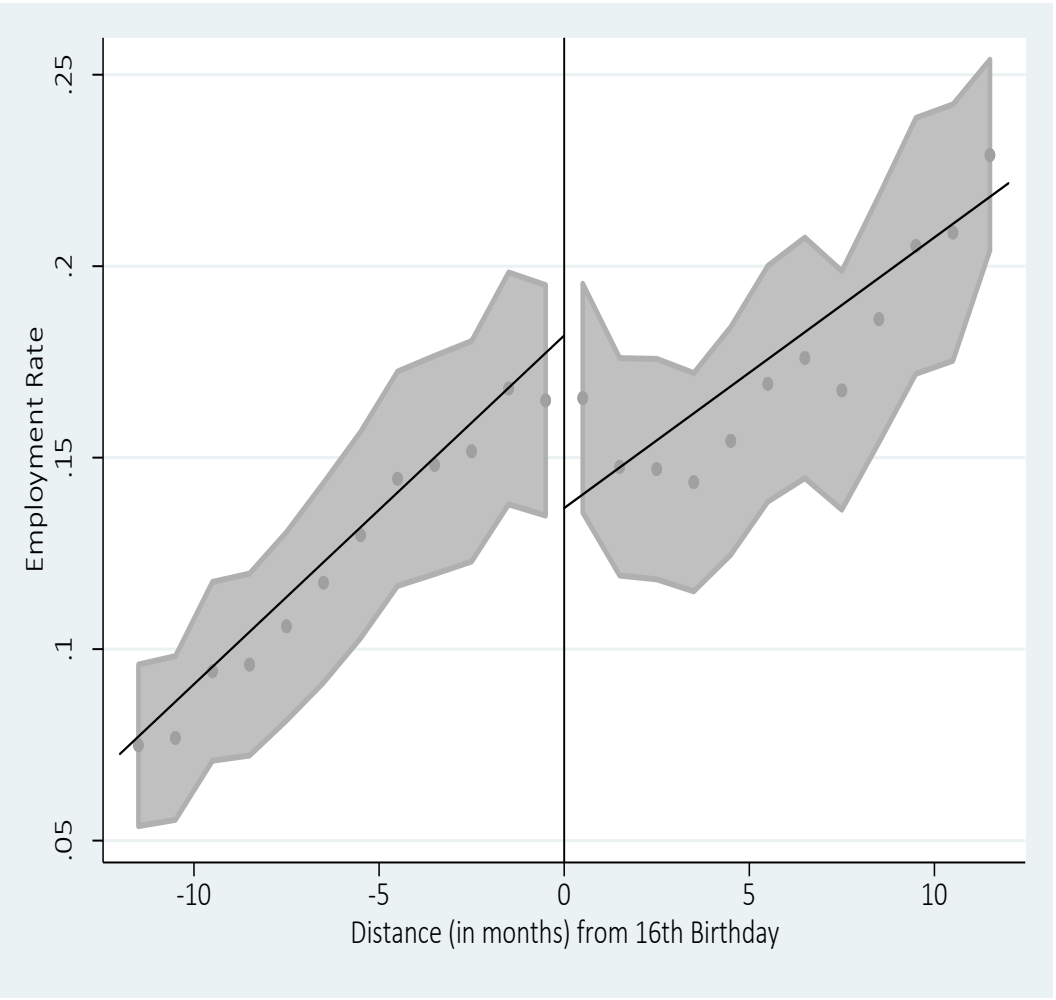
Summary Statistics (Males, 2014)

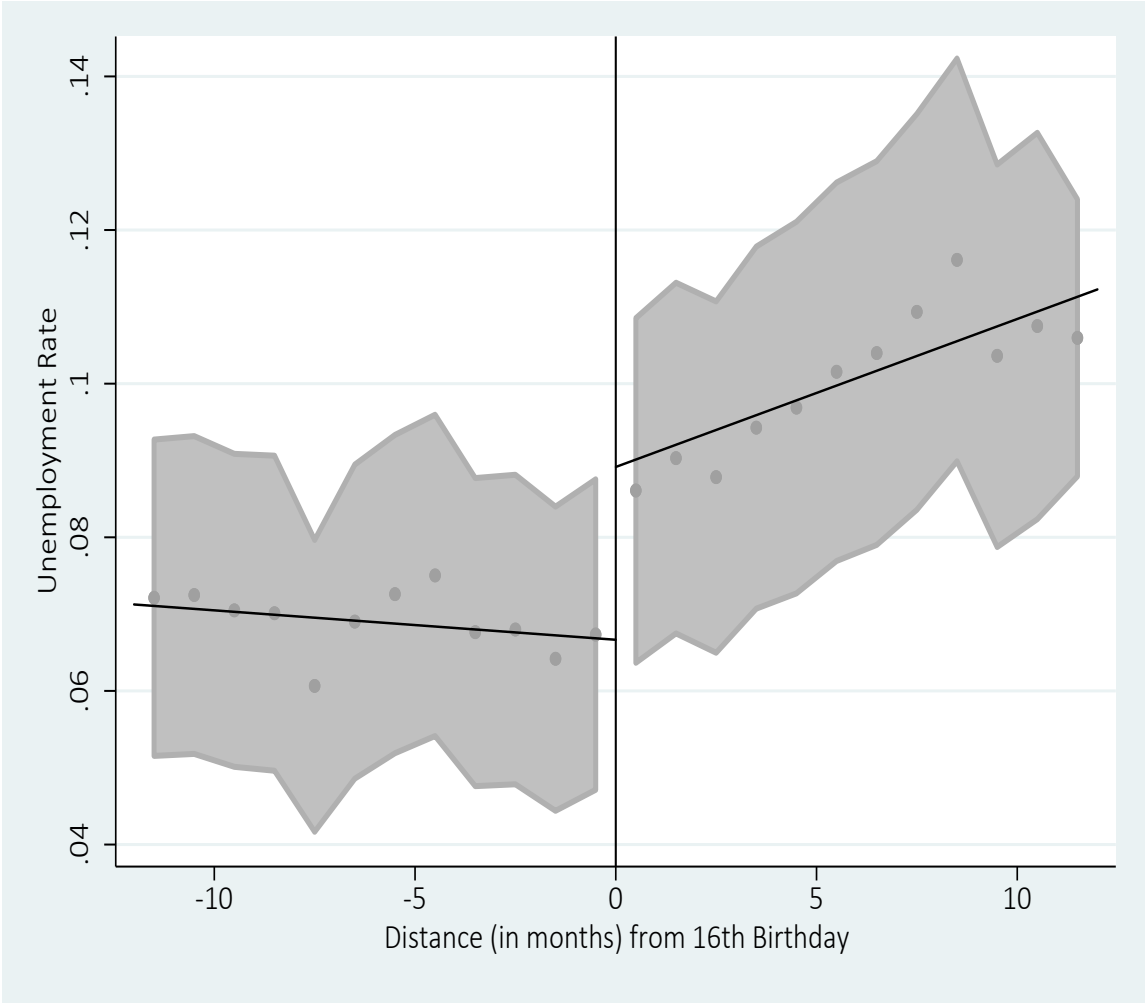
	Age 16	Age 15
Years of Education	7.6	7.6
Years of Job Tenure	1.3	1.0
Household size	4.1	4.2
Log real monthly wage	5.6	5.3
Employed	0.18	0.09
In education	0.71	0.81
Neither in employment nor in education	0.10	0.10
Unemployed	0.09	0.08
In labour force	0.27	0.17
In good health	0.92	0.93
Hours of work[1]	48.45	49.58
# of observations	7,260	7,303

Notes: (1) Corresponds to average hours of work in the main job during the reference week.
Source: Own calculations using SILC.

Outcome Trends in RD Setting

Figure 3: Employment and Unemployment Rates by Age in Months, Males (2013)

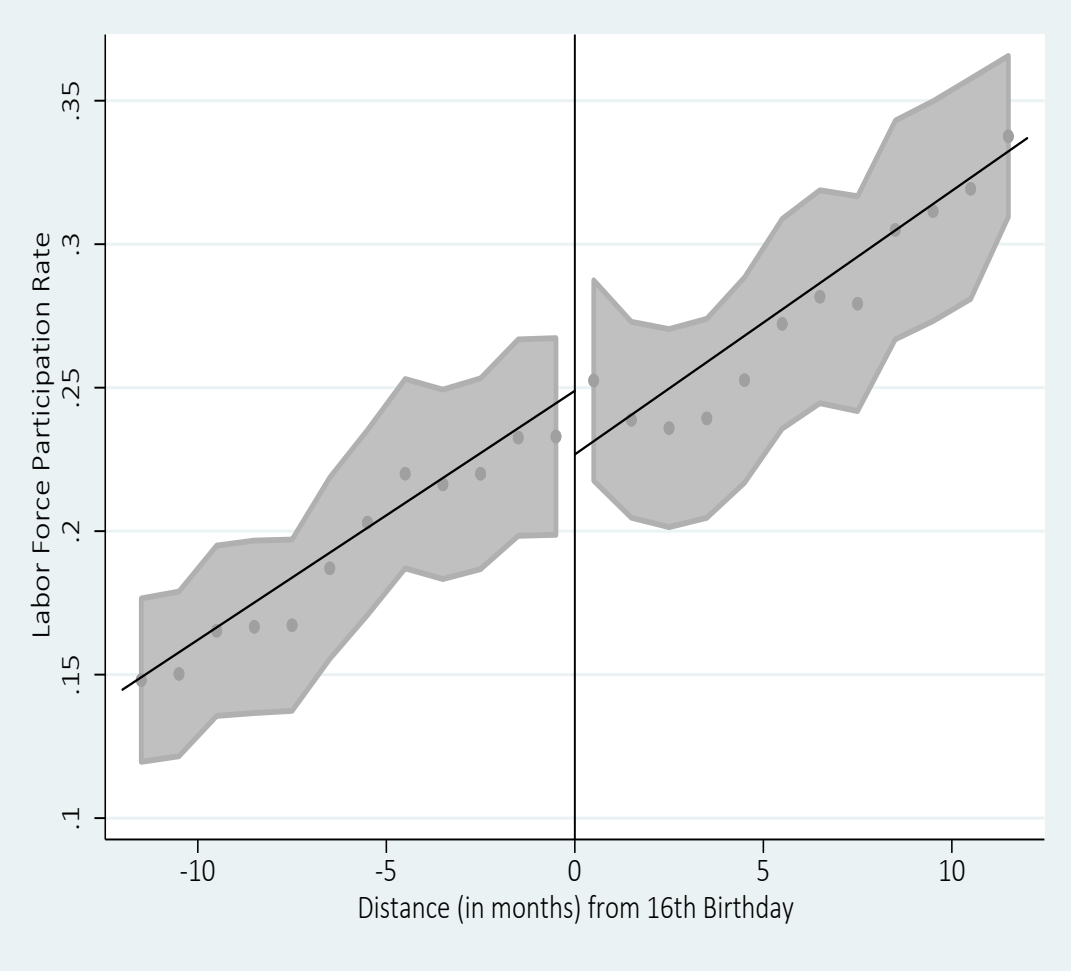


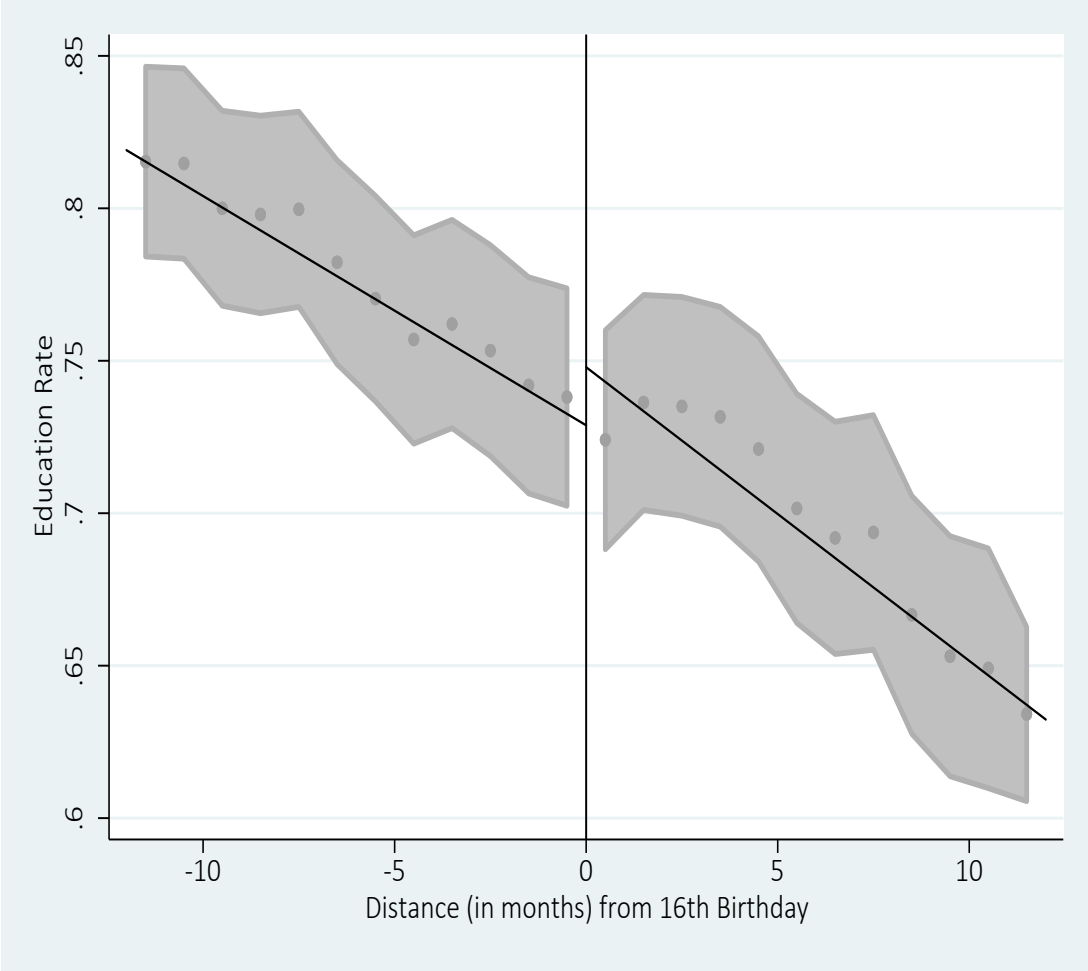


Notes: Age in months is centered at 16 years old, implying that any point on each side represents the distance to 16 years old threshold (e.g., -5 corresponds to the observations who are 15 years and 7 months old).
Source: Own calculations using SILC.

Outcome Trends in RD Setting

Figure 4: Labor Force Participation and Education Rates by Age in Months, Males (2013)

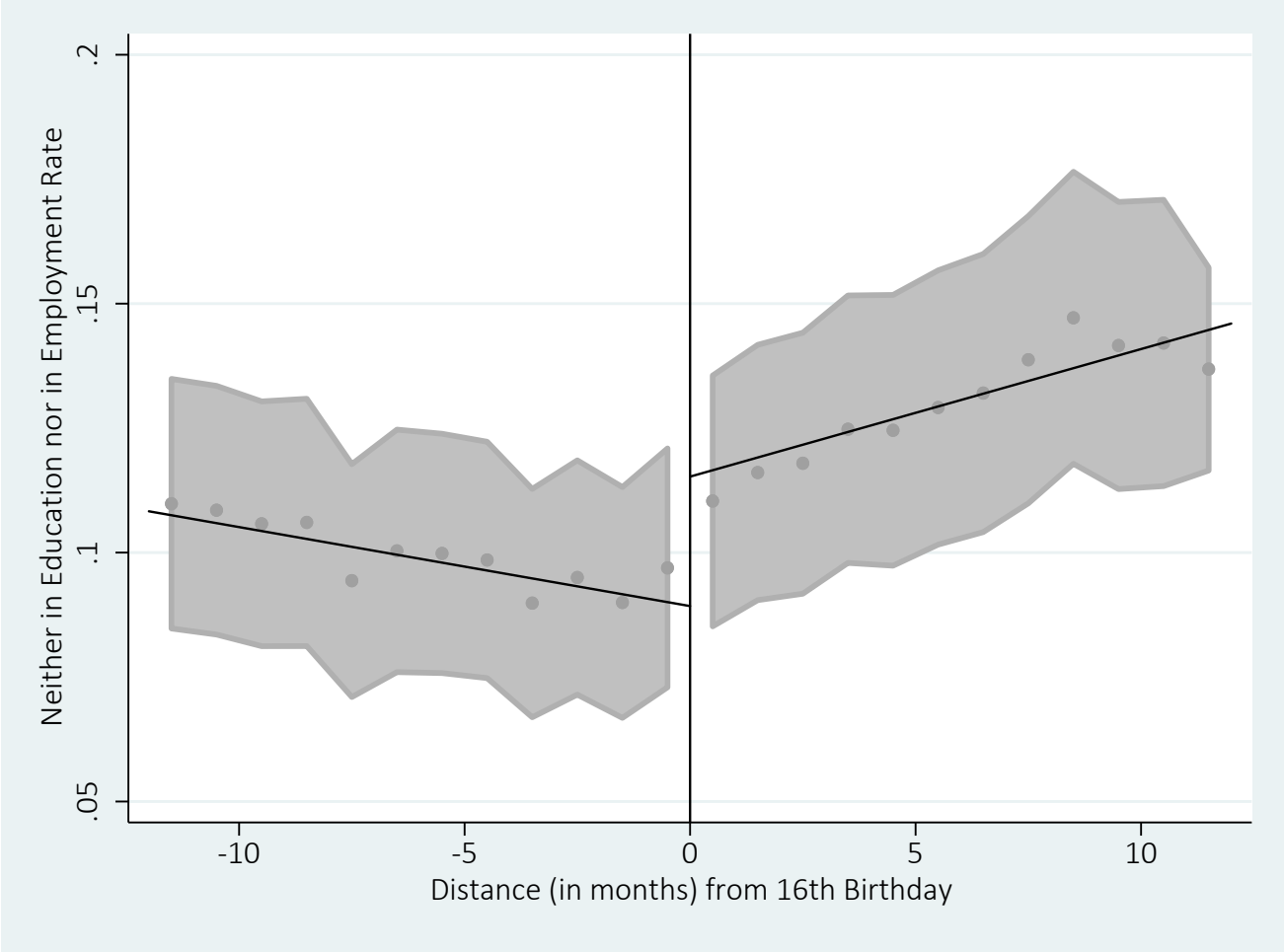




Notes: Age in months is centered at 16 years old, implying that any point on each side represents the distance to 16 years old threshold (e.g., -5 corresponds to the observations who are 15 years and 7 months old).
Source: Own calculations using SILC.

Outcome Trends in RD Setting

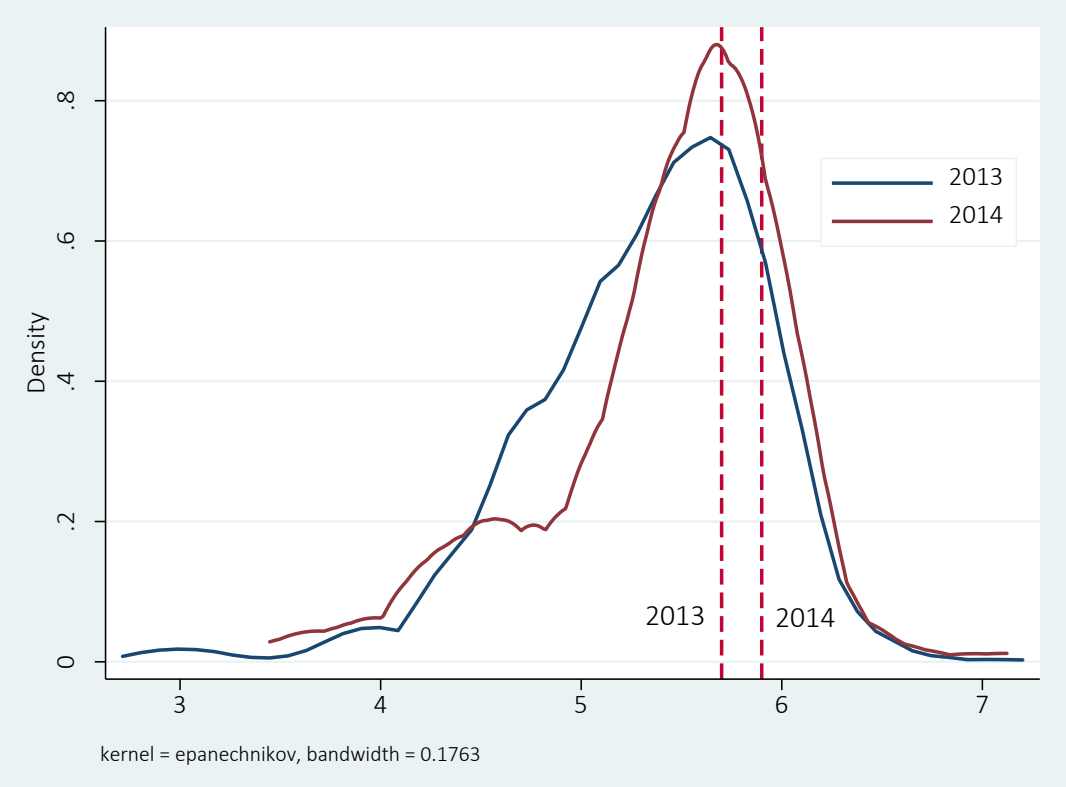
Figure 5: Neither in Education nor in Employment Rate by Age in Months, Males (2013)



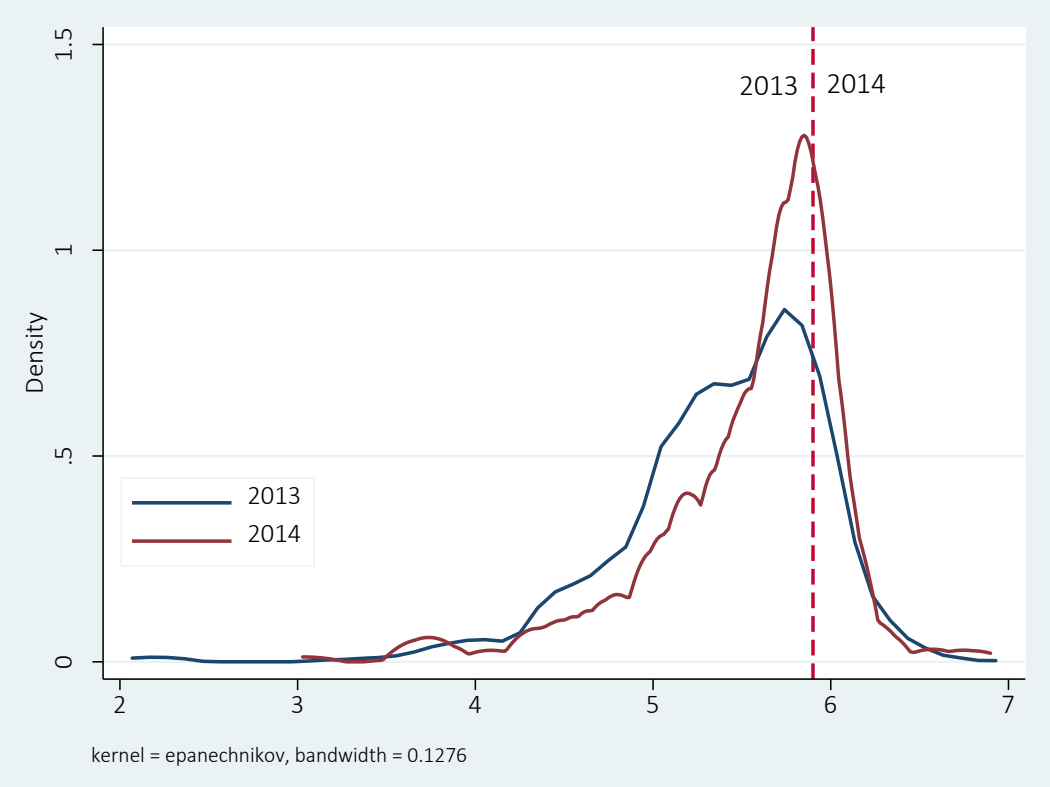
Notes: Age in months is centered at 16 years old, implying that any point on each side represents the distance to 16 years old threshold (e.g., -5 corresponds to the observations who are 15 years and 7 months old).
Source: Own calculations using SILC.

Is Minimum Wage Binding?

Figure 6: Kernel Density Estimates of the Log of Real Monthly Wages, Males (2013-2014)



a) 15-year-old



b) 16-year-old

Notes: Workers do not attend school while working. Appropriate weights are used. Dashed lines refer to the log of average minimum wage in a year in real terms.

Source: Own calculations using 2013-2014 HLFS.

Identification: Sharp Regression Discontinuity

Sharp RD design is employed if the treatment allocation is a discontinuous and a deterministic function of an observable rating (Angrist and Pischke, 2009). Then,

$$D_i=g(z_i)$$

where D_i is treatment variable, z_i is the rating such that g(.) is discontinuous at the cut-off point z_0

- Prior to January 2014, minimum wage was determined based on the age cutoff of 16 years old. Workers at and above this cutoff were entitled to receive a higher minimum pay. In that case, z_i denotes «age in months» and z_0 is «16 years and 0 month of age».
- $D_i=D(z_i)=\mathbf{1}(z_i \geq z_0)$, with **1(.)** is the indicator function.
- Outcome variable, y_i, can take two values: y_{1i} ($D_i=1$) or y_{0i} ($D_i=0$)
- Treatment effect (impact of age-specific minimum wage policy on outcome): $y_{1i}- y_{0i}$

$$y_i=\beta_1 D_i+\beta_2(Age_i-c)+\beta_3\, D_i*(Age_i-c)+u_i$$

Estimation Results for Males of RD Model

	Employed	Unemployed	In labor force	In education	Neither in em. nor ed.
Panel A: Local Linear Regression					
Estimated coefficient (1)	-0.031*** (0.010)	0.019*** (0.003)	-0.013 (0.010)	0.014* (0.008)	0.018*** (0.004)
h	12.67	19.19	13.01	12.45	19.98
# of Observations	7,179 (left) 7,432 (right)	7,244 (left) 11,574 (right)	7,179 (left) 7,972 (right)	7,179 (left) 7,432 (right)	7,179 (left) 11,261 (right)
Estimated coefficient (2)	-0.025** (0.011)	0.019*** (0.003)	-0.01 (0.011)	0.010 (0.009)	0.018*** (0.004)
h	8.98	13.59	9.21	8.82	14.15
# of Observations	4,780 (left) 5,201 (right)	7,244 (left) 8,123 (right)	5,374 (left) 5,766 (right)	4,780 (left) 5,201 (right)	7,179 (left) 8,523 (right)
Panel B: Logistic Regression					
Estimated coefficient	-0.026*** (0.007)	0.022*** (0.003)	-0.010 (0.010)	0.013 (0.008)	0.018*** (0.004)
h	6	6	6	6	6
# of Observations	7,670	7,749	7,670	7,670	7,670
Estimated coefficient	-0.045*** (0.009)	0.022*** (0.002)	-0.026*** (0.008)	0.022*** (0.007)	0.025*** (0.004)
h	12	12	12	12	12
# of Observations	14,070	14,256	14,070	14,070	14,070
Panel C: OLS					
Estimated coefficient	-0.030** (0.011)	0.021*** (0.002)	-0.009 (0.010)	0.012 (0.008)	0.018*** (0.004)
h	6	6	6	6	6
# of Observations	7,670	7,749	7,670	7,670	7,670
Estimated coefficient	-0.043*** (0.009)	0.020*** (0.002)	-0.023** (0.009)	0.020** (0.008)	0.023*** (0.003)
h	12	12	12	12	12
# of Observations	14,070	14,256	14,070	14,070	14,070

Notes: ***, ** and * refer to 1%, 5% and 10% significance levels, respectively. Standard errors, clustered at age (in months), are reported in parentheses. Estimated coefficients in logit estimates correspond to discrete change in the probability. Quarterly calendar time dummies (Last quarter is the reference) and month of birth dummies (December is the reference) are used. (1) MSE Optimal Bandwidth. (2) CER Optimal Bandwidth.

Robustness Check: Difference-in-Discontinuities

- When age is defined in a monthly scale, there might be confounding factors such as ability differentials pertaining to certain age groups (in months), thereby contaminating treatment effect
- Taking before/after difference of the policy change in 2014, January allows us to remove such contamination.

Diff-in-disc model: Comparing the discontinuity before and after policy change yields the effects of the rise in minimum wage for 15-year-old males in Turkey.

- Here, $T_i=T(z_i)=\mathbf{1}(z_i \leq z_0)$ is defined as being lower than 16 years old age.
- Outcome variable y_i would take four values:

$y_{1i,\,post}$ ($T_i=1$, and Post=1), $y_{0i,\,post}$ (when $T_i=0$, and Post=1), $y_{1i,\,pre}$ (when $T_i=1$, and Post=0) or $y_{0i,\,pre}$ (when $T_i=0$, and Post=0).

where Post is the post-treatment dummy. i.e. Post=1 if month of the year is January 2014 and after, Post=0 otherwise.

The treatment effect: $(y_{1i,\,post} - y_{0i,\,post})- (y_{1i,\,pre} - y_{0i,\,pre})$

$$y_i=\beta_1 T_i+\beta_2(Age_i-c)+\beta_3\, T_i*(Age_i-c)+ \alpha_1 Post+\alpha_2 T_i*Post+u_i$$

Estimation Results for Males of Diff-in-Disc Model

	Employed	Unemployed	In labor force	In education	Neither in em. nor ed.
Panel A: Logistic Regression					
Estimated coefficient	-0.057*** (0.005)	0.032*** (0.007)	-0.031*** (0.008)	0.027*** (0.007)	0.036*** (0.006)
h	6	6	6	6	6
# of Observations	15,348	15,348	15,348	15,348	15,348
Estimated coefficient	-0.036*** (0.006)	0.021*** (0.005)	-0.016** (0.007)	0.017** (0.008)	0.020*** (0.006)
h	12	12	12	12	12
# of Observations	28,186	28,186	28,186	28,186	28,186
Panel B: OLS					
Estimated coefficient	-0.059** (0.006)	0.028*** (0.006)	-0.032*** (0.008)	0.025*** (0.008)	0.034*** (0.006)
h	6	6	6	6	6
# of Observations	15,348	15,348	15,348	15,348	15,348
Estimated coefficient	-0.032*** (0.008)	0.019*** (0.005)	-0.014 (0.008)	0.010 (0.008)	0.021*** (0.006)
h	12	12	12	12	12
# of Observations	28,186	28,186	28,186	28,186	28,186

Notes: ***, ** and * refer to 1%, 5% and 10% significance levels, respectively. Standard errors, clustered at age (in months), are reported in parentheses. Estimated coefficients in logit estimates correspond to discrete change in the probability. Quarterly calendar time dummies (Last quarter is the reference) and month of birth dummies (December is the reference) are used.

Estimation Results for the RDD model (Males, 2015-2016)

	Employed	Unemployed	In labor force	In education	Neither in em. nor ed.
Estimated coefficient (1)	0.001 (0.003)	-0.002 (0.003)	-0.001 (0.004)	0.004 (0.004)	-0.005 (0.003)
h	17.33	14.53	15.82	15.97	14.71
# of Observations	12,913 (left) 19,198 (right)	12,913 (left) 16,219 (right)	12,913 (left) 17,228 (right)	12,913 (left) 17,228 (right)	12,913 (left) 16,219 (right)
Estimated coefficient (2)	0.0003 (0.009)	-0.002 (0.003)	-0.003 (0.004)	0.006 (0.004)	-0.005 (0.003)
h	12.24	10.26	11.17	11.28	10.39
# of Observations	12,913 (left) 14,146 (right)	10,776 (left) 12,024 (right)	11,842 (left) 13,100 (right)	11,842 (left) 13,100 (right)	10,776 (left) 12,024 (right)

Notes: ***, ** and * refer to 1%, 5% and 10% significance levels, respectively. Standard errors, clustered at age (in months), are reported in parentheses. Estimated coefficients in logit estimates correspond to discrete change in the probability. Quarterly calendar time dummies (Last quarter is the reference), a year dummy for 2016, and month of birth dummies (December is the reference) are used. (1) MSE Optimal Bandwidth. (2) CER Optimal Bandwidth.

Summary

- The rise in minimum wage reduces young males' probability of being employed and in labor force participation.
- The adverse employment impact is compatible with the *neoclassical view* suggesting that the impact of minimum pay policies are realized through the demand side
    - Lower cost of 15-year-old males compensated for the productivity differentials when compared to older workers before the change in policy
    - Decline in the quantity of labor demanded generates a substitution effect among young males
- Young males losing their jobs either become unemployed or attend school or become neither in employment nor in education

Thank you…