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EVALUATION OF INNOVATIONS AND INNOVATIONS IN EVALUATION



MINISTRY OF FINANCE



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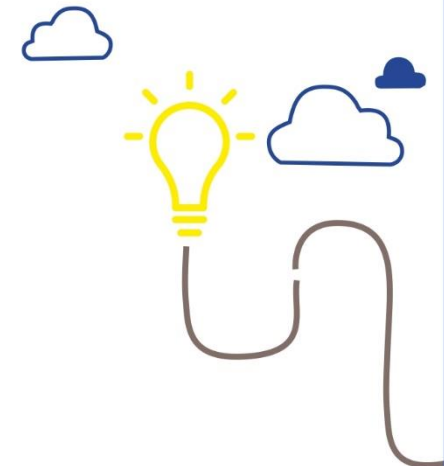
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An Evaluation of a Compulsory School Leaving Age Reform

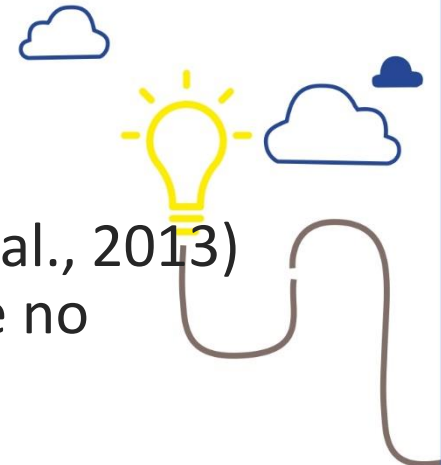
Innovations in the Evaluation of Education Policies



- I examine the effects of increasing the compulsory school leaving (CSL) age from 16 to 18 in Hungary using a regression discontinuity design (RDD) identification strategy
 - On forward-looking decision making
 - Using state-of-the-art procedures
 - I go into the „black-box”
- Raising the CSL age increased the probability of choosing the academic high school track already at age 14
 - Positive effect on earning an academic high school degree
- Adverse effect: those choosing vocational training schools became more likely to drop out
 - Negative effect on the quality of vocational training schools
 - Negative effect on student composition



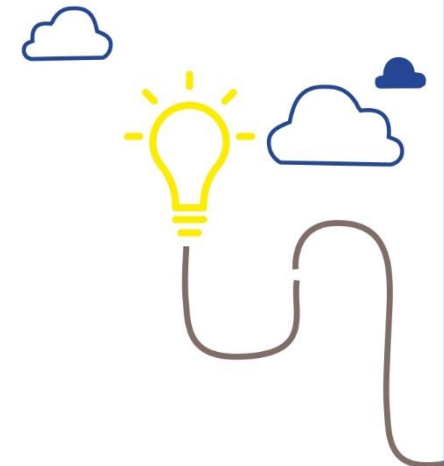
- CSL age legislation introduces a constraint into making decision about schooling investments
- Huge literature on the effects of increased CSL age on various social and economic outcomes, evidence is mixed
 - Positive (Oreopoulos, 2007; Devereux and Hart, 2010) vs. no wage returns (Oosterbeek and Webbing, 2007; Pischke and Wachter, 2008)
 - Effects are heterogeneous by social background (Meghir and Palme, 2005)
- We know little about what it does within schools
 - Induces teachers to reduce the effort they put in teaching (Green and Navarro Paniagua, 2012)
 - Increases criminal behavior of students within school (Anderson et al., 2013)
 - Decreases dropping out (Cabus and De Witte, 2011) but might have no effect on high-school completion (Landis and Reschly, 2010)



Institutional Background



- Before the legislation change: compulsory schooling lasted until the end of the academic year in which one reached age 16
- Most students reach the CSL age in secondary school
 - vocational training school (2001: 16%)
 - professional high school (2001: 45%)
 - academic high school (2001: 39%)
- Big difference in value added and returns (Hajdú et al, 2015)
- Main tracking choice: at age 14



The Policy Change



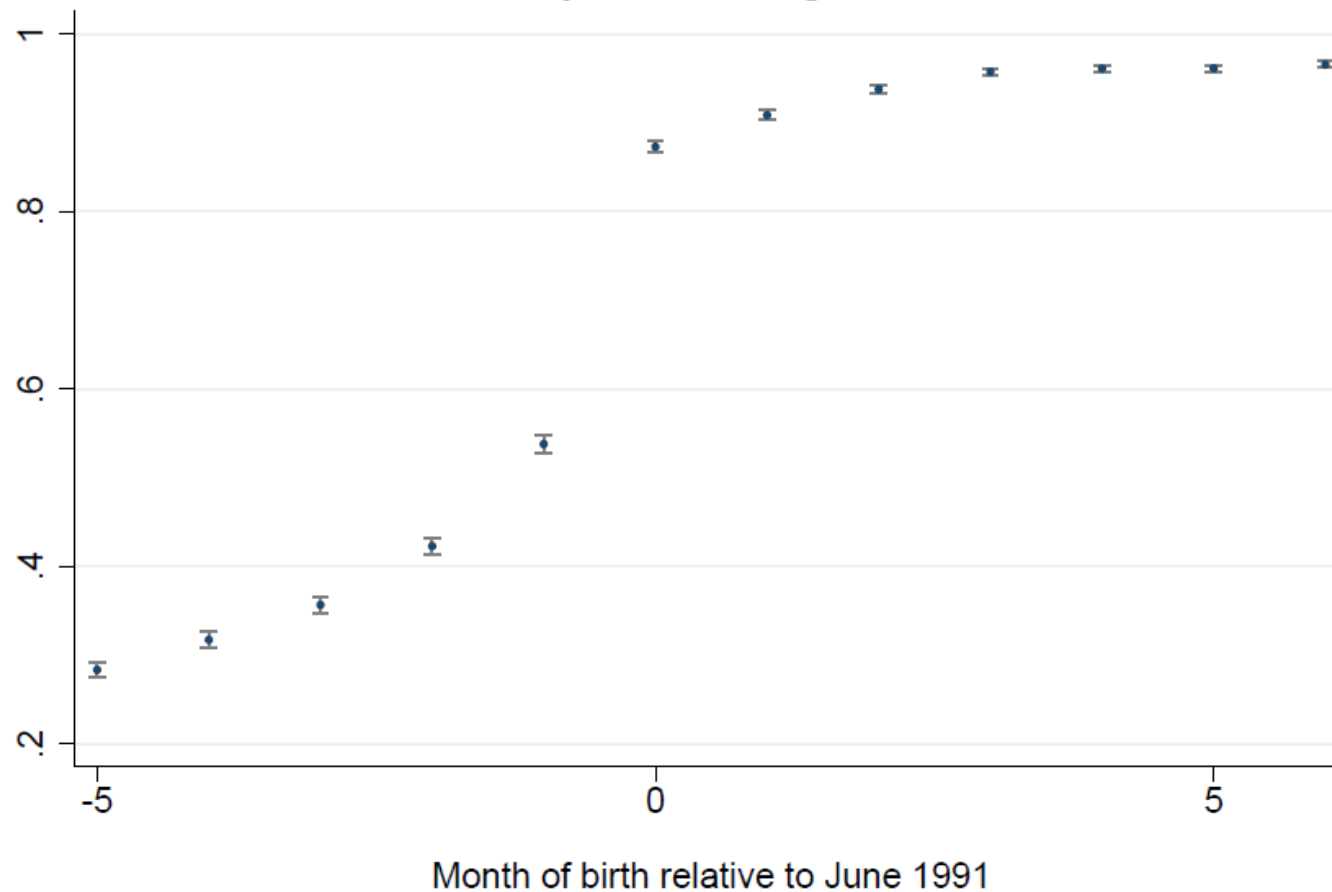
- The 1996 Law of Education raised compulsory school-leaving age from 16 to 18
- Introduced in the case of those starting elementary school in Sept 1998
 - New CSL age known already at age 6
- Age of elementary school start rule: reaching age 6 by May 31
- Relevant cohort: those born in 1991
- Cutoff: being born at June 1, 1991
- Compliance to the age rule: 80% on average but it is lower before the cutoff



Compliance to the Age Rule



The Probability of Starting School in 1998



Identification Strategy



- Compliance to the age rule of school start creates a discontinuity in the probability of starting school under the new CSL age
- This discontinuity is used as a cutoff for an RDD identification strategy
- Jump in the probability of being treated around the cutoff: 0.35
- Estimation in 2 steps:
 - Intention to treat effects (ITT)
 - LATE effects: ITT/size of the jump
- 3 identification assumptions
 - Being born right before or at or after the cutoff is exogenous
 - Exclusion restriction: being born at or right after the cutoff does not affect schooling outcomes if not through the raise
 - Parents knowing about the raise in advance did not manipulate school start (no defiers)



- Nonparametric estimation (Hahn et al (2001), Imbens and Lemieaux (2010), McCrary and Royer (2011), Gulesci and Mayersson (2015)):

- First degree local polynomial (kernel) regressions of the form

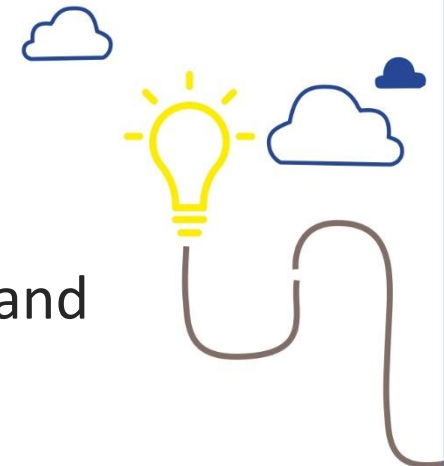
$$y_i = a + b * treated_i + f(x_i, treated_i) + u_i$$

- Optimal bandwidth by Calonico, Cattanao and Titiunik (2014)

- Parametric estimation (Acemoglu and Angrist (2001):
4th order global polynomial regressions of the form

$$y_i = a + b * treated_i + f(x_i, treated_i) + u_i$$

- Controlling for year-, month- and day-of-the-week of birth, county and settlement type fixed effects



Effects on School Choice



Effect on the probability of finishing at least one year in a secondary school

	ITT effects	Robust clustered SE's	Multiple-testing corrected p-values	No. of obs.	CCT bandwidth (in days)
Any secondary school	-0.000	0.003	0.867	102,616	152.6
Vocational training school	-0.017*	0.006	0.066	80,505	118.2
Professional high school	-0.002	0.007	0.775	103,292	153.0
Academic high school	0.015*	0.006	0.074	86,292	127.6

Local linear kernel regressions using the bandwidth optimization routine of Calonico, Cattaneo and Titiunik (2014). Robust p-values clustered by year-and-month-of-birth are in parentheses. ** indicates significance on 5% level after correcting for the fact that 13 hypotheses have been tested together. (FDR multiple testing procedure by Benjamini and Hochberg, 1995)



Effects on Dropping Out



	Effect on the probability of dropping out of ...				
	ITT effects	Robust clustered SE's	Multiple-testing corrected p-values	No. of obs.	CCT bandwidth (in days)
Any secondary school	0.008**	0.003	0.010	82,615	137.5
Vocational training school	0.022***	0.004	0.001	25,525	174.1
Professional high school	0.008*	0.004	0.085	32,570	138.7
Academic high school	0.003	0.002	0.177	48,077	156.9

Local linear kernel regressions using the bandwidth optimization routine of Calonico, Cattaneo and Titiunik (2014). Robust p-values clustered by year-and-month-of-birth are in parentheses. ** indicates significance on 5% level after correcting for the fact that 13 hypotheses have been tested together. (FDR multiple testing procedure by Benjamini and Hochberg, 1995)



Effects on School Completion



Effect on the probability of earning a secondary degree

	ITT effects	Robust clustered SE's	Corrected p-values	No. of obs.	Bandwidth (in days)
Any secondary school degree	-0.015***	0.000	0.001	62,682	92.4
Vocational training school degree	-0.019***	0.002	0.005	70,804	104.4
Professional high school degree	-0.013*	0.006	0.085	83,827	123.5
Academic high school degree	0.017***	0.002	0.001	76,374	112.7

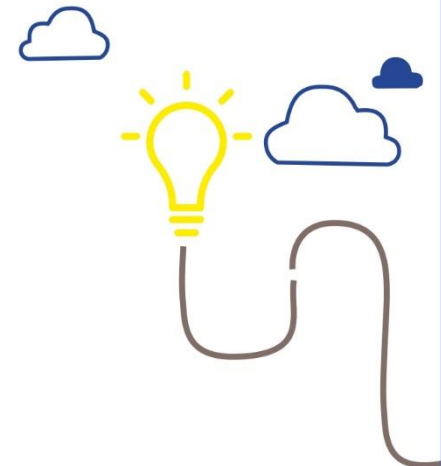
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Heterogeneous Effects



- By gender: positive effects seem to be larger for women, negative effects are realized by men
- By Roma/non-Roma status: no effects on Roma individuals
- By parental education: children of low-educated parents are affected the most



Robustness Checks



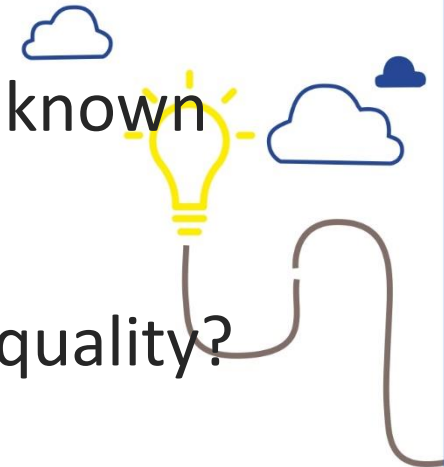
- Same results with 50-150% versions of the CCT (2014) bandwidth
- No such effects in the case of those born the year before (1990) and after (1992)
- Same results with global polynomial estimation
- Same results with different data source on parental education



Discussion



- I find that increasing the CSL age from 16 to 18 affected forward-looking decision making, i.e. school choice at age 14
- Increased the probability of dropping out of vocational training schools
 - changed student composition in vocational training schools
 - might have decreased the quality of teaching in vocational training schools due to supply side constraints
- Effects at age 14, before any consequences might have been known
 - academic high schools were of the same length as vocational training schools
- Anticipation about a potential decrease in vocational school quality?



Thank you for your attention!



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