An Early Assessment of Extension of Compulsory School Attendance in Turkey: Evidence from a Natural Experiment

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MOTIVATION

- Child labor remains an important global public policy concern:
    - 168 million child workers worldwide,
    - 85 million are working in hazardous activities (ILO, 2013).

- Many developing countries has put in place regulations:

    - Bans on child labor to prevent employers from hiring children,
    - Compulsory schooling laws to ensure that every child completes a minimum years of schooling.

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Educational Attainment and Child Labor

- Several studies document a negative correlation between education and child labor (e.g. Levison et al. 1998, Levison et al. 2001, Assaad et al. 2005, Dayioglu 2005, Edmonds 2007, Goksel 2008).

- Others focus on the effects of child labor on schooling in developing countries (e.g. Boozer and Suri 2001, Orazem and Gunnarsson 2004, Gunnarsson et al. 2006, Edmonds and Shrestha 2012).

- A large literature on the effect of CCTs and enrollment subsidies on child labor (Ravallion and Wodon 2000, Cardoso and Souza 2003, Del Carpio and Macours 2010, Guarcello et al. 2010, Gertler et al. 2012, Hoop and Rosati 2013).

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Our Study: Context

- We use a change in compulsory schooling law in 2012 in Turkey to estimate the casual effects of high school attendance on various forms of child labor and idleness.

- In Turkey, among 15-18 year-olds in our sample, 25 percent of boys and 10 percent of girls are employed; and 6 percent of boys and 11 percent of girls are not in education, employment, or training (NEET), i.e. idle/inactive.

- The education reform created no change in monetary incentive for schooling, but changed the time budget binding for the age group that we study.

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Our Study: Mechanisms

- Increased high school attendance affects child labor through **binding time constraints** that depend on two channels:

- **Relative tightness of the child labor market:** An increase in school attendance would have a smaller effect on child labor if there is underemployment in child labor market and the child time allocated to leisure is relatively large (Cigno and Rosati 2005, Edmonds 2007). An increase in school attendance might reduce idleness, with little effect on child labor.

  - Under tight labor market conditions, an increase in time spent on school attendance is likely to reduce time spent on child labor relatively more.

- **Differences in program choice:** If individuals can comply with the compulsory schooling law by attending distance education, this will relax the time constraints for those that choose this option.

  - If this choice is particularly relevant for a particular group of the population, we expect to see smaller effects of high school attendance on this group's time allocated to child labor.

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2012 Compulsory Schooling Law in Turkey

- In April 2012, the parliament of Turkey passed a new law to increase compulsory schooling from 8 to 12 years.

- This law came to be known as 4+4+4 given the three four-year length components: primary school, junior high school, and high school.

- The diploma that had been awarded at the end of eighth grade was abolished, replacing it with one for completing the twelfth grade successfully.

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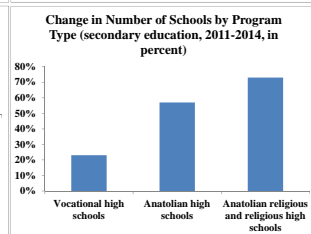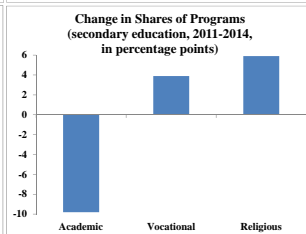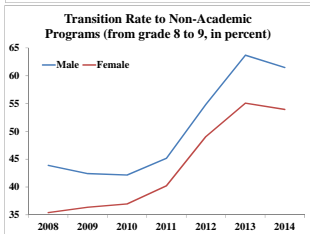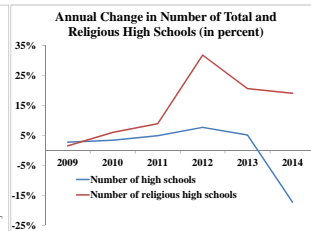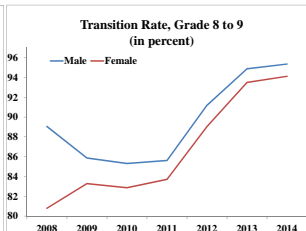
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**New Registrations to High School
(thousands of students)**
— Male — Female

**Transition Rate, Grade 8 to 9
(in percent)**
— Male — Female

**Annual Change in Number of Total and
Religious High Schools (in percent)**
— Number of high schools
— Number of religious high schools

**Transition Rate to Non-Academic
Programs (from grade 8 to 9, in percent)**
— Male — Female

**Change in Shares of Programs
(secondary education, 2011-2014,
in percentage points)**

**Change in Number of Schools by Program
Type (secondary education, 2011-2014, in
percent)**

Source: National Education Statistics Formal Education 2008-2009, 2009-2010, 2010-2011, 2011-2012, 2012-2013, 2013-2014 and 2014-2015.

Annual change in distance high school (as % of formal education eligible population)

Mean PISA 2012 Mathematics Score by Program Type

Average Rankings by Program Type (university entrance exam, verbal, 2005)

Estimated Value-added Coefficients for Program Types (standard deviations)
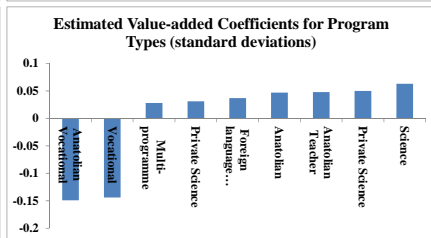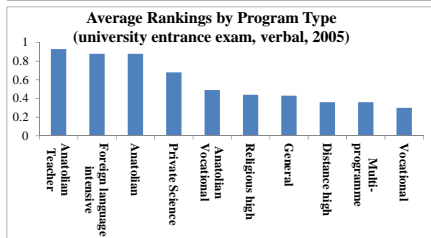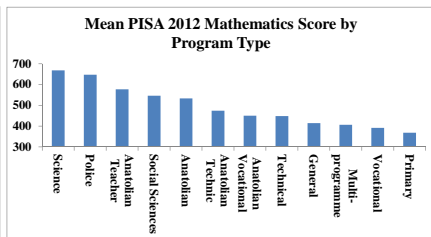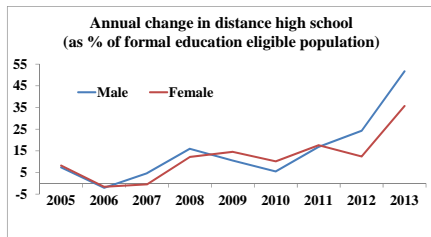
Source: Authors calculations from PISA 2012 Turkey micro data; 2004-2013 HLFS; Alkan et al. (2008)

Identification and Empirical Strategy

- The reform and the regulation on school starting age jointly implied that individuals born after January 1998 were obliged to complete 12 years of schooling while those born earlier could stop schooling after 8 years.

- We use this cutoff point in a Regression Discontinuity (RD) design to estimate the causal effect of school attendance on child labor and idleness.

- In our RD design, we assign treatment according to the month and year of birth of the individual, with those that are born after January 1998 assigned to the treated status.

- We provide both the reduced-form estimate (i.e. sharp RD), and the two-stage least squares estimates (i.e. fuzzy RD) for all outcome variables of interest.

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Empirical Specification

Our specification follows a basic RD form:

$$y_i = \alpha + \beta t_i + f(x_i) + \epsilon_i$$

$$\forall x_i \in (c - h, c + h)$$

- y_i: dependent variable
- t_i: treatment status
- x_i: forcing variable
- h: bandwidth around the cutoff point c
- $f(x_i)$: control function (a continuous n-order polynomial function of the forcing variable on each side of the cutoff point)

BANDWIDTH SELECTION

- We use local linear regressions in our RD estimations (Imbens and Lemieux 2008), and adopt the optimal bandwidth selection using the Imbens and Kalyanaraman (2009) routine.

- We also use specifications that adopt the optimal bandwidth from the first stage results for high school attendance, which is estimated at 20 months around the discontinuity, in second-stage estimations, where we focus on heterogeneous effects and test whether the difference between subsamples is significant.

TABLE 1: SUMMARY STATISTICS OF 15-18 YEAR-OLD TEENAGERS

Panel A: Education

	Overall sample			Female sample			Male sample			Female - Male
	Mean	SD	Obs	Mean	SD	Obs	Mean	SD	Obs	Difference
High School Attendance	0.84	0.36	23,809	0.86	0.35	11,521	0.83	0.38	12,288	0.03 (0.01)***
Vocational High School Attendance	0.38	0.48	23,809	0.36	0.48	11,521	0.39	0.49	12,288	-0.03 (0.01)***
Academic High School Attendance	0.46	0.50	23,809	0.49	0.50	11,521	0.43	0.50	12,288	0.06 (0.01)***
High School Attendance	0.80	0.40	33,426	0.80	0.40	16,196	0.79	0.41	17,230	0.01 (0.00)**
Vocational High School Attendance	0.32	0.47	33,426	0.30	0.46	16,196	0.34	0.47	17,230	-0.03 (0.00)***
Academic High School Attendance	0.41	0.49	33,426	0.44	0.50	16,196	0.38	0.49	17,230	0.06 (0.00)***
Distance High School Attendance	0.07	0.25	33,426	0.06	0.24	16,196	0.08	0.26	17,230	-0.01 (0.00)***

Panel B: Child Labor and Idleness Outcomes

	Overall sample			Female sample			Male sample			Female - Male
	Mean	SD	Obs	Mean	SD	Obs	Mean	SD	Obs	Difference
Employed in Non-agriculture - Wage Work	0.11	0.31	23,809	0.05	0.23	11,521	0.16	0.37	12,288	-0.11 (0.00)***
Employed in Non-agriculture - Total	0.13	0.33	23,809	0.06	0.24	11,521	0.19	0.39	12,288	-0.13 (0.00)***
Employed in Industry - Wage Work	0.05	0.22	23,809	0.02	0.13	11,521	0.08	0.28	12,288	-0.06 (0.00)***
Employed in Industry	0.06	0.23	23,809	0.02	0.14	11,521	0.09	0.29	12,288	-0.07 (0.00)***
Employed in Services - Wage Work	0.06	0.24	23,809	0.04	0.19	11,521	0.08	0.27	12,288	-0.04 (0.00)***
Employed in Services	0.07	0.26	23,809	0.04	0.20	11,521	0.10	0.30	12,288	-0.06 (0.00)***
Employed in Agriculture - Wage Work	0.01	0.09	23,809	0.01	0.08	11,521	0.01	0.10	12,288	0.00 (0.00)***
Employed in Agriculture	0.05	0.22	23,809	0.04	0.20	11,521	0.06	0.24	12,288	-0.02 (0.00)***
Works for a Wage	0.12	0.32	23,809	0.06	0.24	11,521	0.17	0.38	12,288	-0.11 (0.01)***
Seasonal or Temporary Work for a Wage	0.04	0.21	23,809	0.03	0.16	11,521	0.06	0.24	12,288	-0.03 (0.00)***
Log Hours of Wage Work (per week)	0.46	1.25	23,809	0.23	0.90	11,521	0.67	1.48	12,288	-0.45 (0.02)***
Log Hours of Work (per Week)	0.65	1.43	23,809	0.35	1.08	11,521	0.93	1.64	12,288	-0.58 (0.02)***
Not in Education, Employment, or Training (NEET)	0.08	0.28	23,809	0.11	0.31	11,521	0.06	0.24	12,288	0.04 (0.00)***

Panel C: Covariates

|	Overall sample			Female sample			Male sample			Female - Male
	Mean	SD	Obs	Mean	SD	Obs	Mean	SD	Obs	Difference
Mother completed primary school	0.68	0.47	23,809	0.69	0.46	11,521	0.67	0.47	12,288	0.02 (0.01)**
Father completed primary school	0.80	0.40	23,809	0.80	0.40	11,521	0.80	0.40	12,288	0.00 (0.01)
Mother completed junior high school	0.17	0.37	23,809	0.17	0.38	11,521	0.17	0.37	12,288	0.00 (0.01)
Father completed junior high school	0.31	0.46	23,809	0.32	0.47	11,521	0.31	0.46	12,288	0.01 (0.01)
Household size	4.22	1.43	23,809	4.23	1.44	11,521	4.21	1.41	12,288	0.01 (0.03)

Figure 3: Balanced Covariates
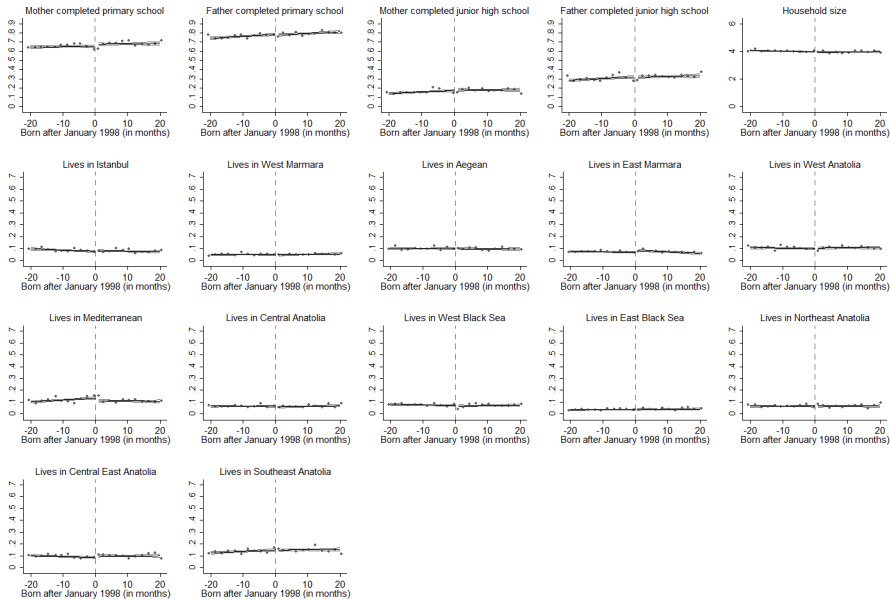
# Figure 4: RD Treatment Effects: Education, Child Labor, and Idleness Outcomes
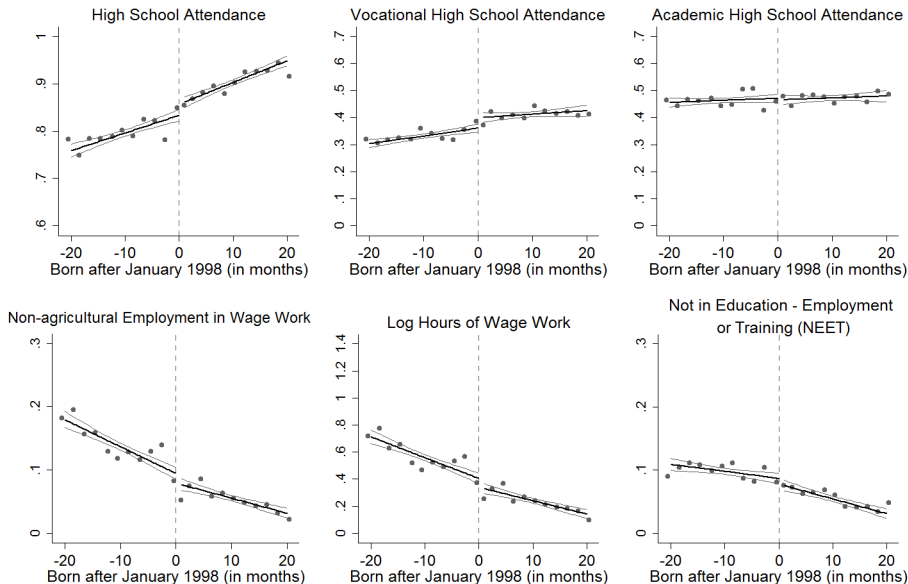
TABLE 2: RD TREATMENT EFFECTS ON EDUCATION

Outcome / statistics	(1) Linear RD ĥ bandwidth	(2) Quadratic RD ĥ bandwidth	(3) Linear RD 0.75 ĥ bandwidth	(4) Linear RD 1.5 ĥ bandwidth	(5) Linear RD 23 bandwidth	(6) Mean	(7) Bandwidth	(8) Obs.
High school attendance	0.032*** (0.011)	0.051** (0.023)	0.024** (0.010)	0.037*** (0.009)	0.038*** (0.010)	0.84	20	23,809
Vocational high school attendance	0.044*** (0.013)	0.040** (0.017)	0.048*** (0.013)	0.060*** (0.011)	0.051*** (0.013)	0.37	26	27,737
Academic high school attendance	-0.019 (0.011)	0.009 (0.019)	-0.005 (0.013)	-0.024** (0.012)	-0.006 (0.013)	0.46	28	29,171

Notes: Data is from the 2014 Household Labor Force Survey of Turkey. Each column reports a reduced-form RD treatment effect of being born after January 1998 with a linear or quadratic control function in month-year-of-birth on each side of the discontinuity. Columns (1) and (2) report local RD regressions with a linear and quadratic control function using optimal bandwidth ĥ, respectively. Columns (3) and (4) report local RD regressions with a linear control function using optimal bandwidth 0.75 ĥ and 1.5 ĥ, respectively. Column (5) reports local linear RD regressions with a bandwidth of 23 months, which is the maximum symmetric bandwidth around the cutoff. Column (7) reports the optimal bandwidth estimated by the Imbens and Kalyanaraman (2009) algorithm. Column (6) reports the outcome mean within the optimal bandwidth, and column (10) reports the number of observations used in the estimations. The dependent variables are a dummy variable equal to one if the respondent attends high school, a dummy variable equal to one if the respondent attends vocational high school, a dummy variable equal to one if the respondent attends academic high school. All specifications control for a set of dummy variables for the type of education respondent's father and mother has completed (no schooling, completed primary, junior-high or a higher level of school), household size, month-of-birth fixed effects, and region fixed effects. Standard errors are clustered at the month-year cohort level.

A. Total High School Attendance
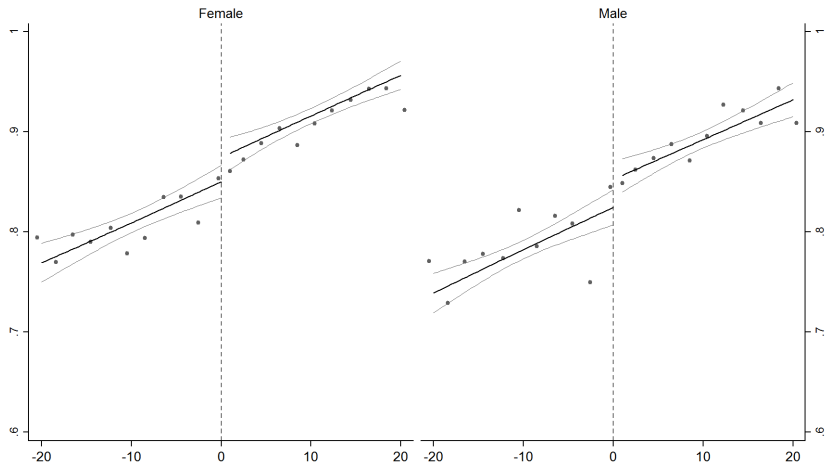
B. Vocational High School Attendance
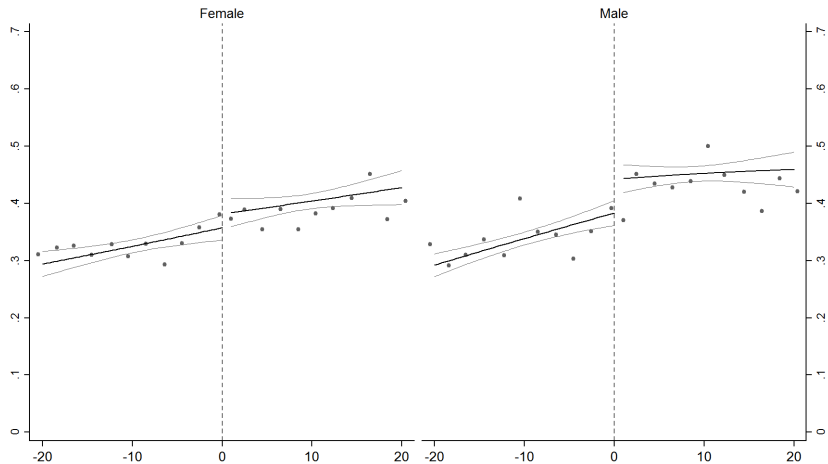
C. Academic High School Attendance
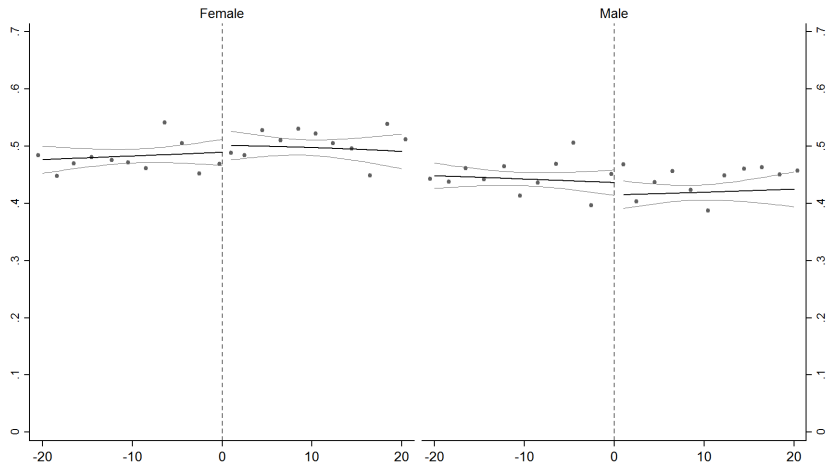
TABLE 3: RD TREATMENT EFFECTS ON EDUCATION BY GENDER

Panel A: 2014 HLFS Survey

Outcome	Overall sample (1) Linear RD ĥ bandwidth	Female (2) Linear RD ĥ bandwidth	Male (3) Linear RD ĥ bandwidth	Difference (4) (2)-(3) p-value	(5) Mean (Overall/Female/Male)	(6) Bandwidth	(7) Observations (Overall/Female/Male)
High school attendance	0.032*** (0.011)	0.035** (0.016)	0.034** (0.013)	0.96	0.84/0.86/0.83	20	23,809/11,521/12,288
Vocational high school attendance	0.050*** (0.013)	0.046** (0.019)	0.055** (0.023)	0.79	0.38/0.36/0.39	20	23,809/11,521/12,288
Academic high school attendance	-0.010 (0.013)	-0.004 (0.023)	-0.013 (0.021)	0.79	0.46/0.49/0.43	20	23,809/11,521/12,288
Panel B: 2013 HLFS Survey							
High school attendance	0.030*** (0.002)	0.032** (0.006)	0.032*** (0.002)	0.94	0.80/0.80/0.79	2	33,426/16,196/17,230
Vocational high school attendance	0.033*** (0.002)	0.039*** (0.004)	0.032*** (0.001)	0.23	0.32/0.30/0.34	2	33,426/16,196/17,230
Academic high school attendance	-0.011*** (0.002)	-0.027*** (0.002)	0.007 (0.004)	0.00	0.41/0.44/0.38	2	33,426/16,196/17,230
Distance high school attendance	0.002 (0.002)	0.015*** (0.001)	-0.011 (0.005)	0.00	0.07/0.06/0.08	2	33,426/16,196/17,230

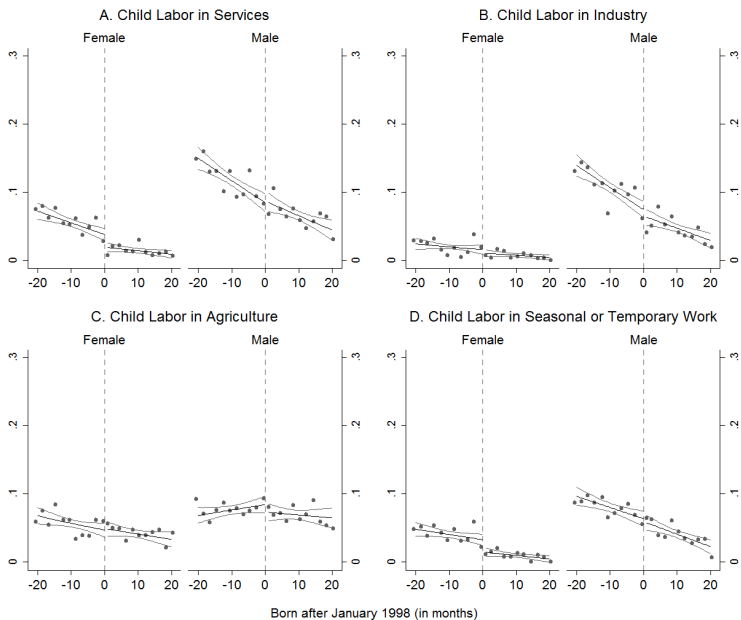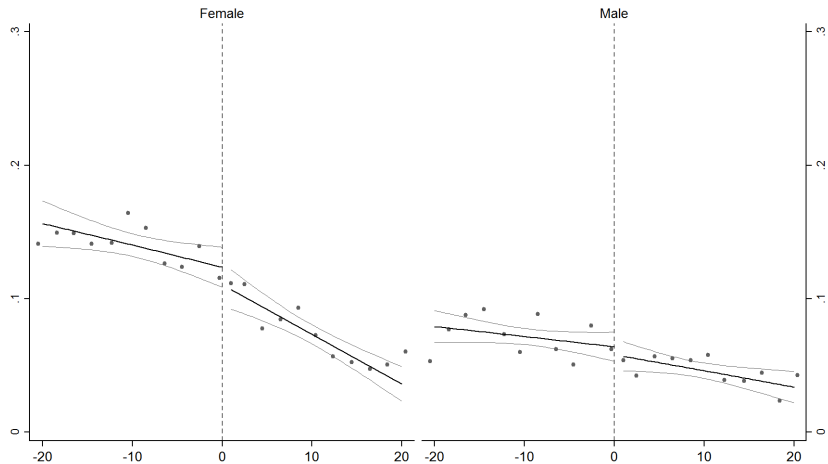Notes: Data is from the 2014 Household Labor Force Survey in Panel A and the 2013 Household Labor Force Survey in Panel B. In Panel A, each column reports a reduced-form RD treatment effect of being born after January 1998 with a linear control function in month-year-of-birth on each side of the discontinuity. Since the month of birth variable is not available in the 2013 survey, in Panel B each column reports a reduced-form RD treatment effect of being born after 1998 with a linear control function in year of birth on each side of the discontinuity. In Panel A, the bandwidth is 20 months in all regressions, which is the optimal bandwidth ĥ estimated by the Imbens and Kalyanaraman (2009) algorithm when high school attendance is the dependent variable. In Panel B, the bandwidth is 2 years in all regressions, which is the closest number of years that correspond to the optimal monthly bandwidth when high school attendance is the dependent variable. Column (1) reports results for the whole sample, column (2) reports them for the subsample of males, and column (3) reports them for the subsample of females. Column (4) reports the p-value for the SUR test of equality between treatment effects for subsamples of males and females reported in columns (2) and (3). The dependent variables are a dummy variable equal to one if the respondent attends high school, a dummy variable equal to one if the respondent attends vocational high school, a dummy variable equal to one if the respondent attends academic high school, and a dummy variable equal to one if the respondent attends distance high school. All specifications control for a set of dummy variables for the type of education respondent's father and mother has completed (no schooling, completed primary, junior-high or a higher level of school), household size, month-of-birth fixed effects, and region fixed effects. Standard errors are clustered at the month-year cohort level in Panel A, and year cohort level in Panel B.

A. Child Labor in Services

B. Child Labor in Industry

C. Child Labor in Agriculture

D. Child Labor in Seasonal or Temporary Work

Born after January 1998 (in months)

Not in Education - Employment - Training (NEET)

Outcome / statistics	(1) OLS ĥ bandwidth	(2) Linear RD ĥ bandwidth	(3) Quadratic RD ĥ bandwidth	(4) Linear RD 0.75 ĥ bandwidth	(5) Linear RD 1.5 ĥ bandwidth	(6) Linear RD 23 bandwidth	(7) Linear RD-2SLS ĥ bandwidth	(8) Mean	(9) ĥ	(10) Obs.
Employed in Non-agriculture:										
Wage Work	-0.235***	-0.020*	-0.071***	-0.035***	-0.020**	-0.017*	-0.619**	0.11	20	23,809
	-0.011	-0.011	-0.016	-0.008	-0.009	-0.01	-0.295			
Total	-0.250***	-0.017	-0.055***	-0.030***	-0.018**	-0.017	-0.546*	0.13	20	23,809
	-0.013	-0.011	-0.015	-0.009	-0.009	-0.01	-0.31			
Employed in Industry:										
Wage Work	-0.149***	-0.007	-0.042***	-0.018**	-0.007	-0.008	-0.227	0.05	20	23,809
	(0.011)	(0.008)	(0.013)	(0.008)	(0.008)	(0.008)	(0.236)			
Total	-0.150***	-0.007	-0.037***	-0.019**	-0.008	-0.009	-0.230	0.06	20	23,809
	(0.011)	(0.008)	(0.012)	(0.008)	(0.007)	(0.007)	(0.231)			
Employed in Services:										
Wage Work	-0.086***	-0.012	-0.029**	-0.017**	-0.013**	-0.009	-0.391	0.06	20	23,809
	-0.009	-0.008	-0.012	-0.007	-0.006	-0.008	-0.264			
Total	-0.100***	-0.01	-0.019	-0.010	-0.010	-0.007	-0.316	0.07	20	23,809
	-0.01	-0.008	-0.011	-0.007	-0.006	-0.008	-0.247			
Employed in Agriculture:										
Wage Work	-0.019***	-0.004	-0.005	-0.009***	-0.004*	-0.004*	-0.134	0.01	20	23,809
	(0.004)	(0.003)	(0.005)	(0.002)	(0.002)	(0.002)	(0.107)			
Total	-0.079***	-0.001	-0.014	0.003	0.001	-0.000	-0.024	0.05	20	23,809
	(0.007)	(0.005)	(0.010)	(0.006)	(0.005)	(0.006)	(0.162)			

Outcome / statistics	(1) OLS ĥ bandwidth	(2) Linear RD ĥ bandwidth	(3) Quadratic RD ĥ bandwidth	(4) Linear RD 0.75 ĥ bandwidth	(5) Linear RD 1.5 ĥ bandwidth	(6) Linear RD 23 bandwidth	(7) Linear RD-2SLS ĥ bandwidth	(8) Mean	(9) ĥ	(10) Obs.
Works for a Wage	-0.254*** (0.010)	-0.024** (0.011)	-0.076*** (0.015)	-0.044*** (0.008)	-0.023** (0.010)	-0.021** (0.010)	-0.752** (0.339)	0.12	20	23,809
Seasonal or Temporary Work for a Wage	-0.026*** (0.007)	-0.023*** (0.005)	-0.023*** (0.008)	-0.021*** (0.006)	-0.022*** (0.005)	-0.020*** (0.005)	-0.738*** (0.284)	0.04	20	23,809
Log Hours of Work: Wage Work	-1.040*** (0.041)	-0.083* (0.043)	-0.298*** (0.057)	-0.167*** (0.031)	-0.078* (0.038)	-0.076* (0.041)	-2.632** (1.313)	0.46	20	23,809
Total	-1.317*** (0.043)	-0.064 (0.050)	-0.267*** (0.073)	-0.107** (0.040)	-0.051 (0.040)	-0.058 (0.047)	-2.021 (1.388)	0.65	20	23,809
Not in Education, Employment, or Training (NEET)	-0.529*** (0.013)	-0.016** (0.007)	-0.004 (0.012)	-0.004 (0.007)	-0.016** (0.008)	-0.019** (0.008)	-0.508*** (0.179)	0.08	20	23,809

TABLE 5: RD TREATMENT EFFECT OF EDUCATION ON CHILD LABOR AND IDLENESS OUTCOMES BY GENDER

	Overall sample		Female		Male		Difference			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Linear RD	Linear RD-2SLS	Linear RD	Linear RD-2SLS	Linear RD	Linear RD-2SLS	(3)-(5)	Mean		Observations
Outcome / statistics	ĥ bandwidth	ĥ bandwidth	ĥ bandwidth	ĥ bandwidth	ĥ bandwidth	ĥ bandwidth	p-value	(Overall/Female/Male)	ĥ	(Overall/Female/Male)
Employed in Non-agriculture:										
Wage Work	-0.020*	-0.619**	-0.014	-0.413	-0.033**	-0.983***	0.27	0.11/0.05/0.16	20	23,809/11,521/12,288
	(0.011)	(0.295)	(0.013)	(0.390)	(0.015)	(0.341)				
Total	-0.017	-0.546*	-0.013	-0.363	-0.032**	-0.946***	0.29	0.13/0.06/0.19	20	23,809/11,521/12,288
	(0.011)	(0.310)	(0.014)	(0.412)	(0.015)	(0.354)				
Employed in Industry:										
Wage Work	-0.007	-0.227	0.005	0.134	-0.025*	-0.732**	0.03	0.05/0.02/0.08	20	23,809/11,521/12,288
	(0.008)	(0.236)	(0.008)	(0.263)	(0.013)	(0.312)				
Total	-0.007	-0.230	0.007	0.200	-0.028**	-0.827**	0.01	0.06/0.02/0.09	20	23,809/11,521/12,288
	(0.008)	(0.231)	(0.008)	(0.275)	(0.012)	(0.337)				
Employed in Services:										
Wage Work	-0.012	-0.391	-0.019**	-0.548*	-0.008	-0.251	0.37	0.06/0.04/0.08	20	23,809/11,521/12,288
	(0.008)	(0.264)	(0.007)	(0.329)	(0.012)	(0.356)				
Total	-0.010	-0.316	-0.019**	-0.562	-0.004	-0.119	0.22	0.07/0.04/0.10	20	23,809/11,521/12,288
	(0.008)	(0.247)	(0.008)	(0.365)	(0.012)	(0.345)				
Employed in Agriculture:										
Wage Work	-0.004	-0.134	-0.005	-0.144	-0.004	-0.119	0.87	0.01/0.01/0.01	20	23,809/11,521/12,288
	(0.003)	(0.107)	(0.003)	(0.108)	(0.004)	(0.139)				
Total	-0.001	-0.024	0.002	0.062	-0.003	-0.076	0.63	0.05/0.04/0.06	20	23,809/11,521/12,288
	(0.005)	(0.162)	(0.007)	(0.208)	(0.007)	(0.211)				

	Overall sample		Female		Male		Difference			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		Linear RD-2SLS		Linear RD-2SLS		Linear RD-2SLS				
	Linear RD		Linear RD		Linear RD		(3)-(5)			
Outcome / statistics	ĥ bandwidth	ĥ bandwidth	ĥ bandwidth	ĥ bandwidth	ĥ bandwidth	ĥ bandwidth	p-value	Mean	ĥ	Observations
Works for a Wage	-0.024**	-0.752**	-0.019	-0.557	-0.037**	-1.102***	0.33	0.12/0.06/0.17	20	23,809/11,521/12,288
	(0.011)	(0.339)	(0.014)	(0.425)	(0.015)	(0.382)				
Seasonal or Temporary Work for a Wage	-0.023***	-0.738***	-0.027***	-0.772**	-0.021**	-0.627*	0.62	0.04/0.03/0.06	20	23,809/11,521/12,288
	(0.005)	(0.284)	(0.006)	(0.362)	(0.008)	(0.320)				
	0.04	0.04	0.03	0.03	0.06	0.06				
Log Hours of Work:										
Wage Work	-0.083*	-2.632**	-0.059	-1.721	-0.142**	-4.222***	0.26	0.46/0.23/0.67	20	23,809/11,521/12,288
	(0.043)	(1.313)	(0.052)	(1.568)	(0.062)	(1.486)				
Total	-0.064	-2.021	-0.035	-1.011	-0.128*	-3.824***	0.20	0.65/0.35/0.93	20	23,809/11,521/12,288
	(0.050)	(1.388)	(0.050)	(1.430)	(0.072)	(1.564)				
Not in Education, Employment or Training (NEET)	-0.016**	-0.508***	-0.028**	-0.819***	-0.002	-0.066	0.02	0.08/0.11/0.06	20	23,809/11,521/12,288
	(0.007)	(0.179)	(0.011)	(0.167)	(0.007)	(0.191)				

	Low Pre-Reform Enrollment Sample				High Pre-Reform Enrollment Sample				Low-High
	Overall	Female	Male	Difference	Overall	Female	Male	Difference	Difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Outcome / statistics	Linear RD	Linear RD	Linear RD	(5)-(6)	Linear RD	Linear RD	Linear RD	(9)-(10)	(4)-(8)
High school attendance	0.049**	0.036	0.059**	0.51	0.016	0.036**	0.009	0.30	0.17
	(0.020)	(0.030)	(0.023)		(0.014)	(0.015)	(0.022)		
Mean	0.80	0.81	0.79		0.88	0.89	0.86		
Vocational high school attendance	0.066***	0.023	0.108***	0.03	0.037	0.070**	0.004	0.14	0.38
	(0.017)	(0.023)	(0.028)		(0.022)	(0.033)	(0.032)		
Mean	0.33	0.33	0.33		0.42	0.39	0.44		
Academic high school attendance	-0.009	0.023	-0.045**	0.04	-0.012	-0.029	0.017	0.33	0.91
	(0.019)	(0.031)	(0.020)		(0.018)	(0.033)	(0.028)		
Mean	0.46	0.48	0.45		0.46	0.50	0.42		

TABLE 7: FUZZY RD TREATMENT EFFECTS BY PRE-REFORM ENROLLMENT RATE

	Low Pre-Reform Enrollment Sample			High Pre-Reform Enrollment Sample		
	Overall	Female	Male	Overall	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)
Outcome / statistics	Linear RD-2SLS	Linear RD-2SLS	Linear RD-2SLS	Linear RD-2SLS	Linear RD-2SLS	Linear RD-2SLS
Non-agriculture: Wage Work	-0.674**	-0.575	-0.703***	-0.648	-0.345	-2.769
	(0.296)	(0.594)	(0.258)	(0.771)	(0.582)	(5.364)
Mean	0.09	0.03	0.15	0.13	0.08	0.17
Non-agriculture: Total	-0.512**	-0.503	-0.472**	-0.842	-0.312	-3.987
	(0.260)	(0.567)	(0.232)	(0.831)	(0.634)	(8.307)
Mean	0.11	0.03	0.18	0.14	0.08	0.20
Industry: Wage Work	-0.174	0.215	-0.334*	-0.435	-0.006	-3.088
	(0.158)	(0.205)	(0.193)	(0.786)	(0.387)	(6.917)
Mean	0.04	0.01	0.07	0.06	0.03	0.09
Industry: Total	-0.126	0.304	-0.299	-0.556	0.044	-3.947
	(0.150)	(0.245)	(0.187)	(0.795)	(0.388)	(9.140)
Mean	0.05	0.01	0.08	0.07	0.03	0.10
Services: Wage Work	-0.499**	-0.791	-0.370	-0.213	-0.339	0.319
	(0.233)	(0.707)	(0.288)	(0.661)	(0.351)	(2.432)
Mean	0.05	0.02	0.08	0.07	0.05	0.08
Services: Total	-0.386*	-0.807	-0.173	-0.286	-0.356	-0.040
	(0.212)	(0.739)	(0.273)	(0.656)	(0.418)	(2.011)
Mean	0.06	0.03	0.10	0.08	0.05	0.10
Agriculture: Wage Work	-0.131	-0.111	-0.162	-0.140	-0.172**	0.184
	(0.130)	(0.208)	(0.153)	(0.184)	(0.085)	(0.447)
Mean	0.01	0.01	0.02	0.00	0.00	0.00
Agriculture: Total	0.103	0.140	0.143	-0.340	-0.006	-1.237
	(0.174)	(0.344)	(0.249)	(0.451)	(0.206)	(3.159)
Mean	0.08	0.06	0.09	0.02	0.02	0.03

TABLE 7: FUZZY RD TREATMENT EFFECTS BY PRE-REFORM ENROLLMENT RATE, cont'ed

	Low Pre-Reform Enrollment Sample			High Pre-Reform Enrollment Sample		
	Overall	Female	Male	Overall	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)
Outcome / statistics	Linear RD-2SLS	Linear RD-2SLS	Linear RD-2SLS	Linear RD-2SLS	Linear RD-2SLS	Linear RD-2SLS
Works for a Wage	-0.804**	-0.686	-0.865***	-0.788	-0.518	-2.585
	(0.375)	(0.701)	(0.299)	(0.785)	(0.602)	(5.041)
Mean	0.11	0.04	0.17	0.13	0.08	0.18
Seasonal or Temporary Work	-0.521**	-0.655	-0.469*	-1.309	-0.840*	-1.599
	(0.263)	(0.583)	(0.251)	(1.144)	(0.448)	(4.142)
Mean	0.05	0.02	0.07	0.04	0.03	0.05
Log Hours of Work: Wage Work	-2.989**	-2.313	-3.349***	-2.251	-1.501	-9.257
	(1.453)	(2.478)	(1.207)	(3.021)	(2.260)	(17.483)
Mean	0.43	0.15	0.68	0.48	0.29	0.67
Log Hours of Work: Total	-1.646	-1.317	-1.448	-3.608	-1.045	-17.650
	(1.181)	(1.534)	(1.151)	(3.345)	(2.418)	(37.037)
Mean	0.70	0.34	1.03	0.61	0.36	0.84
Not in Education, Employment, or Training (NEET)	-0.332	-0.912***	-0.027	-0.983	-0.737***	-0.421
	(0.226)	(0.225)	(0.216)	(0.684)	(0.260)	(1.050)
Mean	0.11	0.14	0.08	0.06	0.07	0.05
Bandwidth	20	20	20	20	20	20
Observations	13,274	6,419	6,855	10,535	5,102	5,433

Conclusion

- An advantage of our empirical setting is that the compulsory schooling reform does not entail a positive income effect that is present in CCTs or enrollment subsidies.

- The key contribution is to assess the isolated effect of time spent on school attendance on the incidence and time allocated to child labor in a developing-country context.

- We find that the reform led to an increase of 3.8 percent (3.2 ppt) of high school attendance. Teenagers in the treated cohorts are less likely to work for a wage, particularly in the non-agricultural sector and seasonal/temporary jobs.

- The channel of binding time constraints depends on relative tightness of the child labor market, and the different constraints facing program choice by gender.

- In relatively tighter male child labor market, the effect of school attendance on child labor is larger. In relatively underemployed female child labor market, the effect of school attendance on idleness is larger.

- The reform had a significant positive effect on distance high school enrollment of girls as families from socially conservative backgrounds preferred to keep their daughters away from co-educational schools.

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- The key contribution is to assess the isolated effect of time spent on school attendance on the incidence and time allocated to child labor in a developing-country context.
- We find that the reform led to an increase of 3.8 percent (3.2 ppt) of high school attendance. Teenagers in the treated cohorts are less likely to work for a wage, particularly in the non-agricultural sector and seasonal/temporary jobs.
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- The reform had a significant positive effect on distance high school enrollment of girls as families from socially conservative backgrounds preferred to keep their daughters away from co-educational schools.

CONCLUSION

- We document that more than half of the increase in vocational high school attendance was due to the increase in religious school enrollment.

- This implies that, combined with our estimates of a sharp increase in vocational high school attendance, the reform led to a substantial increase in religious high school attendance.

- A key implication of this result is that the ruling JDP government was largely successful in increasing religious education among the youth, which was a major motivation in designing this reform.

- Our findings suggest that education reforms may not necessarily have secularizing effects if the government has an active policy of converting several academic high schools into religious ones, disproportionately increasing their relative supply.

- The future empowering effects from increasing returns to education will be limited since the returns to religious education tends to be lower than academic education.

- The non-pecuniary benefits from education will be relatively less given that religious schools tend to promote more conservative attitudes than academic ones in general.

- However, in the short run, our findings provide support for empowering effects of the education reform on teenagers through a reduction on child labor and idleness.

CONCLUSION

- We document that more than half of the increase in vocational high school attendance was due to the increase in religious school enrollment.

- This implies that, combined with our estimates of a sharp increase in vocational high school attendance, the reform led to a substantial increase in religious high school attendance.

- A key implication of this result is that the ruling JDP government was largely successful in increasing religious education among the youth, which was a major motivation in designing this reform.

- Our findings suggest that education reforms may not necessarily have secularizing effects if the government has an active policy of converting several academic high schools into religious ones, disproportionately increasing their relative supply.

- The future empowering effects from increasing returns to education will be limited since the returns to religious education tends to be lower than academic education.

- The non-pecuniary benefits from education will be relatively less given that religious schools tend to promote more conservative attitudes than academic ones in general.

- However, in the short run, our findings provide support for empowering effects of the education reform on teenagers through a reduction on child labor and idleness.

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TABLE 6: SHARP RD TREATMENT EFFECTS BY PRE-REFORM ENROLLMENT RATE , cont'ed

	Low Pre-Reform Enrollment Sample				High Pre-Reform Enrollment Sample				Low-High
	Overall	Female	Male	Difference	Overall	Female	Male	Difference	Difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Outcome / statistics	Linear RD	Linear RD	Linear RD	(5)-(6)	Linear RD	Linear RD	Linear RD	(9)-(10)	(4)-(8)
Non-agriculture: Wage Work	-0.033***	-0.021**	-0.042**	0.21	-0.011	-0.012	-0.025	0.70	0.22
	(0.012)	(0.008)	(0.018)		(0.015)	(0.021)	(0.024)		
Mean	0.09	0.03	0.15		0.13	0.08	0.17		
Non-agriculture: Total	-0.025**	-0.018**	-0.028	0.57	-0.014	-0.011	-0.035	0.48	0.56
	(0.012)	(0.009)	(0.018)		(0.016)	(0.023)	(0.025)		
Mean	0.11	0.03	0.18		0.14	0.08	0.20		
Industry: Wage Work	-0.009	0.008	-0.020	0.10	-0.007	-0.000	-0.027	0.18	0.93
	(0.008)	(0.006)	(0.014)		(0.014)	(0.014)	(0.019)		
Mean	0.04	0.01	0.07		0.06	0.03	0.09		
Industry: Total	-0.006	0.011*	-0.018	0.08	-0.009	0.002	-0.035*	0.09	0.86
	(0.007)	(0.007)	(0.014)		(0.013)	(0.014)	(0.020)		
Mean	0.05	0.01	0.08		0.07	0.03	0.10		
Services: Wage Work	-0.025**	-0.029***	-0.022	0.69	-0.003	-0.012	0.003	0.47	0.15
	(0.009)	(0.007)	(0.016)		(0.012)	(0.012)	(0.018)		
Mean	0.05	0.02	0.08		0.07	0.05	0.08		
Services: Total	-0.019*	-0.029***	-0.010	0.27	-0.005	-0.013	-0.000	0.59	0.38
	(0.010)	(0.008)	(0.017)		(0.012)	(0.015)	(0.019)		
Mean	0.06	0.03	0.10		0.08	0.05	0.10		
Agriculture: Wage Work	-0.006	-0.004	-0.010	0.61	-0.002	-0.006**	0.002	0.01	0.37
	(0.005)	(0.007)	(0.008)		(0.002)	(0.003)	(0.002)		
Mean	0.01	0.01	0.02		0.00	0.00	0.00		
Agriculture: Total	0.005	0.005	0.008	0.85	-0.006	-0.000	-0.011	0.23	0.26
	(0.009)	(0.010)	(0.014)		(0.005)	(0.007)	(0.007)		
Mean	0.08	0.06	0.09		0.02	0.02	0.03		

	Low Pre-Reform Enrollment Sample				High Pre-Reform Enrollment Sample				Low-High
	Overall	Female	Male	Difference	Overall	Female	Male	Difference	Difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Outcome / statistics	Linear RD	Linear RD	Linear RD	(5)-(6)	Linear RD	Linear RD	Linear RD	(9)-(10)	(4)-(8)
Works for a Wage	-0.040***	-0.025**	-0.051***	0.12	-0.013	-0.018	-0.023	0.89	0.12
	(0.012)	(0.010)	(0.017)		(0.015)	(0.022)	(0.024)		
Mean	0.11	0.04	0.17		0.13	0.08	0.18		
Seasonal or Temporary Work	-0.026***	-0.024***	-0.028**	0.75	-0.021***	-0.030***	-0.014	0.35	0.68
	(0.008)	(0.007)	(0.012)		(0.006)	(0.009)	(0.011)		
Mean	0.05	0.02	0.07		0.04	0.03	0.05		
Log Hours of Work: Wage Work	-0.147***	-0.084**	-0.198***	0.09	-0.037	-0.054	-0.082	0.82	0.11
	(0.047)	(0.039)	(0.067)		(0.059)	(0.083)	(0.094)		
Mean	0.43	0.15	0.68		0.48	0.29	0.67		
Log Hours of Work: Total	-0.081	-0.048	-0.086	0.64	-0.059	-0.037	-0.157	0.38	0.76
	(0.058)	(0.037)	(0.083)		(0.063)	(0.088)	(0.102)		
Mean	0.70	0.34	1.03		0.61	0.36	0.84		
Not in Education, Employment, or Training (NEET)	-0.016	-0.033	-0.002	0.22	-0.016*	-0.026**	-0.004	0.12	0.98
	(0.017)	(0.026)	(0.013)		(0.008)	(0.012)	(0.010)		
Mean	0.11	0.14	0.08		0.06	0.07	0.05		
Bandwidth	20	20	20		20	20	20		
Observations	13,274	6,419	6,855		10,535	5,102	5,433		