LONG-TERM EFFECTS OF A CHILD LABOUR BAN: EVIDENCE FROM BRAZIL

Caio Piza – The World Bank Research Group and
University of Sussex
André Portela Souza – São Paulo School of Economics, Fundação Getulio Vargas

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Motivation

- Why do we care about child labour?
  - Normative and positive reasons…

- **Definition matters**:
  - ✓ILO: children are those aged 5 to 17
  - ✓ILO Convention No. 138 (minimum legal age)
  - ✓ILO Convention No. 182 (worst forms of work)

Motivation

- Ways of fighting child labour
  - Direct forms: ban (e.g. minimum legal age)
  - Indirect forms: Compulsory schooling law; CCT; UCT…

- Brazil passed a law in Dec 1998 increasing the minimum legal age of entry into the labour market from 14 to 16
  - Children: 14 years old not involved in hazardous activities!
- *What are the long term consequences of such ban?*

Contribution

- One of the very few papers to look at the impact of a ban on child labour in a developing country (recent episode)

- This is the first paper to provide estimates for long term effects of a child labour ban;

- The paper focuses on school-to-work transition outcomes for white and non-white males in urban areas:
  - Hourly wage (or wage rate)
  - LFPR
  - LFPR in formal sector
  - Occupation
  - College degree

Main results

- White Males:
  1. Higher wages – weak evidence
  2. **More likely to pursue a college degree**
- Non-white males:
  1. Lower wages – weak evidence
  2. Less likely to be employed -- weak evidence
  3. Less likely to be employed in the formal sector -- weak evidence
- Evidence of distributive effects (QTE)
  - *effect concentrated at the lower tail of wage rate distribution*

Some Background

- ILO (2013): 264 million children in employment and 168 million in child labour in 2012
  - World: 13.1 percent among those aged 12 to 14
  - In LAC: ~ 10%
- IBGE estimates for Brazil (in urban areas):
  - Steady decrease in the last couple of decades
  - Among 10 to 14 the # in child labour more than halved between 2001 and 2013
- % attending secondary school
  - 79% in 1999, 82% in 2005 and 84% in 2013
- What do they do instead?
  - Work – formal and informal sector
  - Leisure (NEETs)

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- ILO (2013): 264 million children in employment and 168 million in child labour in 2012
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  - the number of children aged 10 to 14 in child labour more than halved between 2001 and 2013
- % attending secondary school
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- What do they do instead?
  - Work – formal and informal sector
  - Leisure (NEETs)

Outline

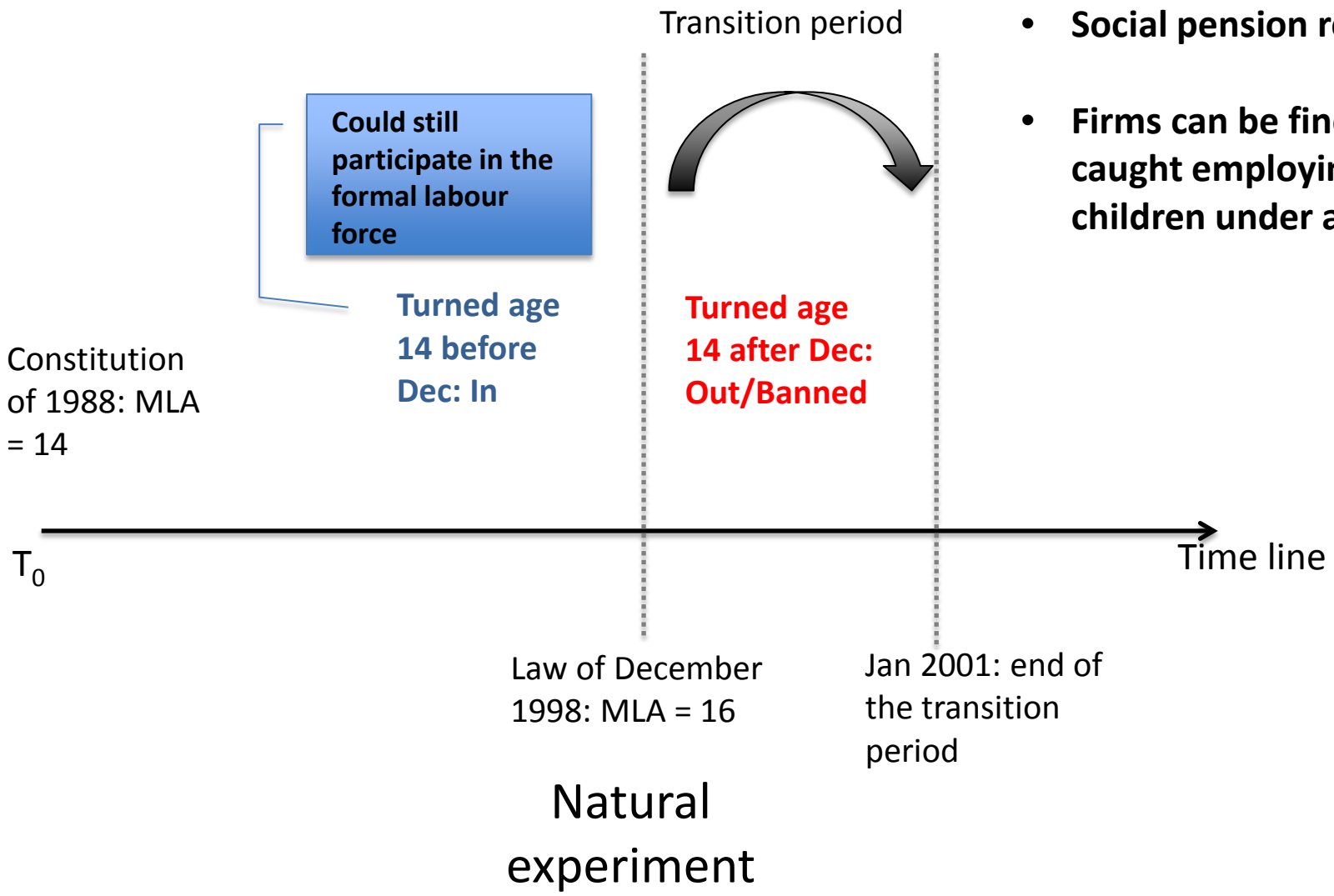
1. Available literature and evidence
2. The intervention: the law of Dec 1998
3. The data and some descriptive stats
4. Method (identification strategy)
5. Results (+ placebo test)
6. Final considerations

Available literature and evidence

- Child labor ban: establishing or increase in the MLA

- What do we know about the impact of ban policies?
  - US: Margo and Finegan (1996); Moheling (1999); Lleras-Muney (2002); Manacorda (2006); Tyler (2003)
  - India: Prashant et al. (2013)*
  - Brazil: **This paper** (and other two!)

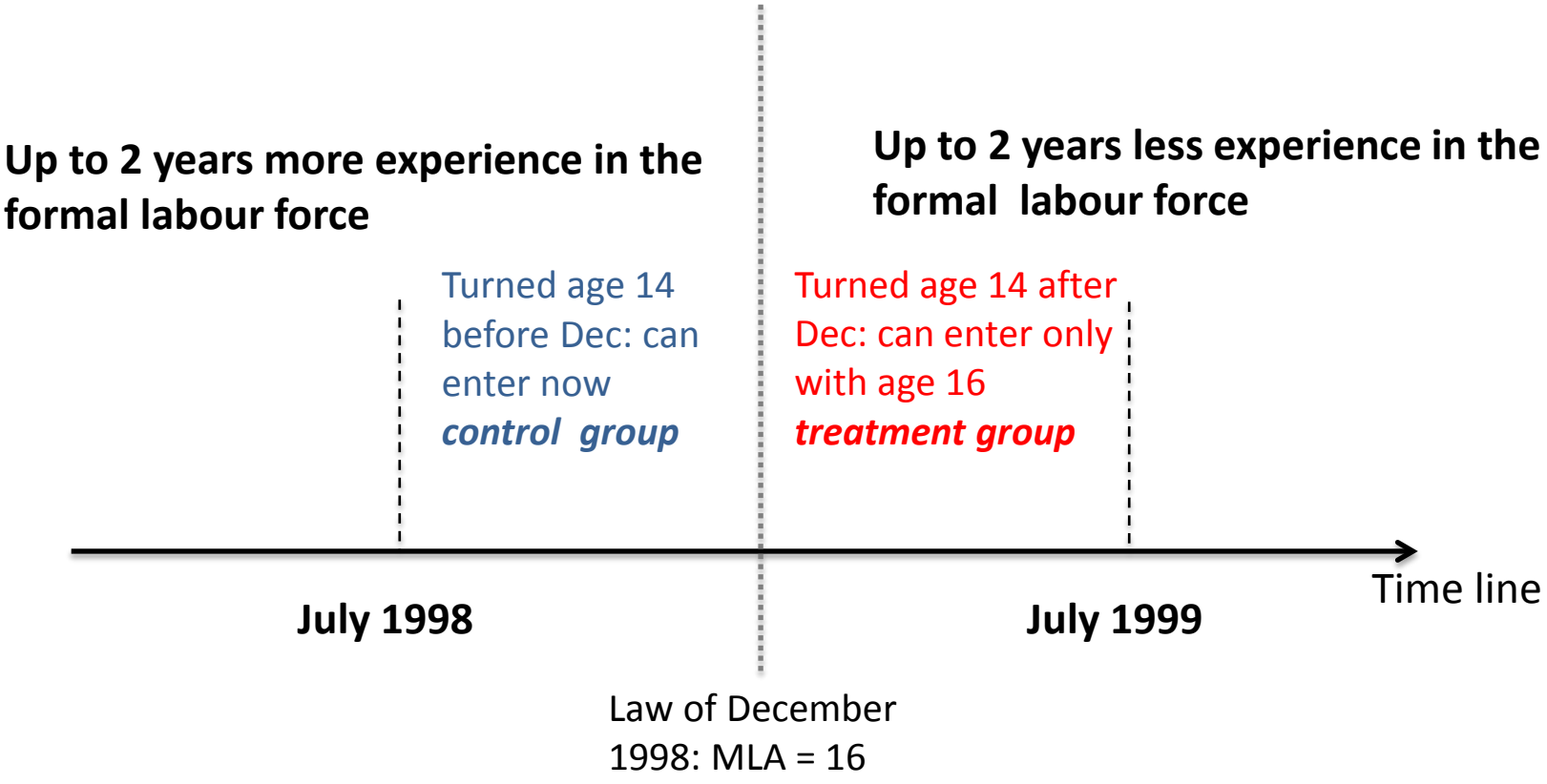
The law of December 1998 (1/2)



- **Social pension reform**
- **Firms can be fined if caught employing children under age 16**

Natural experiment

The law of December 1998 (2/2)



Theoretical Framework

- Standard static labour supply model
  - Wage in the formal sector > wage in the informal sector
  - LFPR >0 if wage rate > reservation wage
  - LFPR will be smaller with the ban: reservation wage > wage in the informal sector (dropouts)
  - Better off children more likely to dropout (higher reservation wage)

Method: Regression Discontinuity Design (RDD)

- *The assignment to the treatment and control groups depends on the date of birth by the time the law changed*

- **Key issues to validate the RDD**
  - ✓Balanced sample around the threshold
  - ✓No perfect control over the assignment variable
  - ✓Bandwidth size and functional forms

Method: Identification Strategy

1. Intent-to-treat: Impact of the law
   - Reduced form with common time effects:

$$y_i = \alpha + \delta D_i + h(z_i) + years + \varepsilon_i$$

- h(.) is a smooth function of the assignment variable *z*
- ***z* is defined in weeks and takes the value of 0 for those who turned 14 in the last week of Dec 1998**
- D_i = 1{age > or = 14 after Dec 1998}
- **δ is the intent-to-treat for the whole period**

Method: Identification Strategy

1. Intent-to-treat: Impact of the law (OLS!)
   - Reduced form with common time effects:

Linear, quadratic, cubic, spline linear and quadratic

$$y_i = \alpha + \delta D_i + h(z_i) + years + \varepsilon_i$$

- h(.) is a smooth function of the assignment variable *z*
- ***z* is defined in weeks and takes the value of 0 for those who turned 14 in the last week of Dec 1998**
- D_i = 1{age > or = 14 after Dec 1998}
- **δ is the intent-to-treat for the whole period**

Data and Descriptive Stats

- Brazilian annual household surveys (*Pesquisa Nacional por Amostra de Domicílios,* PNAD) – different years

- About 120,000 HHs and 360,000 individuals

- In this paper I will work with two cohorts:
  - **Affected cohort (eligible group): 14 years old just after Dec 1998 (ages 22-26 in 2007-2011)**
  - **Unaffected cohort (ineligible group): 14 years old just before Dec 1998 (ages 23-27 in 2007-2011)**
  - **Analysis is for boys in urban areas (short term effects – formal and informal sectors)**

Visual Checks

One year before the law passed

Figure A.2 –Labour Force Participation Rate in 1998

Males – 51 Weeks Bandwidth

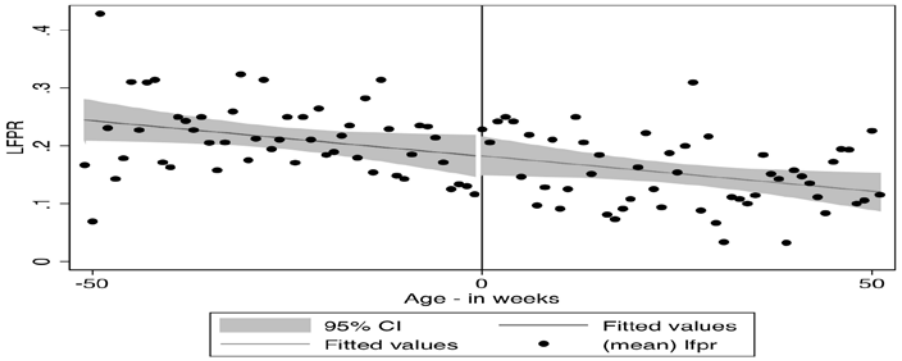


Figure A.3 –Labour Force Participation Rate in 1998

White Males – 51 Weeks Bandwidth

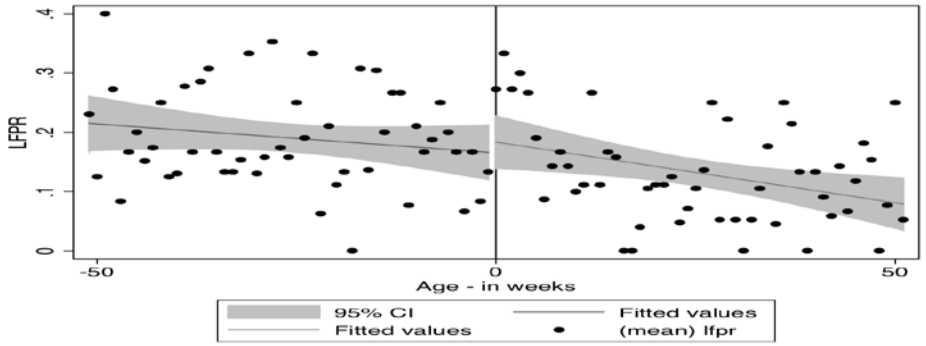
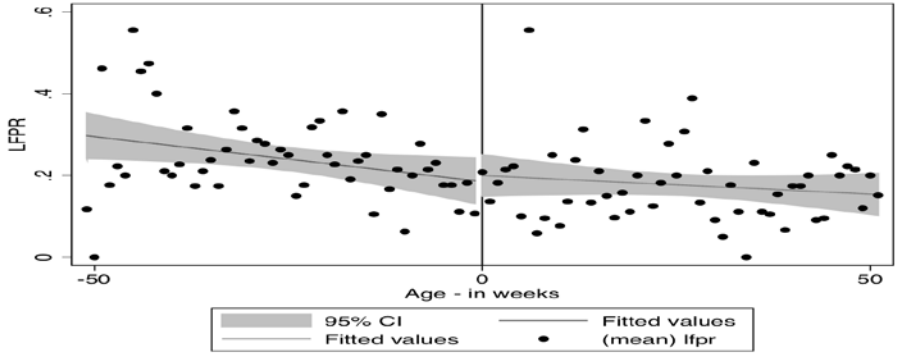


Figure A.4 –Labour Force Participation Rate in 1998

Non-white Males – 51 Weeks Bandwidth



Few months after the year the law passed

Figure 5a –Labour Force Participation Rate in 1999

Males – 26 Weeks Bandwidth

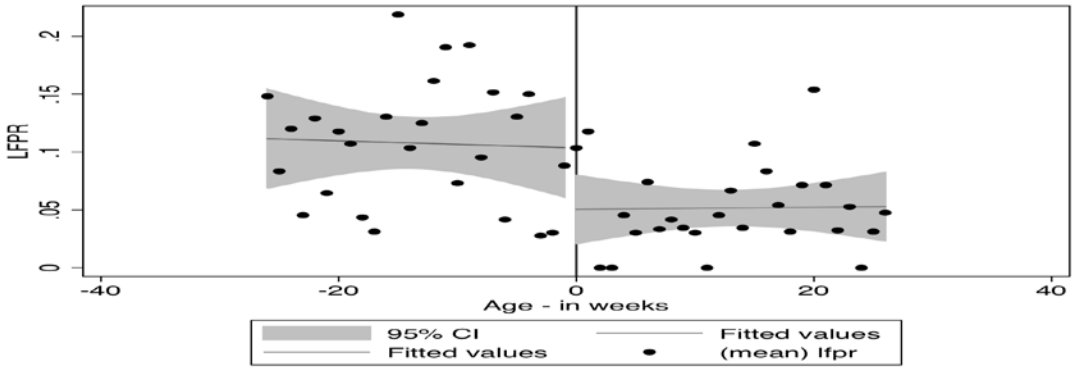


Figure 5b –Labour Force Participation Rate in 1999

White Males – 26 Weeks Bandwidth

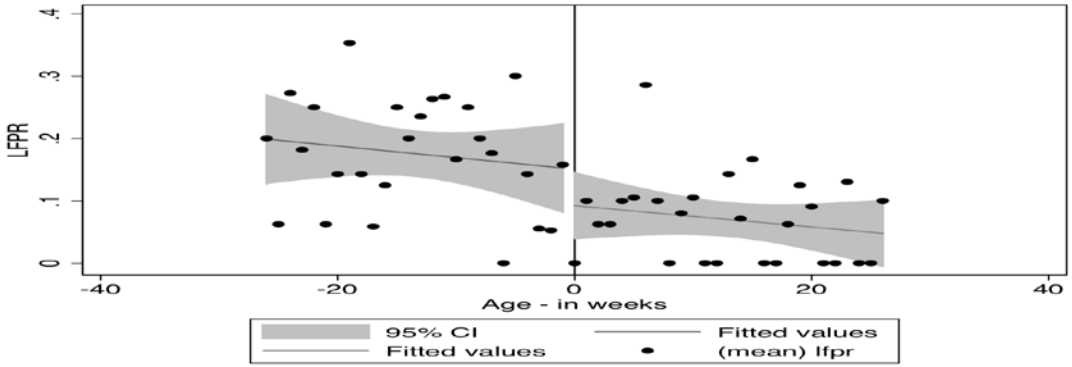
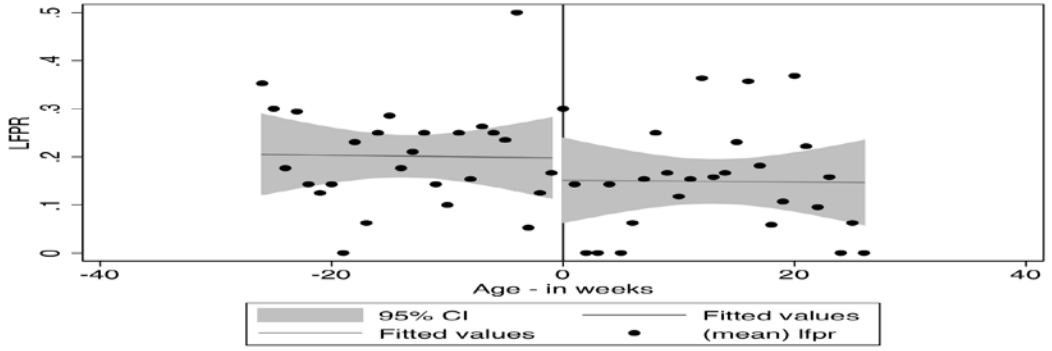


Figure 5c –Labour Force Participation Rate in 1999

Non-white Males – 26 Weeks Bandwidth



Why is the fall in LFPR much smaller for non-white males?

Table – T-test for difference in means
Children aged 14 in 1998

	Non-whites	Whites	P-value
Log of hourly wage	2.21	2.90	0.00
LFPR	0.21	0.15	0.00
LFPR - Formal	0.00	0.01	0.03
Occupation - Formal	0.05	0.15	0.01
Informal	0.07	0.06	0.12
Domestic work	0.69	0.67	0.14
School attendance	0.90	0.94	0.00
Mother's Education	4.60	6.30	0.00
Father's Education	3.60	5.50	0.00
Househod size	5.00	4.60	0.00

Source: PNAD 1998.

Non-white males may have a lower reservation wage → more likely to accept the wage rate paid in the informal sector

Long-term effects?
More Visual Checks…

Selected figures

Figure 7a – Predicted Log Wage – Long Run

White Males – 26 Weeks Bandwidth

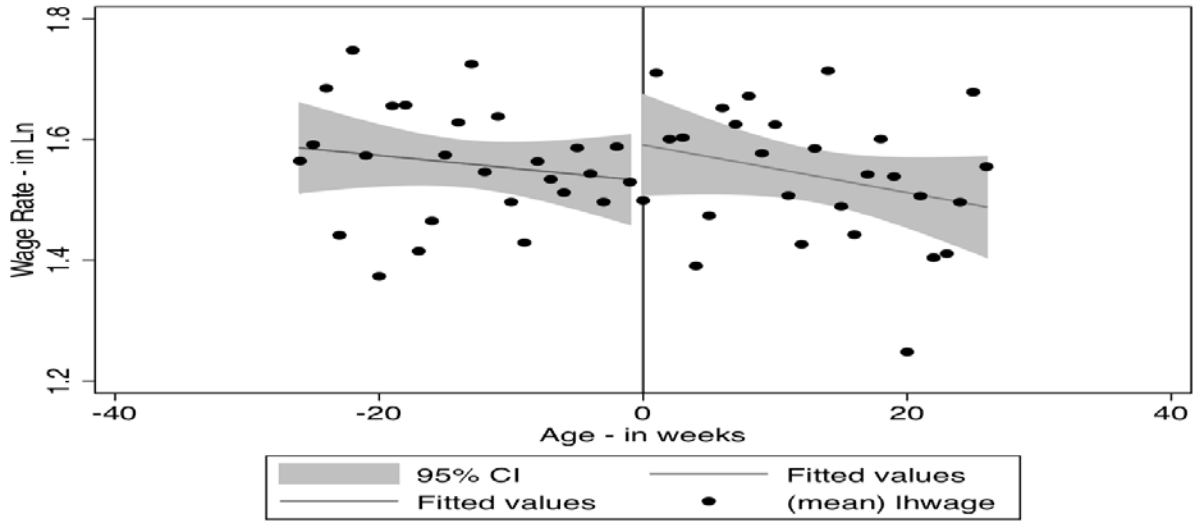
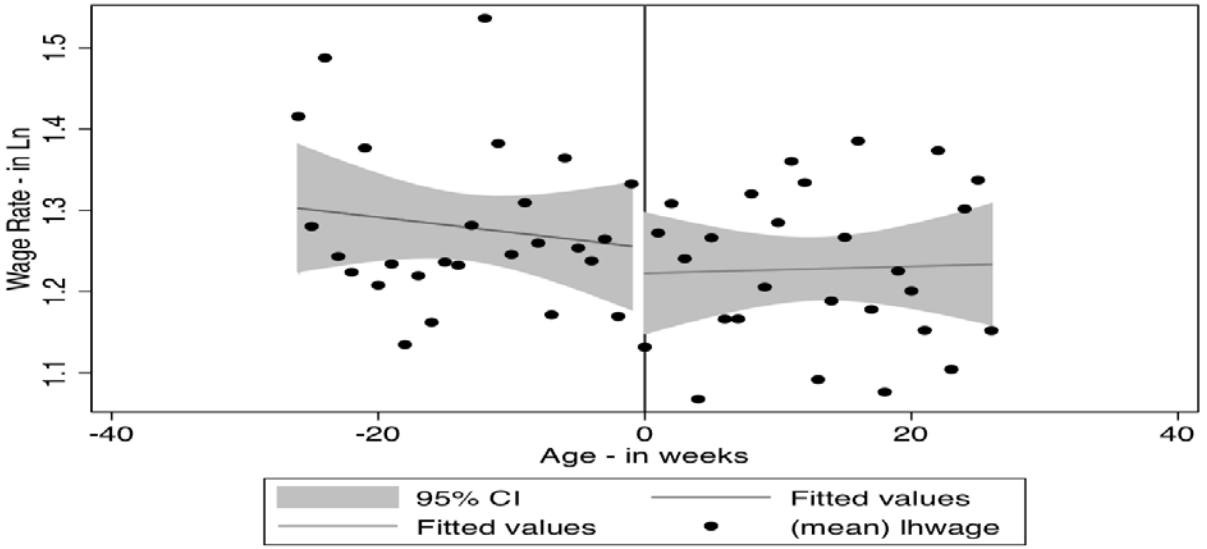


Figure 7b – Predicted Log Wage – Long Run

Non-white Males – 26 Weeks Bandwidth



Source: PNADs 2007-2009, 2011

Figure 8 – LFPR – Long Run

Non-white Males – 26 Weeks Bandwidth

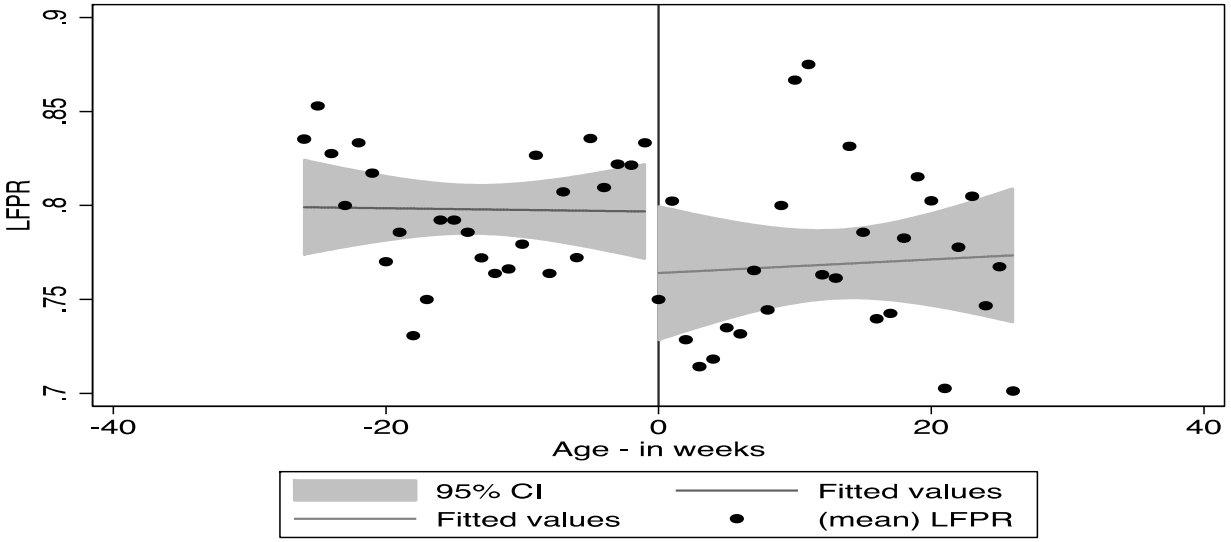
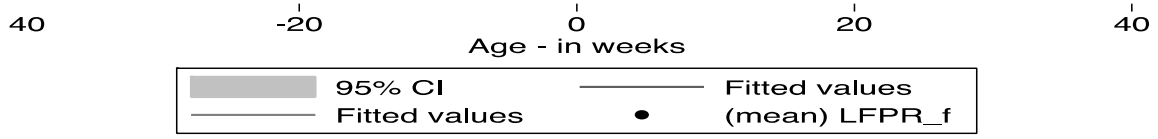


Figure 9 – Participation Rate in the Formal Labour Force – Long Run

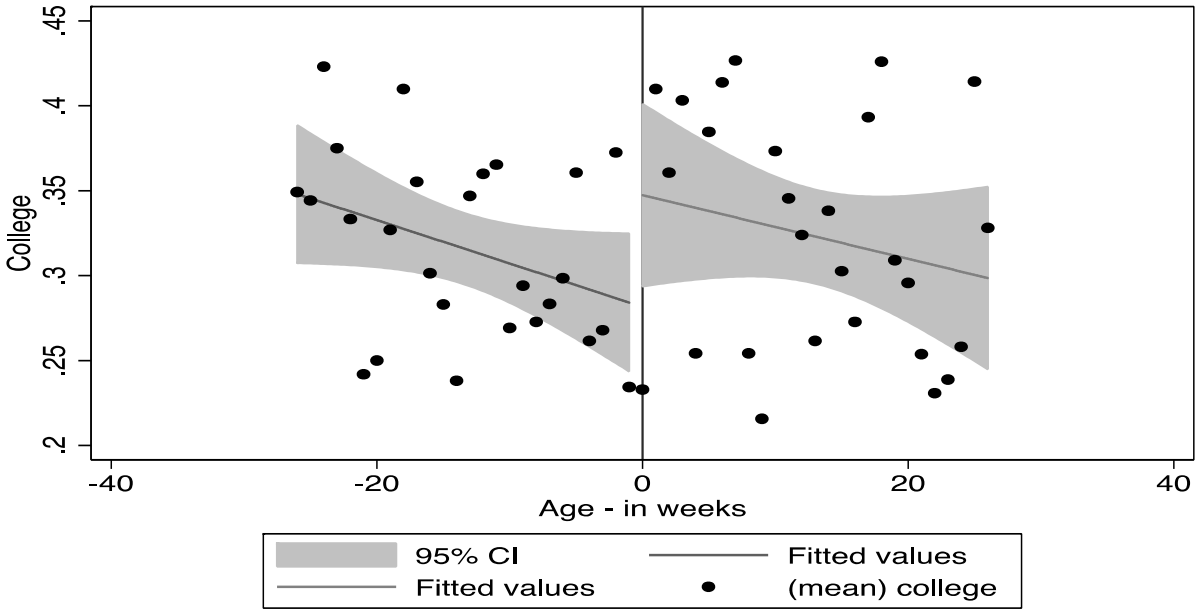
Non-white Males – 26 Weeks Bandwidth



Source: PNADs 2007-2009, 2011

Figure 10 – Probability of Pursuing or Holding College Degree – Long Run

White Males – 26 Weeks Bandwidth



Source: PNADs 2007-2009, 2011

Results

Table 3 – Short Run Effects of the Ban on Labour Force Participation Rate

Functional Formal of *h(z)*	White Males	Non-white Males	White Males	Non-white Males
	3 Months Bandwidth		*6 Months Bandwidth*	
0	-0.085***	-0.071*	-0.11***	-0.059**
	(-2.87)	(-1.64)	(-4.86)	(-2.14)
1	0.0059	-0.091	**-0.054**	-0.041
	(-0.1)	(-0.88)	**(-1.37)**	(-0.66)
2	0.0076	-0.089	**-0.054**	-0.043
	(-0.14)	(-0.87)	**(-1.34)**	(-0.68)
3	**-0.092**	-0.063	-0.024	**-0.15**
	(-1.51)	(-0.63)	(-0.45)	**(-1.53)**
Spline linear	0.01	-0.09	**-0.053**	-0.042
	(-0.18)	(-0.88)	**(-1.32)**	(-0.68)
Spline quadratic	**-0.12**	**-0.12**	-0.013	**-0.15**
	(-1.57)	**(-1.54)**	(-0.21)	**(-1.31)**
Observations	422	412	891	948

Source: PNAD 1999.

Note: Clustered T-statistics in parenthesis. ***, **, * Statistically significant at 1%, 5%, and 10% respectively.

Long-term results

ITT estimates for the pooled model

White and Non-white males

Most of the estimates exclude the school attenders

Wage rate = monthly wage/(4*weekly hours worked) – measurement error

Table – ITT Estimates of the Law of Dec 1998 on Adults' Wage

26 Weeks Bandwidth – exclude school attenders

	White Males					
Polynomial degree	0	1	2	3	spline linear	quadratic spline
D (=1 if 14 after Dec 1998; =0 if 14 before Dec 1998)	-0.011	0.099	0.096	0.18*	0.097	0.21*
	(-0.33)	(1.38)	(1.33)	(1.84)	(1.34)	(1.84)
D*2008						
D*2009						
D*2011						
Dummies for years	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	1966	1966	1966	1966	1932	1932
	Non-White Males					
Polynomial degree	0	1	2	3	spline linear	quadratic spline
D (=1 if 14 after Dec 1998; =0 if 14 before Dec 1998)	-0.029	0.0078	0.0014	-0.074	-0.0057	-0.065
	(-1.29)	(0.16)	(0.03)	(-1.09)	(-0.12)	(-0.82)
D*2008						
D*2009						
D*2011						
Dummies for years	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	2831	2831	2831	2831	2787	2787

Table – ITT Estimates of the Law of Dec 1998 on Adults' Wage

26 Weeks Bandwidth – exclude school attenders

	White Males					
Polynomial degree	0	1	2	3	spline linear	quadratic spline
D (=1 if 14 after Dec 1998; =0 if 14 before Dec 1998)	-0.011	0.099	0.096			0.21*
	(-0.33)	(1.38)	(1.33			(1.84)
D*2008						
D*2009						
D*2011						
Dummies for years	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	1966	1966	1966	1966	1932	1932
	Non-White Males					
Polynomial degree	0	1	2	3	spline linear	quadratic spline
D (=1 if 14 after Dec 1998; =0 if 14 before Dec 1998)	-0.029	0.0078	0.0014	-0.074	-0.0057	-0.065
	(-1.29)	(0.16)	(0.03)	(-1.09)	(-0.12)	(-0.82)
D*2008						
D*2009						
D*2011						
Dummies for years	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	2831	2831	2831	2831	2787	2787

These are lower bound and inefficient estimates!

Table – ITT Estimates of the Law of Dec 1998 on Adults' LFPR

26 Weeks Bandwidth – exclude school attenders

	White Males					
Polynomial degree	0	1	2	3	spline linear	quadratic spline
D (=1 if 14 after Dec 1998; =0 if 14 before Dec 1998)	-0.00054	-0.01	-0.012	-0.018	-0.017	-0.022
	(-0.033)	(-0.29)	(-0.34)	(-0.40)	(-0.47)	(-0.42)
D*2008						
D*2009						
D*2011						
Dummies for years	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	2367	2367	2367	2367	2325	2325
	Non-White Males					
Polynomial degree	0	1	2	3	spline linear	quadratic spline
D (=1 if 14 after Dec 1998; =0 if 14 before Dec 1998)	-0.0045	-0.017	-0.017	-0.071*	-0.021	-0.079*
	(-0.30)	(-0.59)	(-0.60)	(-1.88)	(-0.71)	(-1.78)
D*2008						
D*2009						
D*2011						
Dummies for years	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	3512	3512	3512	3512	3452	3452

Table – ITT Estimates of the Law of Dec 1998 on Adults' LFPR - Formal

26 Weeks Bandwidth – exclude school attenders

	White Males					
Polynomial degree	0	1	2	3	spline linear	quadratic spline
D (=1 if 14 after Dec 1998; =0 if 14 before Dec 1998)	0.0083	0.028	0.027	0.075	0.035	0.082
	(0.33)	(0.61)	(0.58)	(1.25)	(0.74)	(1.21)
D*2008						
D*2009						
D*2011						
Dummies for years	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	2283	2283	2283	2283	2245	2245

	Non-White Males					
Polynomial degree	0	1	2	3	spline linear	quadratic spline
D (=1 if 14 after Dec 1998; =0 if 14 before Dec 1998)	0.011	-0.018	-0.02	-0.080*	-0.019	-0.095*
	(0.58)	(-0.49)	(-0.54)	(-1.69)	(-0.51)	(-1.72)
D*2008						
D*2009						
D*2011						
Dummies for years	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	3403	3403	3403	3403	3344	3344

Table – ITT Estimates of the Law of Dec 1998 – Pursuing College

26 Weeks Bandwidth

	White Males					
Polynomial degree	0	1	2	3	spline linear	quadratic spline
D (=1 if 14 after Dec 1998; =0 if 14 before Dec 1998)	0.022	0.12***	0.12***	0.11**	0.12***	0.11**
	(1.12)	(3.15)	(3.13)	(2.47)	(3.13)	(2.07)
D*2008						
D*2009						
D*2011						
Dummies for years	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	3248	3248	3248	3248	3184	3184
	Non-White Males					
Polynomial degree	0	1	2	3	spline linear	quadratic spline
D (=1 if 14 after Dec 1998; =0 if 14 before Dec 1998)	-0.0034	0.015	0.016	0.00066	0.019	0.0086
	(-0.27)	(0.58)	(0.64)	(0.02)	(0.75)	(0.24)
D*2008						
D*2009						
D*2011						
Dummies for years	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	4223	4223	4223	4223	4146	4146

The bottom line is…

- White Males:
  1. Higher wages – weak evidence
  2. **More likely to pursue a college degree**
- Non-white males:
  1. Less likely to be employed -- weak evidence
  2. Less likely to be employed in the formal sector -- weak evidence

Distributive Effects?

Table 8 – Long Run QTE on Hourly Log Wages – White and Non-White Males

Bandwidth of 6 months – Exclude School Attenders – Homogeneous time effects

	Q10	Q25	Q50	Q75	Q90
			Whites		
D	0.19**	0.15	0.14	0.23	0.20
	(2.04)	(1.54)	(1.28)	(1.42)	(0.82)
			Non-Whites		
D	0.027	-0.092	-0.24***	-0.054	0.18
	(0.39)	(-1.38)	(-2.88)	(-0.49)	(1.02)

Source: PNADs 2007, 2008, 2009, and 2011.

Note: Clustered T-statistics in parenthesis. ***, **, * Statistically significant at 1%, 5% and 10% respectively

Occupation?

Table A.4 – Effect of the Ban on Occupation of Adult Males – ITT Estimates

Homogeneous Time Effects – 6 Months Bandwidth

	Directors in General	Science & Arts	Technicians	Administrative Services	Service Sector	Commerce Sector	Agricultural Sector	Civil Construction	Army Force	Undefined
					White Males					
D	0.027	0.047*	0.032	-0.014	0.0015	-0.010	0.0099	-0.076	-0.020*	0.0030
	(1.20)	(1.93)	(0.98)	(-0.35)	(0.044)	(-0.27)	(1.30)	(-1.56)	(-1.81)	(1.04)
Observations	*1978*	*1978*	*1978*	*1978*	*1978*	*1978*	*1978*	*1978*	*1978*	*1978*
					Non-White Males					
D	0.0054	0.015	-0.028	0.013	-0.030	-0.0034	0.011	0.010	0.0048	0.0030
	(0.35)	(0.86)	(-1.02)	(0.35)	(-0.91)	(-0.11)	(1.19)	(0.23)	(0.59)	(1.03)
Observations	*2851*	*2851*	*2851*	*2851*	*2851*	*2851*	*2851*	*2851*	*2851*	*2851*

Source: PNADs 2007, 2008, 2009, and 2011.

Note: Clustered T-statistics in parenthesis. * Statistically significant at 10 percent level.

Placebo Test

14 before and after June 30th 1999

Macro shock of Jan 1999

Age at School Entry

None of the estimates are statistically significant

Final Considerations

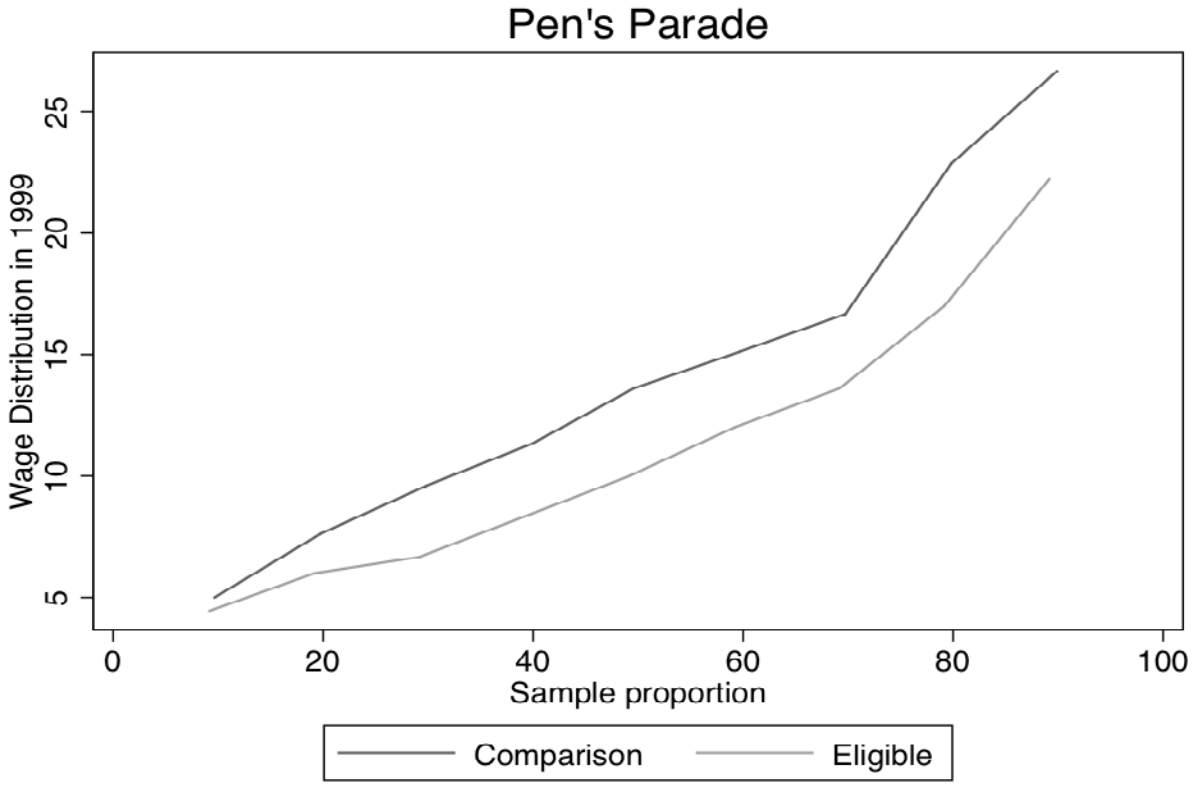
- Taking the results at face value, the ban…
  - Right nudge for white males – myopic parents?
  - Harmful for non-white males (more constraints to deal with?)
- The law affected exclusively those at the bottom of earnings distribution
- These might be seen as lower bound estimates for the return to experience
- Not mentioned: wage elasticity of LS (at the intensive margin): -0.3 (consistent with the available evidence)
- For individuals with disadvantageous background, early experience in the labour market **may have** higher return than low quality public education

Thank you

Data and Descriptive Stats

Figure 4 – First Order Stochastic Dominance: Hourly Wage Distributions for Children Aged 14 Before and After December 1998

52 Weeks Bandwidth



Source: PNAD 1999.