

Perverse Consequences of Well-Intentioned Regulation

Evidence from India's Child Labor Ban

PRASHANT BHARADWAJ (UNIVERSITY OF CALIFORNIA, SAN DIEGO)

LEAH K. LAKDAWALA (MICHIGAN STATE UNIVERSITY)

NICHOLAS LI (UNIVERSITY OF TORONTO)

Child Labor in the World

- 168 million child laborers worldwide, 85 million in hazardous conditions (*ILO*, 2013)
- Child labor not a new problem, but now concentrated in developing countries
- 28 million working children in India (*UNICEF*, 2011)
 - Average 21 hours of work per week (*Child Rights and You*, 2013)

Child Labor Bans

Often used policy: child labor bans

- Minimum age restrictions for work in developed countries
 - In the US: State and industry-specific laws from mid-1800s; national act in 1938
- Bans on child labor across the world
 - ILO Minimum Age Convention ratified by 166 countries (various age restrictions; does *not* currently include India)

Child Labor Bans

Lots of debate, yet very little empirical evidence on effectiveness of child labor bans in developing countries

[Edmonds & Shrestha (2012)]

- Unintended consequences of laws a central concern of economic analysis

Model overview

- Impact of ban on child labor theoretically ambiguous [Basu and Van (1998), Basu (1999), Baland and Robinson (2000), Basu 2005)]
- An imperfectly enforced ban can lead to *more* child labor
 - Mechanism: lower child wages
- With multiple sectors, results still hold
 - As long as labor market frictions exist
- State capacity for enforcement plays a key role

Empirical overview

- Major national law change in 1986
 - All under 14 banned from working in various occupations/processes
- Data: NSS employment surveys (1983-1993/4)
- Difference-in-difference strategy
 - Compare age ineligible (<14) to age eligible (≥ 14), before and after 1986
 - Use sibling age eligibility to tie empirical results to theory
 - Geographic and household heterogeneity

Preview of results

- Relative increases in child employment after the ban
 - Children with *siblings* under the legal working age are more likely to work after the ban
 - No consistent evidence of schooling effects
- Geographic and household heterogeneity
 - Effects stronger in areas where ban is likely to have greater impact
 - Larger effects among poorer households
- Decreases in child wages a likely mechanism
- Household outcomes
 - Usually difficult to make a welfare claim
 - Small *decreases* in expenditure and other measures of wellbeing

Child Labor Act of 1986

Child Labour Bill

It remains to be seen whether the government will introduce the much touted Child Labour Bill in the next parliamentary session. This uncertainty is because of criticism of many of the basic features of the bill from several quarters. There are those who are against the bill because they do not see any way to legitimise and regulate child labour.

Controversy around child labour bill

By USHA RAI
The Times of India News Service
NEW DELHI, August 8. UNCERTAINTY looms over the draft legislation on child labour bill now referred to the cabinet as its basics are in question in several quarters. It was expected to be introduced in the present session which concludes on August 14. But there is no sign of its introduction. There are differences of opinion on the bill. Some are in favour of it, while others are against it. The bill is expected to be introduced in the next session.

Problem Of Child Labour Legislation Is Not Enough

By LOTIKA SARKAR AND CHANCHAL SARKAR

THE merry month of May seems to hold a special fascination for Union ministers of labour. It was on May 4, 1983 that Mr. Veerendra Patil, then minister of labour, made a mountain-top announcement: "We are quite clear in our minds that we will not allow child labour to continue in India. We will take all necessary steps to abolish it."

National policy on child labour

The Times of India News Service
NEW DELHI, August 12. THE three-pronged national policy on child labour announced in parliament today, envisages strict enforcement of labour laws, welfare measures for working children and their families and a project-based action plan for rehabilitating children after withdrawing them from prohibited employment.

Presenting the policy in both houses of parliament today, the minister of labour, Mr P. A. Sangma, revealed that some 30,000 children working in ten specific projects would be withdrawn in the first phase and would cost around Rs. 11 crores in the current financial year.

He said the new policy would further the objectives of the Child Labour (Prohibition and Regulation) Act, 1986, which prohibits employment of children below 14 years in certain occupations, and regulated their employment in other sectors. The policy would ensure strict and effective enforcement of provisions of the laws governing child labour.

Small change

Gunvanthi Balaram on why the latest legislation on child labour is unlikely to liberate children condemned to a life of drudgery

DESPITE the fact that every 18th child in the country is a labourer, only one errand employer was booked under the Child Labour (Prohibition and Regulation) Act in Maharashtra in 1992. A building contractor was prosecuted for having a little boy slave on his construction site in Beed. And in 1993, there are yet to be any prosecutions; this is a state that, according to the 1981 census, had 1,26,000 child labourers.

employers of child labour because they believe that "the kids and their families would then probably starve," says Dr Sharad Sawant of the Maharashtra Institute of Labour Studies. Which explains why a country which, according to the Operations Research Group, has 44 million child workers, had only 3,488 prosecutions between mid-1986 and mid-1993 under the Child Labour Act, with 1,428 convictions.

raashtra, which has a high incidence of child labour, it took the ghastly death of eight-year-old Shiva, a kitchen-hand in an eatery in Wani, to spur the labour department into action. (Shiva, it may be recalled, was beaten to death with iron rods by the hotel proprietor about three months ago.) Investigations were carried out and 15 persons in the district have been prosecuted under the Shops' Act for employing children

Bill on child labour soon
SIVAKASE, April 20 (PTI) The Government would soon bring a comprehensive bill on child labour, the Union minister for labour Mr. P. A. Sangma, said here today. In inaugurating a Rs. 13.89 crore national child labour project, he said the government was very much concerned about child labour welfare, it wanted to involve employers to in their welfare apart from involving Central and state governments, through legislation. The child labour project is for a three-year period commencing from 1986-87. Mr. Sangma said child labour in country existed for "economic reasons" despite Article 24 prohibition and about a dozen children were employed in factories, hotels, carpet mills in various places he said. Government had realised that child labour could not be abolished through laws prohibiting it. Children were employed in various places he said. Government had realised that child labour could not be abolished through laws prohibiting it.

Child Labor Act of 1986

- Ban implemented in December 1986
- Multiple child labor laws before 1986, but only for specific jobs
 - Not coordinated across occupations
- Main draw of 1986 law: uniformity in age restriction
 - Under 14 not allowed to work in certain industries, occupations and processes
 - Ban applied to mostly non-agricultural jobs (transportation, mines, construction, manufacturing, etc.)

Child Labor Act of 1986

- Major caveat: no ban on agricultural work or work in household businesses
 - Act did lay out regulations for *legal* forms of child labor
- Penalties
 - Imprisonment for “not less than three months” or
 - Fine of “not less than 10,000 rupees” or both
 - Harsher punishment for repeat offenders

Child Labor Act of 1986

- From 1997 to 2005, over 2.34 million inspections turned up more than 144,000 violations (*IndiaStat*)
 - Yet few prosecutions (less than 30% of violations from 2002-2008)
- Weak enforcement, though widespread awareness
 - Busts make national news
 - Employers circumvent law by subcontracting, claiming false familial ties, fake identities

Model highlights

[Basu and Van (1998), Basu (1999), Basu 2005)]

- Assumptions
 - Firms: child and adult labor are (imperfect) substitutes
 - Households: supply child labor only if adult wage is below subsistence level
 - Enforcement: fine D applied with probability p
- Main result: child labor could *increase* with increased enforcement
 - Mechanism: child wages fall by pD , households need more children to work to reach subsistence (income effect)
- Two sector extensions
 - No frictions: no overall effects (Edmonds and Shrestha (2012))
 - With frictions: similar effects as in 1-sector model

Data

Source: Employment surveys collected by National Sample Survey Organization (NSS)

- 1983, 1987-8, 1993-4 (employment rounds)
- Estimation sample: children ages 10-17

Time allocation information

- Available for ages 6+
- Extensive margin only
- Categories: paid and unpaid economic activity (by industry), unpaid household services, and school attendance
- Linked expenditure and consumption data

Descriptive statistics

Empirical strategy:

Overall effects on child time allocation

Basic differences-in-differences (DID) design

- Use age ineligibility (<14) as indicator for treatment

$$Y_{it} = \beta_0 + \beta_1 \text{Under14}_i + \beta_2 \text{Post1986}_t + \beta_3 (\text{Under14}_i \times \text{Post1986}_t) + v_{it}$$

— Also includes controls (own age FE, survey year FE, household demographics, etc.)

- National level ban makes reliance on DID assumptions stronger
 - Unfortunately no data on pre-trends
 - Narrower age bands, narrower time frame
 - Geographical and household-level variation as proxies for ban intensity

Results: Overall Effects on Time Allocation

Overall Effects of Ban on Child Time Allocation (Ages 10-17)

	Any Economic Activity (1)	Any Economic Activity (2)	Labor Force Participation (3)	Employment in Banned Occup. (4)	Employment in Non- banned Occ.† (5)	Unpaid Economic Activity (6)	Paid Employment (7)
Under14XPost	0.024 (0.040)	0.026*** (0.005)	0.029*** (0.005)	0.004*** (0.001)	0.023*** (0.005)	0.007* (0.003)	0.019*** (0.002)
Pre-Ban Mean of							
Dep. Variable	0.118	0.118	0.121	0.009	0.108	0.077	0.041
Observations	327,876	327,233	327,233	327,007	327,233	327,233	327,233
R-squared	0.055	0.182	0.192	0.030	0.162	0.093	0.099
Controls?	No	Yes	Yes	Yes	Yes	Yes	Yes

†Non-banned occupations include home production and paid work in non-banned sectors

Standard errors are clustered by age-year. Pre-Ban mean is for children under the age of 14 only.

- No significant overall effect on school attendance; significant drop in unpaid household services (e.g. chores)
- Robust to using other samples, triangular weights, alternate clustering methods; and to including flexible age and time trends, including controls for economic growth and other state/national policies
- No consistent evidence of effects on other age groups, false treatment effects, or impacts of ban on demographics

Results: Narrow Age Ranges

Dependent variable: Any Economic Activity				
	Ages 10-17	Ages 11-16	Ages 12-15	Ages 13-14
	(1)	(2)	(3)	(4)
Under14XPost	0.026***	0.024***	0.019**	0.011
CRVE (age-round)	(0.005)	(0.004)	(0.004)	(0.003)
Bootstrap p-value	0.000	0.006	0.030	0.340
No. of clusters	24	18	12	6
Pre-Ban Mean	0.118	0.138	0.154	0.167
Observations	327,233	241,301	169,995	72,964
R-squared	0.182	0.177	0.160	0.136

- Qualitatively robust to narrowing time range
 - Additional survey round with limited employment information (July 1986 – June 1987)
 - However, employment definitions not consistent with other rounds
 - Effects are smaller and generally not significant

Empirical strategy: Sibling-based effects

Mechanism in model: ban lowers child wages so more children must work

- Implies stronger effects for those with working siblings (pure income effect)
- Sibling work status is endogenous
- Use the age ineligibility of siblings as an *intent to treat*
- Focus on siblings under legal working age (<14) but likely to be working (>9)

Altered differences-in-differences (DID) design

$$Y_{it} = \gamma_0 + \gamma_1 Treat_i + \gamma_2 Post_t + \gamma_3 (Treat_i \times Post_t) + u_{it}$$

- $Treat = 1$ if at least one sibling is between 9 and 14 (exclusive)
- Also includes controls (e.g. sibling and own age FE)

Results: Sibling-based Effects

Sibling Effects of Ban on Child Time Allocation (Ages 10-13)

	Any Economic Activity	Labor Force Participation	Employment in Banned Occup.	Employment in Non-banned Occ.†	Unpaid Economic Activity	Paid Employment
	(1)	(2)	(3)	(4)	(5)	(6)
TreatXPost	0.009*** (0.003)	0.009*** (0.003)	0.001 (0.001)	0.008*** (0.003)	0.007*** (0.003)	0.002 (0.002)
Pre-Ban Mean of Dep. Variable	0.112	0.115	0.009	0.103	0.074	0.038
Observations	158,522	158,522	158,409	158,409	158,522	158,522
R-squared	0.102	0.103	0.014	0.097	0.062	0.051

†Non-banned occupations include home production and paid work in non-banned sectors

Controls: gender, gender of household head, age of household head, urban status, number of adult females, number of male children, number of female children, number of children under 5, number of children ages 6-9, and fixed effects for sibling age, family size, household head's education level, religion, survey round, survey quarter, state. Sample consists of all individuals related to the household head with at least 1 sibling age 25 or younger. Standard errors are clustered by household.

- Negative but not significant effects on school attendance and unpaid household services
- Smaller (but significant) effects on younger children (age 6-9)
- Robust to a number of alternate samples (Additional rounds, Round 42, excluding those with younger “treatment siblings”, etc.)

Empirical strategy: Heterogeneity

National level ban makes reliance on DID assumptions stronger

- Geographical and household-level variation to capture ban *intensity*

Main measures of heterogeneity:

- **Geographical:** *pre-ban* proportion of households in state (district) working primarily in banned industries
- **Household:** education of the household head

Other measures (robustness):

- Probability of detection, staple share of calories, scheduled caste status, child to adult ratio

Results: Heterogeneity

	Dependent variable: Any Economic Activity			
	Geographical Het.: Above-median proportion of HHs in banned industries		Household Heterogeneity: HH Head has less than secondary educ.	
	Overall Effect	Sibling Effect	Overall Effect	Sibling Effect
	(1)	(2)	(3)	(4)
HeterogeneityXUnder14XPost	0.008* (0.004)	0.015** (0.006)	0.016*** (0.005)	0.011** (0.005)
Under14XPost	0.023*** (0.006)	0.002 (0.004)	0.003 (0.002)	-0.001 (0.003)
Total Effect for Het.=1	0.031** (0.004)	0.018*** (0.004)	0.018** (0.006)	0.010*** (0.003)
Age group	10-17	10-13	10-17	10-13
Observations	327,233	175,625	326,754	175,374
R-squared	0.182	0.105	0.189	0.106

- Also includes $Under14 \times Heterogeneity$, $Heterogeneity \times Post$, year FE (collinear with $Post$), state FE (collinear with geographical het.), age FE (collinear with $Under14$), sibling age FE, controls interacted with het. measures
- Robust to including interactions with pre-ban measures of child labor

Wages

Theory predicts that child wages will fall proportionally *more* than adult wages

- DID based on age ineligibility
- Caveat: wage data only available for work outside the home, so selected subsample

Dependent Variable: Log(Real Wage)

	Ages 6-21	Ages 7-20	Ages 8-19	Ages 9-18	Ages 10-17
	(1)	(2)	(3)	(4)	(5)
Under14XPost	-0.078*** (0.023)	-0.076*** (0.024)	-0.070*** (0.025)	-0.065** (0.027)	-0.043 (0.026)
Observations	33,731	30,566	23,648	20,696	14,848
R-squared	0.392	0.378	0.357	0.343	0.313

Wages are trimmed of the top and bottom 1% of values within each round.

Household Welfare

Employment and wage responses not necessarily indicative of household welfare decreases

- Other ways of dealing with lower child wages – could decrease savings, assets, etc.
- DID based on existence of age-ineligible children in household

	Log Expenditure Per Capita (1)	Log Food Expenditure Per Capita (2)	Log Daily Calories Per Capita (3)	(1-Staple Share of Calories) (4)	Asset Index (5)
TreatXPost	-0.012*** (0.002)	-0.011*** (0.002)	-0.008*** (0.001)	-0.002*** (0.001)	-0.011 (0.008)
Obs.	N/A	N/A	N/A	0.292	-0.732
R-squared	222,590	220,342	220,346	220,341	220,526

Each sample is trimmed of the top and bottom 1% of values within each round.

Robustness checks

- Falsification tests
 - False ban ages and dates
 - Effect of ban on demographics
- More flexible age controls
- Economic growth, other national/state policies
- Effects on other ages
- Alternate clustering methods

Summary

Impacts of the ban

- Child labor increases for those under 14 relative to those over 14
—Even in the industries targeted by the ban
- Children with siblings likely affected by the ban increase employment
- Stronger effects for poorer households and those living in areas more exposed to the ban
- Child wages decline relative to adult wages
- Small decreases in consumption and food quality
—Negative welfare implication

Discussion

- Why didn't the 1986 ban work?
 - Policy did not address underlying cause of child labor
 - Broader theme of optimal policy in a world with weak enforcement
 - Behavior at the margin of subsistence can be qualitatively different
- Alternatives to bans
 - Cash transfers, increase returns to and investments in education
[Edmonds and Schady (2012), Edmonds & Shrestha (2013)]

Child Labor Act of 1986

Bangle manufacturing in Bihar

- Public arrests of 4 employers
- Referred to as the “beginning that has to be made somewhere”

(From the *Times of India*, January 1987)

[Return](#)

Ultimatum on U.P. child labour

The Times of India News Service

NEW DELHI, January 16.

RECOVERY of children from locked darkrooms, shamefaced denials of their presence by their employers and prosecution of culprits which are comic strip material, featured what is claimed to be the “beginning that has to be made somewhere” in ending child labour in a hazardous industry.

Four MPs and Mr. P. A. Sangma, the labour minister, made this beginning in Ferozabad, the bangle town close to Agra where an estimated 10,000 children are employed in about 250 units.

Their “inspection”, for which advance notice had been given, enabled the employers to give the children a holiday (wageless perhaps) resulting in the arrest of four employers who had prepared to hide child workers in locked rooms.

minimum wages.

Each child had to move from one end of the shop floor to another over 2,000 times in most of the units in the town while working.

The child labour regulation law forbids employment of children in mines, factories and hazardous units. Bangle-making falls in the last category.

Surprisingly, the state administration which is required to enforce the law seems apathetic. The MPs were told that there were less than 50 prosecutions in a year and the maximum punishment in any proven case was a fine of Rs. 200.

Under the amended law anyone from the public can file complaints and the minimum punishment for a second offence is six months in jail.

Mr. Sangma estimates that 17 million children are employed in the organised sector. “We have to make a beginning somewhere and we started it

in Ferozabad which comes in for dishonourable mention in any forum discussing the subject at national or international level.

The problem, as Ms. Ela Bhatt, one of the MPs and social worker mentioned is that commitment at Central level to any progressive reform does not percolate down the line. State administrations are lax and there is resistance at the local level. This would have to be countered.

She acknowledged that the arrest of four employers for offences under the child labour law would augur well for its implementation.

The minister and the MPs had a meeting with the employers. In the face of the two-month ultimatum, they sought reprieve for six months. But they had little to say in defence of brazen violation of law, declaring a holiday when informed of the team’s visit and trying to lock the children in the darkroom.

Descriptive Statistics

[Return](#)

	Rounds 38, 43, and 50			
	1983		1987-8, 1993-4	
	Ages 10-13	Ages 14-17	Ages 10-13	Ages 14-17
Age	11.4	15.3	11.4	15.4
Male	0.529	0.528	0.535	0.539
In School	0.604	0.430	0.733	0.549
Any Work	0.118	0.296	0.068	0.223
Labor Force Participation	0.121	0.319	0.070	0.242
Domestic Work	0.124	0.214	0.067	0.166
Number of observations	63743	48481	118101	96908
<i>Among working children</i>				
Work in household production	0.654	0.565	0.625	0.573
Paid work	0.346	0.435	0.375	0.427
Number of observations	7511	14361	8049	21605
<i>Among children for pay</i>				
Work in banned industry	0.252	0.313	0.334	0.382
Work in non-banned industry	0.749	0.687	0.666	0.618
Real Daily Wages (1982 Rupees)	4.11	5.53	5.32	7.52
Number of observations	2000	4872	1404	4617

Results: Overall Effects on Time Allocation

All employment/expenditure rounds (1983, 1987-8, 1989-90, 1990-1, 1992,1993, 1993-4)

Overall Effects of Ban on Child Time Allocation (Ages 10-17)

	Any Economic Activity (1)	Any Economic Activity (2)	Labor Force Participation (3)	Unpaid Economic Activity (4)	Paid Employment (5)	School Attendance (6)	Unpaid Household Services (7)
Under14XPost	0.025 (0.036)	0.028*** (0.005)	0.032*** (0.005)	0.009** (0.004)	0.019*** (0.002)	0.002 (0.006)	-0.000 (0.004)
Pre-Ban Mean of							
Dep. Variable	0.118	0.118	0.121	0.077	0.041	0.604	0.124
Observations	424,584	424,584	424,584	424,584	424,584	424,584	424,584
R-squared	0.054	0.177	0.186	0.088	0.095	0.289	0.194
Controls?	No	Yes	Yes	Yes	Yes	Yes	Yes

Controls: gender, gender of household head, age of household head, urban status, number of adult females, number of male children, number of female children, number of children under 5, number of children ages 6-9, and fixed effects for age, family size, household head's education level, survey round, survey quarter, district. Sample consists of all individuals related to the household head aged 10-17. Standard errors are clustered by age-round. Pre-Ban mean is for children under the age of 14 only.

[Return](#)

Robustness: Triangular weights

Dependent Variable: Any Economic Activity		
	Overall Effects	Sibling Effects
	(1)	(2)
TreatXPost	0.023*** (0.004)	0.007* (0.004)
Observations	327,233	116,248
R-squared	0.172	0.089

Each regression is includes triangular weights which give more weight to children closer to the cutoff age of 13/14 (or with a sibling closer to the age cutoff).

Return

Robustness: Seasonality

See below for NSS rounds used

Dependent Variable: Any Economic Activity				
	July-Dec. 1986 vs. July-Dec. 1987*		July-Dec. 1987 vs. Jan-June 1988	
	Overall Effects (Ages 10-17)	Sibling Effects (Ages 10-13)	Overall Effects (Ages 10-17)	Sibling Effects (Ages 10-13)
	(1)	(2)	(1)	(2)
TreatXPost	0.023*** (0.006)	0.027*** (0.003)	-0.001 (0.005)	-0.002 (0.004)
Observations	105,371	95,074	117,808	56,976
R-squared	0.167	0.171	0.170	0.097

*Note that the work status is asked of all children in 1987 but only of children not enrolled in school in 1986.

[Return](#)

Results: Sibling-based Effects

Sibling Effects of Ban on Child Time Allocation (Ages 6-9)

	Any Work (1)	Labor Force Participation (2)	Work in Banned Sectors (3)	Work in Non- Banned Sectors* (4)	Work in Household Production (5)	Paid Work (6)	School (7)	Domestic Work (8)
TreatXPost	0.004*** (0.001)	0.004*** (0.001)	0.000 (0.000)	0.004*** (0.001)	0.004*** (0.001)	0.000 (0.001)	-0.030*** (0.005)	0.003** (0.001)
Pre-Ban Mean of Dep. Variable	0.016	0.016	0.001	0.015	0.013	0.003	0.576	0.022
Observations	179,399	179,399	179,363	179,363	179,399	179,399	179,399	179,399
R-squared	0.024	0.024	0.002	0.024	0.019	0.007	0.323	0.024

Return

Robustness: Alternate Samples – Sibling Effects

See below for NSS rounds used

Dependent Variable: Any Economic Activity				
	All Employment + Expenditure Rounds (1)	42 nd (Education) Round (2)	Excluding Children with <i>Younger</i> “Treatment” Siblings (3)	Siblings Ages 10-17 Only (4)
TreatXPost	0.009*** (0.003)	0.005 (0.005)	0.020*** (0.003)	0.007** (0.003)
Pre-Ban Mean	0.112	0.055	0.104	0.111
Observations	205,217	42,739	124,206	149,881
R-squared	0.097	0.086	0.096	0.103

Return

Robustness: Operation Blackboard & State Labor Reforms

Dependent variable: Any Economic Activity				
	States with Below Median OB Intensity		States with No Change in Besley-Burgess Labor Classifications (1983-1994)	
	Overall Effects	Sibling Effects	Overall Effects	Sibling Effects
	(1)	(2)	(3)	(4)
TreatXPost	0.026*** (0.004)	0.011*** (0.004)	0.030*** (0.005)	0.014*** (0.003)
Pre-Ban Mean of				
Dep. Var.	0.086	0.083	0.096	0.092
Observations	139,790	66,521	267,464	128,802
R-squared	0.173	0.070	0.169	0.080

Return

Results: Geographic Heterogeneity (1)

Geographic Heterogeneity in **Overall** Effects

Dependent Variable: Any Economic Activity

	Importance		Labor Market Frictions (Pre-Ban Wage Differential)		Probability of Detection	
	Above Median	Below Median	Above Median	Below Median	Above Median	Below Median
	(1)	(2)	(3)	(4)	(5)	(6)
Under14XPost	0.031***	0.023***	0.031***	0.022***	0.031***	0.017***
	(0.004)	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)
p-value for test of difference	0.067		0.105		0.000	
Pre-Ban Mean	0.101	0.131	0.095	0.140	0.099	0.141
Obs.	141,969	185,264	159,224	168,009	124,981	173,376
R-squared	0.185	0.181	0.175	0.184	0.176	0.186

- Bolded coefficients are significantly different at the 10% level

Return

Results: Geographic Heterogeneity (2)

Geographic Heterogeneity in **Sibling** Effects

Dependent Variable: Any Economic Activity

	Importance		Labor Market Frictions (Pre-Ban Wage Differential)		Probability of Detection	
	Above Median	Below Median	Above Median	Below Median	Above Median	Below Median
	(1)	(2)	(3)	(4)	(5)	(6)
TreatXPost	0.017***	0.002	0.011***	0.006	0.019***	0.002
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
p-value for test of difference	0.020		.504		0.009	
Pre-Ban Mean	0.096	0.125	0.090	0.134	0.094	0.134
Obs.	67,208	91,314	77,445	81,077	60,409	84,589
R-squared	0.096	0.106	0.081	0.111	0.081	0.110

- Bolded coefficients are significantly different at the 10% level

Return

Results: Household Heterogeneity (1)

Household Heterogeneity in **Overall** Effects

Dependent Variable: Any Economic Activity

	Head Education		Scheduled Caste		Staple Share of Calories		Child to Adult Ratio	
	Less Than Secondary Schooling (1)	At Least Secondary Schooling (2)	Scheduled Castes (3)	Non Scheduled Castes (4)	Above Median (5)	Below Median (6)	Above Median (7)	Below Median (8)
Under14XPost	0.018*** (0.006)	0.003 (0.002)	0.048*** (0.013)	0.025*** (0.004)	0.022*** (0.006)	0.015*** (0.004)	0.029*** (0.006)	0.019*** (0.005)
P-value of test for difference	0.003		0.021		0.155		0.038	
Pre-Ban Mean	0.132	0.011	0.211	0.108	0.161	0.078	0.122	0.105
Obs.	272,774	53,980	32,948	294,275	132,328	186,242	225,876	101,221
R-sq.	0.179	0.037	0.271	0.174	0.203	0.155	0.188	0.175

- Bolded coefficients are significantly different at the 10% level

[Return](#)

Results: Household Heterogeneity (2)

Household Heterogeneity in **Sibling** Effects

Dependent Variable: Any Economic Activity

	Head Education		Scheduled Caste		Staple Share of Calories		Child to Adult Ratio	
	Less Than Secondary Schooling	At Least Secondary Schooling	Scheduled Castes	Non Scheduled Castes	Above Median	Below Median	Above Median	Below Median
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TreatXPost	0.009** (0.004)	-0.002 (0.003)	0.012 (0.012)	0.008*** (0.003)	0.013** (0.005)	0.001 (0.004)	0.008** (0.004)	0.015** (0.007)
P-value of test for difference	0.022		0.773		0.053		0.316	
Pre-Ban Mean	0.126	0.010	0.201	0.103	0.154	0.075	0.117	0.097
Obs.	133,153	25,155	16,021	142,494	66,576	87,683	124,295	34,180
R-sq.	0.100	0.014	0.180	0.095	0.119	0.075	0.106	0.090

- Bolded coefficients are significantly different at the 10% level

[Return](#)

Robustness: Falsification Tests (1)

Dependent Variable: Any Economic Activity					
	Sibling Effects			Overall Effects	Sibling Effects
	False Ban Age			False Ban Date	
	Eligible Age = 5	Eligible Age = 10	Eligible Age = 18	Rounds 43 vs. 50	
	(3)	(4)	(5)	(6)	(7)
TreatXPost	-0.001 (0.004)	-0.003 (0.004)	0.004 (0.004)	0.006 (0.005)	-0.000 (0.003)
Ages	10-13	10-13	10-13	10-17	10-13
Obs.	89,565	89,565	87,899	215,009	102,894
R-squared	0.102	0.102	0.102	0.172	0.091

Return

Robustness: Falsification Tests (2)

Falsification: Effect of Ban on Demographics

	Male (1)	Household Size (2)	Head is Male (3)	Head Age (4)	Head has at least Sec. Educ. (5)	Hindu Household (6)	Number of Females (7)	Number of Children (8)
TreatXPost	-0.004 (0.003)	-0.019*** (0.005)	0.000 (0.001)	-0.107* (0.058)	-0.000 (0.002)	-0.003 (0.002)	0.007 (0.006)	-0.004 (0.004)
Pre-Ban Mean	0.529	6.268	0.914	44.611	0.127	0.783	1.518	3.203
Obs.	327,233	230,013	230,013	230,013	230,013	230,013	230,013	230,013
R-squared	0.268	0.904	0.236	0.298	0.145	0.208	0.621	0.845

- No change in estimated impact of the ban when interactions between demographic variables and “Post” are added as controls

Return

Robustness: Flexible age controls

Dependent Variable: Any Economic Activity

	Overall Effects		Sibling Effects	
	AgeXRound FE, Age ² XRound FE (1)	All Age Interactions (2)	AgeXRound FE, Age ² XRound FE (3)	All Age Interactions (4)
TreatXPost	0.013*** (0.004)	0.030 (0.020)	0.005 (0.003)	0.007* (0.004)
Observations	327,233	327,233	159,171	159,171
R-squared	0.182	0.182	0.103	0.103

"All Age Interactions": age, age squared, age cubed, age*post, age sq.*post, age cub.*post, age*under14, age sq.*post, age cub.*post, age*post*under14, age*sq.*post*under14, age cub.*post*under14.

- Column 2: p-value = 0.144 ; Column 3: p-value = 0.137

Return

Robustness: Economic growth & other state/national policies

Dependent Variable: Any Economic Activity				
	State X Round FE		State GDP Index X Under14	
	Overall Effects	Sibling Effects	Overall Effects	Sibling Effects
	(1)	(2)	(3)	(4)
TreatXPost	0.027***	0.008**	0.025***	0.009**
	(0.005)	(0.003)	(0.006)	(0.004)
Observations	327,233	158,522	325,408	157,621
R-squared	0.184	0.105	0.182	0.101

- No pertinent national labor laws passed between 1984-1986
- National Policy on Education in 1986 but did **not** include language about compulsory education
- Effects still strong in states with low Operation Blackboard intensity (Chin 2005) and excluding states with any changes in state-level labor classification (Besley & Burgess 2004)

Return

Robustness: Effects on other ages

Dependent Variable: Any Economic Activity						
	Ages 14-17	Ages 18-25	Ages 26-35	Ages 36-45	Ages 46-55	Ages 56+
	(1)	(2)	(3)	(4)	(5)	(7)
TreatXPost	-0.007	-0.003	-0.001	-0.009**	-0.003	-0.005
	(0.005)	(0.004)	(0.003)	(0.003)	(0.004)	(0.005)
Mean of Dep. Var.	0.293	0.511	0.645	0.676	0.638	0.383
Observations	135,954	258,716	253,116	185,328	122,158	116,877
R-squared	0.195	0.348	0.502	0.509	0.505	0.399

Return

Robustness: Alternate clustering methods

Dependent Variable: Any Economic Activity

	Standard Cluster by Age-Round (1)	Standard Cluster by Age (2)	Wild Cluster Bootstrap by Age (3)	Standard Cluster by Under 14-Post (4)	Wild Cluster Bootstrap by Under 14-Post (5)
Under14XPost	0.026*** (0.005)	0.026*** (0.007)	0.026** N/A	0.026*** (0.000)	0.026 N/A
No. of clusters	24	8	8	4	4
p-value	0.000	0.005	0.010	0.000	0.176
Observations	327,233	327,233	327,233	327,233	327,233

Columns (3) and (6): Wild cluster bootstrap is implemented as in Cameron, Gelbach and Miller (2008) but using the 6-point distribution weights presented in Webb (2012) due to the low number of clusters.

Return

Results: Overall Effects on Time Allocation

Overall Effects of Ban on Child Time Allocation (Ages 10-17)

	Any Economic Activity (1)	Any Economic Activity (2)	Labor Force Participation (3)	Unpaid Economic Activity (4)	Paid Employment (5)	School Attendance (6)	Unpaid Household Services (7)
Under14XPost	0.004 (0.029)	0.003 (0.004)	0.006 (0.004)	-0.002 (0.004)	0.006** (0.002)	-0.017*** (0.004)	-0.001 (0.004)
Pre-Ban Mean of							
Dep. Variable	0.059	0.059	0.065	0.034	0.024	0.743	0.093
Observations	90,248	90,248	90,248	90,248	90,248	90,248	90,248
R-squared	0.045	0.141	0.148	0.086	0.082	0.248	0.212
Controls?	No	Yes	Yes	Yes	Yes	Yes	Yes

Controls: gender, gender of household head, age of household head, urban status, number of adult females, number of male children, number of female children, number of children under 5, number of children ages 6-9, and fixed effects for age, family size, household head's education level, survey round, survey quarter, district. Sample consists of all individuals related to the household head aged 10-17. Standard errors are clustered by age-round. Pre-Ban mean is for children under the age of 14 only.

- Not simply due to seasonality

Results: Rural/Urban Differences

Dependent Variable: Any Economic Activity				
	Overall Effect (Ages 10-17)		Sibling Effect (Ages 10-13)	
	Rural	Urban	Rural	Urban
	(1)	(2)	(3)	(4)
TreatXPost	0.031*** (0.006)	0.018*** (0.004)	0.008** (0.004)	0.003 (0.004)
Mean of Dep. Var.	0.148	0.053	0.142	0.049
Observations	215,670	111,563	106,545	51,977
R-squared	0.191	0.146	0.110	0.066

Exposure: 1983 proportion of households in area whose primary industry is banned (as of 1986)

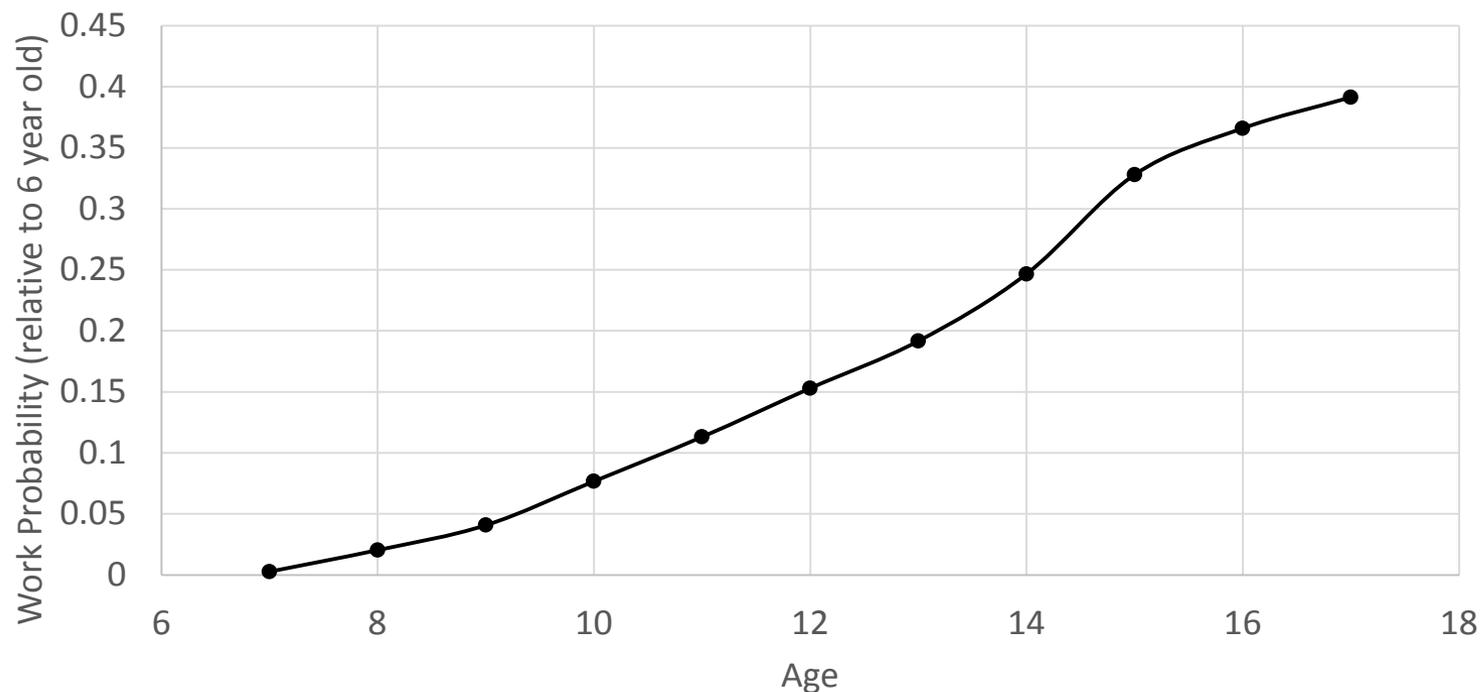
Results: Excluding 1987-8 round

Dependent Variable: Any Economic Activity				
	Baseline Results		Excluding 1987-88	
	Overall Effects	Sibling Effects	Overall Effects	Sibling Effects
	(1)	(2)	(3)	(4)
TreatXPost	0.026*** (0.005)	0.009*** (0.003)	0.030*** (0.006)	0.008** (0.003)
Observations	327,233	158,522	209,425	101,796
R-squared	0.182	0.102	0.190	0.106

Employment probabilities within families

Pre-Ban Age Gradient for Work (within-family)

[Values are work probabilities relative to 6 year olds]



Results: Geographic Heterogeneity

Round 42: July 1986 – June 1987

District-level heterogeneity in exposure				
Dependent variable: Any Work				
	Overall Effect (Ages 10-17)		Sibling Effect (Ages 10-13)	
	Above Median (1)	Below Median (2)	Above Median (3)	Below Median (4)
TreatXPost	0.011* (0.006)	-0.007 (0.006)	-0.001 (0.006)	0.012* (0.007)
Mean of Dep.				
Var.	0.059	0.058	0.055	0.056
Observations	51,773	38,475	24,299	18,440
R-squared	0.144	0.139	0.090	0.086

Exposure: 1983 proportion of households in area whose primary industry is banned (as of 1986)

Results: Household Heterogeneity (1)

Round 42: July 1986 – June 1987

Household Heterogeneity in Overall Effects

Dependent Variable: Any Work

	Head Education		Scheduled Caste		Child to Adult Ratio	
	Less Than Secondary Schooling (1)	At Least Secondary Schooling (2)	Scheduled Castes (3)	Non Scheduled Castes (4)	Above Median (7)	Below Median (8)
Under14XPost	0.004 (0.005)	-0.007* (0.004)	0.022 (0.015)	0.001 (0.004)	0.006 (0.005)	-0.002 (0.007)
Pre-Ban Mean of Dep. Var.	0.065	0.009	0.094	0.055	0.063	0.045
Observations	72,563	13,752	8,634	81,614	62,759	27,468
R-squared	0.139	0.083	0.251	0.135	0.151	0.139

Results: Household Heterogeneity (2)

Round 42: July 1986 – June 1987

Household Heterogeneity in Sibling-based Effects

Dependent Variable: Any Work

	Head Education		Scheduled Caste		Child to Adult Ratio	
	Less Than Secondary Schooling (1)	At Least Secondary Schooling (2)	Scheduled Castes (3)	Non Scheduled Castes (4)	Above Median (7)	Below Median (8)
TreatXPost	0.007 (0.005)	0.003 (0.005)	0.006 (0.011)	0.003 (0.005)	0.005 (0.005)	0.008 (0.009)
Pre-Ban Mean of Dep. Var.	0.061	0.009	0.077	0.048	0.059	0.044
Observations	34,330	6,563	10,391	32,348	33,131	9,606
R-squared	0.086	0.103	0.141	0.086	0.093	0.119

Model: One sector

Basu & Van (1998), Basu (2005)

Setup: Firms

- Two types of labor: adult (L^A) and child (L^C)
 - Substitution axiom: $L^C = \gamma L^A, \gamma < 1$
- Production: $f(L^A + \gamma L^C)$
- Wages: adult wage (w), child wage (w^C)

Model: One sector

Setup: Households

- N households (1 adult, m children), each with 1 unit of labor/person
 - Adults supply 1 unit of labor inelastically
- “Luxury Axiom”: supply child labor only if adult wage is below subsistence level, s
- Child labor supply curve

$$S^C(w) = \begin{cases} 0 & \text{if } w \geq s \text{ or } w^C \leq 0 \\ \min \left\{ m, \frac{s - w}{w^C} \right\} & \text{otherwise} \end{cases}$$

Model: One sector

Setup: Child labor ban

- For each child found employed, fine D is levied on the employer
- Imperfect enforcement: child labor detected with probability p
- Child wages reduce by pD
— pD reflects the enforcement of the ban

Model: One sector

Equilibrium

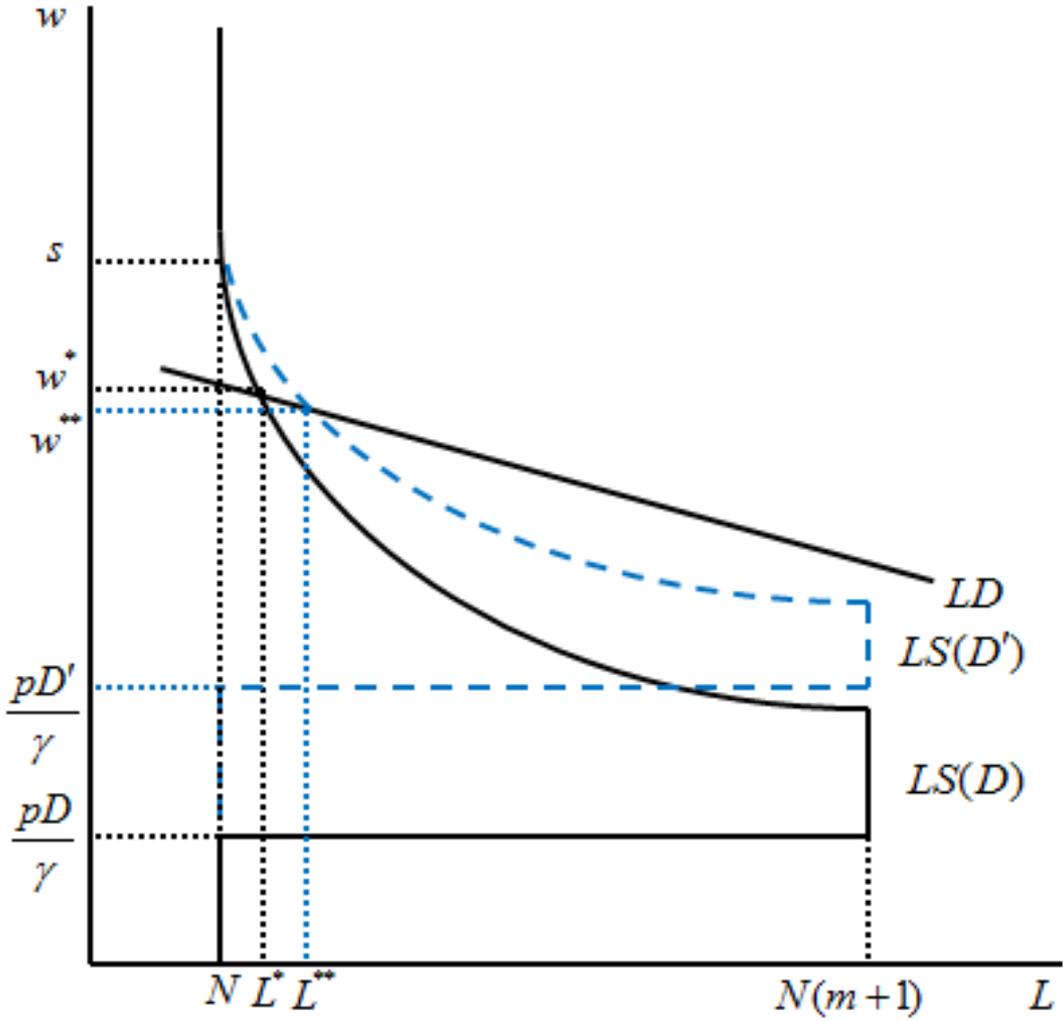
- Start with an equilibrium where there is at least some child labor and $w^C = \gamma w - pD$
 - Can consider other cases when $w^C > \gamma w - pD$, but leads to similar results
- In equilibrium, the child labor supply curve is

$$S^C(w) = \begin{cases} 0 & \text{if } w \geq s \text{ or } \gamma w - pD \leq 0 \\ \min \left\{ m, \frac{s - w}{\gamma w - pD} \right\} & \text{otherwise} \end{cases}$$

What is the impact of increasing expected fines?

One Sector: Impact of child labor ban

Basu (2005)



Model: Two sectors, complete mobility

Edmonds & Shrestha (2012)

- Two sectors: manufacturing (ban), agriculture
- Complete wage equalization across sectors pre-ban
- Impact of ban: labor reallocation
 - Cost of hiring child labor rises in manufacturing; child wages fall
 - Children flow from manufacturing to agriculture
 - Adults flow from agriculture to manufacturing
 - No overall effect on levels of child labor (no increase *or* decrease)

Model: Two sectors, no (or partial) mobility

- Barriers to entry into manufacturing
 - Higher wages in manufacturing pre-ban
- Ban lowers child wages in manufacturing
- Higher levels of child labor overall
 - Though unclear in which sector or both
 - Depends on household structure, barriers to entry

Model: Summary

- Wages fall by more for children relative to adults
- Effects on child employment depend on the state of the labor market
 - No frictions, no overall effect (reallocation only)
 - Child labor could increase in both sectors if labor mobility is restricted (sectoral frictions)