Child labor and schooling in a globalizing world:

Some evidence from urban India*

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Abstract: Trade influences child time allocation in developing countries through its effects on the returns to education, labor demand, and poverty. We examine how India's dramatic 1991 trade liberalization influenced child labor and schooling in urban areas of India that differ in the extent to which employment lost tariff protection. In general, urban India experienced large increases in schooling and decreases in child labor over the 1990s. We find that these improvements are attenuated in Indian cities where employment experienced larger reductions in tariff protection. Girls are particularly affected. We argue that the observed changes in child time allocation are consistent with differential declines in poverty across regions, but changes in the economic opportunities of children might also play a role in our findings.

Keywords: Schooling, Child Labor, Trade Liberalization, Globalization, India
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1. Introduction

Economic theory predicts that international trade influences child labor and schooling in developing countries through its impact on poverty, child labor demand, and the returns to education. Empirically, children work less in countries that trade more, reflecting higher living standards in these economies (Edmonds and Pavcnik 2006). Several micro-level studies find support for the important role changes in the living standards of poor households play in the connection between trade and child labor (Edmonds and Pavcnik (2005), Edmonds, Pavcnik, Topalova (2007), Dammert (2008)). However, labor demand and changes in returns to education also matter.[1] This literature in general infers the effects of globalization from changes in product prices, trade flows, or employment opportunities rather than changes in trade policy.

In this paper we overcome this shortcoming and examine how India's 1991 trade liberalization influenced child labor and schooling in urban India. India's trade reforms contributed to poverty reduction in the 1990s via lower prices, improved quality and variety of goods and inputs, and increased specialization of production. The benefits from trade liberalization were not evenly distributed across rural India (Topalova (2005)). Poverty declined less in areas where a large fraction of the population was employed in previously protected industries.[2] In previous work (Edmonds, Pavcnik and Topalova 2007, EPT from now on), we find that these attenuated declines in poverty diminished the improvements in schooling and child labor in rural India.

The present study considers the impact of India's 1991 trade reforms on child labor and schooling in Indian cities. Cities differ in the industrial composition of employment prior to the trade reforms. We relate the resulting heterogeneity in the exposure to the reforms to variation in child labor and schooling improvements over the 1990s in urban India. We find smaller improvements in schooling and smaller declines in child labor in Indian cities where employment experienced larger declines in tariff protection. Our findings for urban India are similar to EPT's findings for rural areas. As in rural India, the observed changes in child time allocation are consistent with differential declines in poverty across regions, but changes in the economic opportunities of children might also play a role. One interesting difference is that lower tariffs were associated with more idleness in rural areas (i.e. neither working nor attending school). In urban areas, we document a relative increase in child

[1] Kruger (2007) documents an increase in child labor and a decline in schooling in coffee-growing regions of Brazil during a temporary boom in coffee exports. Munshi and Rosenzweig (2005) and Shastry (2008) show that the proliferation of jobs requiring English proficiency and the expansion of service exports have boosted school enrollment in Indian cities with a comparative advantage in speaking English.

[2] These adjustment costs are not unique to India (see Goldberg and Pavcnik (2007)).

labor. Idleness is rare in urban India, perhaps because of more employment opportunities for children in cities.

2. Background

2.1 India's 1991 trade liberalization

India launched a liberalization of its economy in 1991 as part of an IMF adjustment program. Trade liberalization was an important part of this reform. The reform encompassed reductions in tariffs and non-tariff barriers (NTBs). It contributed to India's increase in merchandise trade from around 10 percent of GDP in 1986/87 to about 19 percent in the late 1990s.

Several aspects of India's trade liberalization facilitate the identification of its effects.[3] First, India's reforms came as a surprise. Household unlikely anticipated the reforms in the late 1980s. Second, the reform induced large tariff changes: average tariffs fell from over 90% in 1987 to about 30% in 1997. Third, the reform substantially lowered the dispersion of tariffs across industries. This produced substantive variation in tariff declines across industries. The 1991 reforms followed 35 years of trade policy paralysis. In many industries, tariffs in 1991 were similar to those set in India's second five year plan that established Indian trade policy in the 1950s (Gang and Pandey (1996)) and tariffs did not reflect India's current economic environment. Topalova (2007) documents that tariff changes were not correlated with pre-reform industry characteristics including productivity, industry size, and skill intensity.

Tariff changes occur at the national level but urban areas differ in the extent to which they are affected by national-level policy changes. The distribution of the benefits and costs of tariff reduction depends on the types of goods consumed and the industrial composition of employment locally. Urban areas with few protected industries or industries that are excluded from the 1991 agreement face few adjustment costs but perceive the benefits of lower tariffs. Urban areas with employment concentrated in the hundreds of industries experiencing substantive reductions in tariffs face adjustment costs as workers might experience wage reductions, job loss, and transitions away from industries that cannot compete internationally.

We measure an urban region's exposure to the national tariff changes based on its industrial composition of employment immediately before the reforms and each industry's final output tariff change. Specifically, we construct a time-varying, region specific measure of tariff protection. The region tariff in

[3] Our analysis focuses on tariff measures alone, but NTBs also declined (Topalova (2005), Hasan et. al. (2007)). Tariffs are easier to measure and are available at a substantially more detailed level than NTBs. Because NTBs were also reduced during this period (albeit with a lag) and declines may be correlated with changes in tariffs, we may misattribute to tariffs some of the effect of NTB declines.

region r at time t is $tariff_{r,t} = \sum_i \omega_{ir} * tariff_{i,t}$. $\omega_{i,r} \equiv Emp_{i,r} \Big/ \sum_i Emp_{i,r}$ is the employment weight computed from employment $Emp_{i,r}$ in industry i in region r according to India's 1991 population census. $tariff_{i,t}$ is the national level tariff at time t of industry i. This measure of regional tariff protection, which we refer to as "tariff," assigns zero tariffs to all non-traded industries (such as services, wholesale and retail trade, transportation, etc.). Its magnitude is influenced by the prevalence of non-traded sectors in the region. We also construct a measure of region tariffs that uses only the region's employment in traded sectors in the construction of the employment weights. We call this the "traded tariff." Traded tariff, unlike tariff, does not depend on the relative size of the non-traded sector in each region. Our analysis below relies on both of these measures of exposure to tariff reform.

2.2 The 1991 tariff reform and child time allocation

Time allocation data comes from the 43rd (1987/88) and 55th (1999/00) urban rounds of the National Sample Surveys (NSS), a repeated cross-sectional survey in which we can match urban regions.[4] Our sample includes over 49,000 children aged 10-14. We construct indicators for whether a child attends school or works as a principal activity. Work encompasses *market* work (work for a wage or for the household farm or enterprise) and *domestic* work (attending domestic duties, sewing, tailoring, weaving, etc. for household use).

Schooling increased and child labor declined over the period of study. 73 percent of children 10-14 attended school in 1983, increasing to 76 percent in 1988 and 85 percent by 2000. Work without attending school also declined in prevalence from 17 to 7 percent of children 10-14 between 1983 and 2000. Girls experienced larger changes than boys. Female school attendance rates increased from 67 to 82 percent and work without school fell from nearly 1 in 4 to less than 1 in 10 between 1983 and 2000. Much of the decline in child labor for girls stemmed from a decline in domestic work. In 1983, the fraction of girls participating in market work was low (5 percent), just half the participation rate of boys. The label "idle" refers to children that neither work nor attend school. We cannot identify whether idleness reflects measurement error or true idle status. Compared to rural India, idleness in urban area is rarer and static over time. We next examine heterogeneity in these time trends associated with tariff changes.

3. Empirical Framework

[4] India is divided into 77 regions. A region is a collection of several districts with similar agro-climatic conditions. We match regions between rounds of the NSS, creating a region level panel. In our rural paper, we focus on Indian districts rather than regions. However, the urban data is only representative at the region, rather than district level, thus the unit of analysis is the region.

In EPT (2007), we develop a simple model to illustrate how trade policy changes can affect schooling decisions. As mechanisms, we emphasize tariffs' impact on household income in poor households where school attendance is not universal, the potential economic contribution of children, and the returns to education. In our empirical work, we first examine the net effect of tariffs on school attendance, then the reason for the observed net effect.

We correlate changes in schooling with changes in average region tariffs. We use the detailed survey data to control for changes in individual correlates, but fundamentally the variation used for identification of the effects of tariff changes on child labor/schooling is based on the region panel dimension of our data.[5] Our baseline regression specification is:

$$y_{jhrt} = \beta_0 + \beta_1 Tariff_{rt} + \pi\left(A_{jt}, G_{jt}\right) + \alpha_1 H_{ht} + \tau_t + \lambda_r + \varepsilon_{jhrt}, \quad (1)$$

where subscript *j* denotes a child, *h* a household, *r* a region and *t* a survey round. y_{jhrt} is an indicator for school attendance or child labor, $Tariff_{rt}$ is the measure of region tariff, and $\pi\left(A_{jt}, G_{jt}\right)$ is a third order polynomial in the child's age, a gender indicator and their interactions. Vector H_{ht} controls for household characteristics such as caste, religion, the head's gender, age, literacy and education. We control for time-invariant region characteristics through region fixed effects, λ_r . A post-reform indicator, τ_t , captures economy-wide changes. This approach cannot quantify the overall effect of trade on school attendance in India. It only identifies differential effects across regions that vary in their tariff change. In treating the region as the relevant unit of observation, we rely on the limited labor mobility evident within India (Munshi and Rosenzweig (2005), Topalova (2005)).

A positive value of the coefficient of interest, β_1 , implies that declines in tariffs (freer trade) are associated with declines in schooling relative to regions experiencing smaller declines in protection. This coefficient is identified in the absence of region-specific time-varying trends in schooling correlated with tariffs. One potential source of bias is that regions with more employment in non-traded sectors have a smaller change in tariff than regions with less employment in non-traded sectors. Bias could come from region-specific time trends in schooling that are correlated with the size of the non-traded sector. The composition of employment in traded sectors is not influenced mechanically by the size of the non-traded sector. We can address bias from the size of the non-traded sector by instrumenting for the tariff with the traded tariff. The traded tariff is correlated with the tariff but does not vary mechanically with the size of the non-traded sector.[6]

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[5] Data on children is a repeated cross-section. We observe the same regions over time.

[6] Similarly to EPT (2007), we also perform the analysis by allowing for time-varying trends of various pre-reform conditions in a region such as broad industrial

3.1. Schooling improvements are attenuated in areas loosing protection

There are large improvements in schooling in India during the period of our study. These improvements are smaller in regions with a high concentration of industries losing tariff protection. Table 1 presents the basic results from estimating equation (1). The first column contains OLS estimates. Column 2 contains reduced forms. We focus our discussion on the IV results in column 3. Tariffs decline, so a positive coefficient implies a decline in schooling with the 1991 reforms relative to regions with no loss in tariff protection. The average region experiences a 14.2 percentage point tariff decline. Column 3 implies that school attendance is attenuated by 8 percentage points in regions with the average tariff change relative to regions with no change.[7] This is four times the attenuation in schooling found in rural areas (EPT (2007)).

This attenuation of schooling does not appear to be attributable to pre-existing time trends in school attendance. In column 4, we perform a falsification test, mimicking the approach of column 3 on data from before the reform only. We assign 1987 tariffs to 1983 (which is treated as a pre-reform round) and 1997 tariffs to 1987 data (which is treated as a post reform round). Tariff changes do not appear to be correlated with pre-reform time trends in education. Obviously, directly controlling for pre-existing regional trends in school attendance (as in column 5) has little influence on our results.

Many other policy and economic changes occur during this time period. They could bias our findings if the time and regional variation in these policies are correlated with our traded tariff measure, i.e. the interaction of industrial composition of traded sectors in regions and the industry tariff change. Given the detachment of tariff levels in India in the late 1980s from India's economic environment, industry differences in tariff changes do not correlate with other economic and policy changes. Thus, the interaction of tariff changes with the industrial composition of employment in traded sectors in a region in our traded tariff is uncorrelated with most other economic and policy changes during our period of study. In an unpublished appendix available on our website, we show that the basic result in column 3 of table 1 is robust to controls for changes in other aspects of economic policy such as delicensing, liberalization of FDI entry, financial development, and export growth.

3.2. Child labor declines are smaller in areas loosing protection

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composition, caste composition, share of literate population and state labor laws. However, falsification exercises, using data for earlier periods, suggest that latent time trends do not appear to be a concern in urban India (unlike rural India). Thus, we only report the findings for the simplified baseline specification in this paper.

[7] A child in a household where the head has completed primary education is 23 percentage points more likely to attend school than a child in a household where head has no education and is illiterate. The magnitude of the effect of tariffs is about a third of this magnitude (in absolute value).

The probability a child reports working or working without attending school declines more in areas facing smaller declines in protection. Table 2 presents the results of our preferred specification (equation 1, instrumenting with traded tariffs) for different work categories (the dependent variable is noted in the column heading). Table 2 contains 3 panels with boys and girls combined, then separate. A tariff decline is a negative number. A negative coefficient in table 2 implies that participation rates increase in communities with larger tariff declines relative to those facing smaller changes.

A child in a region that experienced no tariff change was 6.5 percentage points less likely to work than a child in a city experiencing the average tariff change. The time allocation of girls seems to be more affected by tariff changes than that of boys. Relative declines in schooling are larger for girls and they appear to move into both market and domestic work while boys become relatively more engaged in market work.

4. Discussion of results

Why are schooling and child labor improvements attenuated by the loss of tariff protection? Child time allocation changes in table 2 are consistent with diminished declines in poverty as an explanation for our findings, but the data are also consistent with a role for changes in employment opportunities of children.

Poverty affects child labor and schooling when families are liquidity-constrained by raising the marginal utility of income and worsening liquidity constraints. Children help their families cope with poverty by working and avoiding schooling costs. Declines in schooling and increases in child labour observed in urban India in table 2 could thus be driven by changes in the marginal utility of income. The avoidance of schooling costs can explain why declines in schooling (column 1, table 2) are bigger than increases in work without school (work only in column 3, table 2) although the rise in "idleness" is not statistically significant. The fact that changes in schooling and child labor in response to tariffs are larger for girls than boys is also consistent with poverty driving our findings. A standard finding in the child labor literature is that female time allocation is more sensitive to living standards than male, because families often prioritize the education of boys.

Topalova (2005) directly examines the link between tariff reductions and poverty across urban Indian regions. Cities with employment in industries losing protection could face job loss, wage reductions, and diminished income to fixed assets relative to areas that only benefit from lower tariffs. The data suggest diminished relative wage premiums for workers in urban manufacturing and mining industries with larger tariff declines. Topalova also finds attenuated declines in poverty in urban regions of India with greater tariff declines. This relationship is less robust and smaller in magnitude in urban relative to rural areas, but urban-rural differences are not statistically

significant. The smaller poverty changes in urban areas could reflect that poverty is lower in urban India relative to rural India.

The data do not suggest that declines in the returns to education can explain our results. The skill intensity of an industry is not correlated with its tariff change (Topalova (2007)), and the gap in per capita expenditure between families with and without educated heads does not decline with tariff reductions. This evidence is inconsistent with declines in returns to education in areas with a greater loss of tariff protection.

Child time allocation changes in table 2 cannot be fully explained by increases in employment opportunities for children. If children were leaving school for work due to increased labor demand, we would observe an increase in market work that matches the decline in schooling. However, the decreases in schooling exceed the increases in work and market work in table 2. Moreover, our results are largest for girls. Girls are less likely to participate in market work than boys. Changes in labor demand can generate increases in demand for children in domestic work. For example, parental labor supply changes substantively, and children substitute for parents in chores according to their comparative advantage. We therefore cannot rule out changes in employment opportunities for children as an explanation for our findings. We regard this as a less likely explanation than poverty in light of the larger changes in schooling than child labor and the more pronounced effects for girls.

5. Conclusions

We document impressive increases in school attendance and decreases in child labor in urban India between 1987 and 2000. Both are attenuated in urban areas with employment concentrated in industries loosing tariff protection in India's 1991 tariff reforms. The impact of trade adjustment on living standards of the poor appears most consistent with this trade policy - child labor - schooling connection, although the effect of tariff reductions on the economic opportunities open to children may also play a role.

The findings for urban India are similar to EPT's findings for rural India. There are two main differences between EPT's findings and the present study. First, the magnitudes of the changes in child time allocation are larger in urban areas. This could reflect greater transmission of tariff changes to local markets. Second, EPT shows that schooling costs lie behind the trade-poverty-schooling connection in rural areas of India. A central role for schooling costs is less obvious in the urban results. The large movements between schooling and idleness apparent in the rural data are absent in the urban data. One-third of the decline in schooling is absorbed by an increase in work in rural India. In urban areas, more than eight-tenths of the decline in schooling is absorbed by an increase in work. Avoiding schooling costs may be less important in child time allocation decisions in urban regions. Urban schools could be less expensive, and there is a wider variety of employment activities available to children in cities than in rural areas. A third possibility is that the trade

adjustment dynamics in urban India are more complicated than in rural areas, with a combination of changes in the potential economic contribution of children intermixing with relative declines in living standards among the poor.

Overall, the findings of this paper are consistent with other recent research that highlights the importance of poverty as the key motive for child labor and the importance of living standards of the poor as a channel through which trade can affect child labor and schooling. Taken together, this body of research raises important questions about the usefulness of trade sanctions (which inadvertently reduce living standards of poor families) to promote schooling or combat child labor in developing countries.

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Table 1: School Attendance and Tariffs in Urban India

	(1)	(2)	(3)	(4)	(5)
Data	pre and post reform	pre and post reform	pre and post reform	pre reform only	pre and post reform
Tariff	0.198		0.556***	0.051	0.512**
	[0.140]		[0.206]	[0.171]	[0.198]
Traded Tariff		0.289**			
		[0.110]			
Pre-reform Trend in Schooling*Post					-0.154**
					[0.074]
Estimation	OLS	reduced form	IV	IV	IV
Demographic Controls	yes	yes	yes	yes	yes
Household Controls	yes	yes	yes	yes	yes
Post Reform Indicator	yes	yes	yes	yes	yes
Region Indicators	yes	yes	yes	yes	yes
R^2	0.19	0.19	0.19	0.22	0.19
N	49165	49165	49165	49202	49036

Standard errors in brackets are clustered at state-year level. ***, **, * denotes significance at 1, 5, and 10 percent level. Demographic controls include a third order polynomial in the child's age, a gender indicator, and a third order polynomial in age interacted with the gender indicator. Household controls include indicators for whether a child's household belongs to a scheduled caste and schedule tribe, indicators for whether the child's household is hindu, muslim, christian, sikh, and controls for the head of the child's household gender, age, education, and literacy. Post reform indicator in column 4 refers to 1987 NSS round. Differences in sample size across columns are due to missing data (column 5) or different samples (column 4).

Table 2: Activities of children by gender and tariffs in urban India

	school	work	work only	market work	domestic work	idle
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: All						
tariff	0.556***	-0.441***	-0.460***	-0.263***	-0.178*	-0.096
	[0.206]	[0.158]	[0.166]	[0.072]	[0.103]	[0.213]
r2	0.19	0.12	0.12	0.06	0.11	0.1
N	49165	49210	49165	49210	49210	49165
Panel B: Boys						
tariff	0.447**	-0.381***	-0.397***	-0.335***	-0.047	-0.05
	[0.182]	[0.111]	[0.117]	[0.097]	[0.045]	[0.172]
r2	0.16	0.08	0.08	0.08	0.01	0.1
N	25945	25969	25945	25969	25969	25945
Panel C: Girls						
tariff	0.650**	-0.492**	-0.514**	-0.190***	-0.301*	-0.136
	[0.261]	[0.210]	[0.222]	[0.064]	[0.168]	[0.267]
r2	0.22	0.15	0.15	0.06	0.11	0.1
N	23220	23241	23220	23241	23241	23220
IV with traded tariffs	yes	yes	yes	yes	yes	yes
Demographic Controls	yes	yes	yes	yes	yes	yes
Household Controls	yes	yes	yes	yes	yes	yes
Region Indicators	yes	yes	yes	yes	yes	yes
Post Reform Indicator	yes	yes	yes	yes	yes	yes

Standard errors in brackets are clustered at state-year level. ***, **, * denotes significance at 1, 5, and 10 percent level. Demographic controls include a third order polynomial in the child's age, a gender indicator, and a third order polynomial in age interacted with the gender indicator. Household controls include indicators for whether a child's household belongs to a scheduled caste and schedule tribe, indicators for whether the child's household is hindu, muslim, christian, sikh, and controls for the head of the child's household gender, age, education, and literacy. Differences in sample sizes reflect missing observations.