Trade Adjustment and Human Capital Investments: Evidence from Indian Tariff Reform

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Does trade policy influence schooling and child labor in low income countries? We examine this question in the context of India's 1991 tariff reforms. Schooling increased and child labor declined in rural India in the 1990s. These trends are attenuated in rural districts with employment concentrated in industries loosing tariff protection. The loss of protection causes a relative rise in poverty in affected districts. Families reduce schooling to save schooling costs. Girls disproportionately bear the burden of helping their families cope with poverty.

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Trade liberalization is one of the most common policy prescriptions offered to initiate poverty eradication in today's developing countries. Standard trade theory is clear on the many long-term benefits of trade liberalization working through lower prices on consumption goods and production inputs, greater competition, and opportunities for specialization. Most of the concern about trade liberalization focuses on the impact of the loss of protection on those currently employed in protected industries. Several empirical studies document the adjustment costs borne by these workers subsequent to trade reforms in many developing countries (see, for example, Ann Harrison and Gordon Hanson (1999) and Ana Revenga (1997) for Mexico, Janet Currie and Ann Harrison (1997) for Morocco, Orazio Attanasio et al (2004) and Pinelopi Goldberg and Nina Pavcnik (2005) for Colombia, Petia Topalova (2005) for India).

Our study considers whether these short and medium-term adjustment costs of trade reform influence the schooling and work decisions of children in order to learn about both the determinants of human capital investment and the effects of trade policy changes. There are several possible channels through which the labor market impacts of trade liberalization could affect a households' investment in the human capital of their children. First, most of the above studies document a correlation between living standards and the loss of workers' protection from trade liberalization (see Ann Harrison (2006) for a review). While the empirical relationship between living standards and child labor or schooling is not as robust as theory often assumes (Kaushik Basu 1999), living standards seem one obvious channel. Second, the child's economic contribution to the household may be affected by the loss of protection or the structural shifts associated with it. A number of studies pioneered by T. W. Schultz (1960), Mark Rosenzweig and Robert Evenson (1977) and Rosenzweig (1982) have established a connection between the demand for child labor and schooling and children's participation in the work force. Third, the structural change in the economy as a result of trade liberalization may affect returns to education, which in turn will influence educational attainment (Gary Becker 1965, Andrew Foster and Rosenzweig 1996). The more diffuse benefits of trade-induced changes in consumer prices, market structure, productivity, incentives for innovation, etc. are unlikely to be captured through a focus on the loss of protection.[1] However, understanding the implications for children of the adjustment costs associated

[1] Several studies assess the aggregate relationship between trade and child labor or schooling (Robert Shelburne 2001, Alessandro Cigno, Furio Rosati, and Lorenzo Guarcello 2002, Edmonds and Pavcnik 2006), while Edmonds and Pavcnik (2005) examine variation in child labor with changes in relative prices during an export expansion. The present

with trade reform's impact on the labor market is important given the theoretical possibility of poverty traps generated by a lack of education (Vicky Barham et al 1995), child labor (Basu and Pham Hoang Van 1998), or occupational choice (Abhijit Banerjee and Andrew Newman 1993). Moreover, a better understanding of the channels influencing schooling in the context of trade adjustment may shed light on how human capital accumulates as countries grow and what policies might best expedite this process.

We examine these issues in the context of India's 1991 trade reform. In August 1991, in response to a severe balance of payment crisis, India agreed to an IMF adjustment program that stipulated a substantial liberalization of trade policy. Import tariffs across all sectors were drastically reduced and brought to a more uniform level. Set largely by the 1991 agreement, tariff changes over the 1992-1997 were not the result of the usual political economy process and were unlikely to have been anticipated by labor as tariffs had not changed substantively since the mid 1950s. We exploit heterogeneity in the *pre-reform* industrial composition of employment across Indian districts and differences across industries in the magnitude of tariff declines over time to study the impact of tariff reductions on child time allocation. Each of India's states and territories is subdivided into districts for administrative purposes. Microeconomic studies of rural India from Rosenzweig and Evenson (1977) to Esther Duflo and Rohini Pande (2007) focus on the district as the relevant labor market unit because of very low rates of permanent mobility between districts. By focusing on differences across districts in changes in tariff protection, we cannot evaluate the impact of tariffs on economy wide schooling and child labor. Rather, we consider how schooling and child labor changes differ in districts with large reductions in tariff protection on employment relative to districts with little change in tariff protection.

We observe smaller increases in school attendance among children, especially girls, in rural districts where employment was concentrated in industries exposed to large changes in output tariffs. Literacy also appears diminished relative to the national trend. The findings are robust to a variety of approaches to deal with the potential endogeneity of the baseline composition of employment and the confounding effects of concurrent reforms in other parts of the economy. We find no relationship between reform-induced tariff declines and changes in school attendance for children in *pre-reform* data. In addition, there is no relationship between tariff declines and changes in literacy in older cohorts

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study is distinct in its focus on an actual trade policy change, its focus on adjustment costs, and the degree to which it identifies the channels that underlie the trade reform – schooling – child labor relationship.

whose education should have been completed before the onset of trade liberalization. These robustness checks provide an important validation of our empirical approach.

A strong poverty-schooling relationship is the most likely explanation for our findings. As documented in Topalova (2005), higher exposure to trade liberalization is associated with slower poverty reduction relative to the national trend in rural India. Narrative evidence from rural India in the Public Report On Basic Education in India (1999) emphasizes schooling costs as a major reason children either never attend or drop out of school, and our data are most consistent with the avoidance of schooling related costs as the explanation for the poverty-schooling relationship in this study. While children work relatively more in districts with larger tariff declines, the additional work is largely among girls in activities that will not bring direct wage income (i.e. domestic work) and the changes in schooling are much larger than the (relative) increase in work. In fact, there is a significant rise in children, especially girls, who report neither attending school nor working. We also observe reduced schooling expenditures and increased reports of families taking loans for education. Moreover, we find some suggestive evidence that the impact on school attendance of declines in tariff protection on employment is more pronounced in areas with higher schooling costs. We observe little evidence of a strong link between employment exposure to tariff changes and returns to education or child labor demand.

This emphasis on schooling costs to explain a poverty-schooling connection is important in understanding human capital investment. While most researchers have a strong prior belief of a strong poverty-child labor-schooling link, the empirical evidence on this relationship is fraught with econometric challenges and nowhere near as compelling as most assume. Even studies that find a robust statistical link do not pinpoint the reason for this relationship (Jere Behrman and John Knowles 2001, Paul Glewwe and Hanan Jacoby 2004, Eric Edmonds 2005, Dean Yang 2008). Theory often attributes a connection to parental preferences (Basu and Van 1998) and the marginal utility associated with the child's direct economic contribution (for example, Jean-Marie Baland and James Robinson 2000). However, our emphasis on schooling costs is consistent with Duncan Thomas et al's (2004) observation that the largest changes in schooling in Indonesia during its financial crisis were among younger children with the least chance of making a direct economic contribution. Recent experimental evidence has also emphasized the importance of schooling costs in education decisions (Joshua Angrist et al

(2002) and Duflo et al (2006) for example), but schooling cost interventions change the relative price of schooling and alter family incomes. These experiments cannot examine the relative importance of schooling costs in explaining the link between changes in living standards and schooling, and our results suggest that schooling costs are an important reason why there is a relationship between poverty, work, and schooling, especially for girls.

The paper proceeds as follows. In Section I, we provide a conceptual framework. In Section II, we describe the data and Indian trade reform. In Section III, we outline the empirical methodology. Section IV discusses the empirical estimates of the relationship between schooling and tariffs and establishes the robustness of results. Section V explores the underlying mechanisms behind the relationship between schooling and tariff changes. Section VI concludes.

I. Conceptual Framework

The benefits of trade liberalization are diffuse while the costs tend to be concentrated in well defined groups that benefit from protection. Thus, the political attention directed towards trade liberalizations often emphasizes the adjustment costs borne by formerly protected workers, and there is a corresponding empirical economics literature devoted to understanding these adjustment costs (see Harrison (2006)).

How might schooling be influenced by the trade adjustment process? Changes in living standards, child labor demand, and returns to education stand out as likely mechanisms. Consider a household with one adult, one child, and a single family decision-maker. Denote y_0 as the household's income when the child is not in school, and y_S as the household's net income when the child is enrolled in school. y_S is net of direct and indirect schooling costs c and the loss of the child's economic contribution caused by schooling w^*, $y_S = y_0 - w^* - c$. While there is no consensus on the value of the net economic contribution of children in the child labor literature, schooling costs can be considerable. In India, primary school tuition is theoretically free. Together, other direct costs (fees, books, uniforms, tutoring, transportation costs, etc.) and indirect costs associated with the child's need to conform to the social norms of students in the school can be substantial.

The family sends the child to school if the utility from schooling the child is higher:

(1) $$u(y_s, s) + e_s \geq u(y_0, 0) + e_0$$

where e_k, $k \in \{s,0\}$, is an additively separable, mean zero, i.i.d stochastic term. We assume that the family views the return to schooling as a contribution to the child's future welfare and treats it as additively separable from today's consumption.[2] For simplicity, we define *r* as the linear return to schooling and α as the weight the family puts on the child's return to education. The utility from schooling the child is then: $u(y_s, s) = v(y_0 - w^* - c, p) + \alpha r$ where *v(-)* is the indirect utility associated with income y_S at the vector of consumer prices *p*.

The probability that we observe a child in school is:

(2) $$\begin{aligned} \Pr(s=1) &= \Pr\left(v(y_0 - w^* - c, p) + \alpha r + e_s \geq v(y_0, p) + e_0\right) \\ &= \Pr\left(e_0 - e_s \leq v(y_0 - w^* - c, p) + \alpha r - v(y_0, p)\right) \end{aligned}$$

Define $u = e_0 - e_s$ which is mean zero with cdf *F(u)* and strictly positive density *f(u)*. (2) can be written as: $\Pr(s=1) = F\left(v(y_0 - w^* - c, p) + \alpha r - v(y_0, p)\right)$. To analyze the determinants of changes in schooling attendance, we totally differentiate:

(3) $$d\Pr(s=1) = f(u)\left(\left[\frac{\partial v_s}{\partial y} - \frac{\partial v_0}{\partial y}\right]dy_0 - \frac{\partial v_s}{\partial y}dw^* + \alpha dr + \left[\frac{\partial v_s}{\partial p} - \frac{\partial v_0}{\partial p}\right]dp - \frac{\partial v_s}{\partial y}dc\right)$$

where $v_s = v(y_0 - w^* - c, p)$ and $v_0 = v(y_0, p)$. In the present discussion, we treat schooling costs as fixed (*dc*=0). Since our empirical strategy will focus on exposure to trade liberalization through differences in sectoral composition of local employment, we abstract from the tariff's effect on the marginal utility of income through the consumption channel.[3] Thus, tariff declines (*dt*) influence schooling through changes in family income, y_0, returns to education, r, and the child's potential economic contribution to the household, *w**.

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[2] We implicitly assume credit constraints that prevent families from borrowing against future returns on education. While we are not aware of direct evidence of an effect of credit constraints on schooling in India, Banerjee and Duflo (2004) document severe credit constraints for manufacturing firms in India in the late 1990s.

[3] As long as consumption bundles are not correlated with sectoral composition of employment across districts, the omission of the consumption exposure to trade liberalization will not bias our estimates of the impact of the employment exposure to trade reforms (see Section IV. B. for discussion). In addition, to the extent there is no significant variation in consumption bundles across areas in India, the impact through consumption is captured in the time trends.

Rewriting (3), we have:

$$(4) \qquad d\Pr(s=1) = f(u)\left(\left[\frac{\partial v_s}{\partial y} - \frac{\partial v_0}{\partial y}\right]\frac{\partial y_0}{\partial t}dt - \frac{\partial v_s}{\partial y}\frac{\partial w^*}{\partial t}dt + \alpha\frac{\partial r}{\partial t}dt\right)$$

This implies three explanations for declining schooling in the context of declining final product protection for employment ($dt < 0$). First, diminishing marginal utility of income implies $\partial v_s/\partial y > \partial v_0/\partial y > 0$. Thus, if tariff declines lower living standards, schooling declines. Second, increasing economic contribution of the child causes a fall in schooling (for a given income). Third, if parents put positive weight on returns to the child's schooling, α >0, declines in the returns to schooling lead to declines in schooling. The relative importance of tariff declines for these channels and their ultimate importance in schooling decisions is an empirical question.

II. Background

A. Data

Our analysis of the relationship between schooling, child labor, and exposure to tariff reform through employment composition relies primarily on the rural samples in the 43rd (July 87-Jun 88) and 55th (July 1999 - June 2000) rounds of India's National Sample Survey (NSS). We analyze the activities of more than 95,000 children age 10-14. [4] The NSS is a repeated cross-section at the level of individuals (households). Districts are matched across rounds, so that data has a geographic panel dimension.[5]

We consider several measures of the activities of children.[6] We define an indicator *attend school* that is one if a child reports attending school in the household roster regardless of his/her usual principal activity. The NSS does not contain detailed information on child time allocation, collected in a similar way in the 43rd and 55th rounds. However, the survey instruments regarding the child's usual principal activity are the same, and we use this question to define the child's work status. The question

[4]The sample is restricted to children ages 10 – 14 since very few children below the age of 10 work and 14 is typically an upper bound on the definition of a child in child labor conventions such as the International Labor Organization's C182 on the worst forms of child labor. As a household survey, the NSS inevitably misses children who do not live within the sampling frame, such as sex workers, trafficked children, bonded laborers, street children, and the homeless.

[5] Non-response is rare in the NSS. 2 percent of sampled households in the 43rd round did not respond and 1.3 percent did not respond in the 55th round. When a household refuses an interview, it is replaced with the next household from the randomly ordered sampling list. There appears to be very little correlation between changes in non-response rate and changes in our tariff measure. The correlation is -0.0134 and statistically insignificant.

[6] Changes in the NSS questionnaire over time have created substantive issues for the measurement of consumption, poverty, etc (see for example, Alessandro Tarozzi 2007), but these problems do not exist in the child activity measures.

distinguishes between the following categories of work: regular salaried/wage employee, casual wage laborer, begging (very rare), work in a household enterprise (farm or non-farm), and domestic work. A child is labeled *working* if his/her usual principal activity is in one of the above work categories. It is possible that a child's principal activity might be work while the child also attends school. We also define an indicator for whether a child works as a principal activity and does not attend school (i.e. *work only*) that we often refer to as "child labor."

We organize types of work into two categories. A child works in *market work* if his/her usual principal activity is working for wages (as regular salaried/wage employee or as casual wage laborer), in a household enterprise (farm or non-farm), or in begging. Most children engaged in market work in rural areas are working on their family farm or business. *Domestic work* includes attending domestic duties and free collection of goods (vegetables, roots, fire-wood, cattle feed ...), sewing, tailoring weaving, etc. for household use. Policy tends to focus more on market work (and especially wage work), but a basic model of time allocation (e.g. Becker 1965) would suggest that movements in market work and domestic work should be related.

Table 1 provides descriptive statistics on schooling and child labor between 1983 and 1999/2000 for rural India. In addition to the data from 1987 and 2000 that will be mostly used in this paper, we have included tabulations from the 38th (Jan-Dec 1983) and 50th (July 1993 - June 1994) rounds of the NSS in order to highlight the underlying time trends. Each mean in Table 1 is weighted to be representative for rural India in the given year. A clear understanding of the aggregate patterns summarized in Table 1 is critical for interpreting the findings in this study. School attendance has increased dramatically in rural India over the last twenty years. In 1983, less than half of children 10-14 attended school. By 1999/2000, nearly three-quarters of children attend school.[7] This rise in school attendance is concurrent with a 65 percent decline in the fraction of children who are working without attending school. More than a third of rural children in 1983 worked without attending school while 14

[7] There is no central compulsory schooling legislation. 15 states have compulsory schooling laws through age 14, mostly passed in the mid 1980s. We are not aware of any attempt to enforce these laws. The potentially most substantive changes in education policy over our 1987-1999 period of study are the abolition of tuition fees in Government primary schools, scholarship programs aimed at girls and scheduled castes and tribes, Operation Blackboard, and a national mid-day meals program. These programs may be important for the overall trends, but they do not appear to be correlated with tariff variation as we discuss below.

percent work without school in 1999/2000.[8] The bottom panel separates work into market and domestic work. The declines in market work and domestic work are similar in magnitude. Our identification relies on between district variations in exposure to national tariff changes. Hence, we do not assess the importance of trade liberalization in these aggregate trends in school attendance or child labor.

In addition to information about the activities of children, we also use the information on child demographics (gender, age) and household attributes (religion, caste or tribe, primary activity, household expenditure per capita, household size, information on household head (literacy, competed education, gender, age)) from the NSS in our analysis. In our robustness analysis we complement the NSS with data from additional sources that are described in detail in the appendix to the paper.[9]

B. Indian Trade Reform

India provides an excellent setting to study the relationship between trade policy, child labor and schooling. In the August 1991 currency crisis, India initiated unilateral trade liberalization as a condition of an IMF bailout. Several features of the trade reform are crucial to our study. First, because tariffs were high prior to 1991, the reform drastically reduced the level of tariffs. The average tariff declined from 83 % in 1991 to 30% in 1997 (Figure 1). Tariff reductions are smaller in some sectors than others, but all sectors of the economy are affected. Figure 2 depicts average tariffs for cereals and oilseeds, agriculture (other than cereals and oilseeds), and manufacturing and mining over time. Second, the liberalization was instigated as part of the IMF program conditions in response to the 1991 currency crisis and came as a surprise (Ranan Hasan et al, 2007).[10] The reforms were unanticipated in the sense that they were unlikely foreseen in schooling and child labor decisions made by households during the 1980s and in the district industrial composition before the crisis. In fact, Ashutosh Varshney (1999) reports that as late as 1996, less than 20 percent of the electorate had any knowledge of the trade reform. Third, the IMF conditions required a reduction in the level and dispersion of tariffs, drastically altering the structure of protection (Ajai Chopra et al, 1995). Industries with larger pre-reform tariffs

[8] In theory, child labor in factories, mines, and hazardous activities have been prohibited in India since 1986. In practice, serious enforcement of this legislation appears to be beginning in 2006. Most working children in the NSS are engaged inside their family enterprise and are outside the scope of this legislation as it is being implemented in 2006.
[9] Appendix table A.1 provides descriptive statistics for all variables used in our analysis.
[10] This crisis was in part triggered by the sudden increase in the oil prices due to the Gulf War in 1990, the drop in remittances from Indian workers in the Middle East, and the political uncertainty surrounding the fall of a coalition government and assassination of Rajiv Gandhi which undermined investor's confidence.

experienced larger tariff declines (Topalova (2005)). This is not a pattern that would be expected if traditional political economy concerns played an important role in India's trade liberalization of 1991. S. K. Goyal (1996) argues that the reforms were passed quickly as a sort of "shock therapy" with little debate or analysis in order to avoid the inevitable political opposition to such policies. Evidence from Topalova (2004, 2005) is consistent with this view. She observes that tariff changes are not strongly correlated with baseline industry characteristics such as productivity, skill intensity, capital intensity.[11] This observation is consistent with Ira Gang and Mihir Pandey (1996) who analyze the determinants of tariffs prior to the 1991 reforms and argue that economic and political factors are not useful in explaining industry tariff levels in India at the time of the reform. Rather, they argue, tariffs prior to the 1991 reforms reflected India's second five year plan (passed in 1955) and had not been substantively changed even as industries and the Indian economy evolved.

The 1991 reforms were incorporated directly into India's Eighth Five Year plan (1992-1997). Thus, tariff changes through 1997 are spelled out by the 1991 reform and outside of the usual political economy process. Figure 2 documents an increase in tariffs in some sectors subsequent to the end of this plan, which may reflect various political economy factors. We restrict our attention to tariff levels prior to the reform and to levels in 1997. That is, we assign the data from the 55th round of the NSS, the 1997 tariff level. This reflects the idea that adjustment to tariffs is gradual (we do not expect a tariff change in 1991 to have an immediate impact that works through employment) and the importance of using tariff variation that is externally imposed.

One potential concern with relying on tariff changes alone is that tariffs may be correlated with non-tariff barriers to trade (NTBs). NTBs, often in the form of import licenses, have historically played a large role in Indian trade policy. They were gradually removed over the 1990s as a part of the Eighth Five Year plan but more slowly than tariffs (Hasheem Nouroz (2001)). We focus on tariffs alone because they are more transparent and easier to measure comparably across industries and time than NTBs. In addition, NTB data is not readily available at a very detailed industry level. The lack of data would be potentially worrisome if NTBs would be increasing as tariffs are declining. However, the existing evidence suggest that NTBs have been declining during our sample. For example, Nouroz

[11] Table 1 in Topalova (2005) shows that industry tariff declines are not correlated with industry log wage, industry skill-intensity (measured by the share of non-production workers in industry employment), industry capital intensity (measured by capital-labor ratio), log output, average factory size, log employment, pre-reform output growth, and pre-reform employment growth (Table 1, Topalova (2005)). In addition, Topalova (2004) shows that tariff changes between 1987-1997 were not correlated with firm-level productivity.

(2001) reports that by 1997, 57 of HS codes, accounting for 64% of imports were free of import licenses. Second, our data uses only one post-reform round (From 99/00), so that our results are unlikely affected by the exact timing of NTB changes. To the extent that declines in NTBs and tariffs are positively correlated, some of what we attribute to tariff declines may owe to NTB declines. Finally, while some import licenses were still in place by 1997, lower tariffs nonetheless led to increases import volumes. The share of merchandise trade in GDP increased from about 10% in 1986/87 to about 19% in the late 1990s. In a recent paper, Pinelopi Goldberg et. al. (2008) use detailed trade data to directly show that reductions in tariffs were associated with greater import volumes between 1989-1997. Trade is increasing despite the lack of complete elimination of NTBs.

III. Empirical Strategy

A. Measuring Tariff Protection

Most studies that use micro level data to evaluate trade reforms focus on their impact through employment. These studies typically correlate industry trade or trade policy changes with industry employment/wages, or they interact the industry level measures of trade policy with the geographic concentration of industries, constructing an employment weighted regional exposure of trade reforms (see Harrison (2006), Goldberg and Pavcnik (2007) for surveys). As illustrated in Section I, by measuring the effect of tariff changes through employment, this approach emphasizes the mechanisms that work through returns to education, family income, and child employment while missing the effect on consumption and inputs prices. We return to the latter mechanisms in Section IV.

In this study, we rely on India's considerable geographic diversity in how families are affected by the national tariff changes. India is divided into almost 450 districts.[12] Districts differ in their industrial composition *before* the 1991 reforms. Our identification strategy exploits this geographic heterogeneity within India in exposure to tariff protection. The interaction between the share of a district's population employed by various industries on the eve of trade reforms and the reduction in tariffs in these industries provides a measure of the change in a district's tariff protection. We use the

[12]The district is an administrative unit within the state, slightly smaller in geographical area than the typical American county. Boundaries of the districts have been relatively constant since colonial times, though many of the older districts have been split into two or more modern districts.

phrase "district tariff" to refer to the district level measure of employment based exposure to national tariff rates. Product tariffs do not themselves vary at the district level.

In particular, district *d*'s "district tariff" at time *t* is measured by the 1991 district-specific industry employment weighted average of nominal, national, industry ad-valorem tariffs at time *t*. For each industry *i* in district *d*, we compute employment $Emp_{i,d}$ using India's 1991 population and housing census and create industry employment weights $\omega_{i,d} \equiv \frac{Emp_{i,d}}{\sum_i Emp_{i,d}}$ for rural areas that are normalized to sum to one for each district.[13] The district tariff at time *t* is the district-specific employment weighted sum of industry-specific national tariffs *(i.e.* $tariff_{i,t}$*)*:

$$(5) \qquad tariff_{d,t} = \sum_i \omega_{id} * tariff_{i,t}$$

It is important to emphasize that this computation uses district specific employment weights based on industrial composition that is *determined prior to trade reform*. Thus, changes in employment over time that are the result of tariff changes do not affect our measure of exposure to the tariff reforms.

The above tariff measure takes into account employment in traded industries and non-traded industries such as services, trade, transportation, construction, and growing of cereals and oilseeds within a district.[14] Non-traded industries are assigned zero tariffs in all years, resulting in average district tariffs, substantially lower than average tariffs on traded goods. The top row of Table 2 summarizes the change in the average district tariff between 1987 and 1999/2000.[15] The average district tariff in rural areas decreased from 8 percent in 1987 to 2.5 percent in 2000, a decline of nearly 70 percent.

District tariffs and tariff changes are heavily influenced by the prevalence of employment in non-traded sectors. By construction, everything else equal, districts with greater share of employment in non-traded sector have lower district tariffs and lower tariff changes, thus the difference between the 88

[13]Because the Indian census does not distinguish among various subcategories of agriculture, employment information on subcategories of agriculture from the 1987 (i.e. 43rd) round of the National Sample Survey is used.
[14]Topalova (2005) argues that the latter two categories should be treated as non-traded because all product lines within cereals and oilseeds were canalized (i.e. imports were allowed only by the state trading monopoly) until 2000 and the tariffs on all product lines under the growing of cereals are zero throughout the period of our study.
[15]The tariff measure matched to 1987/88 NSS is based on tariff information for 1987. No detailed data on tariffs is available prior to 1987, but there were no major trade reforms prior to 1991. The tariff measure linked to 1999/00 NSS round is based on tariff information for 1997.

percent average product tariff for 1987 in Figure 1 and the corresponding 8 percent average district tariff in Table 2. We create an additional measure of district tariffs that depends only on employment in traded sectors. This measure is constructed along the same lines as the district tariff measure in (5), except that the weights use only the employment in traded sectors within a district. We call this the "traded tariff" for the district and label it $TrTariff_{dt}$. This tariff measure is correlated with the district average tariff $Tariff_{dt}$, but variation in $TrTariff_{dt}$ is not determined mechanically by the size of the non-traded sector. The second row of Table 2 documents the evolution in traded tariffs over the period of study: in rural areas, the average traded tariff declines from 88 percent in 1987 to 31 percent in 2000.[16]

In order for national tariff changes to have a differential impact on district outcomes through employment composition, the district must be the appropriate labor market from the household's point of view. To the extent that the district is either too aggregate or too disaggregate, there will be measurement error in our measure of trade exposure. In treating the district as the relevant unit of analysis, we are following convention in the micro empirical literature on India (Rosenzweig and Evenson 1977, Rosenzweig 1982, Banerjee and Lakshmi Iyer 2005, Duflo and Pande 2007). Part of the reason for focusing on district level variation is that there is surprisingly little migration between districts (Monica Das Gupta 1987, Topalova 2005, Kaivan Munshi and Rosenzweig 2005). Topalova (2005) documents that, even in 2000, less than 2 percent of rural adult males have moved into their current district of residence or between urban and rural areas within their district of residence during the last 10 years.[17] Temporary migration of individual household members for work is probably much more common, although temporary out migrants are supposed to be in the household roster and therefore in our dataset. That said, as a robustness check, we also conduct the analysis at the region level.

B. Empirical Framework

We are interested in the relationship between a child's schooling status and the tariff protection the child faces because of employment in her district. India's 1991 tariff reforms provide variation in tariff protection. Indian districts differ in their exposure to trade reforms based on the composition of

[16] Tariffs decline in agricultural, mining, and manufacturing sectors. The bottom two rows of table 2 report average district tariffs using only traded agricultural sectors (row 3) and traded mining and manufacturing sectors (row 4).

[17] Munshi and Rosenzweig (2005) argue that the critical role played by mutual insurance arrangements within sub-caste networks explain why there is so little permanent mobility in India. Das Gupta (1987) argues that implicit ownership of common property that is conditional on residency and exclusive of new migrants is also important.

employment *prior* to the reforms. We compare how schooling and child labor changed in districts that differ in the tariff decline that they experience. The district panel dimension of the data generates the variation used to identify the effects of tariffs on schooling, but we estimate our regressions at the individual level in order to control for individual correlates of schooling and labor supply with the detailed micro data of the NSS. Our measure of the district *d*'s tariff at time *t* is $Tariff_{dt}$. It is constructed as described in Section III-A. Let y_{jhdt} denote an indicator for participation in activity *y* (for example, attend school as detailed in Section II-A.) by child *j* living in household *h* in district *d* at time (survey round) *t*. Our base specification is then:

$$(6) \qquad y_{jhdt} = \beta_0 + \beta_1 Tariff_{dt} + \pi\left(A_{jt}, G_{jt}\right) + \alpha_1 H_{ht} + \tau_t + \lambda_d + \varepsilon_{jhdt}$$

where $\pi\left(A_{jt}, G_{jt}\right)$ is a third order polynomial in the child's age, a gender indicator, and their interactions. H_{ht} is a vector of household characteristics that might affect household choice of child activity such as caste, religion, the head's gender, age, literacy, and education. β_1, the coefficient on district tariffs, is our main coefficient of interest.

We control for the average changes in the activities of children across all districts between 1987 and 1999/2000 with a post-reform (survey-round) fixed effect τ_t. Consequently, the coefficient on tariffs does not capture any aggregate effects of Indian tariff reforms. Indian districts differ in their endowments, schooling facilities, accessibility, geography, etc. and these attributes are potentially correlated with tariffs (or industrial composition) and schooling/child labor. We control for time-invariant district characteristics with a district fixed effect λ_d and thus use within district variation in tariff exposure to identify the impact of $Tariff_{dt}$ on activity *y*. Because district tariffs are constructed with constant pre-liberalization employment weights, the econometric work is attempting to build the counterfactual of how schooling would have changed if the only parameter differing from the pre-liberalization values were national tariffs on imported goods. Everything else equal, a positive value of the coefficient on tariff β_1 in (6) would suggest that tariff declines are associated with decreases in schooling relative to the national trend.

The coefficient on tariff β_1 in (6) is identified under the assumption that unobserved district-specific time varying shocks that affect schooling/child labor are uncorrelated with changes in district tariffs over time. Changes in district tariffs capture the *interaction* of changes in industry tariffs at the national level and initial industrial composition in a district. Consequently, *only* differential time-trends in schooling that are correlated with *both* baseline industrial composition *and* national level tariff changes could be a source of bias. This type of bias is less likely to be a concern in traded sectors. As discussed in detail in Section II-B, the usual concerns with the political economy of protection are less severe in the case of the 1991 Indian reforms and other studies have found that industry tariff changes are not strongly correlated with industry characteristics at the time of the tariff reductions. A more pressing concern noted in Section III-A is that changes in the district tariff measure in (5) depend in part on the size of the non-traded sector in a given district. The baseline size of the non-traded sector in a district could be associated with differential time trends in our outcomes of interest.

We address this concern in three ways. First, we allow for different time effects across districts based on the pre-reform conditions in a district, such as district's employment composition at a more aggregate level than the one used in the construction of district tariffs. Pre-reform conditions that are interacted with post reform indicator include the share of workers in a district employed in agriculture, mining, manufacturing, trade, transport, services (construction is the omitted category), the share of a district's population that is scheduled caste/tribe, the share of literate population in a district, and state labor laws indicators as defined in Tim Besley and Robin Burgess (2004). Second, we instrument for district tariff with district tariff on traded goods, $TrTariff_{dt}$ (described in Section III-A), which is not mechanically influenced by the size of the non-traded sector. Thus, our main specification is:

$$(7) \qquad y_{jhdt} = \beta_0 + \beta_1 Tariff_{dt} + \pi\left(A_{jt}, G_{jt}\right) + \alpha_1 H_{ht} + \delta D_d * \tau_t + \tau_t + \lambda_d + \varepsilon_{jhdt}$$

where $D_d * \tau_t$ is the vector of pre-reform district characteristics interacted with post-reform indicator and $Tariff_{dt}$ is instrumented with $TrTariff_{dt}$. The tariff on traded goods is strongly correlated with the overall tariff for the district. First stage results of the IV regression are reported in our web appendix (table 2). Third, in the robustness section below, we take several additional steps to test whether our basic findings based on equation (7) stem from latent time trends. In section IV-B, we test for correlation between the tariff changes and pre-reform changes in outcome variables. We also allow for

the pre-reform changes in outcome variables to have a time-varying impact in (7). In section IV-C, we verify that the results on schooling and literacy are restricted only to children of school age during the 1990s. The results from these robustness checks are all consistent with our basic findings, to which we turn next.

IV. Main Findings

A. School Attendance

In rural India in the 1990s, school attendance increased by less in districts that experienced larger tariff declines. This is apparent in Table 3 which contains the basic findings. Column 1 shows the coefficient on district tariff and on the post-reform indicator from the OLS estimation of equation (6). Column 2 reports reduced form results. Column 3 presents the IV estimates of equation (7), the main specification of the paper. With all of the included time trends, the post-reform effect is not reported in column 2 and in all subsequent regressions that include differential time trends across districts. [18] In all specifications, standard errors are clustered by state-year.[19]

Both the OLS and IV estimates suggest that larger tariff declines in a district are associated with lower schooling attendance (relative to national trends).[20] Everything else equal, the average district tariff decline (.05) is associated with a 2 percentage point decline in schooling relative to the national baseline. It is important to interpret this in the context of the impressive progress in school attendance throughout India during this period. As the coefficient on the post-reform indicator in column 1 suggests, in districts that experience no change in tariff, the regression adjusted probability a child is in school increases by 17 percentage points between 1987 and 2000. Everything else equal, the average

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[18] The estimated coefficients for all included control variables are available in web appendix table 1. First stage regression for column 3 is reported in web appendix table 2. We have also estimated regressions similar to column 1 and 3 of table 3 that do not control for child's, household, and household head's characteristics. This analysis yields coefficients on tariff that are larger in magnitude, but statistically indistinguishable from the corresponding coefficients reported in table 3. The results are reported in web appendix table 3.

[19] We have only one pre and one post round separated by a decade (rather than many annual rounds of data surrounding a policy change). Our identifying variation is at the district – year level, but there might be correlations within state in a given year that are potentially important (hence, the state-year clustering).

[20] We report all coefficients for included regressors for columns 1 and 3 in Web appendix table 1. First stage regression for column 3 is reported in web appendix table 2. When we exclude all child's demographic and household controls from specifications corresponding to columns 1 and 3 of Table 3, the coefficients on tariff are larger in magnitude, but statistically indistinguishable from the coefficients reported in table 3. These results are reported in web appendix table 3.

district tariff decline (.05) is associated with a 2 percentage point decline in schooling relative to the national baseline. Thus, a district with the average tariff change experienced a 15 percentage point increase in schooling, 12 percent below the national trend.[21]

The decline in district tariffs varies between 0 to 59 percentage points. In the district experiencing the largest tariff change, the probability that a child attends school actually falls by 4.5 percentage points after the trade reforms (compared to the 17 percentage point rise observed in districts with no tariff change). However, as the standard deviation of the average tariff change (-0.055) is rather small (0.06), extreme tariff changes where the implied effects predict absolute declines in schooling between 1987 and 2000 are not typical. For almost all districts, the observed tariff changes are not large enough to reverse the progress in schooling in the 1990s in India. The implied magnitude of the tariff effects, even in the districts most affected by tariff cuts, are also relatively small when compared to the magnitude of the coefficient on some household characteristics from web appendix table 1. For example, children from a scheduled caste household are on average 7.8 percentage points less likely to attend school than children from non-scheduled caste households.

B. Robustness of Basic Findings

The tariff - schooling relationship captured so far would be biased if the measure of tariff changes in a district is correlated with omitted district-level time-varying factors that affect school attendance. We examine whether districts with different industrial compositions and tariff changes had similar pre-reform time trends in school attendance. We test whether the findings are confounded by other reforms, concurrent to trade liberalization. Finally, we investigate whether investments in school infrastructure are correlated with the district's exposure to trade reforms.

We first focus on pre-existing trends in outcome variables. We directly test whether our results reflect pre-existing time trends in schooling that are correlated with post-reform changes in tariffs by estimating equation (7) with data from the 38th (1983) and 43rd (1987-88) round of the NSS, both prior to the 1991 reforms. This analysis can be performed only using tariff variation at the region level as

[21] No single sector is driving our findings. We observe this result (attenuated schooling increases with larger tariff declines) in 76 of the 233 traded sectors when the reduced form of our main specification is estimated using district's exposure to tariffs for each sector separately.

district identifiers are not available in the 38th round of the NSS.[22] We assign pre-reform tariffs (1987) to 38th round and post-reform tariffs (1997) to 43rd round. The results of this exercise are presented in column 5. In column 4, we provide a region level variant of column 3 for comparison. If the pre-existing trends in school attendance were correlated with the region's tariff reduction shock, then the coefficient on regional tariff in data before trade reform (column 5) will be similar to the coefficient estimated with data before and after the reform (column 4). In fact, the pre-reform coefficient is opposite in sign and much smaller in magnitude. As an additional check in column (6), we allow the pre-reform trend in schooling in a region to have a time-varying effect (we interact the trend with a post reform indicator) in our main specification in equation (7). Both the magnitude and statistical significance of the estimated impact of tariff remain similar to those reported in column 3.

During the 1990s, India implemented several other reforms concurrent with trade liberalization. Some of the more notable reforms include a removal of licenses regulating operations in various industries (Philippe Aghion et al 2006), relaxation of entry regulation of foreign direct investment, substantial reforms in the financial and banking sectors, the growth of exports, and improvements in primary school access. Following Topalova (2005), we construct district employment-weighted share of industries subject to industrial licensing, district employment-weighted share of industries open to FDI, and district employment-weighted share of industry exports (see data appendix). The number of bank branches per capita in a district controls for the possibly confounding effect of banking reforms. The number of primary schools per capita in the district controls for variation in schooling access. These additional controls are included in column 7 of table 3. Neither the magnitude nor the statistical significance of the coefficient on district tariff is sensitive to including these time-varying district measures of reforms.[23]

Beyond improving primary school access, India focused considerable efforts over the 1990s on promoting schooling in India. These schooling changes could confound our results if schooling policy

[22]India is divided into 77 regions and a region is a collection of several districts. Regional tariffs are created in a manner that parallels the creation of district-level tariffs.

[23] Web appendix table 4 contains regression results entering these controls individually and reports regression coefficients on individual reform controls. We view these reform variables simply as controls and the coefficients on them do not warrant a causal interpretation.

changes are correlated with the district's exposure to trade reforms.[24] There is no reason to suspect that programs like Operation Blackboard (Aimee Chin 2005), the District Primary Education Project launched in November 1994 (Raghaw Pandey 2001), or mid-day meals (Jean Dreze and Geeta Kingdon 2001) are correlated with district tariff changes.[25] Using data on primary schools per capita from the 1991 census and the 7th (2002) All India Education Survey (AIES) and additional detail on schooling facilities at the district level from the 6th (1993) and 7th AIES, we mimic our main specification and regress several measures of district school quantity and quality on the corresponding district tariff, a post-reform indicator, pre-reform district characteristics interacted with the post-reform indicator, and instrument for tariffs with traded tariffs.[26] We find no evidence that changes in school availability or quality are substantively correlated with tariff changes (see web appendix table 5).[27]

Tariff changes influence households through consumption and intermediate input prices in addition to final output prices. These consumption and intermediate input channels are likely important for the aggregate effects of tariff reductions, but they do not appear to be a substantive source of bias in our estimates of the relationship between schooling and declines in final product protection on employment. In column 8 of table 3, we include controls for consumption and intermediate input exposure to tariff declines (detailed regression results are in web appendix table 6). For falling consumer prices to generate our findings above, consumption bundles would need to vary with the composition of employment and the substitution effect of consumer price changes would have to dominate the income effect. We find no hint of this in the data. For declining intermediate input prices to generate our findings above, declining input prices would need to lower family incomes or increase

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[24] The absence of any major policy interventions related to child labor in the 1990s is a major source of grief for child labor activists in India. Most of the actions that occurred in the later part of the decade involved listing certain types of employment as "worst-forms" and thereby prohibited. Enforcement of these regulations appears to have begun as early as 2003 in some states although few children in our dataset are involved in these activities.

[25] In unreported regressions, we estimate our main IV specification (7) using as dependent variables household responses on the prevalence of scholarships, free mid-day meals, and free tuition from the 42nd and 52nd (small sample) rounds of the NSS. Estimates of the changes in these aspects of schooling costs with tariffs are close to zero in magnitude and not statistically significant.

[26] The 6th round of the AIES is the earliest available at the district level. We treat it as a baseline, but because it is completed a year after the start of tariff declines, results in columns 3-6 of web appendix table 5 should be viewed with caution.

[27] If anything, the number of schools per capita increase and pupil-teach ratios decline in areas with larger tariff declines. Although coefficient magnitudes are small and no statistically significant, this would suggest a downward bias in our results if better schooling access and smaller pupil-teach ratios promote schooling (as in Duflo 2001 and Anne Case and Deaton 1999).

child labor's productivity. This later channel is unlikely, because the changes in schooling do not appear to be driven by increases in child employment in market work (section V-B). In fact, it is the inclusion of the intermediate input tariff that is responsible for the increase in the magnitude of the employment weighted tariff in column 8 of table 3 although its increase is not statistically significant. Input tariff declines are associated with higher levels of schooling, suggesting that the now cheaper inputs either substitute for child labor or have a positive income effect. Our basic results do not appear to be driven by other trade channels working through either consumption or inputs.

C. Literacy

If districts that were subject to larger tariff declines experienced smaller increases in school attendance, we should also observe diminished literacy in those districts relative to the national trend. However, this effect should be concentrated only among cohorts who were of school going age during the 1990s. Trade reforms should have no impact on literacy of those who had already completed their schooling by 1991. If most children engaged in primary school in rural India are age 15 or younger, it is implausible to observe tariff effects on individuals above age 25 in 2001.

We use the 1991 and 2001 rural population census to examine the correlation between tariffs and literacy by age. Both censuses report district level aggregates of literacy. We regress literacy rates for each age group separately (for example, 14 year olds) in a district *d* at time *t* on the district tariff, post-reform indicator, district fixed effects, pre-reform district conditions (the share of workers in a district employed in agriculture, mining, manufacturing, trade, transport, services, the share of a district's population that is a scheduled caste/tribe, and state labor laws indicators) interacted with the post-reform indicator, and instrument for tariffs with traded tariffs. The estimated coefficient on the tariff measure and the 95 percent confidence interval for each age group is plotted on Figure 3.

The results on the impact of tariffs on literacy mirror the school attendance results. Our basic results in Table 3 compare the schooling attendance of children ages 10-14 in 1999 with that of children ages 10-14 in 1987. In Figure 3 we observe that larger tariff declines are associated with lower literacy rates for children 10-14 in 2001 relative to children 10-14 in 1991. The decline in literacy with tariffs (relative to the time trends) is similar in magnitude to what is observed for school attendance in the NSS. The reduction in literacy with tariff declines extends to the 15-19 age group. Children 15-19 in

2001 were educated during the tariff adjustment process (they were 5-9 in 1991). Hence, the association between tariff declines and the literacy of this older cohort is consistent with our basic findings.

Perhaps the most important finding in Figure 3 is the result from the falsification exercise. We do not observe any false treatment effects in older populations whose schooling should largely be completed by the time of the reforms. The correlation between tariffs and the literacy for older populations are close to zero. For example, an individual age 20 at the time of reforms is unlikely to have his literacy affected by the 1991 reforms. He would be age 30 in 2001, and we observe little correlation between tariff changes and literacy rates for the age 30 population. The association between tariffs and schooling is concentrated in the populations that should be affected by the reforms.

This falsification exercise is also useful in mitigating concerns about selective migration. Selective migration might be a source of bias if families with a greater propensity to educate their children move away from districts with larger tariff declines. Permanent out of district migration is very low, and we do not directly observe large changes in populations or sex-ratios associated with tariff declines (see web appendix table 7). Changes in the population mixes within districts are possible, but if tariff declines lead to a departure of literate adults (who are more likely to educate their children), then we should observe effects of tariffs on the literacy of the adult population. The absence of such evidence in Figure 3, coupled with the insignificant evidence on population counts and sex ratios is inconsistent with substantive changes in population or its composition is a substantive source of bias in this study.

V. Mechanisms

Why do districts with more concentrated pre-reform employment in industries that experience larger tariff declines observe smaller increases in school attendance (relative to the national trend)? The conceptual framework in Section I suggests that declines in returns to education, increases in child's economic contribution to household/child labor demand, or declines in living standards/increases in poverty in communities where employment lost tariff protection may be responsible. The analysis below finds little evidence in favor of declining returns to education or increases in child labor demand. Instead, the observed declines in schooling reflect increases in poverty (relative to national baseline) in

districts where employment lost final product protection. The observed connection between poverty, schooling, and child labor seems to be driven by schooling costs.

A. Returns to Education

If tariff declines lead to a relative reduction in the returns to education in districts that were more exposed to the reforms, schooling will decline with tariffs.[28] Households might gauge returns to schooling both by assessing school quality and by observing the labor market. We have already seen evidence against a strong school quality decline correlated with tariff changes (Section IV-B). In fact, pupil-teacher ratio decrease is consistent with increasing school quality when tariffs decline (web appendix table 5). In this section, we consider whether there is evidence of decreases in the returns to education in either the expenditure or adult employment data. Because of innumerable measurement problems, we do not attempt to directly measure returns to education and pursue a more inferential approach.[29]

First, we compare per capita expenditures of households with literate and illiterate heads of household as a measure of the return to education.[30] We relate the relative expenditures of literate and illiterate households in a district to the employment weighted tariff using an approach parallel to equation (7). We regress the ratio of per capita expenditure in literate households to illiterate households in a district at time t on a district tariff, post-reform indicator, pre-reform district characteristics interacted with the post-reform indicator, and instrument for tariffs with traded tariffs. Standard errors are large relative to the estimated coefficients, but the sign on the tariff coefficient is most consistent with increases in the expenditures of the literate relative to that of the illiterate with tariff declines. We observe a similar finding when we split the sample by primary school completion rather than literacy of

[28] For this to be the mechanism behind the observed correlation between tariffs and schooling, returns to education need to vary at the district level. Hence, we discuss returns to education under this assumption.

[29] Measuring returns to education for each district is a challenge. Current labor market returns may not be a good proxy for expected future returns. The observed average returns may not equal the marginal return relevant for a family's decision-making. Estimates of returns based on observed wages will be biased by non-random selection into wage work. In addition, we face a data problem: information on wages is missing for most individuals in our baseline data. In general, around 30 percent of individuals report working for wages in rural areas in various NSS rounds. However, only 7 percent of individuals report wages in rural areas in 43rd round of NSS.

[30] We thank Esther Duflo for this suggestion. This comparison assumes that individuals infer future returns to education by comparing the living standards of the literate to those of the illiterate. Given the high levels of illiteracy in rural India, literacy is potentially the most obvious measure of education that can be observed outside of an individual's household. Neighbors are more likely to know whether someone can read or write than whether he has completed 3 or 4 years of education.

household head. Overall, the expenditure evidence is more consistent with increasing, rather than decreasing, returns to education (see web appendix table 8).

Adult employment changes are also consistent with increasing returns to education. We infer what might be happening to returns to schooling by examining the employment of adult males (ages 25-50) in wage work by literacy status and tariffs. The changes in wage employment associated with tariff declines are informative about changes in the return to education under strong assumptions. Assume labor-supply is approximately linear and that its slope is positive and roughly the same for literate and illiterate men. Tariffs might affect returns to education by differentially affecting labor demand for literate workers and thereby the wage gap between literate and illiterate workers. Declining returns to education with tariff declines (lower relative wages of the literate) would imply increases in employment of illiterate men relative to the literate population. In fact, we observe the opposite in the formal wage sector.

We estimate equation 7 separately for illiterate and literate adult males ages 25-50, using participation in wage work and the number of days in wage work as dependent variables.[31] The results are reported in table 4 for illiterate (panel A) and literate (panel B) adult males. Each column header indicates the dependent variable. Tariff declines are associated with increases in participation (column 1) and days worked (column 2) in wage work for literate men and declines in wage work for illiterate men. Given the magnitudes of these estimates, the rise in days worked in wage work for literate men reflects an increase in days in wage work beyond the rise in participation in the wage sector.[32]

In sum, while our inference is limited by measurement issues, the expenditure, adult employment, and school quality data are more supportive of increasing rather than decreasing returns to education with tariff declines. Thus, we find little evidence that declines in the returns to education play a substantive role in our findings.

B. Child Labor Demand

[31] We use adult characteristics as controls (rather than child characteristics) and do not include controls for the characteristics of household head.

[32] At the mean tariff decline, estimates from panel B, column 1 of table 4, imply a 1.1 percentage point increase in wage work. If days worked of existing wage workers did not change and all additional wage workers worked seven days a week, we should observe an additional 0.08 days worked per week with the average tariff change in column 2 of table 4. Instead, we observe an additional 0.13 days worked per week in wage work.

If tariff declines are associated with a rise in the child's economic contribution foregone by schooling, w* in section I., schooling could decline with tariffs. w* is the difference between the maximum income the household can achieve when the child does not and does attend school. The economic contribution foregone by schooling depends on the activities the child engages in, and we expect it to increase with higher wages in the formal wage labor market or positive productivity shocks to the family business or domestic production. We refer to the influence of w* on schooling as reflecting child labor demand. This is somewhat imprecise but emphasizes that the channel is distinct from the marginal utility of income. The evidence reviewed in this section provides little support for tariff declines being associated with increased earnings opportunities of children.

Changes in the formal wage labor market are unlikely to be responsible for the observed attenuation of schooling improvements with tariff declines. First, child employment in formal wage sectors is infrequent. Second, child labor is typically modeled as a perfect substitute for unskilled (illiterate) labor (Basu and Van 1998 for example), and we do not observe increases in the adult wage sector employment for illiterates with tariff declines (table 4). Third, we examine the effect of district tariffs on child's participation in several work categories, based on a question in NSS about the child's principal usual activity (see section I for exact definitions). The findings from estimating (7) for each work category as a dependent variable are in Table 5.

The data do not suggest that schooling declines are driven entirely by increased employment of children in market work. Although tariff declines are associated with (statistically insignificant) increase in the probability a child is observed working without attending school (column 3), this increase in work is not in market work where the child's labor is likely to result in additional household income (column 4). The increase in work is operating principally through domestic work (column 5). Moreover, the declines in schooling and increases in work without schooling are largest for girls (panel C), and out of school girls are less involved in cash-generating activities than out of school boys (The Probe Team 1999).

Rather, some of the declining school attendance with tariffs appears as increases in domestic work (such as cooking, cleaning, gathering water and wood) and even larger increases in children (especially boys) who do not report work as a principal usual activity and also do not attend school, i.e. "idle" children. Child time in domestic work may indirectly increase household income either through

the goods produced in home production or complementarities of adult work in the formal labor market and child domestic work (i.e. the child's domestic work allows the adult to earn in the labor market). Thus, domestic work can be an important component of the income foregone by schooling. However, while tariff declines could bring nationwide productivity improvements in domestic work (through cheaper inputs into domestic work that are complementary to child labor, for example), it is less clear why these improvements should vary with district's employment exposure to tariff reforms. Moreover, in unreported regressions we do not observe declines in domestic work among adults associated with lower tariffs. Hence, it seems unlikely that the rise in domestic work reflect children filling in for working parents.

The increased presence of idle children in districts with greater tariff declines might simply reflect mismeasurement of child activities. For example, some parents may not consider working around the house a principal activity. However, there is an economic explanation. If the marginal product of child's labor in the various activities can become zero (or even negative), it can be optimal to not use all the available child time for domestic or household enterprise work.[33] In this case the child's net economic contribution, w*, could be zero. Yet, families might still be better off keeping children out of school if the marginal utility from the returns to education falls short of the disutility associated with schooling costs as discussed in Section I. In fact, it is plausible that the increased incidence of children in domestic work could reflect in part that domestic activities are a type of absorptive labor so that both the increase in idleness and rise in domestic work with tariff declines reflects the avoidance of schooling costs more than an actual economic contribution of the child.

The above evidence suggests that children are not withdrawing from school to improve family incomes through bringing more cash to the household. We cannot exclude the possibility that a rise in the child's potential economic contribution in domestic work lies behind a fraction of the schooling results. However, the employment data are also consistent with the idea that the declines in schooling are largely driven by the avoidance of the direct and indirect costs of schooling to which we now turn.

C. Poverty

[33] This might occur in the presence of binding constraints on the availability of wage employment for children and if home enterprise and domestic work production functions are positive concave in child time in each activity.

If tariff declines are associated with increases in poverty (relative to national trends), schooling could decline (relative to national trends) with tariff declines. Topalova (2005) finds that districts which were more exposed to trade reforms through employment experienced smaller poverty reduction than the national average. For the district with the average change in trade exposure, the liberalization of tariffs increases the headcount rate by 2.7 percentage points (nearly 10 percent) relative to a district with no tariff change.[34] Lower living standards can force families to pull children out of school if there are direct costs associated with going to school or children are needed to contribute to the family income.

The responses of child labor and idleness to tariff declines discussed above suggest that saving on schooling costs (rather than increasing child earnings in formal labor markets) is likely the underlying link between tariffs and schooling. This is consistent with the Public Report On Basic Education in India (1999) that found "schooling is too expensive" is the most frequently cited reason a child was never enrolled in school and one of the two most cited reasons children were withdrawn from school. This answer is plausible despite the fact that primary school tuition is theoretically free in government run schools. Jandhyala Talik (2002) calculates that other direct costs including fees, books, uniforms, tutoring, and transportation costs are about 7 percent of average annual income for families in the poorest decile. Most of these costs need to be incurred in a short time window at the beginning of the school year, and these cost estimates do not include the considerable indirect costs associated with the child's need to conform to the social norms of students in the school.

Below, we present some additional evidence consistent with this schooling costs explanation. First, we observe that in districts with larger tariff declines, there is a relative increase in households taking out loans to finance education and a decline in the amount spent on education. This evidence is in Table 6, where we mimic our preferred specification (7). Even though school attendance trends are attenuated in districts with larger tariff declines, we observe a higher incidence of households taking out formal and informal loans for educational purposes in the more affected districts (column 1). In addition, we observe that tariff declines are associated with declines in household educational expenditure per capita (column 2), and the share of educational expenditure in the household budget

[34] Topalova's basic finding for head count poverty rates is replicated in the top panel of table 8 below (web appendix table 9 for poverty gaps), and we observe in unreported regressions a similar decline in agricultural wages as well (a strong correlate of poverty).

(column 3). This evidence corroborates the school attendance results and is consistent with the schooling costs argument as households are spending less on education with tariff declines.

If the observed declines in school attendance reflect poverty induced saving on schooling costs, one would expect tariff declines to be associated with smaller declines in school attendance in areas where going to school is less costly. The 42nd and 52nd thin rounds of the NSS contain more detailed information on education and schooling costs. In particular, using the 42nd round (1986) as our pre-reform period, we compute the prevalence of free tuition, the share of children obtaining free mid day meals at school, and the share of children with scholarships in a district.[35] We interact these pre-reform aspects of school costs with district tariff and add it as a regressor in our main specification (7). Table 7 contains the results. We use school attendance and enrollment as our dependent variables in columns 1 and 2, respectively.[36] Although not all interactions with schooling costs are statistically significant, the negative signs of the coefficients suggest that declines in schooling relative to the national trend are smaller in districts with smaller baseline schooling costs. That is, the greater the prevalence of free midday meals (panel A), scholarships (panel B), or free tuitions (panel C), the smaller the decline in schooling associated with the tariff changes. Of course, the above measures of the schooling costs are non-random, but the evidence seems consistent with the importance of schooling cost.

In sum, tariff declines attenuate poverty reduction and agricultural wage gains relative to the national trends. At the same time, we observe increases in child work (mainly driven by increases in domestic work) that are smaller than the declines in schooling, and a rise in idleness. Tariff declines are also associated with increases in educational loans and declines in education expenditure and education expenditure as a share of household budget. These observations, coupled with suggestive heterogeneous effect of tariffs on school attendance that vary with baseline schooling costs, point to schooling costs as an important impediment to school attendance in times of slower (relative to trend) progress in poverty alleviation.

D. Poverty Elasticity of Schooling and Child Labor

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[35] These are only three components of schooling costs. They do not capture the costs of clothing, books, materials, and other aspects of "fitting in" at school which may be the most important parts of school costs.

[36] The 52nd round collects data on both school attendance in enrollment, while the 42nd round provides only data on enrollment. In column 1, we assume that enrollment equals school attendance in the 42nd round.

The results of the previous sections suggest that employment weighted tariff changes seem to affect schooling primarily through their impact on poverty. In this section, we make a strong assumption that the employment weighted traded tariffs affect schooling and child labor only through their impact on local poverty rates. We then use the traded tariff as an instrument for poverty rates to estimate the poverty elasticity of schooling and child labor. In particular, in a setting that parallels equation (7), we regress schooling/child labor on a district poverty rate, our usual controls, and instrument for local poverty with traded tariffs in a district.[37] The exclusion restriction necessary for this exercise would obviously be invalid if the traded tariff had an impact on returns to education or labor demand for children.

Estimates of the poverty elasticity of schooling and child labor implied by this exclusion restriction are in Table 8. In columns 1-6, we report results where the headcount ratio is instrumented by the traded tariff (poverty gap results and are reported in the web appendix table 9). Column 1 implies that a 1 percentage point fall in the district's head count rate would increase the probability that a child attends school by 0.7 percentage points. The same decline in the poverty rate is associated with a 0.3 percentage points decline in the probability of a child working (column 2), albeit this effect is imprecisely estimated. The small poverty elasticity of market work (column 4) relative to the poverty elasticity of domestic work and idle status is consistent with our discussion above that the tariff-schooling relationship is driven mostly by schooling costs rather than labor demand.

There are some interesting gender differences in our estimates of the elasticity of schooling and work with respect to poverty (Panel B and C). In general, both female schooling and work is more sensitive to poverty than is male schooling and work. For boys, higher poverty is associated with more market work, domestic work, and idle status. However, higher poverty is associated with less market work and more domestic and idle status for girls. We suspect that these gender differences in the poverty – market work relationship reflect something about the underlying status of girls in Indian households, and a more thorough future study of gender work roles in India would be of interest. That said, the main

[37] These estimates are based on children in districts in states in which poverty lines are available. The results are robust to including children in all states, with poverty lines assumed to be equal to neighboring states' poverty lines when missing.

interesting finding for our study is that the response of girl's schooling and work to changes in poverty appears to be nearly double that of boys.

If we take the pooled results (panel A) in Table 8 seriously, we can assess the role of poverty declines in India's progress on schooling in the 1990s. Headcount poverty rates fell from 37 percent in 1987 to 24 percent in 1999 in rural India (Topalova 2005). Schooling increased from 55 percent of children 10-14 to 73 percent (Table 1). The estimates from column 1 of Table 8 thus imply that more than half of the increase in schooling in rural India in the 1990s can be explained by falling poverty. The fraction of children working as a principal usual activity declined from 25 percent in 1987 to 14 percent in 1999. Over one third of the decline in children who work without attending school can then be explained by falling poverty (column 3). The lower poverty elasticity of work than schooling is perfectly consistent with a theory that implies a greater income elasticity of schooling than work.

VI. Conclusion

Much of the concern about trade liberalization focuses on the impact of the loss of protection on those currently employed in protected industries. Our study considers whether these short and medium-term adjustment costs of trade reform influence the schooling and work decisions of children. Rural India experienced a dramatic increase in schooling and decline in child labor during the 1990s. However, rural districts where employment experienced larger changes in final product protection saw smaller improvements in schooling and declines in child labor relative to the national trend. The attenuation in schooling attendance trends associated with tariff declines is robust but not large in magnitude. A district without any change in final product protection experiences a 17 percentage point improvement in schooling rates for children 10-14 between 1987 and 2000. A district with the mean change in protection experiences a 15 percentage point improvement in schooling.

The data suggest that the relationship between district exposure to trade reforms and schooling is driven by the poverty impact of declining tariffs: districts subject to larger tariff declines experienced slower poverty reduction. We do not find evidence of other obvious channels through which a loss of final product protection might affect schooling such as through declines in the returns to education or increases in child labor demand. Although we focus only on trade adjustment in this study, this finding of a link between trade and child time allocation working primarily through living standards is

consistent with existing evidence from Vietnam's liberalization of rice export trade (Edmonds and Pavcnik 2005) and the cross-country evidence on child labor and aggregate trade flows (Edmonds and Pavcnik 2006). In the present context, the negative elasticity of schooling with respect to poverty is most likely due to the household's inability to cover the costs associated with sending a child to school in the absence of a well-functioning credit market. We have suggestive evidence that the impact of tariffs on schooling is larger in areas with high baseline schooling costs and relative increases in poverty are associated with a rise in the share of children who neither work nor attend school. Many studies have emphasized schooling costs as a major influence on schooling, but studies that work off variation in schooling costs observe behavioral responses driven by both income and substitution effects. Studies that randomly reduce schooling costs should find increases in schooling even if schooling costs were irrelevant in understanding the relationship between schooling, child labor, and living standards. Our findings suggests that schooling costs appear to play an important role in why poverty and schooling are so closely related.

We cannot conclude from the strong empirical tariff – poverty – schooling connection that there is no impact of tariff changes on other factors that influence schooling. It could be that the poverty channel dwarfs these other channels in importance. However, if we assume that poverty is indeed the only way through which the decline in final product protection influenced schooling in India, then the resulting estimates of the poverty elasticity of schooling and child labor imply that half of the improvement in schooling and a third of the decline in child labor in rural India in the 1990s can be attributed to poverty declines. The time allocation of girls appears to be especially responsive to poverty.

It is important to emphasize that these estimated effects do not capture the first order effect of trade opening on school attendance; rather, they reflect differential changes in schooling in areas with more exposure to the tariff reform through their employment composition after controlling for any economy wide changes associated with trade liberalization or other economic factors. Our focus on how districts are affected by tariff changes through the composition of employment prior to reform follows a tradition within the trade literature. Trade liberalization brings a wide array of benefits to a country through lower consumption prices, lower input prices, opportunities for specialization, and greater competition. However, theory predicts adjustment costs associated with the loss of protection on

employment, and examples documenting the impact of these adjustment costs on labor in sectors loosening protection permeate the literature. Our primary contribution to this literature is to show that these short term adjustment costs affect young cohorts through their impact on schooling, child labor, and literacy.

How substantive are the observed changes in human capital? Our estimates imply that the average tariff decline is associated with a 2 percentage points decline in schooling attendance relative to the improvements in districts with no change in tariffs. This 2 percentage point decline in schooling attendance is associated with a 2 percentage point (relative) decline in literacy (figure 3). In the 1999 data used in this study, rural families with a literate adult head have roughly 25 percent higher expenditures per person than families without a literate adult head. This is not a causal estimate of the impact of literacy on per capita expenditures. We treat it as an upper bound on what the causal effect might be. Thus, the two percentage point decline in literacy is associated with at most a 2.5 percent decline in per capita expenditures per year. Assuming that the return to literacy is constant over the life cycle, the decline in literacy is permanent, individuals become household heads at age 20 and continue to age 64 (life expectancy in India), and a discount rate of 6 percent, lifetime per capita expenditures are at most 41 percent lower relative to an individual living in a community not facing these adjustment costs. This calculation does not imply that the affected individual's life time per capita expenditures would be 41 percent higher without the tariff reductions. Trade liberalization has likely contributed to the aggregate increases in schooling and literacy in India during our period of study. However, this calculation suggests that the asymmetric incidence of the costs of these tariff declines are potentially considerable for affected individuals, and our calculations neglect any additional transmission to future generations. Thus, policy attention to the consequences of trade adjustment for human capital accumulation seems merited.

Data Appendix

Schooling and Child Labor variables. Please see Section II-A for information on the NSS data. We use data from the 1991 and 2001 Indian Census about the share of population in a district that is literate by age/age groups.

Population counts. We use information from the 1991 and 2001 rural Indian Census on the number of people living in a district. This information is also provided by age/age group and by gender.

Tariffs. Please see Section III-A.

Exports. $\exp ort_{d,t} = \sum_i \omega_{id} * \exp ort_{i,t}$ where $\omega_{i,d} \equiv \frac{Emp_{i,d}}{\sum_i Emp_{i,d}}$ is the employment of industry i in district d as a share total employment in district d. Data on employment by industry and by district is from the 1991 Indian Census. Industry exports for 1987 and 1997 are used for the 43rd and 55th round, respectively. Data on industry exports are from Annual Trade Database compiled by Tips Software Services Pvt. Ltd. Exports are expressed in millions real Rupees.

FDI. $FDI_{d,t} = \sum_i \omega_{id} * FDILib_{i,t}$, where $\omega_{i,d} \equiv \frac{Emp_{i,d}}{\sum_i Emp_{i,d}}$ is the employment of industry i in district d as a share total employment in district d. FDI is an indicator equal to one if the industry is in the list of industries with automatic permission for foreign equity share up to 51 percent at time t. Data on the list of such industries is compiled from various publications of the Handbook of Industrial Statistics. Data for 1987 and 1997 are used for the 43rd and 55th round, respectively.

Industry Licensing. $License_{d,t} = \sum_i \omega_{id} * License_{i,t}$ where $\omega_{i,d} \equiv \frac{Emp_{i,d}}{\sum_i Emp_{i,d}}$ is the employment of industry *i* in district *d* as a share total employment in district *d*. License is an indicator equal to one if the industry is subject to licensing requirements at time *t*. Details on policies regarding industrial delicensing were compiled from various publications of the Handbook of Industrial Statistics. Data for 1987 and 1997 are used for the 43rd and 55th round, respectively.

Number of Bank Branches. The number of bank branches per capita is the number of bank branches in the district as reported in the Directory of Commercial Bank Offices in India (Volume 1), Reserve Bank of India, 2000, divided by the district population from the 1991 Indian Census. Note that the number of bank branches represents the total number for the district. Data on the number of bank branches in the rural part of the district were not available.

Labor Regulation. State labor regulation indicators are from Besley and Burgess (2004), and indicate whether a state has a pro employer, pro worker, or neutral labor market regulation based on amendments to the 1947 Industrial Disputes Act. Smaller states not covered in Besley and Burgess (2004) were coded as neutral. We use information for 1991.

Poverty Measures. Headcount ratio and poverty gap are from Topalova (2005). They are computed from the household expenditure information in "thick" rounds of the Consumption and Expenditure Schedule of the NSS. The measures are computed at a district and NSS region level, using poverty lines proposed by Deaton (2003a, 2003b) and Deaton's methodology to adjust poverty measures in 1999/2000 NSS round for the change in the recall period.

Agricultural Wages. Agricultural wages are the average daily male agricultural wage in a district from the Evenson and McKinsey India Agriculture and Climate dataset (available at http://chd.ucla.edu/dev_data/index.html). The wage data, spanning 1971-1994 in the original dataset, was updated until 1998. We thank Rohini Pande and Siddharth Sharma for providing us with the updated data. Districts are defined by 1961 district boundaries. This data covers only a subset of districts

(271 across 13 Indian states). They are deflated by the state-specific Consumer Price Index for Agricultural laborers (CPIAL) (reference period October 1973-March 1974) from Bert Ozler, Gaurav Datt and Martin Ravallion (1996).

Consumption Tariff. Schedule 1 of the NSS contains a detailed consumption module with information on home production and purchases of an array of food and non-food goods. We use this data to construct district specific consumption weights for goods in the survey. Define $consshare_{p,d,1987}$ as the share of total expenditures in district d in 1987 spent on good *p*. The product of $consshare_{p,d,1987}$ with the tariff on good *p* at time *t* gives us a measure of how important a tariff on product *p* is for a district *d* resident, assuming homogenous transmission of tariffs across districts within a given product. Summing across all products, we derive a measure of the consumer's perception of tariffs in a given district: $ConsTariff_{d,t} = \sum_{p} consshare_{p,d,1987} * Tariff_{p,t}$.

Input Tariff. We rely on the Indian national input-output (IO) table for 1993, 1991 Indian Census, and output tariffs in the construction of the industry input tariffs. For each industry *i*, we create an input tariff for that industry as the weighted average of tariffs on inputs used in production for industry *i*. The weights are constructed as industry *j*'s share of industry *i*'s total input cost: $sh_{j,i,1993}$. The district input tariff is constructed by weighting industry *i*'s input tariff by *i*'s employment share in the district in 1991:

$$InputTariff_{d,t} = \sum_{i} \frac{Emp_{i,d,1991}}{TotalEmp_{d,1991}} \left(\sum_{j} sh_{j,i,1993} * Tariff_{j,t} \right)$$

Educational Loans. Information on whether a household has a loan for educational expense purposes is from the Employment and Unemployment schedule of the 43rd and 55th round of the NSS. This question is only asked to agricultural workers (excluding everybody that is self employed or employed elsewhere) and it covers on average 30% of households in a rural district.

Ratio of per capita expenditure of literate to per capital expenditure of illiterate. This ratio is computed in two ways. One measure is based on the information on household expenditures provided in the Employment and Unemployment module (schedule 10 of NSS) that does not suffer from changes in recall period in 1999/2000 round. The other measure is obtained from the consumption module (Schedule 1).

Educational Expenditure data. We rely on two sources for educational expenditure data. The first source is the expenditure data in Schedule 1 of the 43rd and 55th round of the NSS. The question on educational expenditure changed in the questionnaire between the 43 and 55th round from 30 day to 12 month recall period. Expenditures include expenditures on books and journals, newspapers, periodicals, library charges, stationery, tuition and other fees (school, college, etc.), private tutor/coaching centre (this category is only in the 55th round), other educational expenses. We compute per capita household education expenditure (deflated by deflators proposed by Deaton 2003a, 2003b) and the share of educational expenditures in the household total expenditures.

We also obtain information on educational expenditure from the 42nd (1986-87) and 52nd (1995-96) round of the NSS, Schedule 25.2, that do not suffer from the change in the questionnaire problem. However, they rely on fewer observations than the "thick" NSS rounds. The data reports the total expenditures on education that include tuition fee, examination fee, other fees & pays, books, stationeries, uniforms, transport charges, private coaching / tuition, and other expenditures for each child

in the household. We construct total educational expenditure as a share of total household expenditure, and total educational expenditure for each child 10-14. Using data from the 42nd round, we compute the prevalence of free tuition (free education), prevalence of mid-day meals, and prevalence of scholarships among children attending primary school at a district level.

School Infrastructure. We use the village abstracts in the 1991 Indian Census to construct the number of primary schools and total number of schools in rural district. Information on the number of primary and total number of schools in a district in the post reform period is from 7th (2002) All Indian Education Survey (AIES). We also use the 6th (1993) and 7th round of the AIES to obtain the pupil teacher ratios in each district.

VII. References

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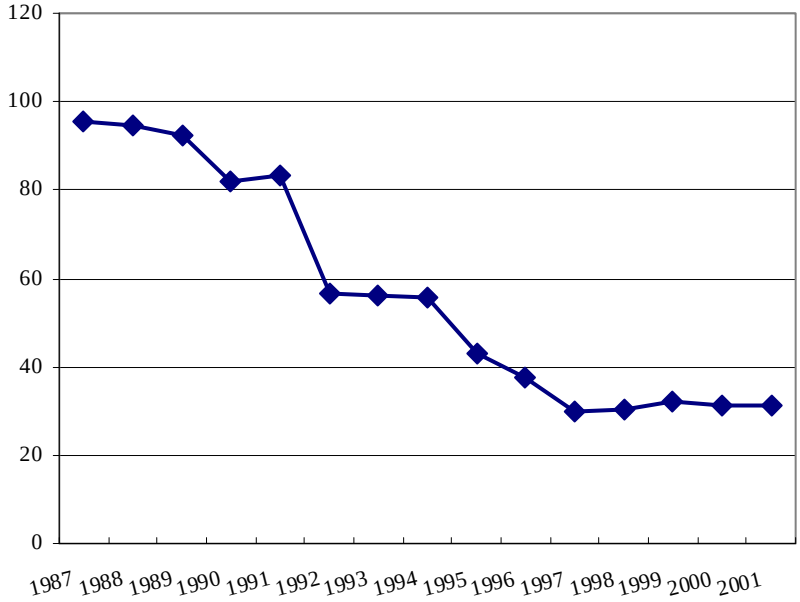
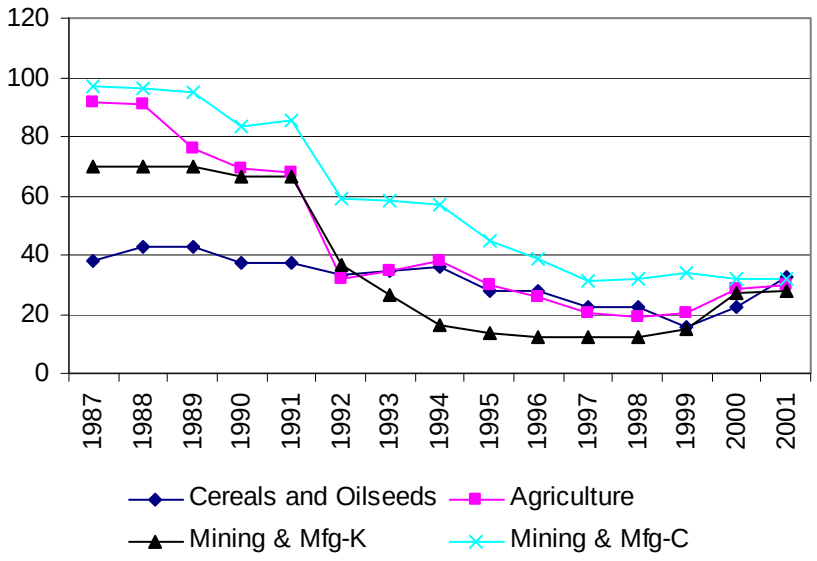
Figure 1: Average Nominal Tariffs



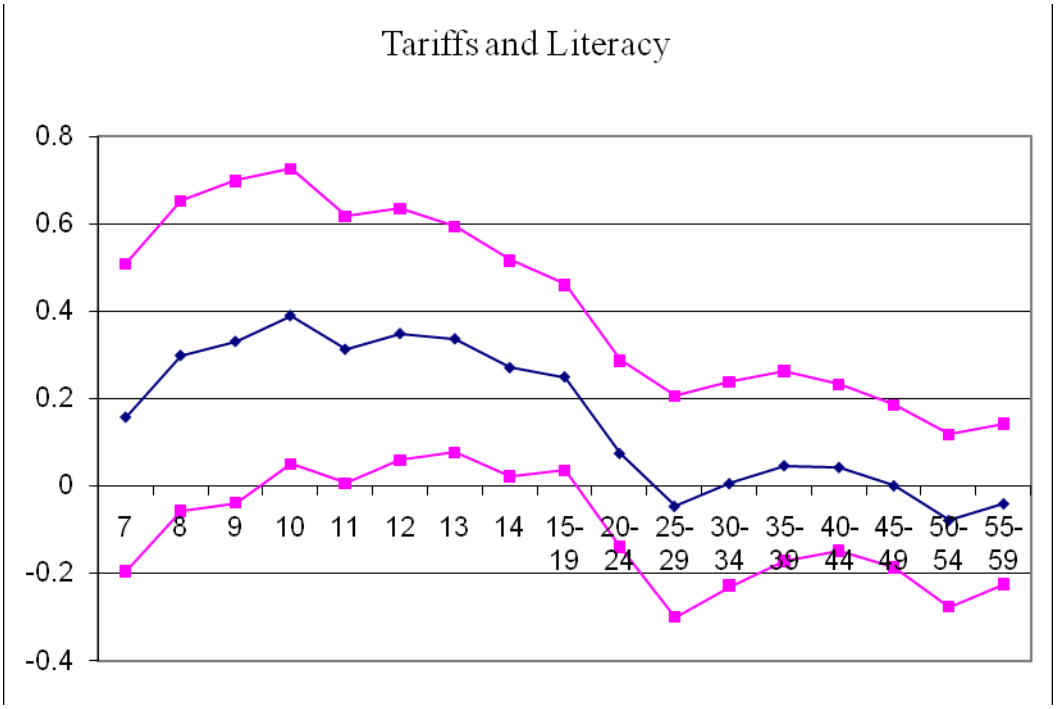
From Topalova (2005)

Figure 2: Tariffs by Industry Category



From Topalova (2005)

Figure 3: Tariffs and Literacy



Note: Each point on the middle curve represents the coefficient on tariff for the age group listed with the share of literate population in a district as dependent variable. Starting at age 15, the data are available only in 5 year age blocks. 95% confidence intervals are also reported. Data based on district-level tabulations of 1991 and 2001 Indian Census.

Table 1: Activities of Children in Rural India, 1983-2000

	1983	87/88	93/94	99/00
Attend School	.485	.550	.667	.727
Work	.360	.250	.205	.142
Work Only	.355	.246	.202	.137
Market Work	.193	.138	.109	.076
Domestic work	.167	.113	.096	.066

Note: Each cell contains the participation share in the indicated activity (row) for the indicated survey round of the NSS (column) for children ages 10-14. Information on participation in types of work is based on the child's principal usual activity. Domestic work includes chores, collection activities, and sewing, tailoring, weaving, etc for household use. Market work includes work in a household enterprise such as a farm or business, wage work, and begging. Work refers to participation in market work or domestic work as a principal usual activity. Work only indicates that the child reports market or domestic work as a principal usual activity and does not report attending school. All means are weighted to be nationally representative.

Table 2: District Tariff Measures in Rural India

	87/88	99/00
Tariff	.080	.025
Tariff on Traded Goods (Trtariff)	.883	.308
Agricultural Goods Only	.812	.230
Mining and Manufacturing Only	.901	.337

Note: Tariff is the employment weighted average nominal ad-valorem tariff at time t in a district. Employment weights are based on pre-liberalization employment shares in a district. Workes in nontraded industries (service, trade, transportation, construction, workers in growing of cereals and oilseeds) are assigned zero tariffs in all years in this measure. Average tariff on traded goods is employment-weighted tariff over the set of traded industries (i.e. it abstracts from individuals working in nontraded industries in a given district. All means are weighted. The tariff measure for 87/88 NSS round is based on tariff information for 1987. Tariff measure for NSS 99/00 round is based on tariff information for 1997.

Table 3: School Attendance and Tariffs in Rural India

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Data	pre and post reform	pre and post reform	pre and post reform	pre and post reform	pre reform only	pre and post reform	pre and post reform	pre and post reform
Tariff	0.376***		0.362**	0.618***	-0.087	0.370**	0.394***	0.471*
	[0.090]		[0.137]	[0.156]	[0.129]	[0.148]	[0.142]	[0.269]
Traded Tariff		0.124**						
		[0.055]						
Post Reform Indicator (Post)	0.172***							
	[0.011]							
Pre-reform Trend in Schooling*Post						0.178**		
						[0.078]		
IV with traded tariff	no	no	yes	yes	yes	yes	yes	yes
District Indicators	yes	yes	yes	n.a.	n.a.	yes	yes	yes
Initial District Conditions*Post	no	yes	yes	n.a.	n.a.	yes	yes	yes
Region Indicators	n.a.	n.a.	n.a.	yes	yes	n.a.	n.a.	n.a.
Initial Region Conditions*Post	n.a.	n.a.	n.a.	yes	yes	n.a.	n.a.	n.a.
Other Reforms Controls	no	no	no	no	no	no	yes	no
Consumption and Input Tariffs	no	no	no	no	no	no	no	yes
R^2	0.25	0.26	0.26	0.24	0.26	0.26	0.26	0.26
N	95488	95488	95488	95249	102955	93285	95249	95488

Standard errors in brackets are clustered at state-year level. ***, **, * denotes significance at 1, 5, and 10 percent level. **All regressions** include demographic controls (a third order polynomial in the child's age, a gender indicator, and a third order polynomial in age interacted with the gender indicator), controls for household characteristics (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), and a post reform survey round indicator. **Initial district conditions** that are interacted with post reform indicator include the percentage of workers in a district employed in agriculture, employed in mining, employed in manufacturing, employed in trade, employed in transport, employed in services (construction is the omitted category), the share of district's population that is a scheduled caste/tribe, the percentage of literate population in a district, and state-labor laws indicators. **Other reform controls** include controls for industry licensing, foreign direct investment, banks per 1000, exports, and number of primary schools per capita. **Consumption and input tariffs** include controls for tariff changes working through the districts consumption composition and the inputs used by industries in the district. Regressions in columns 4 and 5 replace all district-level variables with their equivalents at the region level. Differences in sample size across columns are due to missing data (column 4, 6, and 7) or different samples (column 5).

Table 4: Adult Male Employment in Wage Work by Literacy and Tariffs in Rural India.
Tariffs instrumented with traded tariff

	Participation in Wage Work	Days in Wage Work
	(1)	(2)
Panel A: Men, Illiterate		
Tariff	0.112	0.472
	[0.296]	[1.786]
Panel B: Men, Literate		
Tariff	-0.210*	-2.399***
	[0.116]	[0.764]

Standard errors in brackets are clustered at state-year level. ***, **, * denotes significance at 1, 5, and 10 percent level. All regressions include all of the controls and match the specification of column 3 of table 3. Data restricted to males ages 25-50. 48,805 illiterate men. 78,977 literate men.

Table 5: Activities of children by gender and tariffs in rural India

Tariff instrumented with traded tariff

	school	work	work only	market work	domestic work	idle
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: All						
tariff	0.362**	-0.117	-0.122	0.05	-0.167**	-0.240**
	[0.137]	[0.110]	[0.111]	[0.093]	[0.076]	[0.097]
Panel B: Boys						
tariff	0.261*	-0.122	-0.087	-0.07	-0.052**	-0.174
	[0.147]	[0.116]	[0.118]	[0.121]	[0.022]	[0.112]
Panel C: Girls						
tariff	0.501**	-0.127	-0.172	0.203**	-0.329*	-0.328**
	[0.206]	[0.150]	[0.148]	[0.099]	[0.165]	[0.129]

Standard errors in brackets are clustered at state-year level. ***, **, * denotes significance at 1, 5, and 10 percent level. All regressions include all of the controls and match the specification of column 3 of table 3. Diferences in sample sizes reflect missing observations. Sample size: 51153 boys, 44335 girls.

Table 6: Educational Expenditures and District Tariffs, Rural India
Tariff instrumented with traded tariff

	Household has education loan	Household Education Expenditure Per Capita	Hh. Education expenditure as a share of total hh expenditure	Individual Education Expenditure	Individual Education expenditure as a share of total hh expenditure
	(1)	(2)	(3)	(4)	(5)
Cross-sectional unit	household	household	household	individual	individual
Tariff	-0.030***	16.581***	0.054***	28.113***	0.045
	[0.010]	[4.580]	[0.016]	[7.763]	[0.029]
Data	43rd, 55th rnd	43rd, 55th rnd	43rd, 55th rnd	42nd, 52nd rnd	42nd, 52nd rnd
R2	0.01	0.13	0.14	0.28	0.02
N	49435	63732	63732	68647	68545

Standard errors in brackets are clustered at state-year level. ***, **, * denotes significance at 1, 5, and 10 percent level. Columns 1 -3 include all of the same controls as column 3 of table 3 except for the demographic controls as columns 1 -3 are estimated at the household level. Data in columns 1-3: 43rd and 55th round of NSS. Please see data appendix for details. Education loans data is only available for households of agricultural laborers. The changes in the recall period in the consumption modules of the NSS can effect the data used in columns 1-3. Columns 4 and 5 also include the demographic controls. The dataset used in columns 4 and 5 does not provide information on a household's religion. Data in columns 4 and 5: 42nd and 52nd round of NSS. 1987 tariff matched to 42nd round, 1994 tariff matched to 52nd round. The 42nd (1986) and 52nd (1995) round of NSS also provide information on total education expenditure per child and do not suffer from changes in the questionnaire (they have smaller sample sizes). Differences is sample sizes reflect different data sources and/or missing data.

Table 7: School Attendance, Schooling Costs, and Tariffs in Rural India

Tariff instrumented with traded tariff

	Attend School	Enrolled
Panel A		
Tariff	0.905***	0.877***
	[0.221]	[0.214]
Tariff X Mid-day Meal	-0.667**	-0.571*
	[0.299]	[0.307]
Panel B		
Tariff	0.716***	0.717***
	[0.196]	[0.194]
Tariff X Scholarship	-0.314	-0.893
	[2.995]	[3.025]
Panel C		
Tariff	2.872	2.934
	[1.813]	[1.789]
Tariff X Free Tuition	-2.223	-2.288
	[1.874]	[1.853]

Standard errors in brackets are clustered at state-year level. ***, **, * denotes significance at 1, 5, and 10 percent level. Household roster in 42nd round only provides information on enrollment, so we assume that school enrollment equal attendance in 42nd round in column 1. All regressions include same controls and match specification of column 3 of table 3. Data: 42nd and 52nd round of NSS. 1987 tariff matched to 42nd round, 1994 tariff matched to 52nd round. 68,059 observations

Table 8: Activities of Children, Poverty Head Count Rates, and Tariffs in rural India

First Stage

Tariff	-0.494**
	[0.239]

Two Stage Least Squares

Dependent variable:	school	work	work only	market work	domestic work	idle
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: All						
poverty measure	-0.794**	0.303	0.321	-0.036	0.338	0.473**
	[0.366]	[0.246]	[0.246]	[0.193]	[0.223]	[0.220]
Panel B: Boys						
poverty measure	-0.545	0.291	0.254	0.184	0.107**	0.291
	[0.329]	[0.242]	[0.244]	[0.245]	[0.044]	[0.237]
Panel C: Girls						
poverty measure	-1.167*	0.351	0.427	-0.347	0.698	0.740**
	[0.609]	[0.366]	[0.376]	[0.284]	[0.521]	[0.342]

Standard errors in brackets are clustered at state-year level. ***, **, * denotes significance at 1, 5, and 10 percent level. The results labeled **first stage** use 43rd and 55th round of NSS to compute district - year poverty estimates. The first stage regression shown is estimated at the district-survey round level. Regressions include district fixed effects, a survey round indicator, and the initial district characteristic*survey round intereactions listed in the notes to table 3. First stage estimates include only districts in states in which poverty lines are available. Results are similar if we include all states, with poverty lines assumed to be equal to neighboring states' poverty lines when missing. **Two stage least squares results** return to the child as the unit of observation. All regressions include all of the controls and match the specification of column 3 of table 3.

Appendix Table A.1: Descriptive Statistics

	Period		Source
	1987/88	1999/00	
Child Characteristics			NSS
Female	.458	.467	
Age	11.785	11.817	
Household Characteristics			NSS
Scheduled Caste	.183	.215	
Scheduled Tribe	.099	.106	
Hindu	.843	.830	
Islam	.106	.121	
Christian	.019	.019	
Sikh	.021	.017	
Head Female	.085	.086	
Head Age	45.077	44.576	
Head Literate	.463	.506	
Head Complete Primary	.139	.123	
Head Complete Middle	.083	.118	
Head Complete Secondary	.058	.062	
Head Complete Higher than Secondary	.013	.051	
Household Education Expenditure information (43rd and 55th round)	1987/88	1999/00	NSS
Household has loan for educational expense purposes	.003	.002	
Household Educational Expenditures per capita	2.752	4.597	
Log (1+hh educational expenditures per capita)	.647	1.184	
Household Educational Expenditure as a share of total household budget	.015	.022	
Education Expenditure information for an individual (42nd and 52nd round)	1986/87	1995/96	NSS
Educational Expenditures	8.660	14.267	
Log (1+educational expenditures)	1.268	1.791	
Educational Expenditure per child as a share of total household budget	.015	.015	
Baseline Prevalence of mid-day meals in a district (1986/87)	.192		
Baseline Prevalence of free tuition in a district (1986/87)	.903		
Baseline Prevalence of scholarships in a district (1986/87)	.021		

The reported numbers are means.

Appendix Table A.1 continued: Descriptive Statistics

	Period		Source
District-level variables	1987/88	1999/00	See data appendix
Consumption Tariff	.567	.177	
Input Tariff	.626	.199	
Exports	25.7	97.5	
Licensed Industries	.003	.001	
FDI	.000	.002	
Number of primary schools per person	.001	.001	
Number of banks per 1000 people	.064	.078	
Basline District Characteristics			1991 Census
Emp. Share Services	.072		
Emp. Share Transport	.013		
Emp. Share Trade	.033		
Emp. Share Mining	.005		
Emp. Share Agriculture	.806		
Emp. Share Manufacturing	.056		
Share Literate	.373		
Share Scheduled Caste/Scheduled Tribe	.321		
Other district-level variables	1987/88	1999/00	NSS
Headcount Ratio	.373	.242	
Poverty Gap	.089	.048	
PCE Literate/PCE Illiterate (Schedule 10)	1.324	1.248	
PCE Literate/PCE Illiterate (Schedule 1)	1.309	1.247	
PCE Primary/PCE Non-primary (Schedule 1)	1.401	1.317	
	1987	1998	
District Agricultural Wages (log real wages)	1.715	1.919	Pande, Sharma

The reported numbers are simple district means. PCE stands for percapita household expenditure.

Web Appendix for Trade Adjustment and Human Capital Investments: Evidence from Indian Tariff Reform

Eric V. Edmonds, Nina Pavcnik, and Petia Topalova

The attached tables are all mentioned in the paper text. They are not intended to be included in the paper's print publication. They will be available from the authors' websites and the journal's website if accepted.

Web Appendix Table 1: Coefficients on Demographic and Household Characteristics from Table 3 of Main Text

Column of Table 3:	1	2	3
Coefficients:			
Tariff	0.376***		0.362**
	[0.090]		[0.137]
Traded Tariff		0.124**	
		[0.055]	
Female	-2.934	-2.871	-2.815
	[3.048]	[3.086]	[3.079]
Age	1.624***	1.622***	1.623***
	[0.559]	[0.556]	[0.557]
Female * Age	0.726	0.71	0.696
	[0.781]	[0.791]	[0.789]
Age Squared	-0.133***	-0.133***	-0.133***
	[0.047]	[0.047]	[0.047]
Female * Age Squared	-0.062	-0.061	-0.059
	[0.066]	[0.067]	[0.067]
Age Cubed	0.004***	0.004***	0.004***
	[0.001]	[0.001]	[0.001]
Female * Age Cubed	0.002	0.002	0.002
	[0.002]	[0.002]	[0.002]
Scheduled Caste	-0.078***	-0.078***	-0.078***
	[0.013]	[0.013]	[0.013]
Scheduled Tribe	-0.115***	-0.116***	-0.116***
	[0.014]	[0.014]	[0.014]
Hindu	-0.03	-0.034	-0.034
	[0.027]	[0.026]	[0.026]
Muslim	-0.123***	-0.127***	-0.127***
	[0.029]	[0.029]	[0.029]
Christian	0.011	0.007	0.008
	[0.035]	[0.034]	[0.034]
Sikh	-0.002	-0.007	-0.007
	[0.039]	[0.038]	[0.038]
Head is Female	0.088***	0.089***	0.088***
	[0.012]	[0.012]	[0.012]
Head's Age	0.003***	0.003***	0.003***
	[0.000]	[0.000]	[0.000]
Head is Literate	0.169***	0.168***	0.169***
	[0.010]	[0.010]	[0.010]
Head Completed Primary	0.067***	0.068***	0.068***
	[0.007]	[0.007]	[0.007]
Head Completed Middle Secondary	0.120***	0.121***	0.121***

Web Appendix Table 1: Coefficients on Demographic and Household Characteristics from Table 3 of Main Text

Column of Table 3:	1	2	3
	[0.010]	[0.010]	[0.010]
Head Completed Secondary	0.166***	0.169***	0.168***
	[0.015]	[0.015]	[0.015]
Head Completed Post Secondary	0.178***	0.181***	0.181***
	[0.016]	[0.016]	[0.016]
Post Reform Indicator	0.172***		
	[0.011]		
Post * Fraction Literate		-0.285***	-0.267***
		[0.059]	[0.063]
Post * Fraction Scheduled Caste or Tribe		0.015	0.011
		[0.023]	[0.023]
Post * Fraction in Manufacturing		-0.218	-0.146
		[0.296]	[0.304]
Post * Fraction in Agriculture		-0.142	-0.25
		[0.264]	[0.264]
Post * Fraction in Wholesale and Retail Trade		0.794*	0.865*
		[0.424]	[0.435]
Post * Fraction in Transport		-1.039	-1.542**
		[0.743]	[0.690]
Post * Fraction in Mining		-0.146	0.042
		[0.370]	[0.355]
Post * Fraction in Services		-0.569	-0.683
		[0.418]	[0.426]
Post * Proemployer Labor Laws		0.039**	0.043**
		[0.017]	[0.017]
Post * Neutral Labor Laws		0.016	0.02
		[0.020]	[0.019]
R2	0.25	0.26	0.26
N	95488	95488	95488

See table 3 of main text for notes. Column headings in this table correspond to those of table 3 in the main text.

Web Appendix Table 2: First Stage Results for Table 3, column 3

Dep. Variable: District Tariff	
District Tariffs on Traded Goods	0.341***
(TrTariff)	[0.068]
Demographic Characteristics	yes
Household Characteristics	yes
District Indicators	yes
Post Reform Indicator	yes
Initial District Characteristics*Post Reform	yes
F statistic for significance of instrument	24.88
R^2	0.92
Number Observations	95488

Standard errors in parenthesis are clustered at state-year level. ***, **, * denotes significance at 1, 5, and 10 percent level. 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 an indicator for whether a child's household belongs to a scheduled caste or 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. Initial conditions that are interacted with post reform indicator include the percentage of workers in a district employed in agriculture, employed in mining, employed in manufacturing, employed in trade, employed in transport, employed in services (construction is the omitted category), the share of district's population that is a scheduled caste/tribe, the percentage of literate population in a district, and state-labor laws indicators. Data: 43rd and 55th rounds of the NSS.

Web Appendix Table 3: School Attendance and Tariffs in Rural India with no Demographic and Household Controls

	(1)	(3)	(6)
Tariff	0.415***	0.541***	0.536***
	[0.094]	[0.169]	[0.185]
Post Reform Indicator (Post)	0.185***		
	[0.013]		
Pre-reform Trend in Schooling*Post			0.133
			[0.090]
IV with traded tariff	no	yes	yes
District Indicators	yes	yes	yes
Initial District Conditions*Post	no	yes	yes
R^2	0.12	0.12	0.12
N	95488	95488	95488

Standard errors in brackets are clustered at state-year level. ***, **, * denotes significance at 1, 5, and 10 percent level. These regressions are the same as those reported in respective columns in table 3, except they do not control for demographic, household, and household head characteristics characteristcs. Column headings of this table (1, 3, 6) correspond to regression results in column 1, 3, and 6 of table 3 in the main body of the paper.

Web Appendix Table 4: School Attendance, Tariffs, and Other Reforms in Rural India

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tariff	0.362**	0.319**	0.365***	0.387***	0.408***	0.383***	0.394***
	[0.137]	[0.139]	[0.135]	[0.136]	[0.148]	[0.125]	[0.142]
Licensed Industries		-9.168**					-9.252**
		[3.702]					[3.735]
FDI			1.94				-0.054
			[4.235]				[4.552]
Number of banks per 1000 people				1.645***			1.665***
				[0.394]			[0.446]
Exports					-0.0001*		-0.0001*
					[0.0001]		[0.0001]
Number of primary schools per capita						25.031	11.361
						[18.173]	[18.428]
IV with traded tariff	yes	yes	yes	yes	yes	yes	yes
Demographic Controls	yes	yes	yes	yes	yes	yes	yes
Household Controls	yes	yes	yes	yes	yes	yes	yes
Post Reform Indicator (Post)	yes	yes	yes	yes	yes	yes	yes
District Indicators	yes	yes	yes	yes	yes	yes	yes
Initial District Conditions*Post	yes	yes	yes	yes	yes	yes	yes
R^2	0.26	0.26	0.26	0.26	0.26	0.26	0.26
N	95488	95488	95488	95249	95488	95488	95249

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. Initial district conditions that are interacted with post reform indicator include the percentage of workers in a district employed in agriculture, employed in mining, employed in manufacturing, employed in trade, employed in transport, employed in services (construction is the omitted category), the share of district's population that is a scheduled caste/tribe, the percentage of literate population in a district, and state-labor laws indicators. Differences in sample size in columns 4 and 7 are due to missing data.

Web Appendix Table 5: Schooling Infrastructure and Tariffs in Rural Districts

	Number of Primary Schools per capita (Census, AIES)	Total Schools per capita (census, AIES)	Number of Primary Schools per capita (AIES)	Total Schools per capita (AIES)	Pupil Teacher Ratio in Primary Schools (AIES)	Pupil Teacher Ratio in Upper Primary schools (AIES)
	(1)	(2)	(3)	(4)	(5)	(6)
Tariff	-0.0005	-0.0003	-0.0004	-0.0001	30.71	20.661
	[0.0012]	[0.0011]	[0.0009]	[0.0010]	[36.966]	[24.196]
IV with traded tariff	yes	yes	yes	yes	yes	yes
District Indicators	yes	yes	yes	yes	yes	yes
Post Reform Indicator (Post)	yes	yes	yes	yes	yes	yes
Initial District Conditions*Post	yes	yes	yes	yes	yes	yes
R2	0.93	0.93	0.96	0.95	0.83	0.84
N	798	798	798	798	787	787

Notes: Standard errors in brackets are clustered at state-year level. ***, **, * denotes significance at 1, 5, and 10 percent level. Information on number of primary schools per capita and total schools per 1991 capita in columns 1 and 2 is from 1991 Census (for pre-reform period) and 7th AIES for post reform period. Information in columsn 4-6 is from 6th and 7th AIES for the pre- and post- reform round, respectively. Initial district conditions that are interacted with post reform indicator include the percentage of workers in a district employed in agriculture, employed in mining, employed in manufacturing, employed in trade, employed in transport, employed in services (construction is the omitted category), the share of district's population that is a scheduled caste/tribe, the percentage of literate population in a district, and state-labor laws indicators. Differences in sample sizes reflect missing observations.

Web Appendix table 6: Rural Schooling Attendance and Alternative District Tariffs

Dep. Variable: Attend School	(1)	(2)	(3)	(4)	(5)
Tariff (Employment Based)	0.362**		0.365***		0.471*
	[0.137]		[0.134]		[0.269]
Consumption tariff		-0.076	-0.122		-0.151
		[0.117]	[0.115]		[0.147]
Input tariff				-0.322	-0.413
				[1.243]	[1.187]
IV for Employment Based Tariff	yes	n.a.	yes	n.a.	yes
IV for Consumption Tariff	n.a.	no	no	n.a.	no
IV for Input Tariff	n.a.	n.a.	n.a.	yes	yes
Demographic Controls	yes	yes	yes	yes	yes
Household Controls	yes	yes	yes	yes	yes
District Indicators	yes	yes	yes	yes	yes
Post Reform Indicator (Post)	yes	yes	yes	yes	yes
Initial District Conditions*Post	yes	yes	yes	yes	yes
R^2	0.26	0.26	0.26	0.26	0.26
N	95488	95488	95488	95488	95488

Standard errors in brackets are clustered at state-year level. ***, **, * denotes significance at 1, 5, and 10 percent level. Demographic controls include third order polynomial in child's age and gender. 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. Initial district conditions that are interacted with post reform indicator include the percentage of workers in a district employed in agriculture, employed in mining, employed in manufacturing, employed in trade, employed in transport, employed in services (construction is the omitted category), the share of district's population that is a scheduled caste/tribe, the percentage of literate population in a district, and state-labor laws indicators.

Web Appendix table 7: Population and Tariffs by District, Rural Census Results

	Log Population			Male Female Ratio		
	0-14	15+	Total	0-14	15+	Total
	(1)	(2)	(3)	(4)	(5)	(6)
Tariff	-0.075	-0.223	-0.164	0.076	-0.136	-0.077
	[0.251]	[0.144]	[0.171]	[0.070]	[0.124]	[0.083]
IV with Traded Tariff	yes	yes	yes	yes	yes	yes
District Indicators	yes	yes	yes	yes	yes	yes
Post Reform Indicator (Post)	yes	yes	yes	yes	yes	yes
Initial District Conditions*Post	yes	yes	yes	yes	yes	yes
R2	0.99	1	1	0.96	0.9	0.92
N	798	798	798	798	798	798

Notes: Standard errors in brackets are clustered at state-year level. ***, **, * denotes significance at 1, 5, and 10 percent level. Initial district conditions that are interacted with post reform indicator include the percentage of workers in a district employed in agriculture, employed in mining, employed in manufacturing, employed in trade, employed in transport, employed in services (construction is the omitted category), the share of district's population that is a scheduled caste/tribe, the percentage of literate population in a district, and state-labor laws indicators. Data: district tabulations of 1991 and 2001 Indian Census.

Web Appendix table 8: District Per Capita Consumption, Adult Literacy, and Tariffs in Rural India

	PCE Literate/ PCE Illiterate	log (PCE Literate/ PCE Illiterate)	PCE Literate/ PCE Illiterate	log (PCE Literate/ PCE Illiterate)	PCE Primary/ PCE Non-Primary	log (PCE Primary/ PCE No Primary)
	(1)	(2)	(3)	(4)	(5)	(6)
Tariff	-0.032	0.042	-0.678	-0.468	-0.351	-0.244
	[0.266]	[0.199]	[0.563]	[0.424]	[0.343]	[0.257]
IV with Traded Tariff	yes	yes	yes	yes	yes	yes
District Indicators	yes	yes	yes	yes	yes	yes
Post Reform Indicator (Post)	yes	yes	yes	yes	yes	yes
Initial District Conditions*Post	yes	yes	yes	yes	yes	yes
Data Source	Schedule 1	Schedule 1	Schedule 10	Schedule 10	Schedule 1	Schedule 1
r2	0.63	0.63	0.58	0.59	0.64	0.65
N	798	798	798	798	797	797

There are two ways to measure per capita expenditures in the NSS data. In columns 1, 2, 5, and 6 we use per capita expenditure measures from the detailed expenditure modules (Schedule 1). There is a substantive questionnaire change between rounds in this module that is a cause for concern if recall biases or purchase frequencies differ with literacy (or primary school completion in columns 5 and 6). As a robustness check, we replicate our approach using the household per capita expenditure reported in the Employment and Unemployment Schedule 10 of the NSS that does not suffer from this problem in columns 3 and 4. Notes: Standard errors in brackets are clustered at state-year level. Initial district conditions that are interacted with post reform indicator include the percentage of workers in a district employed in agriculture, employed in mining, employed in manufacturing, employed in trade, employed in transport, employed in services (construction is the omitted category), the share of district's population that is a scheduled caste/tribe, the percentage of literate population in a district, and state-labor laws indicators. Differences in sample sizes reflect missing observations.

Web Appendix Table 9: Activities of Children, Poverty Gaps, and Tariffs in rural India

	poverty measure: poverty gap					
First Stage						
Tariff	-0.195***					
	[0.069]					
Two Stage Least Squares						
Dependent variable:	school	work	work only	market work	domestic work	idle
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: All						
poverty measure	-2.354**	0.897	0.952	-0.106	1.003	1.402**
	[1.001]	[0.688]	[0.682]	[0.575]	[0.624]	[0.648]
Panel B: Boys						
poverty measure	-1.623*	0.865	0.757	0.548	0.318**	0.867
	[0.896]	[0.679]	[0.686]	[0.703]	[0.129]	[0.692]
Panel C: Girls						
poverty measure	-3.426*	1.028	1.253	-1.018	2.046	2.173**
	[1.730]	[1.043]	[1.064]	[0.791]	[1.437]	[1.011]

Standard errors in brackets are clustered at state-year level. ***, **, * denotes significance at 1, 5, and 10 percent level. The results labeled **first stage** use 43rd and 55th round of NSS to compute district - year poverty estimates. The first stage regression shown is estimated at the district-survey round level. Regressions include district fixed effects, a survey round indicator, and the initial district characteristic*survey round intereactions listed in the notes to table 3. First stage estimates include only districts in states in which poverty lines are available. Results are similar if we include all states, with poverty lines assumed to be equal to neighboring states' poverty lines when missing. **Two stage least squares results** return to the child as the unit of observation. All regressions include all of the controls and match the specification of column 2 of table 3.