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

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Abstract: Can the short and medium term adjustment costs associated with trade liberalization have long term consequences through their impact on schooling and child labor? We examine this question in the context of India's 1991 tariff reforms. Overall, in the 1990s, rural India experienced a dramatic increase in schooling and decline in child labor. However, communities that relied heavily on employment in protected industries before liberalization do not experience as large an increase in schooling or decline in child labor. The data suggest that this failure to follow the national trend of increasing schooling and diminishing work is associated with a failure to follow the national trend in poverty reduction. Schooling costs appear to play a large role in this relationship between poverty, schooling, and child labor. Extrapolating from our results, our estimates imply that roughly half of India's rise in schooling and a third of the fall in child labor during the 1990s can be explained by falling poverty and therefore improved capacity to afford schooling.

Keywords: Schooling, Child Labor, Trade Liberalization, India

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1. Introduction

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 born by these workers subsequent to trade reforms in many developing countries (see, for example, Harrison and Hanson (1999) and Revenga (1997) for Mexico, Currie and Harrison (1997) for Morocco, Attanasio et al (2004) and Goldberg and Pavcnik (2005) for Colombia, Topalova (2005) for India).

Our study considers whether these short and medium-term adjustment costs of trade reform can have longer term implications through their influence on schooling and work decisions of children. There are several possible channels through which the labor market impacts of trade liberalization could affect 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 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 (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 Schultz (1960), Rosenzweig and 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 (Becker 1965, 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 employment loss of protection.[1] However, understanding the implications for children of the adjustment costs

[1] Several studies assess the aggregate relationship between trade and child labor or schooling (Shelburne 2001, Cigno, Rosati, and 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 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.

associated with trade reform's impact on the labor market is important given the theoretical possibility of poverty traps generated by a lack of education (Barham et al 1995), child labor (Basu and Van 1998), or occupational choice (Banerjee and 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 dramatic, unanticipated trade liberalization. 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. 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 Duflo and Pande (2007) focus on the district as the unit relevant for the labor market 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 tariff changes on economy wide changes in schooling and child labor. Rather, we consider how schooling and child labor changes differ in districts with large changes in tariff protection on employment relative to districts with little change in tariff protection.

We observe smaller increases in school attendance among children 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. Importantly, 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 whose education should have been completed before the onset of trade liberalization. These robustness checks provide important validation of our empirical approach.

A strong poverty-schooling relationship is the most likely explanation for our findings. We observe little evidence of a strong link between employment exposure to tariff changes and returns to education or child labor demand. Yet, 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 schooling, 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 more in districts with larger tariff declines, the additional work is largely 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 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.

This emphasis on the schooling costs explanation for a poverty-schooling connection is important in understanding human capital investment. The empirical evidence on the poverty-child labor-schooling link is fraught with econometric challenges. Even studies that find a robust statistical link do not pinpoint the reason for this relationship (Behrman and Knowles 2001, Glewwe and Jacoby 2004, Edmonds 2005, Yang 2006). 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, Baland and Robinson 2000). However, our emphasis on schooling costs is consistent with 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. Moreover, recent experimental evidence from Angrist et al (2002) and Duflo et al (2006) shows substantive changes in schooling in interventions designed to lower schooling costs. A natural question is the extent to which similar interventions can expedite improvements in schooling during development, and our contribution to this experimental evidence is the extent to which this seems possible given that schooling costs appear important in understanding how schooling changes with living standards.

The paper proceeds as follows. In Section 2, we provide a conceptual framework. In Section 3, we describe the data and Indian trade reform. In Section 4, we outline the empirical methodology. Section 5 discusses the empirical estimates of the relationship between schooling and tariffs and establishes the robustness of results. Section 6 explores the underlying mechanisms behind the relationship between schooling and tariff changes. Section 7 concludes.

2. 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 born by formerly protected workers, and there is a corresponding empirical economics literature devoted to understanding these adjustment costs born by labor because of the loss of final product protection (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, but other direct costs including fees, books, uniforms, tutoring, and transportation costs can and indirect costs associated with the child's need to conform to the social norms of students in the school 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 treat 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:

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

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:

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

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 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^*.

Rewriting (3), we have:

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

This implies three explanations for declining schooling in the context of declining final product protection for employment ($dt < 0$). First, diminishing positive marginal utility of income implies

[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, 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 5.5 for evidence). In addition, to the extent there is no significant variation in consumption bundles across areas in India, the impact through consumption is indistinguishable from time trends.

$\partial v_s / \partial y > \partial v_0 / \partial y > 0$. 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.

3. Background

3.1. 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).[4] We analyze the activities of more than 95,000 children age 10-14. [5] The NSS is a repeated cross-section at the level of individuals (households). Topalova (2005) has matched districts across rounds and in so-doing added this geographic panel dimension to the data.

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. We define a child's work status based on a survey question about the child's usual principal activity. The question distinguishes between the following categories of work: regular salaried/wage employee, casual wage laborer, begging, 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."

[4] NSS is a nationally representative, large-scale multipurpose household survey that provides information on household expenditures, household demographic characteristics, education, and employment among others.

[5]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. We are not able to infer anything about changes in the status of these children during India's trade liberalization.

[6] Changes in the NSS questionnaire over time have created substantive issues for the measurement of consumption, poverty, etc (see for example, Tarozzi 2005). However, our measures of the activities of children rely on questions that have been asked in a consistent manner in each of the survey rounds.

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 percent work without school in 1999/2000.[8] The bottom panel separates work into market and domestic work. The declines in market work have been similar in magnitude to the declines in domestic work as a principal usual activity. Because our identification relies on between district variation in changes in protection from national changes in tariffs, we cannot assess how important trade liberalization has been for these aggregate trends in school attendance or child labor. Our results should only be interpreted as

[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.

[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.

capturing how the variation in the outcome variables around the underlying time trends is associated with the variation in the district exposure to tariff reforms.

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 data appendix.

3.2 Indian Trade Reform

India provides an excellent setting to study the relationship between trade policy, child labor and schooling. In August 1991, India launched a dramatic unilateral trade liberalization. The reforms were initiated in the context of a currency crisis as a condition of an IMF bailout. Several features of the trade reform are crucial for our study. First, because tariffs were high prior to 1991, the reform drastically reduced the level of tariff protection. The average tariff declined from 83 % in 1991 to 30% in 1997 (Figure 1).[9] Tariff reductions are smaller in some sector 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 (Hasan et al, forthcoming).[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, 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 (Chopra et al, 1995). Industries with larger pre-reform tariffs experienced larger tariff declines. 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. 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. In fact, Topalova (2004,

[9] The sources of tariff data are various publications of the Indian Ministry of Finance.

[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.

2005) shows that tariff changes are not strongly correlated with baseline industry characteristics such as productivity or skill intensity at the industry level. This observation is consistent with Gang and 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 changed.

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 subsequently to the end of this plan, which may reflect various political economy factors. Hence, 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). NTB 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. 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 limited available data on NTBs suggest that tariffs and NTBs are positively correlated during this period (higher tariffs, higher NTBs: Topalova 2005) albeit with a time lag. Given this positive correlation, it is possible in theory that a portion of the adjustment costs attributed to tariffs may owe to NTB declines, although some robustness checks suggest this not to be necessary the case (see the discussion around table 4 below). Despite the slower NTB reforms, the tariff changes considered herein are mirrored in increases in imports. The share of merchandise trade in GDP increased from about 10% in 1986/87 to about 19% in the late 1990s.

4. Empirical Strategy

4.1. 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 to construct an employment weighted regional exposure of trade reforms (see Harrison (2006), Goldberg and Pavcnik (forthcoming) for surveys). As illustrated in Section 2, 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 5.5.

In this study, we follow Topalova (2005) and rely on India's considerable geographic diversity in how families are affected by the national tariff changes. India is divided into almost 450 districts. [11] Districts differ in their industrial composition *before* the 1991 reforms. Our identification strategy exploits geographic and time heterogeneity within India in 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 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.[12] The district tariff at time *t* is the district-specific employment weighted sum of industry-specific national tariffs *(i.e.* $tariff_{i,t}$*)*:

[11]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.

[12]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.

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

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.[13] Non-traded industries are assigned zero tariffs in all years,[14] resulting in average district tariffs, substantially lower than average tariffs on traded goods. The top row of Table 2 summarizes the time trend in the average district tariff between 1987 and 1999/2000 for the years in which we have household survey data.[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 percent average product tariff for 1987 in Figure 1 and the corresponding 8 percent average district tariff in Table 2. Subsequently, we create a 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 influenced 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]

[13]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.

[14] Since our identification strategies relies on the within-district change in trade exposure, it does not matter whether we assign non traded industries to have 0 or infinite tariffs as long as these tariffs do not change over time.

[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. We use a lag because there is likely some delay in how national policies affect regional outcomes and because of the political economy concerns that arise after 1997.

[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).

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 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 (Das Gupta (1987), Topalova (2005), 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.[18]

4.2 Empirical Framework

Our empirical strategy is straightforward. Indian districts vary in their exposure to trade reforms based on the composition of employment *prior* to the reforms. We compare how schooling and child labor changed in districts that experienced larger tariff cuts, relative to districts that experienced smaller tariff cuts. While we control for individual correlates with the detailed micro data of the NSS, it is the district panel dimension of the data that generates the variation used to identify the effects of tariff declines on schooling/child labor. $Tariff_{dt}$ is our measure of the district *d*'s tariff at time *t* and is constructed as described in Section 4.1. Let y_{jhdt} denote an indicator for participation in activity *y* (for example, attend school as detailed in Section 3.1) by child *j* living in household *h* in district *d* at time (survey round) *t*. Our base specification is then:

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

[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.

[18] India is divided into 77 regions and a region is a collection of several districts. Creation of regional tariffs enables us to check the robustness of our findings.

where $\pi\left(A_{jt}, G_{jt}\right)$ is a third order polynomial in the child's age, a gender indicator, and a third order polynomial in age interacted with the gender indicator. 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.

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 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. β_1, the coefficient on district tariffs, is our main coefficient of interest. Because district tariffs are constructed with constant pre-liberalization employment weights, the econometric work is attempting to build the counterfactual of how child labor and schooling would have changed if the only parameter changing 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 cuts are associated with decreases in schooling relative to a 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. Differential time-trends in schools correlated with both baseline industrial composition and national level tariff changes could be a source of bias. As there are a number of reasons to expect time trends in schooling to be correlated with baseline employment composition, the unusual circumstances of India's tariff reforms are important for our identification. As discussed in Section 3.2, Topalova (2005) makes a convincing case that the usual concerns with the political economy of protection are less severe in the case of the 1991 Indian reforms because there was little scope until 1997 for lobbying groups to influence tariff changes. The exogenous nature of tariff changes could be in doubt if tariff changes are correlated with pre-reform industry characteristics, and differences between industries in these characteristics influence differential time

trends in schooling. However, Topalova (2005) shows that tariff changes in traded sectors are not statistically significantly correlated with industry characteristics such as the share of educated workforce, real wage, etc, and Gang and Pandey (1996) argue that pre-reform tariffs were largely set in 1955 and do not reflect contemporaneous economic and political circumstances.

Bias in estimating the coefficient on tariff β_1 in (6) requires a differential time trend correlated with both the tariff change at the national level and baseline employment composition in a district, and the most obvious concern is bias owing to the size of the non-traded sector in a district. As noted in section 4.1., changes in the district tariff measure in (5) depend in part on the size of the non-traded sector in a given district. The non-traded sector enters the employment total but experiences no change in tariffs. Consequently, everything else equal, there is a mechanical correlation between a district's tariff change and the share of employment in the non-traded sector. If time trends in schooling are correlated with the fraction of employment in the non-traded sector in a district, β_1 in (6) would be biased.

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 a scheduled caste/tribe, the share of literate population in a district, and state labor laws indicators as defined in Besley and Burgess (2004). Second, we instrument for district tariff with district tariff on traded goods, $TrTariff_{dt}$ (described in Section 4.1), 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 appendix table 2. Third, in our 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 5.2., 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 5.3, we verify that the results on schooling and literacy are restricted only to those who were of school going age during the 1990s. The results from these robustness checks are all consistent with our basic findings, to which we turn next.

5. Main Findings

5.1. School Attendance

School attendance in rural India in the 1990s 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 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. In all specifications, standard errors are clustered at the state-year level.[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). 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 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.[20]

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

[19]We have one year of data prior to the reform and one year of data after the reform, 13 years later.

[20] 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.

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 and child labor reduction in the 1990s in India.

5.2 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.

Let us 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 district identifiers are not available in the 38th round of the NSS.[21] 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 4. In column 3, we provide a region level variant of column 2 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 4) will be similar to the coefficient estimated with data before and after the reform (column 3). In fact, the pre-reform coefficient is opposite in sign and much smaller in magnitude. As an additional check in column (5), we allow the pre-reform trend in schooling in a region to have a time-varying effect (by interacting the trend with 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 2.

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 (Aghion, Burgess, Redding and Zilliboti 2005), relaxation of entry regulation of foreign direct investment, and substantial reforms in the financial and banking sectors. Following Topalova (2005), we

[21]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.

construct district employment-weighted share of industries subject to industrial licensing and district employment-weighted share of industries open to FDI (see data appendix). The number of bank branches per capita in a district controls for the possibly confounding effect of banking reforms. In columns 2-4 of Table 4, we estimate equation (7) with these additional controls and neither the magnitude of the coefficient on district tariff nor the statistical significance are sensitive to including these time-varying district measures of reforms. We view these reform variables simply as controls and the coefficients on them do not warrant a causal interpretation. We also verify that the results are robust to the inclusion of exports, by including the district employment-weighted industry exports (column 5). In sum, we find little evidence that our findings reflect other reforms concurrent with the 1991 tariff reductions.

Over the 1990s, substantial policy attention has been directed towards the promotion of schooling in India, which could confound our results if schooling policy changes are correlated with the district's exposure to trade reforms.[22] There is no reason to suspect that programs like Operation Blackboard (Chin 2005), the District Primary Education Project launched in November 1994 (Pandey 2001), or mid-day meals (Dreze and Kingdon 2001) are correlated with district tariff changes.[23] We examine education infrastructure changes 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 infrastructure at the district level from the 6th (1993) and 7th All India Education Surveys.[24] We mimic our main specification and regress several measures of district school quantity and quality on the corresponding district tariff, post-reform indicator, pre-reform district characteristics interacted with the post-reform indicator, and instrument for tariffs with traded tariffs. The results are in Table 5. None of the correlations between schooling infrastructure and tariffs are statistically significant. If anything, larger tariff declines are associated with an increase in the number of primary schools and the number of

[22] 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.

[23] 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 statistically insignificant.

[24] The 6th round of the AIES is the earliest available at the district level. As it occurs slightly more than a year after the initial tariff reforms are implemented, we treat it as a baseline. However, due to the ambiguous timing, results in columns 3-6 of Table 5 should be viewed with caution.

primary schools per capita, and a decline in pupil teacher ratios. If more schools (Duflo 2001) or lower pupil-teacher ratios (Case and Deaton 1999) lead to increased schooling, our estimate of the impact of tariffs on schooling would be downward biased. Overall, these findings are consistent with our review of education and child labor policy in India over the 1990s – while there is considerable activity, there are no district level interventions that are obviously correlated with district tariff changes.

Not surprisingly, controlling for the number of primary schools per capita in a district in our basic specification has little overall effect on our estimates of how schooling changes with tariff declines (Table 4, column 6). The number of primary schools per capita is positively (but insignificantly) correlated with school attendance, however its inclusion does not affect the coefficient on tariffs. Column 7 of Table 4 estimates equation (7) controlling for the number of primary schools per capita in a district and all other district measures of time-varying policy. The estimate of tariff coefficient barely changes.

5.3 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.[25] The estimated coefficient on the tariff measure and the 95 percent confidence interval for each age group is plotted on Figure 3.

[25] Starting at age 15, the data are available only in 5 year age blocks.

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 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.[26] The decline in literacy with tariff declines (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 treatments 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.

5.4 Selective Migration

Figure 3 also suggest that it is unlikely that selective migration of individuals drives our findings. For example, if families whose kids attend school migrated away from districts that were more exposed to larger tariff declines, one would observe a negative relationship between child school attendance and tariff decline. However, given the positive correlation between adult and child education noted in many previous studies, one would also observe a negative relationship between adult literacy and tariff declines. This is not what figure 3 indicates. The absence of selective migration is consistent with the surprisingly low labor mobility in rural India discussed above.

We directly test whether changes in district population counts in the 1991 and 2001 censuses are associated with district tariff changes (Table 6). In the first three columns of Table 6, we mimic our basic approach in equation (7) using log population counts by district as a dependent variable and regress it on a district tariff, post-reform indicator, pre-reform district characteristics interacted with the post-reform indicator, and instrument for tariffs with traded tariffs. In the last three columns, we

[26]One possible mechanism for the schooling impacts observed herein is the sustained impact of a transitory shock in utero, but the persistence across treated ages in Figure 3 is not what that explanation would predict.

estimate this specification with the ratio of males to females in a district as the dependent variable. There is no evidence in Table 6 or figure 3 suggesting substantive changes in population or composition associated with employment tariffs.

5.5 Other trade channels

The focus on an employment based measure of exposure to tariff is standard in the trade literature. This reflects the belief that it is the labor market where the adjustment costs will be most evident. However, tariff changes will also influence households through consumption and intermediate input 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.

Tariff-induced declines in consumer prices should have an income effect that increases schooling and a substitution effect that encourages families to consume more consumption goods at the expense of schooling and leisure. The consumption effects are absorbed by the post-reform indicator in equation (7) if individuals in different districts consume the same consumption bundle and prices of goods equalize across districts. 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 table 7. We estimate our main specification (7) by including a district specific consumption weighted tariff as a regressor (see data appendix for construction). Column 1 of table 7 reproduces our main specification from table 3. Column 2 reports results when we estimate our main specification (7) with consumption tariff as the main independent variable of interest, and column 3 reports estimates of the coefficients of interest when we include both the employment weighted tariff and the consumption tariff in equation 7.[27] The estimated impact of employment weighted tariff on school attendance conditional on consumption tariff in column 3 is very similar to what we obtain in our main specification.

For declining intermediate input prices to generate our findings above, declining input prices would need to lower family incomes or increase child labor's productivity. This later channel is unlikely,

[27] Two important caveats regarding the consumption results need to be discussed. First, they are imprecise. The results in column 2 of table 7 are consistent with an increase in schooling of 12 percentage points or a decline of 6 percentage points at the mean consumption tariff change relative to a district with no change. Second, we do not instrument for consumption tariffs. Bias might arise if tariff changes are larger on products that are consumed disproportionately in rich communities. However, no obvious solution presents itself.

because the changes in schooling do not appear to be driven by increases in child employment in market work (section 6.2). To explore whether our results reflect the effect of tariffs on input prices rather than declining final product protection, we estimate our main specification in (7) using the district's exposure to tariffs on inputs as a regressor (see data appendix). Input tariffs suffer from the same concerns as our employment tariff, and we create an analogous instrument of input tariffs for traded goods. The results are presented in column 4 and 5 of Table 7. Though the estimates are extremely imprecise, input tariff declines are associated with higher levels of schooling (column 4), suggesting that the now cheaper inputs either substitute for child labor or have a positive income effect. The estimates of the coefficient on employment weighted tariff conditional on input tariffs and consumption tariffs (column 5) increase slightly, but they are not statistically different from basic results in column 1. Overall, our basic results do not appear to be driven by other trade channels working through either consumption or inputs.

6. Mechanisms

Why do districts with more concentrated pre-reform employment in industries that experience larger tariff cuts observe larger declines in school attendance (relative to the national trend)? The conceptual framework in Section 2 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 explanations. Instead, most of the evidence suggests that the observed declines in schooling reflect increases in poverty (relative to national baseline) in districts where employment lost final product protection. In particular, the observed connection between poverty, schooling, and child labor seems to be driven by schooling costs.

6.1 Returns to Education

If tariff declines lead to a relative decline in the returns to education in districts that were more exposed to the reforms, we may observe declines in schooling with tariff declines.[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 (Table 5). In fact, if anything, pupil-teacher ratio changes with tariffs are consistent with increasing school quality. In

[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.

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 examine changes in returns to education by comparing per capita expenditures of households with literate and illiterate heads of household.[30] This 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.

We relate the relative expenditures of literate and illiterate households in a district to the employment weighted tariff using the 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. Our findings are in Table 8. Each column header indicates the dependent variable. Standard errors are large relative to the estimated coefficients, but the negative sign on the tariff coefficient in all but one column suggests—if anything--an increase in the expenditures of the literate relative to that of the illiterate with tariff declines.[31] We observe a similar finding when we bifurcate the sample by primary school completion rather than literacy of household head (columns 5 and 6). Overall, the evidence in table 8 is more consistent with increasing, rather than decreasing, returns to education.

Second, 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

[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 may 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.

[31] 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.

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.[32] The results are reported in table 9 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.[33]

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. We find little evidence that declines in the returns to education play a substantive role in our findings.

6.2 Child Labor Demand

If tariff declines are associated with a rise in the child's economic contribution foregone by schooling, w* (i.e. increase in demand for child labor), schooling could decline with tariff cuts. As explained in Section 2, for the family, 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

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

[33] At the mean tariff decline, estimates from panel B, column 1 of table 9, 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 9. Instead, we observe an additional 0.13 days worked per week in wage work.

imprecise, but helps clarify the focus on a channel that 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 cuts. 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 cuts (table 9, panel A). 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 3.1 for exact definitions). The findings from estimating (7) for each work category as a dependent variable are in Table 10.

The data do not suggest that schooling declines are driven entirely by increased earnings opportunities for 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 be directly related to 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). Hence, the data are not consistent with declines in schooling stemming solely from higher earning opportunities of children with tariff cuts.

Rather, some of the declining school attendance with tariff cuts appears as increases in domestic work (such as cooking, cleaning, gathering water and wood) and even larger increases in children 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 reflects children filling in for working parents.

Increased presence of idle children in districts with greater tariff cuts 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.[34] 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 2. 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 cuts 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.

6.3 Poverty

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. We first replicate this analysis and find that in addition to poverty, it extends to agricultural wages as well (a strong correlate of poverty). We then bring additional evidence which suggests that schooling costs are at the core of the observed relationship between poverty, schooling, and child labor.

[34] 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.

Table 11 documents the relationship between employment weighted tariff declines and poverty. Columns 1 and 2 replicate Topalova (2005) findings for rural areas by regressing a district level poverty measure at time t (headcount ratio in column 1 and poverty gap in column 2), on the employment weighted tariff, district fixed effects, post-reform indicator, and the interaction of the initial conditions in a district with the post-reform indicator. As usual, we instrument for district tariff with district tariff on traded goods.[35] For the district with the average change in trade exposure, the liberalization of tariffs increases the headcount rate by 3 percentage points (nearly 10 percent) relative to a district with no tariff change. Column 3 shows that declines in tariffs are associated with declines in wages of agricultural workers, a high correlate of poverty (Burgess and Pande 2005, Duflo and Pande 2007).[36] The lower living standards may 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. 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 when the child begins the school, 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 12. We mimic our preferred specification (7). We find that tariff declines are associated with

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

[36] Agricultural wage data is available annually, but only for a subset of districts. We follow a specification that parallels equation (7) and regress log wages in a district on district tariff, year indicators, the interactions of pre-reform district characteristics with the year indicators, and instrument for tariff with traded tariff. Standard errors are clustered at the district level.

increases in reports of taking out formal and informal loans for educational purposes (column 1) by households despite our results above that school attendance is declining relative to the national trends.[37] In addition, we observe that tariff declines are associated with declines in household educational expenditure per capita (column 2), the log of (1+household educational expenditure per capita) (column 3), and the share of educational expenditure in the household budget (column 4).[38] This evidence corroborates the school attendance results and is consistent with the schooling costs argument as households are spending less on education with tariff cuts.

If the observed declines in schooling 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 (small sample) 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.[39] We interact these pre-reform aspects of school costs with district tariff and add it as a regressor in our main specification (7). Table 13 contains the results. We use school attendance and enrollment as our dependent variables in columns 1 and 2, respectively.[40] 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 cut. 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 increases 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

[37] NSS collects this information only for households of agricultural laborers. Please see data appendix for details.
[38] The first four columns of table 12 use the 43rd (1987) and 55th (1999-2000) consumption module of the NSS and might thereby be affected by changes in the recall period in the questionnaire. 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). Those results are presented in columns 5-7. Both data sources deliver similar results.
[39] 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.
[40] 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.

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.

6.4 Poverty Elasticity of Schooling and Child Labor

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.[41] 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 14. In columns 1-6, we report results where the headcount ratio is instrumented by the traded tariff; in the remaining columns, the poverty gap is instrumented with the traded tariff. 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

[41] 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.

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 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 14 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 60 percent of children 10-14 to 76 percent (Table 1). The estimates from column 1 of Table 14 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 22 percent in 1987 to 12 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.

7. 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 schooling and work decisions of children. Overall, in the 1990s, rural India experienced a dramatic increase in schooling and decline in child labor. 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 return 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 impediment to schooling. However, to our knowledge the important role schooling costs appear to play in explaining a strong poverty-schooling connection is novel in observational data.

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.

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

loosing protection permeate the literature. Our primary contribution to this literature is to show that these short term adjustment costs can have long-term consequences for affected young cohorts through their impact on schooling, child labor, and literacy.

How substantive are these long-term consequences for affected individuals? 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 30 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 30 percent as an upper bound on whatever the causal effect might be. Thus, the two percentage point decline in literacy is associated with at most a 3 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 start becoming 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 43 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 43 percent higher without the tariff reductions. Tariff declines contribute 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 3.1 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 4.1

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 are used for the 43rd round. The average of industry exports in 1993, 1994, 1995, 1996 and 1997 is used for the 55th round. Data on industry exports are from Annual Trade Database compiled by Tips Software Services Pvt. Ltd.

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.

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.

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.

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 Ozler, Datt and 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 rural 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 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) and is computed following the same procedures as in Topalova (2005).

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.

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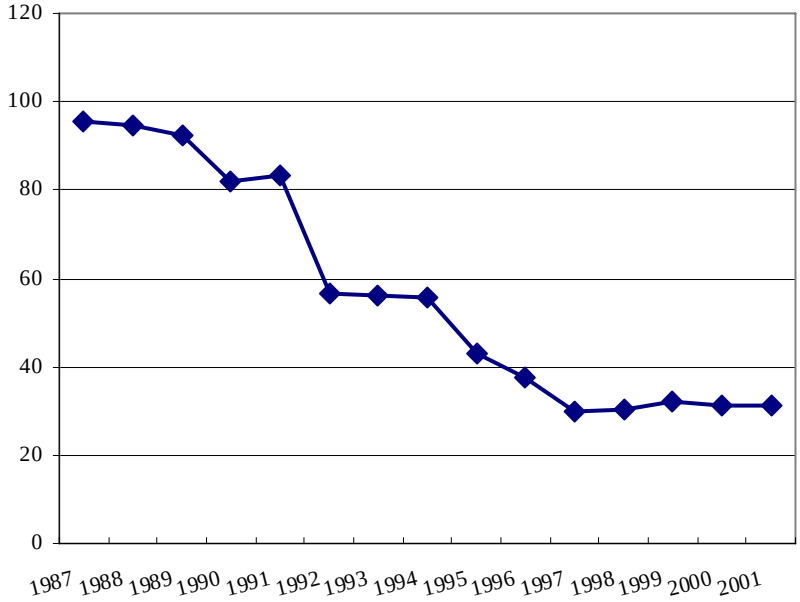
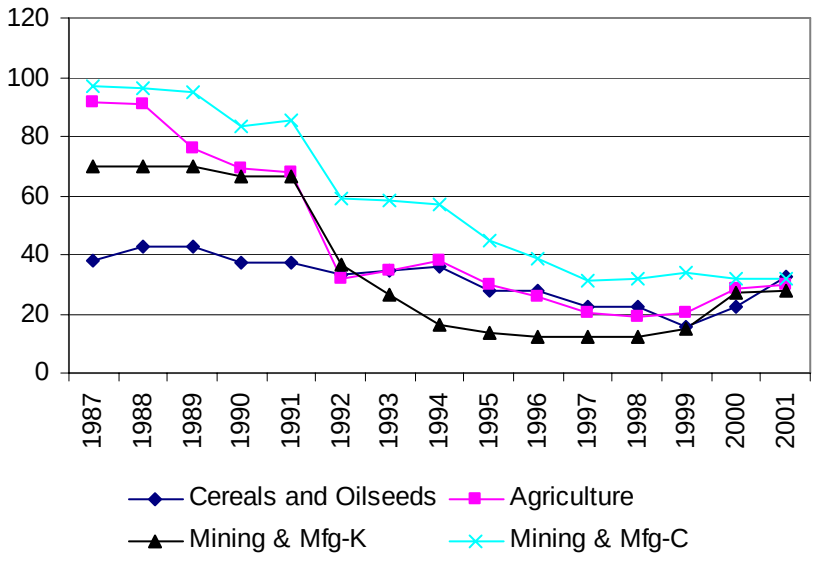
Figure 1: Average Nominal Tariffs



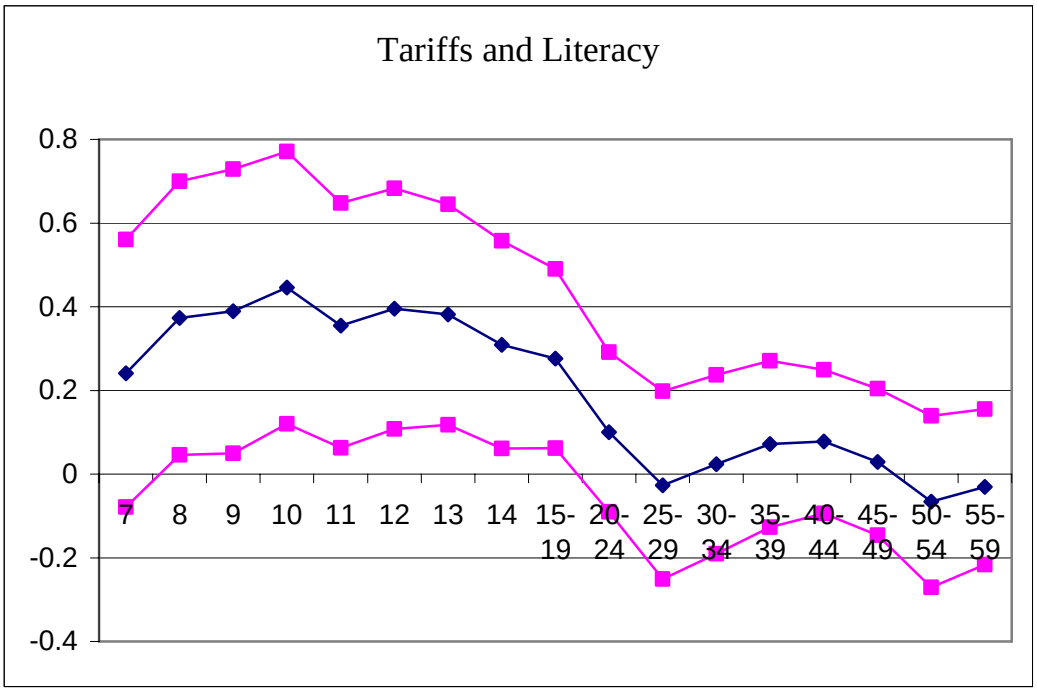
From Topalova (2005)

Figure 2: Tariffs by Industry Category



From Topalova (2005)

Figure 3: Literacy and Tariffs



Note: Each point on the middle curve represents the coefficient on tariff for the age group listed on x-axis of district-level variant of equation (7) with the share of literate population in a district as dependent variable. 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	.551	.668	.728
Work	.360	.250	.205	.141
Work Only	.355	.245	.201	.136
Market Work	.193	.137	.108	.075
Domestic work	.167	.112	.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	.911	.343

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)
Data	pre and post reform	pre and post reform	pre and post reform	pre reform only	pre and post reform
Tariff	0.367***	0.370**	0.606***	-0.071	0.371**
	[0.090]	[0.139]	[0.155]	[0.126]	[0.148]
Post Reform Indicator (Post)	0.172***				
	[0.011]				
Pre-reform Trend in Schooling*Post					0.185**
					[0.078]
IV with traded tariff	no	yes	yes	yes	yes
Demographic Controls	yes	yes	yes	yes	yes
Household Controls	yes	yes	yes	yes	yes
Post Reform Indicator	yes	yes	yes	yes	yes
District Indicators	yes	yes	n.a.	n.a.	yes
Initial District Conditions*Post	no	yes	n.a.	n.a.	yes
Region Indicators	n.a.	n.a.	yes	yes	n.a.
Initial Region Conditions*Post	n.a.	n.a.	yes	yes	n.a.
R^2	0.25	0.26	0.24	0.26	0.26
N	95669	95669	95943	103198	93328

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. Regressions in columns 3 and 4 replace all district-level variables with their equivalents at the region level. Post reform indicator in column 4 refers to 1987 NSS round.

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

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tariff	0.370**	0.318**	0.372***	0.393***	0.425***	0.389***	0.401***
	[0.139]	[0.141]	[0.137]	[0.136]	[0.150]	[0.128]	[0.143]
Licensed Industries		-0.104***					-0.099***
		[0.037]					[0.036]
FDI			0.035				0.011
			[0.044]				[0.046]
Number of banks per 1000 people				1.624***			1.641***
				[0.392]			[0.443]
Exports					-0.002**		-0.001**
					[0.001]		[0.001]
Number of primary schools per capita						23.53	9.979
						[18.428]	[18.504]
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	95669	95669	95669	95669	95669	95669	95669

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.

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	-0.0008	-0.0005	-0.0006	-0.0001	30.996	20.283
	[0.0013]	[0.0012]	[0.0010]	[0.0011]	[36.408]	[24.311]
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	0.94	0.96	0.96	0.83	0.85
N	802	802	802	802	791	791

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.

Table 6: 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	-0.031	-0.186	-0.127	0.075	-0.138	-0.08
	[0.256]	[0.149]	[0.174]	[0.069]	[0.123]	[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	1	1	1	0.96	0.91	0.92
N	802	802	802	802	802	802

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.

Table 7: Rural Schooling Attendance and Alternative District Tariffs

Dep. Variable: Attend School	(1)	(2)	(3)	(4)	(5)
Tariff (Employment Based)	0.370**		0.372***		0.460*
	[0.139]		[0.137]		[0.272]
Consumption tariff		-0.089	-0.138		-0.162
		[0.118]	[0.116]		[0.149]
Input tariff				-0.278	-0.341
				[1.252]	[1.200]
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	95,669	95,368	95,368	95,669	95,368

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.

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	-0.038	0.037	-0.677	-0.467	-0.36	-0.25
	[0.266]	[0.199]	[0.565]	[0.426]	[0.346]	[0.259]
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	799	799	799	799	798	798

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.

Table 9: Adult Male Employment in Wage Work by Literacy and Tariffs

	Participation in Wage Work	Days in Wage Work
	(1)	(2)
Panel A: Men, Illiterate		
Tariff	0.111	0.483
	[0.293]	[1.790]
R2	0.18	0.13
N	48,827	48,827
Panel B: Men, Literate		
Tariff	-0.207*	-2.381***
	[0.116]	[0.751]
R2	0.10	0.07
N	79,207	79,207
IV with traded tariff	yes	yes
Demographic Controls	yes	yes
Household Controls	yes	yes
District Indicators	yes	yes
Post Reform Indicator (Post)	yes	yes
Initial District Conditions*Post	yes	yes

Standard errors in brackets are clustered at state-year level. ***, **, * denotes significance at 1, 5, and 10 percent level. Demographic controls include a third order polynomial in age. Household controls include indicators for whether a person's household belongs to a scheduled caste and schedule tribe, indicators for whether the person's household is hindu, muslim, christian, sikh. 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 restricted to males ages 25-50.

Table 10: Activities of children by gender and tariffs in rural India

	school	work	work only	market work	domestic work	idle
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: All						
tariff	0.370**	-0.116	-0.121	0.051	-0.168**	-0.248**
	[0.139]	[0.110]	[0.111]	[0.093]	[0.077]	[0.099]
r2	0.26	0.2	0.2	0.14	0.15	0.14
N	95669	95695	95669	95695	95695	95669
Panel B: Boys						
tariff	0.269*	-0.121	-0.087	-0.069	-0.052**	-0.182
	[0.149]	[0.115]	[0.118]	[0.120]	[0.022]	[0.112]
r2	0.19	0.13	0.13	0.13	0.04	0.12
N	51235	51252	51235	51252	51252	51235
Panel C: Girls						
tariff	0.507**	-0.126	-0.171	0.205**	-0.330*	-0.336**
	[0.209]	[0.151]	[0.149]	[0.100]	[0.167]	[0.131]
r2	0.32	0.23	0.23	0.17	0.13	0.17
N	44434	44443	44434	44443	44443	44434
IV with traded tariffs	yes	yes	yes	yes	yes	yes
Demographic Controls	yes	yes	yes	yes	yes	yes
Household Controls	yes	yes	yes	yes	yes	yes
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

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.

Table 11: Poverty, Agricultural Wages and Tariffs in Rural India

	Headcount Ratio	Poverty Gap	log (agricultural wage)
	(1)	(2)	(3)
Tariff	-0.560**	-0.216***	1.051**
	[0.245]	[0.072]	[0.407]
IV with Traded Tariff	yes	yes	yes
District Indicators	yes	yes	yes
Year Indicators	yes	yes	yes
Initial District Conditions*Year Indicators	yes	yes	yes
Data	NSS (43rd, 55th rnd)	NSS (43rd, 55th rnd)	1987-1998
R2	0.83	0.79	0.73
N	725	725	2,750

Notes: Standard errors in brackets are clustered at state-year level in columns 1 and 2 and district level in column 3. ***, **, * denotes significance at 1, 5, and 10 percent level. Initial conditions that are interacted with year indicators 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. Columns 1 and 2 have an uneven number of observations because 3 districts are missing information on poverty in the 55th round. Data: Columns 1 and 2 use 43rd and 55th round of NSS. Column 3 uses data on agricultural wages from Evanson and McKinsey dataset that was updated to 1998.

Table 12: Educational Expenditures and District Tariffs, Rural India

	Household has education loan	Household Education Expenditure Per Capita	Log (1+Hh. Education Exp. Per Capita)	Hh. Education expenditure as a share of total hh expenditure	Individual Education Expenditure	Log (1+Indiv. Education Expenditure)	Individual Education expenditure as a share of total hh expenditure
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cross-sectional unit	household	household	household	household	individual	individual	individual
Tariff	-0.030***	16.610***	1.921***	0.054***	28.116***	1.901***	0.045
	[0.010]	[4.592]	[0.464]	[0.016]	[7.763]	[0.498]	[0.029]
IV with Traded Tariff	yes	yes	yes	yes	yes	yes	yes
Demographic characteristics	n.a.	n.a.	n.a.	n.a.	yes	yes	yes
Household characteristics	yes	yes	yes	yes	yes	yes	yes
District Indicators	yes	yes	yes	yes	yes	yes	yes
Post Reform Indicators (Post)	yes	yes	yes	yes	yes	yes	yes
Initial District Conditions*Post	yes	yes	yes	yes	yes	yes	yes
Data	43rd, 55th rnd	43rd, 55th rnd	43rd, 55th rnd	43rd, 55th rnd	42nd, 52nd rnd	42nd, 52nd rnd	42nd, 52nd rnd
R2	0.01	0.14	0.33	0.15	0.28	0.33	0.02
N	49,473	63,834	63,834	63,834	69,095	69,095	68,993

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 an indicator for whether a household belongs to a scheduled caste or schedule tribe, household religion and controls for the head of the child's household gender, age, education, and literacy. 42nd and 52nd round do not provide information on a household's religion. 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 in columns 1-4: 43rd and 55th round of NSS. Data in columns 5-7: 42nd and 52nd round of NSS. 1987 tariff matched to 42nd round, 1994 tariff matched to 52nd round.

Table 13: School Attendance, Schooling Costs, and Tariffs in Rural India

	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]
R2	0.28	0.28
Obs	68,059	68,059
Panel B		
Tariff	0.716***	0.717***
	[0.196]	[0.194]
Tariff X Scholarship	-0.314	-0.893
	[2.995]	[3.025]
R2	0.28	0.28
Obs	68,059	68,059
Panel C		
Tariff	2.872	2.934
	[1.813]	[1.789]
Tariff X Free Tuition	-2.223	-2.288
	[1.874]	[1.853]
R2	0.28	0.28
Obs	68,059	68,059
IV with Traded Tariff	yes	yes
Demographic characteristics	yes	yes
Household characteristics	yes	yes
District Indicators	yes	yes
Post Reform Indicators (Post)	yes	yes
Initial District Conditions*Post	yes	yes

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. 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 an indicator for whether a child's household belongs to a scheduled caste or schedule tribe 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, 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: 42nd and 52nd round of NSS. 1987 tariff matched to 42nd round, 1994 tariff matched to 52nd round.

Table 14: Activities of Children, Poverty, and Tariffs in rural India

	school	work	work only	market work	domestic work	idle	school	work	work only	market work	domestic work	idle
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
	poverty measure: headcount ratio						poverty measure: poverty gap					
Panel A: All												
poverty measure	-0.721**	0.274	0.291	-0.034	0.308	0.430**	-2.070**	0.787	0.834	-0.097	0.884*	1.235**
	[0.329]	[0.219]	[0.219]	[0.175]	[0.193]	[0.203]	[0.838]	[0.587]	[0.581]	[0.503]	[0.517]	[0.560]
r2	0.25	0.2	0.2	0.14	0.15	0.13	0.25	0.2	0.2	0.14	0.15	0.13
N	86742	86763	86742	86763	86763	86742	86742	86763	86742	86763	86763	86742
Panel B: Boys												
poverty measure	-0.492*	0.263	0.229	0.166	0.097**	0.263	-1.424*	0.76	0.664	0.48	0.280**	0.76
	[0.292]	[0.216]	[0.218]	[0.221]	[0.037]	[0.213]	[0.773]	[0.591]	[0.599]	[0.617]	[0.110]	[0.604]
r2	0.18	0.13	0.13	0.13	0.03	0.12	0.18	0.13	0.13	0.13	0.03	0.12
N	46474	46489	46474	46489	46489	46474	46474	46489	46474	46489	46489	46474
Panel C: Girls												
poverty measure	-1.059*	0.317	0.385	-0.316	0.632	0.674**	-3.005**	0.898	1.092	-0.895	1.793	1.912**
	[0.544]	[0.325]	[0.333]	[0.244]	[0.450]	[0.314]	[1.432]	[0.883]	[0.895]	[0.665]	[1.187]	[0.860]
r2	0.29	0.23	0.23	0.17	0.12	0.16	0.29	0.23	0.23	0.17	0.12	0.16
N	40268	40274	40268	40274	40274	40268	40268	40274	40268	40274	40274	40268
IV	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Demographic Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Household Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
District Indicators	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Post Reform Indicator (Post)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Initial District Conditions*Post	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Standard errors in brackets are clustered at state-year level. ***, **, * denotes significance at 1, 5, and 10 percent level. Demographic controls include a third order polynomial in the child's age, a gender indicator, and a third order polynomial in age interacted with the gender indicator. Household controls include 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 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.

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	.184	.215	
Scheduled Tribe	.099	.106	
Hindu	.843	.830	
Islam	.106	.121	
Christian	.019	.020	
Sikh	.021	.017	
Head Female	.085	.086	
Head Age	45.074	44.579	
Head Literate	.463	.507	
Head Complete Primary	.139	.123	
Head Complete Middle	.083	.118	
Head Complete Secondary	.058	.062	
Head Complete Higher than Secondary	.013	.051	

The reported numbers are means computed using survey weights.

Appendix Table A.2: First Stage Results for Table 3, column 2

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 joint significance of instrument	17.23
R^2	.922
Number Observations	95,669

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.