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

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October 17, 2006

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. Our results suggest 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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[*] We would like to thank Orazio Attanasio, Penny Goldberg, Ann Harrison, Marc Melitz, Deborah Swenson, Alessandro Tarozzi as well as seminar and conference participants at ASSA meetings, Boston College, Boston University, BREAD, Colby College, Columbia University, Duke University, Econometric Society Meetings, Empirical Investigations in International Trade Conference, Federal Reserve Board of Governors, Minnesota International Economic Development Conference, MIT, NBER India Working Group, NEUDC, Stanford Trade Liberalization and Its Consequences Conference, Syracuse University, University of Michigan, University of Toronto, and Yale University. We thank Rohini Pande and Siddharth Sharma for sharing their data.

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We are grateful for the support of the National Science Foundation on this project, and Pavcnik is also grateful for financial support from the Rockefeller Center at Dartmouth College. The views expressed in this paper are those of the authors and should not be attributed to the International Monetary Fund, its Executive Board, or its management.

I. 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, Goldberg, and Pavcnik (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 (2005) 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 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. Rather, they reflected the conditions in the adjustment program: sectors with higher initial levels of protection received larger tariff cuts.

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 (DasGupta (1987), Topalova (2005), Munshi and Rosenzweig (2005)). By focusing on differences across districts in changes in tariff protection, we cannot evaluate the impact of tariff

[1] Several studies attempt to 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 (2005b) 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.

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 and primary school completion rates also appear 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 and primary school completion 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 schooling costs as the explanation for a poverty-schooling connection is an important step in understanding the determinants of 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). Theory often attributes a connection to parental preferences (Basu and Van 1998) and the marginal utility associated with the child's 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 children with the least chance of making a direct economic contribution to the household, and it is consistent with Edmonds (2006) evidence from South Africa of credit constraints influencing education through schooling costs perhaps more than through the child's economic contribution. Moreover, recent experimental evidence from Angrist et al (2002) shows substantive changes in schooling associated with 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.

II. Conceptual Framework

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 be substantial. Talik (2002) estimates these to be about 7 percent of average annual income for families in the poorest decile. This does not include the considerable indirect costs associated with the child's need to conform to the social norms of students in the school. The Public Report On Basic Education in India (1999) found that "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.

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.[4] 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 prices.[5] 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:

[4] We implicitly assume credit constraints that prevent families from borrowing against future returns on education. This is not an unrealistic assumption in the present setting. While there is evidence of an effect of credit constraints on schooling and child labor in other developing countries, we are not aware of such direct evidence in India during this period. However, Banerjee and Duflo (2004) document severe credit constraints for manufacturing firms in India in the late 1990s.

[5] As long as consumption bundles are not correlated with sectoral composition of employment across areas, 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.E for evidence). In addition, to the extent there is no significant variation in consumption bundles across areas in India, the impact through consumption prices is indistinguishable from time trends.

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

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

III. Background

A. Data

Our analysis of the relationship between schooling, child labor, and exposure to tariff reform through employment composition relies primarily on the rural samples in the 43rd (July 87-Jun 88) and 55th (July 1999 - June 2000) rounds of India's National Sample Survey (NSS).[6] We analyze the activities of more than 95,000 children age 10-14.[7,8] 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.[9] We define an indicator *attend school* that is one if a child reports attending school in the household roster regardless of

[6] NSS is a nationally representative, large-scale multipurpose household survey that provides information on household expenditures, household demographic characteristics, education, and employment among others.
[7]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.
[8] 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.
[9] Changes in the NSS questionnaire over time have been substantial and create substantive issues for the measurement of consumption, poverty, etc (see for example, Tarozzi 2005). However, our measures of the activities of children that have been asked in a consistent manner in each of the survey rounds.

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."

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. *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. A discussion of why it is useful to consider both market and domestic work can be found in Edmonds and Pavcnik (2005a).

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.[10] 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.[11] The bottom panel separates work into types of work. The declines in market work such as work in a family business or wage work have been similar in magnitude to the declines in domestic work (which includes chores such as cooking, cleaning, collecting wood or water, shopping, etc.) 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 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 NSS information on child's demographics (gender, age, completed education) and child's household attributes (religion, caste or tribe, primary activity, household expenditure per capita, household size, information on household head (literacy, competed education, gender, age)) 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.

B. Indian Trade Reform

[10] 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.

[11] 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 at the time of our writing. Most children in our data who are working are engaged inside their family enterprise and are thereby outside the scope of this legislation.

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.[12] 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[13] (Figure 1). These tariff cuts encompassed all sectors of the economy, as conveyed in Figure 2 which depicts industry tariffs in 1987 against tariffs in 1997. Second, the liberalization was instigated as part of the IMF bailout conditions in response to the 1991 currency crisis and came as a surprise (Hasan et al, forthcoming).[14] 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. The reform drastically changed the structure of protection across industries by reducing the differences in tariffs across industries. As Figure 3 depicts, industries with larger pre-reform tariffs (represented on the X axis of the graph) experienced larger tariff declines (on the Y axis). [15] 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. In fact, Topalova (2004, 2005) shows that tariff changes are not strongly correlated with baseline industry characteristics such as productivity or skill intensity at the industry level.

India's tariff changes have potentially important implications for those living in rural areas, because tariff reductions occurred across manufacturing, mining, and agricultural sectors. This is illustrated in Figure 4, which depicts average tariffs for cereals and oilseeds, agriculture (other than cereals and oilseeds), and manufacturing and mining over time. The figure suggests

[12]Although India was a member of GATT since 1947 it did not participate in tariff reducing GATT rounds.
[13]The sources of tariff data are various publications of the Indian Ministry of Finance.
[14]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.
[15] In fact, the IMF conditions required a reduction in the level and dispersion of tariffs (Chopra et al, 1995).

that all sectors experienced tariff reductions, albeit the tariff reductions were less pronounced in cereals and oilseeds.[16]

IV. Empirical Strategy

A. Measuring Tariff Protection

Most studies that use micro level data to evaluate trade reforms focus on their impact through employment. These studies typically correlate industry trade or trade policy changes with industry employment or instead, 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 Goldberg and Pavcnik forthcoming for a survey). As illustrated in Section 2, by measuring the effect of tariff changes through employment, these studies, as well as ours, emphasize 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 part E of Section 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.[17] 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

[16]This mainly reflects declines in tariffs on oilseeds. Tariffs on cereals are zero throughout this period.
[17]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.

t. For each industry *i* in district *d*, we compute employment $Emp_{i,d}$ using India's 1991 population and housing census[18] and create industry employment weights $\omega_{i,d} \equiv \frac{Emp_{i,d}}{\sum_i Emp_{i,d}}$ that are normalized to sum to one for each district. The district tariff at time *t* is the employment weighted sum of industry-specific national tariffs *(i.e.* $tariff_{i,t}$*)*:

(5) $$tariff_{d,t} = \sum_i \omega_{id} * tariff_{i,t}$$ [19]

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 1991 tariff reforms.

The above tariff measure takes into account employment in traded industries and non-traded industries within a district, such as services, trade, transportation, construction, and growing of cereals and oilseeds.[20] Non-traded industries are assigned zero tariffs in all years,[21] 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.[22] 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.

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[18]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.

[19]Because census data distinguishes between rural and urban population in each district, we can compute district specific exposure to trade for rural areas.

[20]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.

[21] Note that 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.

[22]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. Also, Topalova (2005) shows that political economy concerns might be more pronounced after 1997.

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.[23]

One concern with relying on tariff changes alone as a measure of trade liberalization is that their impact might be attenuated by non-tariff barriers to trade (NTBs). NTB have historically played a large role in Indian trade policy and they were gradually removed over the 1990s. 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 and the limited data on NTBs suggest that tariffs and NTBs are positively correlated during this period (higher tariffs, higher NTBs: Topalova 2005). To the extent that the removal of NTB was implemented more slowly than the reduction of tariffs, our findings might be an attenuated characterization of the overall impact of trade policy changes working through employment composition. 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.

[23] 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 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 (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.[24] 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.[25]

B. 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.[26] $Tariff_{dt}$ is our measure of the district *d*'s tariff at time *t* and is constructed as described in Section 4.A. Let

[24] 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.
[25]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.
[26]We have repeated cross section at the household/child level (i.e. each child is observed once), but a panel at the district level.

y_{jhdt} denote an indicator for participation in activity *y* (for example, attend school as detailed in Section 3.A) by child *j* living in household *h* in district *d* at time (survey round) *t*. Our base specification is then:

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

where $\pi\left(A_{jt}, G_{jt}\right)$ is a third order polynomial in the child's age, a gender indicator, and 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 coefficients 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. We thus use within district variation in tariff exposure to identify the impact of average tariff $Tariff_{dt}$ 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 (negative) value of the coefficient on tariff β_1 in (6) would suggest that tariff cuts are associated with decreases (increases) in schooling (child labor) relative to a national baseline change in outcome variable.

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. As changes in district's exposure to trade liberalization are captured through the interaction of changes in industry tariffs at the national level and initial industrial composition in a district, potentially confounding differential time-trends could stem from either component. As discussed in Section 3.B, Topalova (2005) makes a convincing case that the usual concerns with political economy of protection are potentially less severe in the case of the Indian reforms of 1991 because there was little scope (at least until 1997) for lobbying groups to influence tariff changes. There could still be a concern if tariff changes are correlated with pre-reform industry characteristics and industries with differences in these characteristics follow differential time trends. However, Topalova (2005) shows that tariff changes are not statistically significantly correlated with industry characteristics such as the share of educated workforce, real wage, etc.

We are more concerned about the differential time-trends associated with pre-reform industrial composition of a district through the size of the non-traded sector. As noted in section 4.A., changes in the average tariff measure in (5) depend in part on the size of the non-traded sector in a given district (as non-traded sector enter the employment total but experiences no change in tariffs). Consequently, everything else equal, districts with a higher pre-reform share of employment in non-traded sector mechanically experience smaller tariff changes. If the size of the baseline non-traded sector in a district is also correlated with secular changes in outcome variables, our results could 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. Initial 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.A), which is not mechanically influenced by the size of the non-traded sector. Thus, our main specification is:

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

where $D_d * \tau_t$ is the vector of pre-reform district characteristics interacted with post-reform indicator and $Tariff_{dt}$ is instrumented with $TrTariff_{dt}$. The tariff on traded goods is strongly correlated with the overall tariff for the district. First stage results of the IV regression are reported in appendix table 1.

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.B., we test for correlation between the tariff changes and pre-reform changes in outcome variables. We also allow for the pre-reform changes in outcome variables to have a time-varying impact in (7). In section 5.C, 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.

V. Main Findings

A. 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.[27]

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

Both the OLS and IV estimates suggest that larger tariff declines in a district are associated with lower schooling improvements (relative to national trends).[28] 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 year effect 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.

The decline in district tariffs varies between 0 to 59 percentage points. In the district experiencing the largest tariff change, the probability that a child attends school actually falls by 4.5 percentage points after the trade reforms (compared to the 17 percentage point rise observed in districts with no tariff change). However, as the standard deviation of the average tariff change (-0.055) is rather small (0.06), extreme tariff changes where the implied effects predict absolute declines in schooling between 1987 and 2000 are not typical. For almost all districts, the observed tariff changes are not large enough to reverse the progress in schooling and child labor reduction in the 1990s in India.

B. Robustness of Basic Findings

The effect of trade reforms on schooling 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

[28] 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 (column two of table 3) is run separately for each sector. Hence, no one sector is driving our findings.

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 at the region level as district identifiers are not available in the 38th round of the NSS.[29] 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 district's tariff reduction shock, then the coefficient on regional tariff in the period before trade reform (column 4) will be similar to the coefficient estimated with data before and after the reform (column 3). In fact, the 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 at the region level to have a time-varying effect (by interacting the trend with post reform indicator) in our district level regression of 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 (see Aghion, Burgess, Redding and Zilliboti 2005), relaxation of entry regulation of foreign direct investment (see Topalova 2005), and substantial reforms in the financial and banking sectors. Following Topalova (2005), we construct district employment-weighted share of industries subject to industrial licensing and district employment-weighted share of industries open to FDI. The number of bank branches per capita in a district controls for the possibly confounding effect of banking reforms (see data appendix for details). In columns

[29] We estimate a region-level analog of equation (7), where all district-level variables are replaced by their region-level counterparts.

2-4 of Table 4, we estimate equation (7) including these time-varying district measures of reforms.[30] We view these reform variables simply as controls and the coefficients on them do not warrant a causal interpretation. Neither the magnitude of the coefficient on district tariff nor the statistical significance are sensitive to the inclusion of industry licensing (column 2), FDI (column 3), or number of bank branches per capita (column 4). We also ensure 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 results are driven by other reforms concurrent with the 1991 trade liberalization.

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.[31] To be clear, if the local economic impacts of tariff declines drive changes in schooling infrastructure and that is reflected in our results, the schooling infrastructure changes would be a mechanism for how trade liberalization impacts schooling, rather than a source of bias. Several major initiatives in the late 1980s and 1990s were designed to increase primary school enrollment through improving school quality such as Operation Blackboard (Chin 2005) and the District Primary Education Project launched in November 1994 (Pandey 2001). The relative importance of these schooling efforts versus other changes in the environment in explaining improvements in schooling in India over the 1990s has not been resolved, and there is nothing to suggest that these interventions would be correlated with district tariff changes.

We examine this directly by looking at the correlation between changes in schooling infrastructure and district tariffs. We have information on number of primary schools per capita from the 1991 census and the 7th All India Education Survey (AIES). Additional detail on

[30] We replicate the finding from our main specification in Table 3, column 2 in column 1 here for easy comparison.
[31] 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.

schooling infrastructure at the district level is available from the 6th (1993) and 7th (2002) All India Education Surveys.[32] We regress several measures of school quantity and quality on the corresponding district tariff, instrumenting with traded tariffs, and including time trends that differ with baseline district characteristics (mimicking the specification in equation (7)). The results are in Table 5.

None of the correlations between changes in schooling infrastructure and changes in tariffs are statistically significant. If anything, larger tariff declines are associated with an increase in the number of primary schools and the number of 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 and all other measures of time-varying policy changes at the district level. Estimates of the attenuation in schooling improvements associated with tariff declines are barely affected.

C. Literacy and Schooling Attainment

If districts that were subject to larger tariff declines experienced smaller increases in school attendance, we should also observe diminished literacy and schooling attainment in those

[32] 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.

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 the educational attainment of those who had already completed their schooling by 1991. If most children engaged in primary school are age 15 or younger, it is implausible to observe tariff effects on individuals above age 25 in 2001, and it would be surprising to see much (especially with regards to literacy) in individuals above age 20 in 2001.

We use the 1991 and 2001 rural population census to examine the correlation between tariffs and literacy and schooling attainment age by age. Both censuses report district level aggregates of primary school completion rates and literacy. We mimic our basic approach in equation (7), regressing primary school completion or 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 interacted with the post-reform indicator, number of primary schools per capita in a district, and instrumenting for tariffs with traded tariffs.[33] The estimated coefficient on the tariff measure and the 95 percent confidence interval for each age group is plotted on Figure 5 for literacy, and Figure 6 for primary school completion.

The impact of tariffs on literacy and primary school completion mirror the school attendance results As our basic results, which focus on children 10-14 in Table 3 would suggest, larger tariff declines are associated with lower literacy rates and lower primary school completion rates for these age categories.[34] 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, while the decline in primary school completion is somewhat smaller, though the difference is not statistically significant.

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

[34]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 Figures 5 and 6 are not what that explanation would predict.

Perhaps the most important finding in Figures 5 and 6 are the results 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 and primary school completion for older populations are close to zero. For example, an individual age 20 at the time of reforms is unlikely to have his primary school completion rate or literacy affected by the 1991 reforms. He would be age 30 in 2001, and we observe little correlation between tariff changes and literacy or primary school completion rates for the age 30 population. The association between tariffs and schooling is concentrated in the populations who should be affected by the reforms.

D. Selective Migration

Figures 5 and 6 also suggest that it is unlikely that out results are driven by selective migration of individuals across districts that experienced different tariff changes. For example, if families whose kids attend school migrated away from districts who 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 figures 5 and 6 indicate. The absence of selective migration is consistent with the surprisingly low labor mobility that has been documented in India in other studies (Topalova 2005, Munshi and Rosenzweig 2005).

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. In the last three columns, we repeat this specification with the ratio of males to females in a district as the dependent variable. None of the evidence from Table 6 or figures 5 and 6 suggests that substantive change in population counts or composition are behind the relative declines in schooling associated with trade reforms.

E. Other trade channels

The focus on an employment based measure of exposure to tariff changes is standard in the trade literature. This reflects the belief that it is the labor market where the negative adjustment costs will be most evident. However, tariff changes will also influence consumption and intermediate input prices, and as Section 2 suggests, these prices influence child time allocation. The price effects may bias our estimates of the impact of trade exposure through employment if intermediate input tariffs are correlated with final product tariffs or the consumption basket is correlated with employment composition. In this section, we find little evidence of a substantive bias due to the omission of these channels. However, there is some suggestive evidence that the trade-induced decline in consumption and intermediate input prices is associated with higher school attendance. Controlling for these channels increases the magnitude of the estimated effects working through exposure to final goods tariffs through employment exposure, albeit insignificantly, and when considered jointly, the net effect of employment weighted tariff changes is attenuated by tariff changes on intermediate inputs.

Often overlooked in the adjustment cost literature, the effects of tariff changes on consumer prices is potentially important. To the extent that consumer prices fall because of tariff declines, the income effect should lead to increased schooling, while the substitution effect will encourage 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. Yet, transmission of price changes might vary with a district's integration into the national economy or district's preferences over consumption bundles. Our basic results would reflect the consumption channel through which trade liberalization affects schooling if the employment weighted tariff is correlated with the consumption bundle in a district, and the substitution effect from lower final product prices outweighs any income effect on school attendance.

We use detailed data on consumption of food and non-food goods from the 1987 NSS to construct district specific consumption weighted tariffs (see data appendix). In comparison to employment based tariffs, the variation in consumption tariffs across districts relative to the mean is much smaller. We estimate equation (7) with consumption tariff and present estimates in Table 7 (The first column of Table 7 reproduces our preferred specification from column 2 of Table 3). A decline in consumption weighted tariffs is associated with an increase in schooling, albeit insignificantly (column 2), consistent with the income effect for consumption dominating the substitution effect for schooling. In column 3 of Table 7, we include both the employment weighted tariff and the consumption tariff.[35] The estimated impact of employment weighted tariff on school attendance is identical in the hundredths decimal place to what we observe in our main specification.

Most of the immediate benefits of tariff reductions for a country can also come through decreased input costs and improved quality of production inputs. While the effect of input cost on school attendance is ambiguous, as it depends on the elasiticity of substitution between child labor and other inputs, our results may reflect the input price channel of trade reforms if the employment based district tariffs are correlated with district's exposure to changes in input prices. Using the Indian national input-output (IO) table and national industry tariffs, we follow similar procedures as with the construction of employment weighted tariffs to create a district's measure of exposure to tariffs on inputs (see appendix). We then estimate equation (7) using this input tariff. The results are presented in column 4 and 5 of Table 7. Because input tariffs suffer from the same concerns as our employment tariff, we create an analogous instrument of input

[35] 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 in schooling of 6 percentage points in a district experiencing the average change in the consumption tariff relative to a district with no change in the consumption tariff. Second, we are not instrumenting for the endogeneity of the consumption tariff in columns 2 or 3. The endogeneity concern (with the inclusion of all the year effect interactions) is more subtle than in the employment case where a large part of the between district variation in tariff changes owes to the size of the non-traded sector which may be more likely to employ children. Bias might arise if tariff changes are larger on products that are consumed disproportionately in rich communities. However, it seems unlikely that correcting for bias of this type would generate an artificial independence of the employment and consumption tariffs, and no obvious solution presents itself.

tariffs for traded goods, and all results reported in columns 4 and 5 are IV results that include the usual set of controls.

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. When considered jointly, the estimates of the impact of both input tariffs and employment based tariffs increase slightly, although the difference is not statistically significant. Overall, the declines in employment based tariffs continue to be associated with declines in schooling suggesting that the adjustment costs working through employment dominate the benefits of input price liberalization for formerly protected industries in the short run.

VI. Mechanisms

Why do districts with more concentrated pre-reform employment in industries that experience larger tariff cuts experience 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.

A. Returns to Education

If trade liberalization leads 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.[36] 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 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.[37]

First, we examine changes in returns to education by comparing per capita expenditures of households with literate and illiterate heads of household.[38] 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 changes in the relative expenditures of literate and illiterate households to changes in the employment weighted tariff by estimating our preferred IV specification in 7 at the district level using the ratio of per capita expenditure in literate households to illiterate households in the district at time t as a dependent variable. Our findings are in Table 8. Each

[36] 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.

[37] 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.

[38] We thank Esther Duflo for this suggestion.

column header indicates the dependent variable. Standard errors are large relative to the estimated coefficients, but the negative sign on the tariff coefficient suggests an increase in the expenditures of the literate relative to that of the illiterate with tariff declines.[40] 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) by literacy status and tariffs. Table 9 reports estimates of equation 7 separately for illiterate (panel A) and literate (panel B) adult males ages 25-50.[41] Each column header indicates the dependent variable. Columns 1-3 look at the incidence of being out of the labor force (inactive), market work, and wage work, respectively. The remaining columns use counts of the number of days involved in the indicated activity in the last seven days as a dependent variable.

The changes in wage employment associated with tariff declines observed in table 9 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 adults. 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

[40] 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.

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

increases in employment of illiterate adults relative to the literate population. In fact, we observe the opposite in the formal wage sector. Tariff declines are associated with increases in wage work for literate men and declines in wage work for illiterate men. This is true for both participation (column 3) and days worked (column 6). Given that the number of days worked in the last week is at most seven, the rise in days worked in wage work for literate men reflects more than just participation.

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.

B. Child Labor Demand

As explained in Section 2, a rise in the child's economic contribution foregone by schooling, w*, can lead to schooling declines. For the family, w* is the difference between the maximum income the household can achieve if the child does not attend school and the maximum income if the child attends school. The economic contribution foregone by schooling depends on what activities the child engages in, and we expect foregone income could increase with increasing wages in the formal wage labor market or positive productivity shocks to the family business or domestic production. We refer to the influence of w* on schooling as reflecting child labor demand. This is somewhat imprecise, but helps make clear that we are looking at factors distinct from the marginal utility of income. The evidence reviewed in this section do not suggest that employment weighted tariff declines increase the earnings foregone by schooling.

Changes in the formal wage labor market are unlikely to be responsible for the observed attenuation of schooling improvements. First, child employment in formal wage sectors is rare (table 2). Second, child labor is typically modeled as a perfect substitute for unskilled (illiterate) labor (Basu and Van 1998 for example). We do not observe increases in adult wage sector

employment for illiterates (table 9). However, it is possible that tariff declines increase child productivity in activities such as the family farm or business where child labor is substantially more prevalent. We examine this directly by estimating 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.A for exact definitions). The findings from estimating (7) for each work category are in Table 10.

The data do not suggest that schooling declines are driven entirely by increased earnings opportunities for children in family businesses either. 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 does not come through market work where the child's labor is likely to be directly related to additional household income (column 4). In fact, the data suggest declines in market work with tariff declines. This is similar to what we observed for illiterate adult males as well (table 9 column 5). The increase in work is operating principally through domestic work (table 10, 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 increases in the income foregone by schooling.

Rather, some of the declining school attendance appears as increases in domestic work (such as cooking, cleaning, gathering water and wood) and even larger increases in children who do not report 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 if adult work in the formal labor market and child domestic work are complements (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 aggregate tariff declines could bring productivity improvements in domestic

work (through cheaper domestic inputs that are complementary to child labor, for example), it is less clear why these improvements should vary with employment exposure to trade reforms. Moreover, we do not observe large declines in domestic work associated with lower tariffs for men (table 9) or women (unreported). Hence, it seems unlikely that the rise in domestic work reflects children filling in for working parents.

The presence of idle children is puzzling. The simplest explanation is that it reflects mismeasurement of child activities. Some parents may not consider working around the house as 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.[42] This would imply that the child's net economic contribution of schooling time, w*, could be zero. Even if this is the case, 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 as a principal usual activity could reflect that domestic activities are partially a type of absorptive labor such that both the increase in idleness and rise in domestic work reflects the avoidance of schooling costs more than an actual economic contribution of the child.

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

C. Poverty

[42] This might be the case 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.

As demonstrated in Topalova (2005), 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, child labor, and schooling.

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 (column 1) and poverty gap (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.[43] 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,[44] a high correlate of poverty (Burgess and Pande 2005, Duflo and Pande 2007). The lower living standards may force families to pull kids 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. Below, we present some additional evidence consistent with this 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 continue with our preferred

[43] These estimates include only 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.

[44] We thank Rohini Pande and Siddharth Sharma for the updated series on agricultural wages in a district. The data is available annually, but only for a subset of districts. The regression is estimated at a district level and follows our main specification in equation (7) with year indicators for all years and interactions of the initial district characteristics with the year indicators. Standard errors are clustered at the district level.

specification (7). We find that tariff declines are associated with increases in educational loans[45] (column 1) by households despite our results above that school attendance is declining relative to the national trends. In addition, we find that tariff declines are associated with declines in educational expenditure per capita (column 2), the log of (1+educational expenditure per capita) (column 3), and the share of educational expenditure in the household budget (column 4).[46] This evidence corroborates the attendance results and is consistent with the schooling costs argument as households are clearly spending less on education. The budget share result seems particularly compelling as it suggests that the decline in schooling spending is outpacing the overall decline in spending.

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. We rely on the very detailed information on education and schooling costs in the 42nd and 52nd (small sample) rounds of the NSS. In particular, using the 42nd round as our pre-reform period, we compute the prevalence of free tuition, the share of children obtaining mid day meals at school, and the share of children with scholarships in a district.[47] We interact these pre-reform aspects of school costs with the employment weighted tariff. Table 13 contains the results from our main specification. We use school attendance and and enrollment as our dependent variables in columns 1 and 2 respectively.[48] Although not all interactions with schooling costs are statistically significant, the negative signs of the coefficients suggests that declines in schooling relative to the national trend are smaller in districts with

[45] This information is collected only for agricultural laborers in rural India. Please see data appendix for details.
[46] 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 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.
[47] These are obviously only three components of schooling costs and do not capture any of the costs of clothing, books, materials, and other aspects of "fitting in" at school which may be the most important parts of school costs. However, they are measurable.
[48] The 52nd round collects data on both school attendance in enrollment, while the 42nd round provides only data on enrollment. We assume that enrollment equals school attendance in the 42nd round in column 1.

smaller baseline schooling costs. That is, the greater the prevalence of midday meals (panel A), scholarships (panel B), or tuitions (panel C), the smaller the decline in schooling associated with the tariff. Of course, the above measures of the schooling costs are likely non-randomn, but the evidence seems to be 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 that are smaller than the declines in schooling, and a rise in idleness. Tariff declines are also associated with increases in educational loans and declines in education expenditure and education expenditure as a share of household budget. These observations coupled with suggestive heterogeneous effect of tariffs with baseline schooling costs point to schooling costs as an important impediment to school attendance in times of slower (relative to trend) progress in poverty alleviation.

D. Poverty Elasticity of Schooling and Child Labor

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

Estimates of the poverty elasticity of child labor and schooling 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 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 India in the 90s 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.

VII. Conclusion

India has undergone an array of economic reforms over the last twenty-five years. Concurrent with these policy changes are large improvements in schooling and declines in child labor. In this study, we have focused on one component of these reforms – the changes in the structure and level of trade protection surrounding the 1991 tariff reform that was a condition of an IMF bailout. We find that 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. 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. In addition, there is no robust evidence that children are sent out to work as the family crosses the poverty line; in fact 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. For example, the Public Report on Basic Education in India (The Probe Team, 1999) puts considerable emphasis on the barriers schooling costs raise for school attendance. However, we think that 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 half of the improvement in schooling and a third of the decline in child labor in India in the 1990s can be attributed to declines in poverty.

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

That said, the results of this study are not just of academic interest. They highlight that there are potentially long-term consequences of short-term adjustments to trade policy changes and have implications for the design of trade adjustment assistance. In particular, our findings suggest that simply focusing on retraining adult labor as is commonplace may miss an important part of the adjustment process and a more detailed focus on the entire affected family may be

merited. Moreover, our findings that the connection between schooling and poverty works through schooling costs more than through child labor suggests that interventions aimed to lower schooling costs (or improve credit markets) can help mitigate the long-term consequences of the trade adjustment process. These findings also have implications for the design of schooling policies in that they imply that a focus on schooling more so than on child labor demand might be effective in influencing the parts of low school enrollments that owe strictly to poverty. A more precise evaluation of these policy options is clearly merited given the observational findings in this study.

Data Appendix

Schooling and Child Labor variables
Please see Section 3.A for information on the NSS data. We use data from the 1991 and 2001 Indian Census about the share of population in a district that is literate and has completed primary education by age/age groups.

Population counts
We use information from the 1991 and 2001 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.A

Exports

$\exp ort_{d,t} = \sum_i \omega_{id} * \exp ort_{i,t}$ where $\omega_{i,d} \equiv \frac{Emp_{i,d}}{\sum_i Emp_{i,d}}$ is the employment of industry i in district d as a share total employment in district d. Data on employment by industry and by district is from the 1991 Indian Census. Industry exports for 1987 are used for the 43rd round. The average of industry exports in 1993, 1994, 1995, 1996 and 1997 are 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

The share of agricultural households in a district that have a loan for educational expenses purposes. This information 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 that does not suffer from changes in recall period in 1999/2000 round. The other measure is obtained from the consumption module 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 detailed 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 average levels of per capita education expenditures in a district (deflated by deflators proposed by Deaton 2003a, 2003b) and the average share of educational expenditures in the household total expenditures in a district.

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 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 All Indian Education Survey (2002). 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

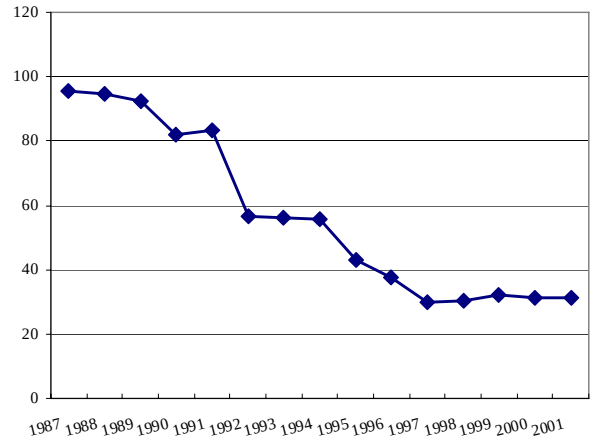


Figure 2: Correlation of Industry Tariffs in 1997 and 1987

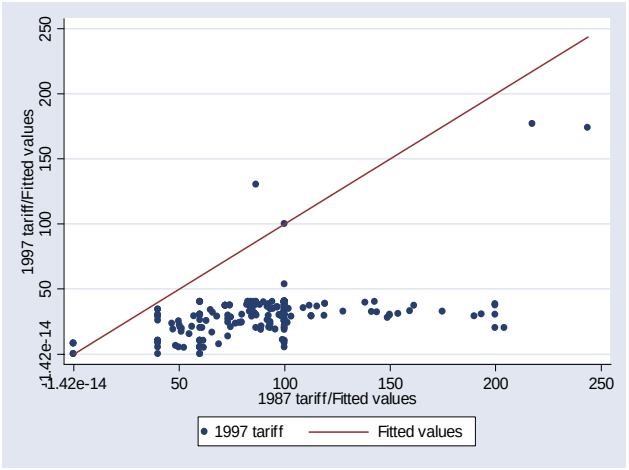


Figure 3: Tariff Declines and Industry Tariffs in 1987

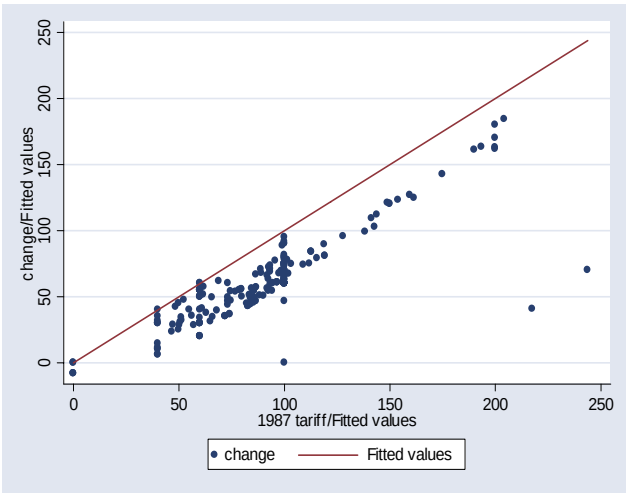
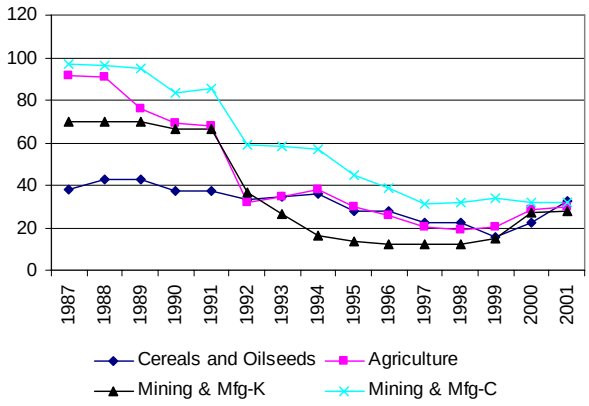
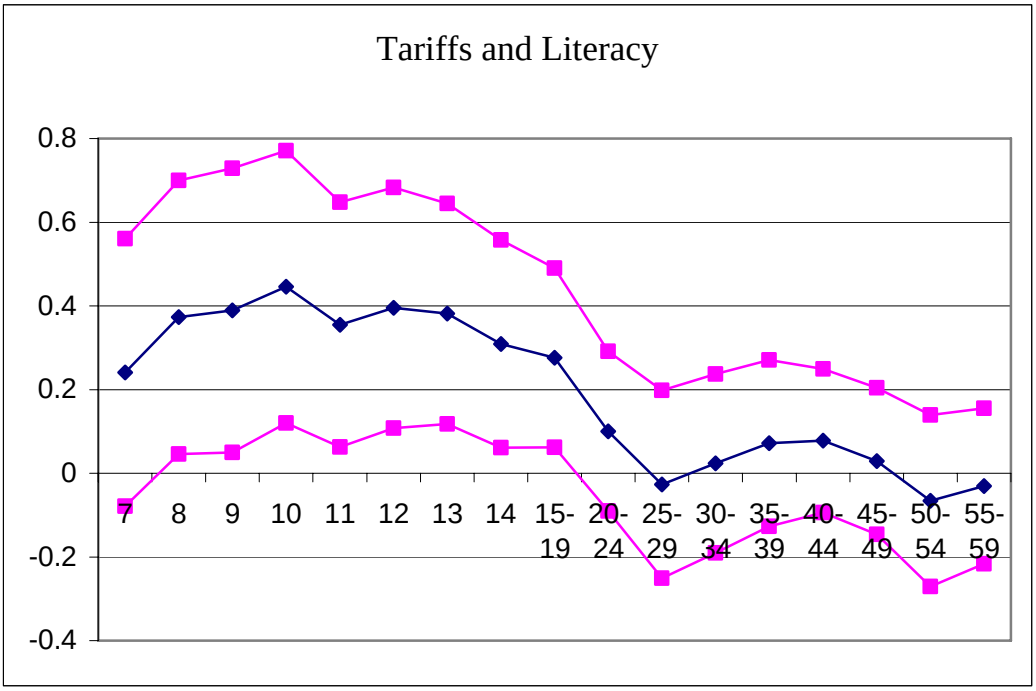


Figure 4: Tariffs by Industry Category



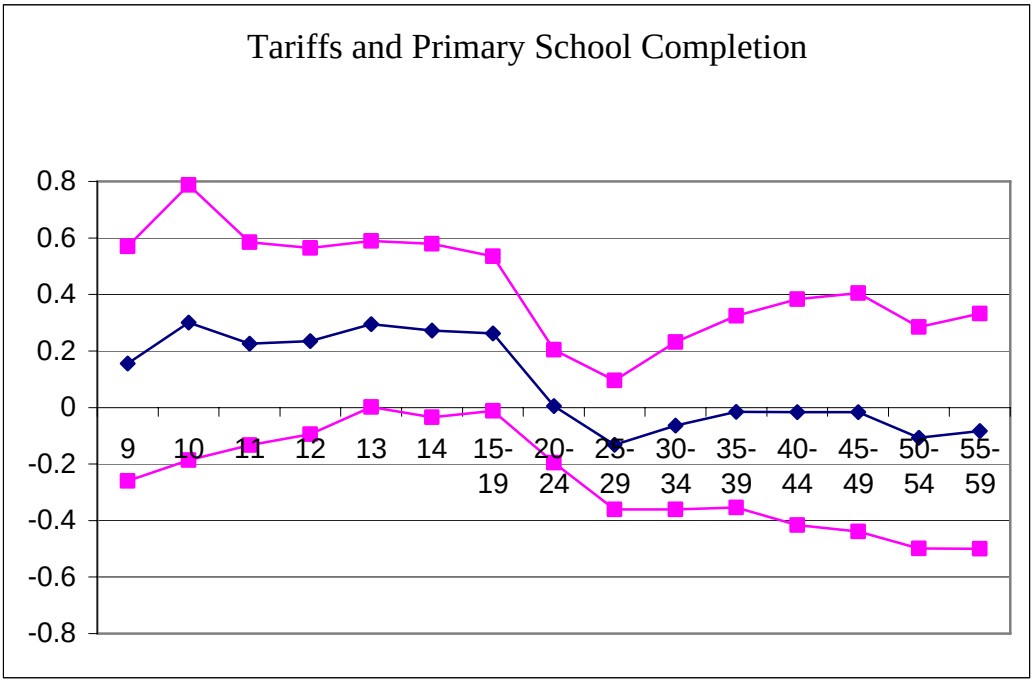
All figures from Topalova (2005)

Figure 5: 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 (6) 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.

Figure 6: Primary School Completion 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 (6) with the share of individuals with complete primary school 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	48.5	55.1	66.8	72.8
Work	36.0	25.0	20.5	14.1
Work Only	35.5	24.5	20.1	13.6
Market Work	19.3	13.7	10.8	7.5
household ent.	11.9	8.2	6.3	4.0
wage work	7.1	5.5	4.5	3.5
begging	0.0	0.1	0.0	0.0
Domestic work	16.7	11.2	9.6	6.6

Note: Each cell contains the participation rate 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)
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.
Data	pre and post reform	pre and post reform	pre and post reform	pre reform	pre and post reform
R^2	0.25	0.26	0.24	0.26	0.26
N	95669	95669	95943	103198	93328

Standard errors in parenthesis 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.

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

	(1)	(3)	(4)	(5)	(6)	(7)	(8)
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 capita				1.624***			1.641***
				[0.392]			[0.443]
Exports					-0.002**		-0.001**
					[0.001]		[0.001]
Number of primary schools per capita						0.024	0.01
						[0.018]	[0.019]
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 parenthesis 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 / 1,000 (Census, AIES)	Total Schools / 1,000 (census, AIES)	Number of Primary Schools / 1,000 (AIES)	Total Schools / 1,000 (AIES)	Pupil Teacher Ratio in Primary Schools (AIES)	Pupil Teacher Ratio in Upper Primary schools (AIES)
	(1)	(2)	(3)	(4)	(5)	(6)
Tariff	-0.018	-0.022	-0.004	0.002	31.362	19.111
	(0.020)	(0.024)	(0.011)	(0.012)	(36.412)	(24.325)
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	0.935	0.942	0.966	0.971	0.839	0.852
N	804	804	804	804	807	807

Notes: Standard errors in parenthesis are clustered at state-year level. ***, **, * denotes significance at 1, 5, and 10 percent level. Information on number of primary schools per 1000 people and total schools per 1000 people 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	0.123	-0.047	0.015	0.086	-0.153	-0.085
	(0.278)	(0.194)	(0.209)	(0.070)	(0.127)	(0.085)
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	0.995	0.995	0.996	0.958	0.906	0.920
N	818	818	818	818	818	818

Notes: Standard errors in parenthesis 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 parenthesis 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	-0.122	-0.019	-0.677	-0.467	-0.36	-0.25
	[0.251]	[0.186]	[0.567]	[0.428]	[0.348]	[0.260]
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	0.64	0.64	0.59	0.6	0.65	0.66
N	808	808	807	807	806	806

Notes: Standard errors in parenthesis 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 by Literacy and Tariffs in Rural India

	(1) Inactive	(2) Market Work	(3) Wage Work	(4) Total Days Worked in Last Week	(5) Days in Market Work	(6) Days in Wage Work	(7) Days in Household Enterprise	(8) Days in Domestic Work
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Men, Illiterate								
Tariff	0.109	0.08	0.111	-2.965	-0.378	0.483	-0.719	-1.266
	[0.175]	[0.126]	[0.293]	[2.003]	[1.987]	[1.790]	[1.816]	[1.281]
R2	0.04	0.06	0.18	0.07	0.09	0.13	0.15	0.08
N	48,827	48,827	48,827	48,827	48,827	48,827	48,815	48,815
Panel B: Men, Literate								
Tariff	-0.045	0.124*	-0.207*	-1.307***	-0.035	-2.381***	2.402***	-0.212
	[0.038]	[0.062]	[0.116]	[0.462]	[0.736]	[0.751]	[0.800]	[0.500]
R2	0.05	0.06	0.10	0.05	0.09	0.07	0.10	0.07
N	79,207	79,207	79,207	79,207	79,207	79,207	79,066	79,066
IV with traded tariff	yes	yes	yes	yes	yes	yes	yes	yes
Demographic Controls	yes	yes	yes	yes	yes	yes	yes	yes
Household Controls	yes	yes	yes	yes	yes	yes	yes	yes
District Indicators	yes	yes	yes	yes	yes	yes	yes	yes
Post Reform Indicator (Post)	yes	yes	yes	yes	yes	yes	yes	yes
Initial District Conditions*Post	yes	yes	yes	yes	yes	yes	yes	yes

Standard errors in parenthesis 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 parenthesis 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	-0.509	**	-0.186	***	1.051	**
	(0.239)		(0.067)		(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		NSS		1987-1998	
R2					0.73	
N	725		725		2,750	

Notes: Standard errors in parenthesis 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 survey round 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. Data: Columns 1 and 2 use 43rd and 55th round of NSS. Column 3 uses xx.

Table 12: Educational Expenditures and District Tariffs, Rural India

	Has education loan	Education Expenditure Per Capita	Log (1+Education Exp. Per Capita)	Education Exp. as share of total hh expenditure	Education Expenditure	Log (1+Education Expenditure)	Education Exp. as a share of total hh expenditure
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tariff	-0.030***	16.610***	1.921***	0.054***	28.284 **	1.919 *	0.046
	[0.010]	[4.592]	[0.464]	[0.016]	(7.768)	(0.501)	(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
Cross-section unit	household	household	household	household	individual	individual	individual
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	69,130	69,130	69,028

Standard errors in parenthesis 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	0.922 ***	0.893 ***
	(0.226)	(0.218)
Tariff X Meal	-0.704 **	-0.609 **
	(0.297)	(0.306)
R2	0.28	0.28
Obs	68,094	68,094
Panel B		
Tariff	0.721 ***	0.723 ***
	(0.198)	(0.196)
Tariff X Scholarship	-0.339	-0.917
	(2.994)	(3.024)
R2	0.28	0.28
Obs	68,094	68,094
Panel C		
Tariff	2.954	3.017 *
	(1.805)	(1.781)
Tariff X Free Tuition	-2.302	-2.367
	(1.863)	(1.842)
R2	0.28	0.28
Obs	68,094	68,094
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 parenthesis 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 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. 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 parenthesis 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: First Stage Results for Table 3, column 2

Dep. Variable: District Tariff	
District Tariffs on Traded Goods (TrTariff)	0.341*** [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 National Sample Survey