

Parental income, Child Labour and Human Capital Accumulation: Evidence from Trade Liberalisation in India

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Abstract

This paper revisits the *contentious issue* of how parental income affects their decision on children's human capital investment and work. India's sudden and unanticipated trade liberalisation creates exogenous variation in industry-specific tariffs over time. It was a national policy whose implementation was completely unrelated to household characteristics. Industries with greater exposure to foreign competition as a result of tariff cuts experience increased productivity relative to less exposed industries. Workers in more exposed industries with the same observable skills enjoyed higher earnings compared to their counterparts in less exposed industries. The variation in earnings across industries provides a good setting for the identification of the causal effect of changes in parents' income on child's labour and schooling. Using instrumental variable (IV) estimation approach, I find a positive income effect for child's schooling but a negative effect on work, and the effect is larger for girls compared to boys. Policies and programs by the government that improve economic status of parents would have a huge impact in the ongoing campaign about possible the ways to effectively eradicate child labour.

Key words: Parental income; Child labour; Schooling; Trade liberalisation; India

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1 Introduction

“[u]nfortunately, we remain fairly ignorant about the causal processes underlying the intergenerational transmission of earnings...does parental income matter so much as it does because high-income parents are able to invest more in their children’s human capital, or because the genetic or cultural traits that contributed to the parents high earnings are passed on to the children?” - Solon (1999).

This essay revisits the topical issue of the relationship between parental income, children’s schooling and work. Public Report on Basic Education in India (The Probe Team 1999) found that schooling costs are prohibitively expensive and the most often cited reason a child was never enrolled in school, and one of the two most cited reasons children were withdrawn from school².

With the poorly developed credit and risk markets in developing countries, most of children n’s education investment comes from the parents or family members (Banerjee, 2004). This has huge implication for child labour and schooling, and they also have far-reaching acceptance in both theoretical literature and policy-oriented work on the subject matter (Basu and Van, 1998; Baland and Robinson, 2000; Rogers and Swinnerton, 2003; Ranjan, 2001)³.

The challenge of parents’ inability to adequately meet children’s education investments necessitated governments’ action around the world to making unwavering effort through various policies and programs. These actions are accompanied by provision of incentives such as school meals, cash transfer to parents, provision of school uniforms and tuition fees, inter alia, to ameliorate the burden of educational expenditure from parents.

In spite of the laudable efforts on the part of governments to curb child labour and promote children’s school attendance through various measures, International Labour Organization (2013) estimates the number of child labourers worldwide to be 168 million, with the largest number being in the Asia and the Pacific region. The outrageous number is due to the *reluctance and/or unwillingness* of parents to send their children to school, and out of labour market participation. Some of the reasons for such reluctance are: opportunity costs in the use of child’s time (poverty stricken families’ use their as children as insurance to

² Rammohan (2000) shows that increase in schooling costs and child wage rate lead to substitution away from children’s schooling towards child labour

³ House-hold level evidence quite often failed to establish an inverse relationship between child labour and parental income (see Edmonds, 2002; Dar et al. 2000 for survey of the existing literature).

generate income), parental attitude and expected returns to education have been found to have critical influence in parents' decision of child labour and schooling (see Das and Deb, 2006; Mukherjee and Sinha, 2009). This is often explained as: if child's labour is not a bad in parental preferences because of cultural norms or parental attitudes, then improvements in income may have no effect on the economic activities of children (e.g. Ennew 1992, Ray 2000, or Deb and Rosati, 2002).

Child labour could persist in the presence of high parental income if the degree of altruism of the parent is sufficiently low (Rogers and Swinnerton, 2004). Therefore, decision to send a child to school does not only depend on those incentives by the government and the parental level of income but on factors such as: the expected returns on the alternative uses of a child's time, nature of the capital market and credit constraints (Basu and Van, 1998; Baland and Robinson, 2000; Edmonds, 2004; Loury, 1981).

There is a wide held consensus amongst researchers, and previous studies have established that income is positively correlated across generation; income is presumably correlated with unobserved abilities transmitted across generations (Shea, 2000). There is also extensive literature on intergenerational transmission with regard to both income and education (Solon, 1999; Behrman and Rosenzweig, 2002; Plug, 2003; Black et al. 2005). Unobserved factor such as parental abilities that are correlated with economic status could potentially bias simple OLS regression estimates. There may be differences in parents' abilities (which comes from heterogeneity in skills, tastes and preferences) to generate income that are passed onto their children and generate the observed correlation between parental income, child labour and schooling (Løken, 2010). The selection process comes from hereditary factors, cultural factors, or from other family background linked to parental education levels. One other challenge is that parental earnings or income could be measured noisily; if this is the case, OLS estimates are likely to suffer from attenuation bias.

This paper contributes to the spate of existing studies on the estimation of causal effect of parental income on child labour and human capital accumulation, through the use of trade policy shock as an instrument for parental income. This paper focuses on industrial variation in the intensity of the exposure to trade reforms, which generates exogenous variation in the earning of parents due to their industrial affiliation, and consequently leads to wage premium. To the best of my knowledge, no specific studies have been carried-out to estimate the causal impact of India's trade reforms on child labour and schooling, through the exogenous changes in parental income as a result of the policy.

This paper provides answers to the following questions: First, to what extent the decision of parents on child labour and human capital is due to variations in parental income? Second, does the decision of parents vary by age and gender of the children? Using NSSO Employment-Unemployment survey data from India, I estimate the causal effect of parental income on child's labour and human capital, using instrumental variable estimation strategy to address the endogeneity of parental income. I use India's trade liberalization of 1991, as instrument for parental income, because increases in parental income after the policy were unrelated to parents' abilities.

In the absence of a proxy for ability, I adopt instrumental variable approach to estimate the causal link of the phenomenon under investigation. Some industries experienced significant increase in wages, which was unrelated to parental abilities or other factors potentially affecting child labour and human capital accumulation. It was an exogenous and unanticipated reduction in tariff across industries, in which, industries with larger tariff reductions experienced increase in wages of its workers. The increase in wages comes by virtue of industrial affiliation of the parents (Kumar and Mishra, 2008).

During the period of trade liberalisation, tariffs were reduced sharply over time and the resultant reduction varied across industries. The sudden and unanticipated exposure of industries to foreign competition creates exogenous variation in productivity and earnings of workers across industries. Tariff levels during liberalisation were determined solely at the national level and it is related only to previous level of industry tariffs; no economic and political forces were found to influence the outcomes. Using instrumental variable (IV) estimation approach, I find a positive income effect for child's schooling but a negative effect on work, and the effect is larger for girls compared to boys. However, the OLS estimates are biased downwards relative to the IV results.

This study is important, in the sense; it has been argued that even though children acquire useful skills from working (see Dumas, 2012), the implications are quite enormous. Child labour's effect on the future is not limited to lack human capital but deficiency of social and cognitive skills (Ennew, 1982), it depress wages for adult and create poverty (Basu and van, 1998), it may conflict with school attendance, leading to poor school performance and attainment (Boozer and Suri, 2001; Heady, 2003; Jensen and Nielsen, 1997; Psacharopoulos, 1997; Patrinos and Psacharopoulos, 1997; Beegle et al. 2004), it may impair child development through reduced play and leisure (Fasa, 2003). These consequences have the capacity to perpetuate intergenerational poverty trap (Emerson and Souza, 2002).

The remainder of the chapter is outlined as follows: Sections 2.1 to 2.2 consider both empirical and theoretical literature; section 3 discusses the data source; section 4 discusses India's trade liberalisation and the suitability of industry tariffs as instrument for parental income; section 5 presents identification strategy; section 6 present results and discussions, and lastly, section 7 concludes and make policy recommendations.

2 Literature Review

2.1 Theoretical Review

Within the parental income and child labour literature, several theoretical models/discussions have been considered. Being that this paper is an empirical study, the focus of this section is to summarise the various mechanisms at work in the relationship between parental income and child labour/human capital accumulation in a robust manner.

Shultz (1960) model of standard human capital investment shows that families send their children to work if the return is greater than the alternative uses of child's time, such as schooling. In similar vein, Ben-Porath (1967) educational investments (and then child labour supply) are determined by weighing the present discounted value of schooling against its opportunity cost. Child labour may be the optimal response to a trade-off between returns to and costs of education (Becker, 1991). The link between cost of education and child labour is quite immediate since in most developing countries, and at least at low levels of education, the cost of schooling mainly constitutes the opportunity costs.

Varying abilities and background of parents across generations matter for income status and consequently, parents' decisions on labour and investment on children across households depend on it (Loury, 1981, Emerson and Souza, 2003)⁴. Regardless of the degree of parental altruism, child-labour can arise when bequest is zero and capital market is imperfect (Baland and Robinson, 2000). Similarly, Ranjan (1999) in a simple two-period model argues that despite parental altruism, the absence of market for loans against the future earnings of children gave rise to inefficient child labour.

Children's leisure (non-work) is a luxury good in the household's consumption, in which poor households cannot afford to consume it, but does consume it only if income rises (Basu and Van, 1998). However, in the presence of labour market imperfection, household wealth (e.g. land) exhibits an inverted-U relationship between land holding and child

⁴ Intergenerational correlations have been found to be lower for daughters than sons (Bowles and Gintis, 2002).

labour; as a household's land ownership rises, child labour first rises and then decline, in the manner of an inverted-U (Basu et al. 2010; Bhalotra and Heady, 2003; Dumas, 2007).

A productive economy will exhibit multiple equilibria with children working in at least one. A family sends its children to work only if its income from sources other than child labour is very low, and child labour is a close substitute for adult labour; these are known as luxury and substitution axioms respectively (Basu and Van 1998)⁵. This work has been further explored by Swinnerton and Rogers (1999) to get the distributive axiom; they introduced heterogeneity in the ownership of non-labour income and show that if the distribution of non-labour income is done with sufficient equality and not left in the hands of the few, in that case, a market equilibrium with child labour would not exist- distributive axiom. Ranjan (2001) shows that not just inequality in distribution but inequality in the distribution of income in the presence of credit constraints gives rise incidence of child labour.

Baland and Robinson (2000) model that child labour would be inefficient in the presence of capital market constraints. This occurs when parental savings, parental bequests to children, and children's transfer to their parents are restricted to non-negative.

When parents and children care about each other's utility (two-sided altruism), increase in parental income⁶ need not *always* lead to decrease in child labour and increase in schooling. A parent with low altruism can achieve a higher utility by sending the child to work for a longer time and saving some the household's aggregate income for the future even with increase in their incomes, in the anticipation of low transfers from their adult children in the future (Roger and Swinnerton, 2003; 2004)⁷.

In light of the above theory models, one vital channel through which trade liberalisation affect child labour and human capital accumulation is through relative price movements, which results from reduction in tariff and non-tariff barriers. This changes in the relative price of products which affect parents' income will affect child labour/schooling through substitution and income effects (Maskus, 1997; Ranjan, 2001; Edmonds and Pavcnik, 2005).

⁵ An unproductive economy generates a unique equilibrium in which children work, while a sufficiently productive economy will not have child labour.

⁶ Parental preferences are not identical: Fathers are less altruistic than mothers and the degree of altruism towards sons and daughters differ (Bhalotra, 2001). Also, Bhalotra and Heady (2003) find that the daughters of land-rich households are more likely to work than the daughters of land-poor households in both Ghana and Pakistan. This phenomenon is referred to as 'wealth-paradox'.

⁷ The relationship between child labour and parental income may be neither continuous nor monotonically decreasing. If parents are at all altruistic towards their children, then amount of human capital accumulation will be zero even if parental income is sufficiently high.

Looking at gender bias in parental investment in children's education, we have the following strands of theoretical discussion. First, unitary model (Becker and Tomes, 1976) assumes that altruistic parents choose the amount and standard of their children education. Other determinants of bias in education come from expected returns to education, parental preferences, and cost of schooling between boys and girls⁸. Second, another approach used the Nash bargaining model in which household decisions are considered as a result of a bargaining process among family members who differ in their order of preference and decision power (Manser and Brown, 1980; McElroy and Horney, 1981). In a related paper, Pasqua (2005) uses two-period household Nash-bargaining model to show that traditional values interact with market factors (costs and returns to education) in poor countries to shape parents' decision to invest in their children education.

The Alderman and King (1998) provide explanation for disparity in investment in education between children of different gender using a model of parental investment in children. Differences could be arise from variation in the opportunity cost of the child's labour, differences in the probability of transfers from children to parents, and in the degree of altruism.

2.2 Empirical Review

The empirical literature review covers three strands of studies. The first category consider's the correlation between household income⁹, child labour and schooling (inter alia see Ray, 2000¹⁰; Behrman and Knowles, 1999; Solon, 1992; Zimmerman, 1992; Corcoran et al, 1992; Hill and Duncan, 1987). Most of these studies find positive association between family incomes, children's schooling. Household's wealth e.g. land has been found to have negative effect on children's schooling but positive effect on children working (see Bhalotra and Heady, 2003; Basu et al. 2010). However, endogeneity of income still remain an issue of contention in most of these studies; high earning parents presumably have high ability on average than low-earning parents.

⁸ Behrman et al. (1982) use unitary model to show that only on efficiency grounds do parents invest more on high-returns children.

⁹ Until very recently, empirical studies linking parental income and children's outcomes have focussed very little to eliminate biases caused by the omission of unobserved characteristics and other measurement error problems (see Mayer, 1997).

¹⁰ The hypothesised relationships between child labour and household poverty, and between child schooling and household poverty are both strongly confirmed by the Pakistan data on these variables of child behaviour, but not on the Peruvian data.

In order to mitigate the problem of endogeneity, spate of studies use instrumental variable approach to address the concern of the endogeneity of family income (see Shea, 2000; Blanden and Gregg (2004)¹¹. Using father's union status, industry and job losses as instruments (compares children of union fathers to children of non-union fathers with similar observable skills); Shea (2000) on the other hand finds that parental income due to union status has negligible impact on children's human capital accumulation but has significant effect in a sample of low income families. Blanden and Gregg (2004), on the other hand review different approaches to estimating the effect of family income on children's educational attainment for Britain. They find significant but small effect of family income. In addition to parental union status as instrument for parental income, Chevalier et al. (2013) use minimum school leaving age for the parents and month of birth for the parents to instrument parental education as well, to investigate the intergenerational transmission of education with both parental income and education. They show that parental income matter for children's education. Maurin (2002) uses grandparent's socioeconomic background as a predictor of parental incomes. He finds that with a higher family income a child is much less likely to be held back in school.

This paper is related to previous studies that use instrumental variables approach based on natural experiment or policy reforms that change the income distribution of parents, and the eventual consequence of the effects of such policies on children's schooling and work. Edmonds and Pavcnik (2005) use regional and intertemporal variation in the real price of rice as a result of market integration in Vietnam. The authors find that greater market integration is associated with declines in child labour in household that are net producers of rice¹². Kruger (2004) repeats the analysis for coffee market liberalisation in Nicaragua and finds that higher coffee prices induce higher child labour. Exogenous increase in household's income due to government transfer which is unrelated to household characteristics lead to higher level of education (Akee, et al. 2010); and black South African families eligibility for pension income leads to large increase in schooling attendance, decline in total hour hours worked and there is a gendered effect¹³ (Edmonds, 2006, Duflo, 2003) .

¹¹ In a related study, Cochrane (1991) and Jacobson et al. (1993) use involuntary job losses (plant closure) as instrument for parents' income, on the assumption that plants closure are exogenous with respect to employees' unobservable skills. They compare children of displaced fathers with children on non-displaced fathers with similar observable characteristics. They found large negative impact of involuntary job losses on earnings.

¹² Increase in the price of an exported good could either increase or decrease child labour depending on the magnitude of the substitution and income effect.

¹³ Alderman and King (1998) review of evidence brought to the fore that differences in investment in education between gender could result from : gender differences in the returns to schooling, access and price of schooling, income constraints, patterns by birth order and number of siblings, maternal versus paternal preferences.

In a related paper, Mayer (1997)¹⁴ uses household assets and child support payments as a measure of household income, and she finds that income has a positive and significant effect on educational attainment. Another related approach is presented by Oreopoulos et al. (2008), they consider how worker displacement leads to a protracted decline in family income and find a small but significant effect of income on children's outcomes. Alternative strategies to correct for endogeneity of parental income using products price shock or boom have been used extensively in the literature¹⁵. Households that experienced crop failure had significant increase in the use of child labour and educational enrolment decreases in Tanzania (Beegle et al. 2006).

Løken (2010) and Løken, Mogstad, and Wiswall (2010) use Norwegian oil shock of the 1970's as an instrument for family income. The oil shock increased the income of families living in Rogaland relative to those in Sør-Trøndelag, which did not experience any effect. They find that family income does not matter directly for children's educational attainment, even though OLS results show clear effects, the IV results are mostly negative and close to zero. This suggests that the positive link between family income and children's education in Norway is due to selection into education not causation.

Furthermore, Black et al. (2005) using evidence from the coal boom in the US to study the impact on the demand for education. They find that the coal boom reduced the demand for education in the short run, after the boom, the earning of high school dropouts declined relative to graduates. Duryea et al. (2007) find that unemployment shock in Brazil (they compare households in which the male household head becomes unemployed during a four-month period with households in which the head is continuously employed) significantly increases the probability that a child enters the labour force, drops out of school, and fail to advance in school. In a related paper, Duryea (2003) finds that children are more likely to leave school as labour market condition become less favourable.

Also, using exogenous variation in rainfall across districts in Uganda as instrument for household income, in order to estimate the causal effects of household income shocks on children's enrolment and cognitive skills, Björkman-Nyqvist (2013) finds that negative deviations in rainfall from the long-term mean have large negative and significant effects on female enrolment in primary schools, and the effect is stronger for older girls, but no effect of

¹⁴ Using argument similar to Mayer, Acemoglu and Pishke (2001) exploit changes in the family income distribution between the 1970's and 1990's. They find a 10 percent increase in family income is associated with a 1.4% increase in the probability of attending a four year college.

¹⁵ Other studies have found that financial crisis leads to higher child labour especially among the poor and younger children (see Funkhouser, 1999; Skoufias and Parker, 2006; Rucci, 2003).

rainfall variation on the enrolment of boys and younger girls. Poor households reduce school attendance of their children, as a self-insurance strategy, whenever are they hit by unanticipated income shocks (Jacoby and Skoufias, 1997). The myriad of studies show that the effect of economic shock on child labour and schooling is ambiguous.

Other papers have considered levels of parental expectations of future economic returns to schooling may also matter for their decision to send children to school or work. Chamarbagwala (2008) finds that regional returns to primary education not only increase the likelihood that boys and girls attend school but also decrease the likelihood that they work. Foster and Rosenzweig (1996) find that agricultural technological improvements introduced by the Green Revolution in rural India, increased schooling amongst children in landed but not in landless households since expected returns to schooling increased for landed but not for landless children. Kochar (2004) shows that urban rates of return to education influence schooling decisions amongst rural boys aged 15-20 years in landless households since compared to landowning, landless labourers are more likely to migrate to urban areas in search for work. Yamauchi-Kawana (1997) corroborate this by showing that village level returns to education have a positive relationship with school enrolment in India. Gormly and Swinnerton (2004) show that among liquidity-constrained households, there are positive and robust relationships between regional returns to schooling and school enrolment.

Considering the relationship between trade liberalisation, child labour and schooling; the impact of trade liberalisation on these outcomes may be non-uniform, in the sense that it may differentially reduce school among older children and increase attendance rate among the younger age group, and the variation may also vary across gender of the children. These differential outcomes are explained by income and substitution effects as a result of trade liberalisation (Edmonds et al. 2011; Marchand, 2013).

3 Data Sources

In the analysis of the relationship between parental income, child labour and human capital accumulation, I consider two quinquennial rounds of the survey from the Employment and Unemployment Survey conducted by the Indian National Sample Survey Organisation (NSSO) for the year 1987-88 and 1999-2000, respectively¹⁶. This enables the analysis to span a period that begins approximately three years prior to the trade reforms of 1991. The dataset consists of a repeated cross-section since different households are surveyed in each round or

¹⁶ The two rounds are combined form a pooled cross sectional dataset.

year and households are selected through multi-stage stratified random sampling over a full year.

The employment-unemployment surveys consist of household and individual level data, and the survey collects information on demographic characteristics of the household members, industry of employment, and economic activities engaged. I consider only households that have parents in wage employment in order to get parental weekly wages or earning, and nominal wages are corrected to real wages using the appropriate consumer price index.

Since this study focuses on children, considering children aged between 5 to 14 years (those in this category meets International Labour Organisation definition of children), I use their principal activity status (e.g. regular salaried/wage employee, casual wage labourer, work in the household enterprise, and attend school) to generate the dependent variables, i.e. work, schooling, work only, and school only, across the various households¹⁷. Also, demographic and household attributes of children from the data are used in the analysis. These include: household size, education of household head, age of household head, and gender of household head, child's characteristics (gender, age, and completed education).

Data on tariff rates across industry over time are from Rees et al. (2012). In order to get parents' industry tariff rates which instrument for parents' income, tariff rates across industries for the two periods are matched to the corresponding parents' industry affiliation with the help of National Industrial Classification (NIC) codes.

The household survey (Employment and Unemployment survey data) reports the industry affiliation for each individual, which allows the merging of the tariff rates to the parental industry affiliation for each child; this restrict the sample to only parents working in traded industries, which are: Agriculture, Mining and Manufacturing. Tariff data for the non-traded sector are not available.

¹⁷ An indicator variable that takes the value 1 and 0 otherwise if the child's works as a principal activity and does not attend school (i.e. work only). I refer to this as child labour.

Table 1: Selected Industry-Specific Tariff Coverage Rates

Industries	Years		1988-2000 Tariff reduction (%)
	1988	2000	
Coal Mining	90.00	20.40	77.33
Crude Pet. Nat. gas	105.03	15.42	85.32
Metal Ore Mining	130.00	18.67	85.64
Mfg. Food Product	171.96	48.00	72.08
Mfg. of Beverages & Tobacco	150.00	66.05	55.97
Mfg. of Textiles	138.85	33.89	73.97
Mfg. of Textile Products	140.93	33.35	73.58
Mfg. of Leather and Leather Products	145.00	37.22	75.89
Mfg. of Chemicals and chem. Products	141.23	36.32	74.28
Mfg. of Transport Equip. & parts	129.96	38.48	70.39
Agriculture	74.67	40.49	45.78

Source: Author's estimation. The table above shows tariff rates for selected industries traded industries used by the author.

Table 2: Summary Statistics

Variable	Mean	Std. Dev.
<i>Dependent Variables</i>		
Child labour	0.154	0.361
Attend school	0.682	0.466
Work only	0.099	0.298
Market work	0.088	0.284
Domestic work	0.078	0.269
<i>Household Characteristics</i>		
Land owned (hectares)	1.361	3.377
Real weekly Paternal wage	3.776	7.181
Real consumption	4.693	52.740
Expenditure		
Paternal industry tariff	51.566	38.790
Household size	5.774	2.850
Number of children	1.729	1.556
<i>Individual characteristics</i>		
Paternal age	46.605	13.246
Paternal education	0.619	0.486
Age child	9.297	2.857
Child gender (1=male)	0.529	0.499

NSS Employment-Unemployment dataset- Pooled Sample (43rd and 55th Rounds)

Principal activities of children are considered for the dependent variables. Market work includes work in household enterprise such as wage work, farm or business, and

begging. Work only indicates that the child does not report attending school but reports market work and domestic work as the principal usual activity. Domestic work includes collection activities, chores, sewing, tailoring, weaving, etc. for household consumption.

4 India's Trade Liberalisation

India's trade liberalisation episode of 1991 is characterised by huge tariff cuts which resulted in cross sectional variation in tariffs across industries over time. Also, the trade reforms were exogenous and came as a surprise to many people in the country, such that policy makers and other interest group were unable to influence outcome of the tariff reduction across industries (Kumar and Mishra, 2008; Topalova, 2010). The industry tariff rates were related exclusively to pre-reform tariff levels across industries.

One of the consequences of India's trade liberalisation is productivity changes of firms which also impacted on industry wages. The persistent threat of foreign competition increases innovation incentives by domestic producers, forcing them to restructure and increase their productivity (Topalova and Khandelwal, 2011). Trade liberalisation and relative wages would be positively correlated if productivity enhancements are passed through onto industry wages; these studies find that industries with increased tariff trade liberalisation experienced an increase in wages relative to industries with lower liberalisation (Topalova, 2004; Krishna and Mitra, 1998; Kumar and Mishra, 2008; Felbermayr, Prat, and Schmerer, 2008). Topalova and Khandelwal (2011) find that tariff cuts in India raised total factor productivity through pro-competitive effect due to lower output tariffs, and through access to better inputs due to lower input tariffs. The wage increase that occurs as a result of individual's industry affiliation alone (independent of any other industry characteristics) is known as wage premium.

Based on the above evidence, parents' industry tariff rates are used as instrument for parental income. This is because the trade policy shock was exogenous to parents' abilities, education and other neighbourhood characteristics, which constitutes the endogeneity concern in studies of the impact of parental income on child labour and human capital accumulation. Due to the fact that the reform was unanticipated and sudden, it was unlikely foreseen in the schooling and child labour decisions made by households during that period.

These industry tariff rates are unlikely to be correlated with unobservables, as they are determined at the national level and are specific to parents' industry affiliation¹⁸.

Using parental industries tariff rates as instrument for parental income meet the following conditions: First, the instrument has to be randomly assigned. The India's trade reforms meet this condition it was sudden, unanticipated and seen as a 'shock therapy' by policy makers. Second, it satisfies the exclusion restriction: the instrument should affect the explanatory variable and not directly the outcome of interest. Therefore, the effect of trade liberalisation on children's participation in activities (work, schooling, child labour, work only) is through parental income. Hence, there is no direct effect between trade reforms and children's outcomes. Third, the existence of a strong first-stage relationship and high F-statistics meet the conditions for the suitability of the instrument in the regression.

Table 3: First-Stage Regression Results of Tariff Rates & Parental income on Child Labour & Human Capital Accumulation

Dependent variable:	(1)	(2)	(3)	(4)	(5)
Paternal Wages					
Paternal Industry Tariffs	-0.034*** (0.000)	-0.035*** (0.000)	-0.011*** (0.002)	-0.006** (0.002)	-0.003** (0.001)
Observations	55, 056	37, 741	20, 691	17, 727	18, 080
F-Stat. for instrument Strength	266.99	217.79	257.10	251.91	251.54

Notes: The dependent variables are binary, which takes value between 0 and 1. They are based on the principal activity of each child in the household. Included in the regression are: Household controls, child characteristics, parental characteristics, year indicator, district fixed effects, paternal industry fixed effects. Column (1) shows first-stage result for schooling as dependent variable; column (2) shows first-stage result for work only as dependent variable; column (3) shows first-stage result for work as dependent variable; column (4) shows first-stage result for domestic work as dependent variable; column (5) shows first-stage result for market work as dependent variable. All standard errors are corrected for heteroskedasticity and are clustered at the household level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Number of observations varies across columns because of missing data.

¹⁸ There is no central compulsory schooling legislation. Fifteen states have compulsory schooling laws through age 14, which was passed in the mid-1980s. There has not been any attempt towards enforce of these laws. Other changes in education policy over the period this 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 programs. These programs are in no way likely to be correlated with tariff variation across industries, even though they could affect the overall trends in schooling (Edmonds, et al. 2010).

5 Identification Strategy

To estimate the causal effect of parental income on child labour and schooling, I use instrumental variable estimation approach with the model given by the specification below:

$$Y_{iht} = \beta_0 + \beta_1 H_{ht} + \beta_2 X_{it} + \gamma_{drt} + \varepsilon_{iht} \quad (1)$$

where Y_{iht} is a binary variable for whether or not a child participate in any of the following activities Y (i.e. attend school, work only, domestic work, market work) by child i living in household h at time t , H_t denotes earnings of household head H which belongs to household h at time t ¹⁹, X_{it} is a vector of individual and household characteristics. Differential changes across regions over time that are independent of trade reforms are captured by district and year fixed effects, denoted by γ_{drt} . Finally, ε_{iht} is an *i.i.d.* error term that is assumed to be uncorrelated with any of the child's participation activity. Parental industry tariff rates are used as instrument for parental income. This result to assuming that, conditioning on observables skills, fathers' industry tariffs are orthogonal to the part of unobserved ability transmitted across generations.

The above assumption will be valid as long as tariff cuts across industries were random and unanticipated. From the available evidence, tariff reductions were related to pre-reform tariff levels only and were done randomly; neither industry productivity level nor other economic variables were taken into account during the trade liberalisation episode²⁰. In order to identify the causal effects of parents' income on child labour and schooling, I consider policy that creates variation in parents' income that are exogenous to both the parents' and children's abilities. By using India's trade liberalisation that increased the wages of those in the more exposed industries compared to those in the less exposed industries, I find results that represent and show this connection. The identification assumption is that, workers in the more exposed industries (industries with higher tariff cuts) are not more able or do not have more or higher ability than those in the less exposed industries (industries with lower tariffs cut)—tariff reductions across industries were random and unanticipated.

¹⁹ Following Chevalier et al. (2013), I use paternal income because the use of household income measure requires the inclusion of female earnings which is likely to be affected by endogenous labour decisions.

²⁰ Gang and Pandey (1996) assert that changes in trade policy are unrelated to economic and political factors in the country.

Using OLS regression to estimate the causal impact would give a bias estimate due to the positive correlation between parents' income and ability. These traits are subsequently passed on to their children, through norms and culture: intergenerational transfer of ability.

Equation (1) is estimated through the use of a linear probability model to find the various children's outcomes. In order to ensure identification, I use the exogenous variation in parents' industries tariff rates to instrument for parental earnings or wages for the periods under investigation. The coefficient on parental industry tariff β_1 in (1) is identified based on the assumption that there are no omitted or unobserved time-varying industry-specific characteristics that affect child labour and human capital accumulation which are correlated with parental industry tariffs over time. Further, I use exactly identified model, meaning that the number of exogenous regressor is equal to then number of instrument. Everything else equal, a negative (positive) coefficient of parental industry tariff β_1 in (1) would suggest that tariff reductions are associated with increases (decreases) in child labour and human capital accumulation.

Workers in industries with greater exposure to trade liberalisation experience increase in their earnings through the pro-competitive effect, making tariff rates across industries an important determinant of parental earning. These tariff rates across parents' industries are unlikely to affect child's labour and human capital accumulation directly. Edmonds, et al. (2010) support this assertion by showing that child labour is typically modelled as a perfect substitute for unskilled labour (e.g. Basu and Van, 1998), and they did not observe increases in the adult wage sector employment for illiterates with tariff declines. This lends credence to the exclusion restriction assumption, that trade liberalisation or tariff cuts do not affect child labour and human capital accumulation directly, but through changes in parental income as a result of the policy shock.

Conditional on a set of controls for demographic, child and parental characteristics, these tariff rates are unlikely to be correlated with unobservables, as they are determined at the national level and are specific to each parent's industry affiliation. Moreover, Topalova (2005) shows that industry tariff rates decline are not correlated with industry log wage, industry skill intensity, industry capital intensity, log output, average factory size, log employment, pre-reform output growth, and pre-reform employment growth.

To take into account other changes in parental industries over time, such as productivity improvements and changes in other policies, I include industry and time fixed effects. Also, Even though tariffs are determined at the national level, it is possible that some

regions or districts are affected differently due to variation in their industry-specific employment shares. In order to account for these possible regional or district differences, I control for district fixed effects. See table 3 for the first stage regression results of parental income, child labour and human capital accumulation using parental industry tariff rates as instrument for parental income. The results presented in table 3 suggest that tariff reductions across industries are associated with increase in parental income for workers in the more exposed industries compared to those in the less exposed industries.

6 Results and Discussions

Table 4: The Effect of Parental Income on Activities of Children by gender-OLS Results

Dependent variable:	School (1)	Work only (2)	Work (3)	Domestic Work (4)	Market work (5)
Panel A					
All children					
Paternal income	0.002** (0.0010)	-0.001 (0.0008)	-0.003*** (0.0010)	-0.001** (0.0006)	-0.002*** (0.0007)
Observations	55, 056	37, 741	20, 691	17, 727	18, 080
R-Squared	0.170	0.217	0.673	0.662	0.696
Panel B: Boys					
Paternal income	0.001 (0.0009)	-0.000 (0.0004)	0.002*** (0.0005)	-0.000 (0.0002)	-0.002*** (0.0005)
Observations	29, 258	20, 874	10, 534	8, 790	10, 217
R-Squared	0.152	0.146	0.696	0.598	0.715
Panel C: Girls					
Paternal income	0.003*** (0.0012)	-0.002** (0.0009)	-0.004** (0.0009)	-0.003*** (0.0007)	-0.002*** (0.0007)
Observations	25, 798	16, 867	10, 157	8, 937	7, 863

R-Squared	0.214	0.314	0.663	0.663	0.677
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Notes: The dependent variables are binary, which takes value between 0 and 1. They are based on the principal activity of each child in the household. Included in the regression are: Household controls, child characteristics, parental characteristics, year indicator, district fixed effects, paternal industry fixed effects. All standard errors are corrected for heteroskedasticity and are clustered at the household level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Number of observations varies across columns because of missing data. Standard error in brackets are clustered. at industry level.

Table 5: The Effect of Parental Income on Activities of Children by Ages -OLS Results

Dependent variable:	School (1)	Work only (2)	Work (3)	Domestic work (4)	Market work (5)
Panel A: 5-9					
Paternal income	-0.000 (0.0012)	0.003 (0.0022)	-0.000 (0.0003)	-0.000 (0.0002)	0.000 (0.0002)
Observations	29, 274	16, 629	8, 184	7, 943	7, 911
R-Squared	0.165	0.059	0.726	0.656	0.816
Panel B: 10-14					
Paternal income	0.004*** (0.0009)	-0.002** (0.0007)	-0.005*** (0.0008)	-0.002*** (0.0005)	-0.003*** (0.0006)
Observations	25, 782	24, 112	12, 507	9, 784	10, 169
R-Squared	0.219	0.238	0.625	0.653	0.658

Notes: The dependent variables are binary, which takes value between 0 and 1. They are based on the principal activity of each child in the household. Included in the regression are: Household controls, child characteristics, parental characteristics, year indicator, district fixed effects, paternal industry fixed effects. All standard errors are corrected for heteroskedasticity and are clustered at the household level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Number of observations varies across columns because of missing data.

Table 4 shows the OLS results on the effect of parent's income on child's schooling, work, work only, domestic work and market work respectively. A one percentage point increase in parent's income increases the probability of children's schooling by 0.2 percent (A hundred percentage point increase in parent's income correspond to a 20 percentage point increase in the probability of children's schooling). However, the results from the estimation on effect of parent's income on work only, work, domestic work and market work are negative. On the results on work, indications are that a percentage point increase in parent's income leads to a decline in the probability of child labour between 0.1 to 0.3 percentage points. Also, estimation of equation 6 by gender shows that parent's income has a stronger

effect on girls compared to boys. A one percentage point increase in parent's income leads to an increase in the probability of girl-child schooling by 0.3 percentage point, while not significant for boy-child.

Furthermore, estimation of equation 6 by age (between 5-9 years and 10-14 years) shown in table 5, the results show the effect of parent's income on children's outcomes is higher on the older children than the younger. Therefore, from the OLS results above, there are no significant effects of parent's income on any of the children's outcomes for between 5-9 years.

Table 6: The Effect of Parental Income on Activities of Children by gender - IV Results

Dependent variable:	School (1)	Work only (2)	Work (3)	Domestic work (4)	Market work (5)
Panel A					
All children					
Paternal income	0.037*** (0.0068)	-0.023** (0.0102)	-0.007** (0.0033)	-0.007*** (0.0027)	-0.002 (0.0028)
Observations	55, 056	37, 741	20, 691	17, 727	18, 080
F-Stat. for instrument strength	260.99	217.79	257.10	251.91	251.54
Panel B: Boys					
Paternal income	0.035*** (0.0081)	-0.015 (0.0115)	-0.003 (0.0038)	-0.002 (0.0021)	-0.002 (0.0036)
Observations	29, 258	20, 874	10, 534	8,790	10, 217
F-Stat. for instrument strength	179.00	152.18	161.71	161.54	163.28
Panel C: Girls					
Paternal income	0.042*** (0.0102)	-0.033** (0.0155)	-0.012** (0.0053)	-0.013*** (0.0047)	-0.002 (0.0041)
Observations	25, 798	16, 867	10, 157	8, 937	7, 863
F-Stat. for instrument strength					

192.24 148.71 182.86 177.43 168.30

Notes: The dependent variables are binary, which takes value between 0 and 1. They are based on the principal activity of each child in the household. Included in the regression are: Household controls, child characteristics, parental characteristics, year indicator, district fixed effects, paternal industry fixed effects. All standard errors are corrected for heteroskedasticity and are clustered at the household level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Number of observations varies across columns because of missing data.

Equation (1) is estimated using instrumental variable estimation approach by instrumenting the paternal income variable with paternal industry tariff rates. The results in table 6 and 7 suggest that paternal tariff rates serve as a strong instrument for paternal income, as implied by the high first stage F-statistics. From table 6, the estimation results show that parents income increase the probability of children’s schooling but decrease the probability of child labour. Precisely, a one percentage point increase in parent’s income corresponds to a 3.7 percentage point in the probability of children’s schooling. For children that work only, a one percentage point increase in their parent’s income leads to a decline in the probability of working by 2.3 percentage point. Parent’s income have greater impact on the probability of girls schooling compared to boys, while child labour of boys is scarcely significant to parent’s income compared to girls. Also, except for children’s schooling and domestic work, parent’s income is rarely significant to other children’s activities.

Table 7: The Effect of Parental Income on Activities of Children by Ages - IV Results

Dependent variable:	School (1)	Work only (2)	Work (3)	Domestic work (4)	Mkt work (5)
Panel A: 5-9					
Paternal income	0.034*** (0.0087)	0.006 (0.0073)	-0.002 (0.0017)	-0.002* (0.0014)	0.000 (0.0010)
Observations	29, 274	16, 629	8, 184	7, 943	7, 911
F-Stat. instrument strength	242.12	177.92	198.11	208.43	203.35
Panel B: 10-14					
Paternal income	0.042*** (0.0092)	-0.047*** (0.0174)	-0.017*** (0.0057)	-0.013*** (0.0046)	-0.007 (0.0049)
Observations	25, 782	21, 112	12, 507	9, 784	10, 169
F-Stat. instrument	145.00	123.54	158.73	142.51	147.34

strength

Notes: The dependent variables are binary, which takes value between 0 and 1. They are based on the principal activity of each child in the household. Included in the regression are: Household controls, child characteristics, parental characteristics, year indicator, district fixed effects, paternal industry fixed effects. All standard errors are corrected for heteroskedasticity and are clustered at the household level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Number of observations varies across columns because of missing data.

An OLS estimate of the coefficient of parent's income is likely to be biased and inconsistent due to omitted variable bias resulting from the potential correlation between parent's income and ability that is transmitted to their children through genes and culture. Also, if parents' incomes are computed with error, that is, it involves random measurement error in the data, it would bias the estimated coefficient on parental income towards zero (attenuation bias).

7 Conclusions and Policy Implications

There is a widely held consensus in the literature on the positive correlation between parents' economic status and ability, which are transmitted across generations.

This paper contributes to the existing literature on the demand-side analysis for children's schooling and work. It's in agreement with previous studies that find large or positive effect of parental income on children's outcomes, such as children's schooling (Edmonds and Pavcnik, 2005; Akee, et al.2010; Edmonds, 2006; Duflo, 2003; Mayer, 1997).

Furthermore, the results from this essay are in agreement with the luxury axiom of Basu and Van (1998) seminal model. The luxury axiom posits that households have a threshold level of subsistence, in which, when the level is exceeded without children's contribution from work, families will take their children out from labour market participation; otherwise, parents will encourage child labour regardless of how insignificant children's contribution from economic activities would be.

The novelty of the research is using instrument variable estimation approach to deal with the pernicious issue of endogeneity of parental income and children's outcomes. I find that India's trade liberalisation of 1991 created an exogenous variation in income across industries; those in more exposed industries to tariff cuts experienced higher earnings relative to their counterparts in less exposed industries to tariff cuts with the same observable skills. Therefore, I use parents' industry tariff rates as instrument for parental income; the instrument satisfies both the exogeneity and exclusion restriction, making it a valid instrument for this analysis.

From the estimation results, I find that parental income matters for children's outcomes, such as schooling and work. There exists a positive income effect for children's schooling but negative income effect on children's work. These effects vary between gender and ages of the children. There is stronger impact of parental income on girls relative to their boys' counterpart, and age group 5-9 years respond differently or almost insignificantly to parental income compared to those in the age group 10-14 years, within the same family.

The pertinent question that often arises is: why does parent's income matters for children's outcomes? If parental preference to child labour is regarded as a "bad" and child schooling as a "good", then, parents' income would matter for children's outcomes, because as income increases, we are more likely to have a fall in child labour and increase in children's human capital accumulation. This is partly due to capital or risk matter imperfection, and the consequence is the inability of parents to enter into binding contracts or borrow against the future earnings of their children.

The extent of the results (the degree to which parents income matter for children's schooling and work) provide the basis for programs that redistribute resources to low income families and direct investment or incentive to children by the government. The impact of parental income on children's outcomes may be higher in developing countries than developed ones due to absence or limited public investment and social welfare programs.

There have been agitations by economists and policy makers alike, for the outright ban on child labour in developing countries. Since children's schooling and work depends on parent's income, the effectiveness of a ban on child labour would hinge on the improvement in the economic status of parents. Therefore, policies and programs by the government that improve economic status of parents' and raise the economic benefits of education would have a huge impact on the ongoing campaign about possible ways to effectively eradicate child labour.

Empirical studies have shown that the effect of India's trade reforms often depends the local institutional environment, i.e. the nature of labour market institution across states (see Hasan et al. 2012; Hasan et al. 2007; Topalova, 2010). Future research could consider whether institutional characteristics, such as flexible and rigid labour laws, and the degree of enforcement of existing laws across state have any impact on child labour and human capital accumulation.

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