International Trade and Child Labor: Cross-Country Evidence[*]

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Abstract

We explore the relationship between exposure to trade (as measured by openness) and child labor in a cross country setting. Our methodology accounts for the fact that trade flows are endogenous to child labor (and labor standards more generally) by examining the relationship between child labor and variation in trade based on geography. We find that countries that trade more have less child labor. At the cross-country means, the data suggest an openness elasticity of child labor of -0.7. For low-income countries, the elasticity of child labor with respect to trade with high income countries is -0.9. However, these relationships appear to be largely attributable to the positive association between trade and income. We consistently find a small and statistically insignificant association between openness and child labor when we control for cross-country income differences in the full sample, when we split the sample into different country groups, consider only trade between high and low income countries, or focus on exports of unskilled-labor intensive products from low income countries. Thus, the cross-country data do not substantiate assertions that trade per se plays a significant role in perpetuating the high levels of child labor that pervade low-income countries.

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1. Introduction

Recent estimates suggest that approximately 211 million children under 15 are working worldwide (ILO 2002). Because of their economic circumstances, these children are forced to give up the future benefits of leisure, education, and in some instances health in their youth in order to provide the immediate gains associated with their labor. The role international trade plays in this pervasive child labor has recently drawn substantial political attention. Activists have been quick to blame child labor on the effects of trade on local labor markets and have suggested trade sanctions as tools to coerce policy changes aimed at mitigating child labor. Others have argued that by improving incomes, trade reduces child labor. This study examines the cross-country data to see whether the data provide any support for either of these hypotheses about the relationship between trade and child labor.

The interaction of trade and child labor has received considerable theoretical attention (surveyed in section 2 of this study), but empirical evidence on the topic is scarce (Brown, Deardorff, and Stern 2002 is a survey). The main identification problem that limits the empirical evidence is the endogeneity of trade: the resource endowments and policies which determine trade flows also influence child labor supply and are difficult to fully control for in an empirical setting. For example, the idea that the availability of child labor and (more generally) labor standards determine trade flows appears in studies by Maskus (1997), Martin and Maskus (1998), Brown (2001), Brown, Deardroff, and Stern (1996), and Busse (2002). Thus, the ideal setting in which to consider how trade affects child labor is one where an exogenous policy experiment induces variation in trade, and children are asymmetrically affected within a country by the policy experiment (perhaps because of community differences in resources endowments). Edmonds and Pavcnik (2005b) is one such study, but data limitations preclude such analysis for

a large set of countries.[1] Therefore, *general* evidence on the relationship between trade and child labor that *explicitly* considers the joint determination of the two is missing in the existing literature.

This paper examines the link between trade and child labor in a cross-country framework that addresses the problem that trade flows can be endogenous to child labor. Previous cross-country studies document a negative association between openness and child labor (Shelburne (2001) and Cigno, Rosatti, and Guarcello (2002)). While the studies interpret this evidence as a causal link from trade to child labor, Busse (2002) considers the effect of child labor on trade and finds that higher child labor is associated with higher exports of unskilled-labor intensive goods. These studies do not attempt to address the endogeneity of openness, and a priori it is not transparent how endogeneity affects inference. For example, reverse causality (trade occurs because of high levels of child labor) would introduce a positive correlation between trade and child labor (i.e. the estimates would be biased upwards). However, latent factors associated with both openness and child labor may also be an important source of bias. For example, wealthier countries trade more and have less child labor independent of trade. Bias of this form would introduce a negative correlation between trade and child labor (i.e. the coefficients would be biased downwards). The contribution of the present study is to address the endogeneity problem as in the literature on trade and income by Frankel and Romer (1999) and examine the relationship between child labor and variation in trade based on a country's geography.[2] The main identification assumption in this approach is that trade which is driven by geography does not affect child labor except in its impact on total trade flows.

Our second contribution is the examination of various channels through which trade might affect child labor. Trade theory provides two main channels through which trade

[1]Edmonds and Pavcnik (2005b) employ detailed household level data spanning a period of liberalization of Vietnamese rice markets and find that the liberalization was associated with declines in child labor

[2]See Frankel and Rose (2004) for a similar analysis on the effect of trade on the environment.

expansion affects child labor. First, if trade raises income, it might in turn be associated with declines in child labor. The link between trade and income is well established in a cross-country setting (Frankel and Romer (1999), Irwin and Tervio (2002)), and there are both theoretical reasons (e.g. Basu and Van 1998) and empirical evidence (Edmonds 2005) that suggest that child labor declines with improvements in income. Second, trade alters the relative return to unskilled and therefore child labor. Anti-globalization advocates appear to be most concerned that trade-induced increases in product demand will affect higher levels of child labor. Unlike the existing cross-country evidence on child labor and openness, we consider *both* whether there is an association between trade and child labor, and whether there appears to be a channel for this relationship other than improvements in income. Since the theoretical discussion in section 2 suggests that the effects of trade on child labor will be heterogeneous across countries, we examine the relationship between trade and child labor in developing countries and allow the relationship to vary with country attributes. We also examine aspects of openness such as overall trade, trade with richer (OECD) countries, and exports of unskilled-labor intensive goods.

The data suggest that child labor is lower on average in countries that trade more even after controlling for the endogeneity of trade. This is true in low income countries, when one considers only trade between low and high income countries, and when one focuses on exports of what are generally viewed as child labor intensive goods from low income countries. However, this relationship appears to be driven mostly by the relationship between trade and income. When one controls for differences in income across countries and addresses the endogeneity of trade, the data do not reject the hypothesis that child labor is unrelated to trade.. These results are robust over a large set of specification checks and accounting for endogeneity of income. The implications of these results are discussed in the conclusion of the paper.

The paper proceeds as follows. In section 2 we review the theory models of trade and child labor. In section 3 we outline the empirical framework and describe the data. In section 4 we present the results. Section 5 concludes.

2. Theory Discussion

The theory work on child labor and trade is relatively abundant. In this paper, we only provide an overview of the mechanisms suggested by these models and then examine the cross-country data for evidence on the relative importance of these mechanisms. We group the mechanisms through which trade affects child labor into three categories: effects of income changes, effects of changes in the relative return to child labor (through shifts in product demand), and interaction effects of local endowments or government policy.

There is a separate literature which debates the effects of trade on aggregate income (see Frankel and Romer 1999, Irwin and Tervio (2002) for a discussion). From this literature, there appears to be a general view that higher levels of trade are associated with greater income, and that while these gains are not necessarily uniformly distributed, benefits from trade do not accrue to the wealthy alone (Dollar and Kraay (2002)). Increases in income (modeled as a rise in adult wages) affect child labor depending on how child labor enters parental preferences and on the significance of liquidity constraints. In the Basu and Van (1998) framework, child labor is a bad in parental preferences, and parents send children to work only when forced to do so by poverty. Thus, when household income from adult wages surpasses some threshold, families withdraw the children from the labor market. In an adaptation of the Ben-Porath model (1967), Baland and Robinson (2000) show that even when child labor is not a bad in parental preferences, increases in income can lower child labor by overcoming liquidity constraints if the market returns to not working are greater in present discounted value terms than the return to working (this result is

not sensitive to the absence of child labor in the utility function, Brommier and Dubious 2004).[3] Thus, increases in income can reduce child labor supply by overcoming liquidity constraints or because of preferences.

Many academic discussions of trade's impact on child labor emphasize trade's effect on household incomes (adult wages) and therefore child labor supply. For example, Brown (2000) and Dixit (2000) adapt the Basu and Van setup to argue that the effect of trade on child labor depends on the slope of the labor demand curve, trade's impact on labor demand, and the elasticity of substitution between child and adult labor. In their frameworks, when the economy is fully integrated in the world market, wages are completely determined by international product prices (i.e. the labor demand curve is perfectly elastic). Thus, by increasing the price of a product exported by developing countries, trade liberalization or increased access to global market can reduce the incidence of child labor.

However, models based implicitly on the more general Ben-Porath type model of child labor supply place greater emphasis on how trade alters the relative return to child labor through shifts in labor demand. For example, Maskus (1997) models an economy producing an export (adult labor intensive) and import-competing (capital intensive) good. The export sector subcontracts inputs from the informal sector, which employs children. The demand for child labor is thus determined by the product demand for the exported good. Child labor supply is assumed to be a positive function of child wages and a negative function of adult wages. Maskus shows that everything else equal, the expansion of the export sector following trade liberalization increases the demand for child labor and equilibrium child wages. However, the expansion of the export sector also increases adult wages via Stolper Samuelson effects and thus reduces the

[3] Baland and Robinson and Brommier and Dubios also focus on constraints on intergenerational bequests which we do not discuss, because we do not see an obvious mechanisms through which trade affects bequests.

supply of child labor given child wages. If child labor supply is highly elastic with respect to adult wage, trade might reduce the equilibrium child labor.[4]

Ranjan (2001) emphasizes that credit constraints also influence whether the effects on child labor of additional income are greater than any upward shift in labor demand that accompanies a growth of trade. He models an economy that produces a high-skill and low-skill intensive good and is endowed relatively well with unskilled labor. Child labor is an imperfect substitute for unskilled adult labor. Household welfare depends on current household consumption and on the discounted future welfare of children. The model implicitly assumes that the present discounted return to education exceeds the present value of the return to child labor. In each period, a parent decides whether to send a child to school or to work. Ranjan shows that opening up to trade has two implications for the incidence of child labor in an unskilled labor abundant country in a simple Hecksher-Ohlin framework. Trade liberalization increases the wages of unskilled workers and reduces the returns to educated workers, thus making it more likely for parents to send children to work.[5] This is the demand effect of trade liberalization that the critics of globalization focus on. However, at the same time, households endowed with unskilled labor also become better off and thus less credit constrained (making it less likely for parents to send children to work). The overall effect depends on which of the two channels dominates.

Within these models the effects of growth in trade on child labor will be heterogeneous depending on a country's factor endowments. In particular, one would expect to observe relatively smaller decreases (greater increases) in child labor associated with trade in countries that are relatively less abundant in skilled labor or capital. The literature on international labor

[4]In addition, the firm might adjust its adult to child labor ratio depending on the substitutability of child and adult labor in production.

[5] It is not obvious that trade liberalization in low-income countries will lower the relative return to education. For low income countries, growth in trade may lead to greater household specialization (as Edmonds and Pavcnik 2003 find). This in turn may increase the relative return to education if the returns to education are increasing in specialization (as they likely are).

standards emphasizes that the country's institutional environment might also be important. If countries differ in the extent of child labor regulation, countries that lack child labor regulation will specialize in industries that use child labor relatively more intensively following trade liberalization. This increases the demand for child labor in such economies. If one assumes that child labor is a bad in preferences, poorer countries are less likely to have child labor regulation and thus more likely to observe increases in child labor with trade. One would thus expect child labor to potentially decrease by less (increase by more) in relatively poor countries than in more developed economies.[6]

The review of theory work suggests that the overall effect of trade on child labor depends on how trade affects income, how income affects child labor, how trade affects the relative return to child labor, and how child labor responds to changes in its relative return. If trade increases income and child labor declines with increasing income, then a growth in trade should put downward pressure on child labor. However, trade likely also increases the relative demand for unskilled labor in developing countries and could thereby exert upward pressure on child labor.[7] Though these product demand effects of trade on child labor have received substantive theoretical attention, we do not expect that they are likely to be important in the data given that most working children are helping their parents in the family business or farm (Edmonds and Pavcnik 2005a), thus *typically* not making products for export in industries that experienced largest reductions in trade barriers.

3. Methodology

3.1 Data and Empirical Framework

[6]Similar mechanism also underlies the theory analysis of implications of trade sanction for child labor in Jaferey and Lahiri (2002).

[7] This discussion has focused on the direct effects of trade. If there is a connection between trade and inequality, there may also be an indirect effect of trade on child labor through inequality. In a framework such as Rogers and Swinnerton (2001), the product demand effects discussed in the text would be augmented or attenuated (depending on the country's productivity) by trade's impact on inequality.

Our empirical work is aimed at understanding whether the cross-country evidence suggests a link between trade and child labor and whether there is any evidence that increases in product demand accompanying a growth in trade exert upward pressure on child labor.

Our data is described in detail in the data appendix. We focus our analysis on data from 1995 for the 113 countries where we have complete data (listed in the data appendix).[8] Table 1 presents descriptive statistics. As a measure of child labor, we use the percent of a country's population ages 10-14 that is economically active according to ILO (2000) definitions in 1995.[9] These participation rates are computed by the ILO based on household survey data with adjustments made to make the data comparable across countries and to reflect that not all countries have survey data from 1995 (or in other years in which they report child labor statistics, i.e. 1960, 1970, 1980, 1990).[10] Exposure to trade is measured by openness, defined as the ratio of exports and imports to GDP (expressed in percentage terms) and comes from the World Development Indicators. GDP is from Penn World Tables 6.1 and is in purchasing power parity terms (deflated with the chain index).

We begin our analysis by considering the association between the volume of trade (openness) and child labor without attempting to separate the effects of income from other factors. Figure 1 presents the raw data. Hong Kong and Singapore are clear outliers for openness, so they are not pictured in the graph (they both report no child labor). Their exclusion

[8] We have child labor and openness information for 152 countries. We have GDP for 138 countries. Of these 138, we are missing bilateral trade flow data for 25 countries. We have checked the robustness of our main findings to the choice of year for all years in which all of this information is available (1970, 1980, 1990). Our findings are not sensitive to the choice of year.

[9] ILO does not provide such information for children younger than 10.

[10] In theory, there is panel data on child labor in this cross-country database that has been used in previous work (Cigno, Rosati, and Guarcello (2002), Deheija and Gatti (2002)). The problem with this data is that very few low-income countries have multiple observations on child labor over time. Much of the intertemporal variation in child labor in the ILO data is thus driven by the imputations and adjustments done by ILO rather than independent observations on child labor based on household surveys. Hence, when most countries have one independent observation on child labor, inclusion of a country fixed effect leads to identification based solely on ILO imputations rather than actual changes in child labor. Because of the infrequency of nationally representative household surveys in most low-income countries, we elect not to use the panel element of the data as variation in child labor through time more likely reflects ILO adjustments rather than independent observations on child labor in a given country over time. Moreover, as we subsequently discuss, our empirical framework does not require panel data for identification.

will be a robustness check in our empirical work. Three characteristics stand out in the data. First, there is significant variation in both openness and child labor that we will be able to exploit in our empirical analysis. Second, more open economies have less child labor. This is true in the entire dataset and in each quartile of the openness distribution. Third, at any given level of openness, there is considerable heterogeneity in child labor. In fact, the openness variable can only explain 4 percent of the total cross-country variation in child labor. Thus, while the raw data suggest scope for a link between child labor and openness, trade's overall significance as a determinant of child labor is likely minor.

In our regression work, we rely on a linear form for the data presented in figure 1. That is, for country *i*, the percent of the 10-14 population that is economically active (cl_i) will be regressed on a constant and the country's openness:

$$cl_i = \beta_0 + \beta_1 openness_i + \varepsilon_i \qquad (1)$$

where β_1 has the interpretation of being the average change in the child labor participation rate associated with an increase in the ratio of total trade to GDP. β_1 cannot be interpreted as the causal effect of trade on child labor because of the endogeneity of openness.

One possible reason for the link between trade and child labor apparent in Figure 1 is that there is a strong association between trade and income as documented by many sources including Frankel and Romer (1999). This could lead to an association between trade and child labor, because there is an incredibly strong cross-country relationship between child labor and GDP. This is evident in Figure 2 which plots child labor participation rates against our measure of GDP per capita (on a log scale). In 1995, a second order polynomial in log GDP per capita can explain 73 percent of the cross-country variation in child labor. Average child labor participation rates drop below 10 percent for countries with a GDP per capita above $3600 in PPP terms (Indonesia) and are below 5 percent in countries with a GDP per capita above $6,000

in PPP terms (Venezuela). Thus, there is ample scope for the relationship between trade and child labor in Figure 1 to be driven by the association between trade and GDP.

To explore this directly in the empirical work, we control for the log of GDP per capita (i.e. ln(income)). That is, we modify (1) as:

$$cl_i = \beta_0 + \beta_1 openness_i + \gamma_1 \ln(income_i) + \gamma_2 (\ln(income_i))^2 + \varepsilon_i \qquad (2)$$

We allow for (log) income to enter the specification nonlinearly because the effects of income on child labor likely differ across poor and rich countries. Moreover, if nonlinearities in income play an important role and if openness varies systematically with income, exclusion of nonlinear terms will bias our coefficient on openness.[11] In this specification, β_1 has the interpretation of being the average change in the child labor participation rate associated with an increase in the ratio of total trade to GDP after controlling for any effect of trade on income. In terms of the theory models of the previous section, then, β_1 captures any effect on child labor of changes in its relative return, perhaps because of shifts in product demand. The change in β_1 in equation (2) relative to its value in equation (1) gives us a measure of how much of the association between trade and child labor in equation (1) is driven by the association between trade and income.

Finally, we allow the relationship between trade and child labor to vary based on some of the country characteristics that have been emphasized in the theory literature. Let, *A* denote a given country attribute. We modify (2) as follows:

$$cl_i = \beta_0 + \beta_1 openness_i + \beta_2 A_i + \beta_3 openness * A_i + \gamma_1 \ln(income_i) + \gamma_2 (\ln(income_i))^2 + \varepsilon_i \qquad (3)$$

In this specification, β_1 is now interpreted as the change in child labor participation rates when trade relative to GDP increases by 1 percentage point when a given attribute is 0, and $\beta_1 + \beta_3 A_i$

[11] In an older version of the paper, we have included a 3rd order polynomial of the log GDP per capita in (2). This yielded similar conclusions on the relationship between openness and child labor as the current paper. Those results are available as an NBER working paper (see Edmonds and Pavcnik 2004).

is how child labor participation rates change with a 1 percentage point increase in trade relative to GDP for a country with attribute of *A.* We consider country attributes such as average years of schooling in the population, capital per worker, and whether the country is a signatory on child labor conventions.

3.2 Description of Instruments

We address the endogeneity of openness in equations (1)-(3) by instrumenting for it with trade based on geography as in Frankel and Romer (1999).[12] We construct a measure of trade based on geography using information on bilateral trade flows from the World Trade Analyzer and bilateral geographic characteristics from Rose (2004). We mimic Frankel and Rose (2002, 2004) in the construction of the measure of trade based on geography. That is, we regress a measure of the log bilateral openness between country *i* and *j* (defined as $\frac{Tr_{ij}}{NGDP_i} \equiv \frac{\exp orts_{ij} + imports_{ij}}{NGDP_i}$) on the log of distance between the two countries, the log of country *j's* population, the log of the product of the areas of the two countries, and indicators for whether the two countries share a common language, border, and landlocked status.[13] This yields the following regression equation:[14]

$$\ln(Tr_{ij}/NGDP_i) = \underset{(.40)}{.45} - \underset{(.04)}{.95}\ln distance_{ij} + \underset{(.02)}{.96}\ln pop_j + \underset{(.08)}{.47}commlang_{ij} + \underset{(.20)}{.61}border_{ij} - \underset{(.01)}{.20}\ln(area_i * area_j) - \underset{(.07)}{.43}landlocked_{ij}.$$

Openness based on geography for country *i* is then created by exponentiating the predicted values for bilateral openness from the above equation and summing the predicted values for country *i* across its trading partners. The correlation between the constructed openness based on geography and the actual openness is 0.65. Our assumption is that geography based trade has no

[12] An alternative to IV would be to just look at the relationship between openness based on geography and child labor. This reduced form captures the exact source of variation in trade that we are using for identification. We elect to follow convention and focus on IV results rather than the reduced forms. In practice, this decision is not substantive to our findings.

[13] NGDP is nominal GDP which is used in the present case, because trade flows are also nominal.

[14] Robust standard errors are reported in parenthesis. This regression is based on 5720 observations. R^2 is .31.

relationship to child labor except through its effect on total trade flows. This assumption might be potentially violated if a country's geography independently impacts child labor. In our empirical work, we consider this concern with extensive robustness analysis.

We also evaluate the robustness of our results when we consider the endogeneity of GDP. The importance of including a non-linear form for GDP per capita in (2) adds the additional complications associated with instrumental variables in non-linear models. We mimic Dubin and McFadden (1984) in our approach to IV in a non-linear setting. That is, we attain predicted values for log GDP per capita by regressing it on a vector of instruments for income and any other controls included in (2). We then estimate (2) using two-stage least squares where openness and the nonlinear terms in log GDP per capita are instrumented by our trade instrument and predicted log GDP per capita and its square. For instruments for log GDP per capita, we use lagged (15 year) log GDP per capita and lagged (15 year) investment.[15] We choose 15 year lag because the children in our sample are of ages 10-14. The idea is that lagged income and investment will be correlated with income today, but not child labor today (through channels other than today's income) given that there is little opportunity for children to have accumulated work experience. Latent economic factors correlated with both child labor and income today will also likely be correlated with lagged income. Thus, we view the identification assumptions for these income instruments as strong, but perhaps tenable in some specifications discussed below. It is obviously extremely difficult to find persuasive instruments for income in cross-country regression, we mostly view this as a robustness check to our findings on trade and child labor.

4. Empirical Findings

4.1 Basic Results

[15]We use information on GDP per capita and investment share of GDP from Penn World Tables 6.1.

In the cross-country data, there is a significant, negative correlation between child labor and openness that is substantially attenuated in magnitude by the endogeneity of trade and largely attributable to the association between trade and income. These findings are evident in Table 2. Table 2 contains the results of estimating (1) and (2) on the full sample of countries. The next section focuses on low income countries. The first column in Table 2 presents OLS estimates of the association between trade and child labor (equation 1) without controlling for income or the endogeneity of trade. A 10 percentage point increase in openness is associated with a 0.67 percentage point reduction in child labor or, at the cross-country averages, an openness elasticity of child labor of -0.38. As discussed in the introduction, endogeneity between child labor and trade plagues the interpretation of results in column 1, and the direction of the bias could be positive or negative. Column 2 contains two stage least squares results where openness is instrumented with constructed trade based on geography as described in the previous section. Once we account for endogeneity, the coefficient on openness becomes more negative. A 10 percentage point increase in openness is associated with 1.2 percentage point decline in child labor. At cross-country means, the openness elasticity of child labor nearly doubles to -0.68 when we rely on trade based on geography. Thus, the cross-country data suggest child labor is lower on average in countries that trade more.

Since equation (1) does not control for income, the negative association between trade and child labor may be driven by the positive association between trade and income. Yet, anti-globalization advocates appear to be most concerned with changes in the demand for child labor associated with trade-induced increase in product demand. Our main interest is thus in whether there appears to be a channel other than improvements in income through which trade is associated with child labor. As a result, we focus our analysis on the relationship between trade and child labor conditional on income as in equation (2). Column 3 of table 2 presents IV estimates of the relationship between openness and child labor once one controls for variation in

income across countries with the second order polynomial in log GDP per capita. The coefficients on income terms suggest that higher income is associated with less child labor (i.e. the coefficient on ln(income) is negative and significant), but less so in richer countries (i.e. the coefficient on $(\ln(\text{income}))^2$ is positive and significant). After controlling for income, any remaining association between child labor and openness may reflect changes in the relative return to work including the product demand effects as discussed in section 2. However, conditional on income, we find no statistically significant association between trade and child labor and the magnitude of the coefficient is very small. At the cross-country means, the implied openness elasticity of child labor in column 3 is -0.04, with the confidence interval for this estimate ranging between -0.2 to 0.1. In sum, we find very little evidence that conditional on income greater openness is associated with child labor.[16]

We next perform several robustness checks. First, we are concerned that the coefficient on openness could be biased if the instrument based on geography is correlated with unobserved country characteristics that affect child labor independently. First, Rodriguez and Rodrik (2000) suggest that country's geographic characteristics could affect country outcomes such as child labor by being correlated with the quality of institutions or public health (due to exposure to various diseases).[17] We consider this possibility by adding a country's latitude and measure of political freedom as controls to specification (2).[18] Second, countries differ in their compliance with child labor laws. Moreover, various regions of the world vary drastically in the incidence of child labor and these regions also differ in other unobserved characteristics that are potentially correlated with geography. We thus additionally control for whether a country signed the ILO child labor conventions 138 on the minimum age of employment and the location of the country

[16]Our results are not driven by the focus on data from 1995. Estimates of equations (1) and (2) for all additional years (i.e. 1970, 1980, 1990) for which we have the required data yield same conclusions as those in columns 1-3.
[17]Acemoglu, Johnson and Robinson (2002), Hall and Jones (1999), and Easterly and Levine (2003) suggest the link between a country's latitude and the quality of institutions and exposure to diseases.
[18] We use Freedom House measure of political freedom from Dollar and Kraay (2003). Greater index value is associated with *less* political freedom.

by inclusion of indicators for whether a country is located in East Asia, South Asia, Sub-Saharan Africa, Latin America and the Caribbean, Middle East and North Africa. Finally, we include the share of the population that is rural (a proxy for the extent of agriculture) because the extent of agriculture could be correlated with geography and independently affect child labor through the country's industry mix.[19] The results that include all these additional controls are presented in column 4. As the estimates of the coefficient on openness in column 4 suggests, none of these additional controls alter our baseline finding of a very small and statistically insignificant negative association between child labor and greater openness conditional on income. In the column 4 specification, the implied openness elasticity of child labor at cross-country means is -0.08.

Second, we are concerned about how the endogeneity of GDP per capita affects our inference. If there is mismeasurement of income and an underlying association between true income and openness, then the coefficient on openness may still reflect the relationship between trade and true (unobserved) income. We address the potential endogeneity of (log) GDP per capita by following the IV procedure described in section 3.2, using 15 year lags in (log) GDP per capita and investment as instruments. While it is obviously a challenge to find plausible instruments for GDP per capita in a cross-country regression, we view this specification as a robustness check. Column 5 (column 6) estimates the specification from column 3 (column 4) by accounting for endogeneity of GDP per capita.[20] We continue to find that higher income is associated with less child labor, but less so in richer countries. Moreover, addressing the endogeneity of income does not affect our findings on the association between trade and child

[19]In NBER working paper version of the paper we have also considered the share of mining in GDP (15 year lag) from Aiyar and Feyrer (2003) as a control, which yielded similar findings on the link between openness and child labor. However, this variable is missing for over 20 countries in our sample.

[20]Note that this reduces the number of observations because several countries do not report lagged GDP per capita or lagged investment.

labor conditional on income. The coefficient on openness continues to be small in magnitude and statistically insignificant.[21]

The theory discussion in section 2 implies that the relationship between openness and child labor could be either positive or negative, depending on the magnitudes of various channels through which trade might affect child labor. Our results strongly suggest that greater openness is associated with less child labor. This relationship appears to be attributable to the positive association between trade and income. Controlling for income, theory tends to emphasize that trade and child labor may be positively correlated because of product demand factors. In reality, child labor in manufacturing[22] is a very small part of child labor in low-income countries (Edmonds and Pavcnik 2005a). Hence, it is also likely that, controlling for income, the labor demand channel may not have any role in practice. Our findings, in fact, do not reject the hypothesis that openness to trade has no effect on child labor except through its effect on income.

Although the coefficient on openness conditional on income has a negative sign at times, what really matters for interpretation is that the coefficients are statistically insignificant and the confidence intervals around zero are small in magnitude. For example, the confidence interval of the estimate 0.002 (-0.02) reported in column 5 of table 2 (column 6 of table 2) ranges from -0.03. to 0.03 (-0.08 to 0.04). The data are consistent with the hypothesis that there is no association between openness and child labor when we condition income, but the data cannot exclude the possibility of a small positive or negative relationship. Thus, the variation of the coefficient of openness (conditional on income) between small/not significant/positive and small/not significant/negative is not meaningful in that we cannot rule out either a positive or negative relationship. Rather, we can only conclude that nothing in the data suggests that

[21]Our results in table 2 are also robust to dropping outliers with no child labor and extremely high openness (i.e. Hong Kong and Singapore). These results are available from authors upon request.

[22]International trade in agriculture, a sector where child labor is much more common, continues to be relatively more protected by domestic policies of poor countries and domestic and trade policies in high income countries (see Goldberg and Pavcnik 2004).

anything other than the relationship between trade and income plays an important role in influencing child labor.

4.2 Results for non-OECD countries

73 percent of the cross-country variation in child labor can be explained by cross-country variation in income. Only 7 countries with a PPP GDP per capita above 8,000 report any child labor, and the highest incidence among these is Argentina where 4.5 percent of children are working. It is difficult to argue that trade could affect child labor in Germany with GDP per capita of 21,000 in PPP terms in 1995, whereas such an argument is more plausible in a country such as Uganda, with GDP per capita of about 900 in PPP terms in 1995. Our insignificant coefficient on openness in the previous section might reflect that we are averaging countries where there is no scope for trade to impact child labor with countries where there is a role. We thus estimate equation (2) for the set of non-OECD countries. Table 3 presents these results.

Several interesting findings emerge from Table 3. First, without controlling for income, the negative association between child labor and trade implied by the IV estimate is approximately the same among non-OECD countries as was observed in the full sample of countries (compare column 1 of Table 3 with column 2 of Table 2). Second, conditional on income, the magnitude of the IV coefficient on openness in column 2 of Table 3 is small (positive) and statistically insignificant. We continue to obtain statistically insignificant coefficient on openness when we add country characteristics such as latitude and political freedom, ILO convention indicator, regional indicators, and the share of rural population (column 3); account for the endogeneity of GDP per capita (column 4); and account for the endogeneity of GDP per capita while also controlling for the above country characteristics (column 5). The magnitudes of the coefficients range from -0.06 to 0.01. These findings from non-OECD countries are thus consistent with what we observed in the pooled sample. There is

no compelling evidence of a substantive association between openness and child labor except through the relationship between trade and national income.

The absence of an association between trade and child labor conditional on income, could be driven by the fact that our measure of openness captures a developing country's trade with both OECD and non-OECD members. However, trade between OECD and non-OECD countries might potentially be a more likely source of higher demand for child labor in non-OECD countries. In the remaining columns of table 3 we thus repeat the analysis of the relationship between openness and child labor from columns 1-5 of table 3, but focus *solely* on *trade with OECD countries* as a measure of openness.[23]

When we do not control for income (column 6), increased openness to trade with OECD countries is associated with large declines in child labor. For a non-OECD country, a 10 percentage point increase in openness to trade with an OECD country is associated with a 3.8 percentage point decline in child labor. At the sample means for non-OECD country and their openness to trade with OECD countries (the mean child labor participation rate is 16 percent and the mean openness to trade with OECD countries is 39 percent), this implies an openness elasticity of child labor of -0.9. Interestingly, once we control for income in all other columns of Table 3, we continue to find a small, negative association between trade and child labor that is not statistically significant. Thus, while trade between OECD and non-OECD countries seems to be associated with much lower child labor in the non-OECD countries, this lower child labor appears to stem entirely from the higher levels of income for non-OECD countries associated with this trade.

Another potential explanation for the absence of an association between openness and child labor conditional on income is that our measure of openness encompasses trade in all goods, yet, if there is any relationship between trade and child labor, it would most likely be in

[23]We also adjust the constructed openness accordingly so that trade based on geography only contains trade with OECD partners. The information on trade with OECD countries is based on data from World Trade Analyzer.

exports of unskilled-labor intensive goods from developing countries. The lack of industry-specific measures of child labor across countries precludes the analysis of child labor and trade on the industry-level across countries. We instead examine the potential association between exports of unskilled-labor intensive goods from low income countries and child labor. We focus on exports from BEA manufacturing industry categories that involve agricultural and food products (BEA codes 1-4), Apparel and Textiles (BEA 5), Leather and Leather Products (BEA 6), and Other Manufacturing (BEA 34).[24] Note that the category "other manufacturing" consists of products such as jewelry, basket and wickerwork, sporting goods, and toys whose production is often the focus of anti child-labor activists. We express the unskilled-labor intensive exports as a share of GDP.

In table 4, we repeat the analysis of the relationship between openness and child labor in non-OECD countries from table 3, but focus *solely* on *exports of unskilled-labor intensive goods as a share of GDP* as a measure of openness (we call it export-openness).[25] Note that the magnitudes of the regression coefficients in table 4 are not comparable to the rest of the paper, because the range of variation in export openness differs from openness (see table 1). When we do not control for income (column 1), greater exports of unskilled-labor intensive products are associated with less child labor. However, the regression coefficient has a large standard error and is not statistically significant. The coefficient in column 1 is heavily influenced by Hong Kong (this is the only table in this study where results are sensitive to the treatment of Hong Kong). We exclude Hong Kong in column 2 and again observe a strong, statistically significant negative association between trade and child labor. We should emphasize, though, that trade based on geography is a weak instrument for unskilled labor intensive exports once one excludes

[24]The source of this data is World Trade Analyzer.

[25]We also adjust the constructed openness accordingly so that trade based on geography only focuses on unskilled-labor intensive exports. The information on bilateral trade in unskilled-labor intensive exports is based on data from World Trade Analyzer. This information and the information on total exports of labor-intensive goods were missing for Gabon.

Hong Kong from the analysis (this is true only for the openness measure in this table).[26] Consequently, the results in table 4 should be interpreted with caution. That said, we observe in table 4, the same patterns of results that we have observed throughout. Once we condition on income, the data do not reject the hypothesis that there is no association between child labor and openness to trade.

4.3 Accounting for differences in country characteristics

An additional reason for why we find no association between trade and child labor conditional on income might be that so far we have not allowed the relationship to vary with country characteristics. We do so in table 5, that reports estimates of equation (3).

First, as discussed in section 2, Ranjan (2001) predicts that child labor should decline by more (increase by less) in countries with greater abundance of skilled workers as openness increases. Similar logic could be applied across countries that differ in their relative capital abundance. In column 1 of table 5, we estimate (3) including a country's skill endowment as measured by the average years of schooling in total population and its interaction with openness.[27] In column 2 of table 5, we include the log of the country's capital per worker and its interaction with openness.[28] While the results in column 1 indicate that we observe less child labor in countries with greater average year of schooling, we continue to find no significant association between openness and child labor, and the coefficient on the interaction of openness and this measure of skill is small in magnitude and statistically insignificant. Similarly, the results in column 2 suggest that countries that have more capital per worker have less child labor, but the link between openness and child labor is statistically insignificant (as is the interaction of openness with capital abundance).

[26] F-statistics on excluded instruments from trade equation are reported at the bottom of the table.
[27] The measure of average schooling years is from Barro and Lee (1996). We have also employed the share of total population with complete secondary education based on Barro and Lee (1996) as an alternative measure of a country's skill abundance and obtained similar conclusions.
[28] We use capital per worker from 1980 from Easterly and Levine (2001).

Second, some have suggested that openness could increase child labor in countries that lack or do not comply with labor market standards because greater openness would increase the demand for child labor by expansion of child-labor intensive industries. In column 3, we measure child labor standards by an indicator for whether the country signed ILO convention 138 on the minimum age of employment. We find no statistically differential impact of openness on child labor in countries that ratified the convention. Columns 4-6 of table 5 report results from the specification of equation (3) that takes into account endogeneity of income and these results yield similar conclusions on the differential effect of openness on child labor across countries. In sum, nothing in the data rejects the hypothesis that the link between trade and child labor is determined by the association between trade and income, even when one allows the relationship between trade and child labor to vary with country endowments and child labor standards.

4.4 Child Labor and Trade Policy

There are two main concerns with examining the link between openness and child labor. The first problem is the endogeneity of openness. To address this issue, our analysis above instruments for openness with trade based on geography under the assumption that trade based on geography has no effect on child labor except in how it impacts total trade. A second shortcoming of looking at openness is that openness is not itself a policy variable. In this section, we examine the link between child labor and one available policy variable: average import duties. However, recall that a primary goal of this study is to consider the correlations between trade and child labor across a large range of countries. Data on import duties is only available for a nonrandom subset of countries used in this paper (72 out of 113 in 1995). Thus, selection into the sample becomes a potential concern. Nevertheless, the advantage of using trade policy measures over trade based on geography is that trade policies are variables that policy makes can actually affect (see Rodriquez and Rodrik (2000)).

As a robustness check on our finding of little link between trade and child labor outside of the declines in child labor associated with rising incomes, we explore the relationship between a country's average import duty and child labor in table 6.[29] Column 1 is based on cross-sectional regression of child labor on import duties, log GDP per capita, and its square. The data do not reject the hypothesis that there is no association between child labor and import duties. Column 2 instruments for income as above and yields the same conclusion. We are concerned about endogeneity in average tariffs. One type of bias might be that average tariff rates proxy for other aspects of government policy that independently affect child labor. If we were to use the available panel data, we can control for time-invariant country characteristics (see footnote 10 for a discussion of our reservations about the panel data on child labor). Hence, we regress child labor on import duties, log GDP per capita, its square, year indicators, and country fixed effects. The results from this specification are in column 3.[30] Column 4 accounts for the endogeneity of income in specification from column 3. Because of our concerns (footnote 10) about the source of variation in the child labor panel data, it is not obvious that this column 3 and 4 specification is preferred to that of column 1 and 2. However, the data in columns 3 and 4 suggest the same conclusions as columns 1 and 2: the data do not reject the hypothesis that there is no significant relationship between changes in import duties and changes in child labor on average (conditional on income). We also replicate the analysis reported in column 4 and 5 using all country-year observations that report import duties, child labor, and income, regardless of whether they report information on openness or bilateral trade, as well as extend the sample beyond 1995. These results are reported in columns 5 and 6, and they again suggest no substantive link between import duties and child labor conditional on income. From this additional analysis, we infer that there is little evidence that the use of openness rather than trade policy variables drives our

[29]The information on import duties is from World Development Indicators.

[30]We perform this analysis using sample of countries that report import duties and do not have missing observations on child labor, income, openness, and constructed trade based on geography up to 1995, so that the data is comparable to the set of countries used throughout the paper. This yields a sample of countries from 1970, 1980, 1990, and 1995.

finding of little connection between trade and child labor across countries other than through the association between trade and income.

5. Conclusions

In this paper we explore the link between greater openness and child labor across countries by directly addressing the endogeneity of trade and child labor. The cross-country data suggest that there is a negative association between child labor and openness. After correcting for endogeneity, a 10 percent increase in openness is associated with a 7 percent decline in child labor at the data means. For non-OECD countries, trade with OECD countries is especially beneficial in terms of child labor. For the average non-OECD country, a 10 percent increase in the ratio of trade with OECD countries to GDP is associated with a 9 percent decline in child labor. However, this decline in child labor with openness appears to stem entirely from the association between trade and income. Once we control for income differences across countries, we find no evidence of a substantive or statistically significant association between trade and child labor.

The study also focuses on the mechanisms other than income through which trade might affect child labor that are often the focus of the anti-globalization movement. We find no support for the view that when a country's trade expands, product demand changes instigated by trade are associated with increases in child labor. This is true generally and when we focus solely on developing countries and their trade with the developed world. Moreover, the data do not support the idea that heterogeneity across countries in their skill endowments, capital to labor ratios, or signing of anti-child labor agreements interacts with trade to affect child labor. Overall, then, the cross-country data appear in line with the within-country evidence by Edmonds and Pavcnik (2005b), who found very little support of the importance of the substitution effects in inducing more child labor in agriculture in Vietnam following rice market liberalization.

It is important to be careful in how we interpret these findings. First, our results do not concern the question of whether the presence of child labor in a country leads to higher levels of trade to exploit this abundance of child laborers. Rather, our findings suggest that on average countries that trade more because of their geographic location have higher levels of income which in turn mitigates child labor. Second, the absence of evidence of an effect of trade on child labor on average does not imply that there are not circumstances or some types of trade that stimulate child labor. Identifying these atypical circumstances seems an important avenue for future research. Finally, this paper abstracts from the role of foreign direct investment and the activities of multinational corporations in the incidence of child labor in developing world. These activities provide another dimension of globalization process that the activists have blamed for high levels of child labor. Exploring the link between such activities and child labor remains a topic for future work.

Data Appendix

Child Labor: Percent of the 10-14 age group active in the labor force. Labor force comprises all people who meet the International Labour Organization's definition of the economically active population. The concept of "economically active population" is defined as "all persons of either sex who furnish the supply of labour for the production of economic goods and services as defined by the United Nations systems of national accounts and balances during a specified time-reference period. According to these systems the production of economic goods and services includes all production and processing of primary products whether for the market, for barter, or for own consumption, the production of all other goods and services for the market and, in the case of households which produce such goods and services for the market, the corresponding production for own consumption" (ILO 2000 p1). This definition includes wage workers, employers, own-account workers, members of producer cooperatives, unpaid family workers, apprentices, members of the armed forces, and the unemployed.

Openness: Sum of Exports and Imports as a share of GDP (Source: WDI).

GDPPC: Real GDP per capita (chained), PPP terms (Source: Penn World Tables 6.1).

Rural: Rural population as a percent of total population (Source: WDI).

Mining: Share of Mining and Quarrying in GDP in 1980 (Source: Aiyar and Feyrer (2003)).

Schooling: Average Years of Schooling in Total Population in 1990 (Source: Barro and Lee (1996)).

K/L: Capital per worker in 1980 (Source: Easterly and Levine (2001)).

Import duty: Import Duties as a share of imports (Source: WDI).

Bilateral trade (Tr): bilateral exports and imports in thousands current US$ (Source: World Trade Analyzer, Center for International Data at UC Davis).

Nominal GDP (NGDP): nominal GDP in thousands current US$ (Source: WDI).

Latitude: A country's distance from equator (Source: Frankel and Rose (2002)).

Freedom: Freedom House measure of political freedom (Source: Dollar and Kraay (2003)). Greater index value is associated with *less* political freedom.

ILO Convention 138: A country is a signatory of ILO convention 138 (Source: ILO web site). This variable is coded as missing for Hong Kong because of conflicting information on whether it signed the convention.

Geographical variables: bilateral distance, landlocked status, indicators for common border, common language from Rose (2004). Data on population and internal area from WDI and Penn World Tables 6.1.

Countries in the dataset:
The 113 countries below have available data on GDP per capita, nominal GDP, openness, child labor, and bilateral trade data: Albania (ALB), Algeria (DZA), Argentina (ARG), Australia (AUS), Austria (AUT), Bangladesh (BGD), Barbados(BRB), Belize (BLZ), Benin (BEN), Bolivia (BOL), Brazil (BRA), Bulgaria (BGR), Burkina Faso (BFA), Burundi (BDI), Cambodia (KHM), Cameroon (CMR), Canada (CAN), Chad (TCD), Chile (CHL), China (CHN), Colombia (COL), Comoros (COM), Congo Dem. Rep. of (Zaire), (ZAR), Congo Rep. of (COG), Costa Rica (CRI), Cotre d'Ivorie (CIV), Cyprus (CYP), Denmark (DNK), Dominican Rep. (DOM), Ecuador (ECU), Egypt (EGY), El Salvador (SLV), Equatorial Guinea (GNQ), Ethiopia (ETH), Fiji (FJI), Finland (FIN), France (FRA), Gabon (GAB), Gambia (GMB), Germany (DEU), Ghana (GHA), Greece (GRC), Guatemala (GTM), Guinea (GIN), Guyana (GUY), Haiti (HTI), Honduras (HND), Hong Kong (HKG), Hungary (HUN), Iceland (ISL), India (IND), Indonesia (IDN), Iran (IRN), Ireland (IRL), Israel (ISR), Italy (ITA), Jamaica (JAM), Japan (JPN), Jordan (JOR), Kenya (KEN), Korea South, (KOR), Lebanon (LBN), Madagascar (MDG), Malawi (MWI), Malaysia (MYS), Mali (MLI), Malta (MLT), Mauritania (MRT), Mauritius (MUS), Mexico (MEX), Morocco (MAR), Mozambique (MOZ), Nepal (NPL), Netherlands (NLD), New Zealand (NZL), Nicaragua (NIC), Niger (NER), Nigeria (NGA), Norway (NOR), Pakistan (PAK), Panama (PAN), Papua N.Guinea (PNG), Paraguay (PRY), Peru (PER), Philippines (PHL), Poland (POL), Portugal (PRT), Romania (ROM), Rwanda (RWA), Senegal (SEN), Sierra Leone (SLE), Singapore (SGP), South Africa (ZAF), Spain (ESP), Sri Lanka (LKA), Sweden (SWE), Switzerland (CHE), Syria (SYR), Tanzania (TZA), Thailand (THA), Togo (TGO),

Trinidad&Tobago (TTO), Tunisia (TUN), Turkey (TUR), Uganda (UGA), United Kingdom (GBR), United States (USA), Uruguay (URY), Venezuela (VEN), Vietnam (VNM), Yemen Republic of, (YEM), Zambia (ZMB), Zimbabwe (ZWE)**.**

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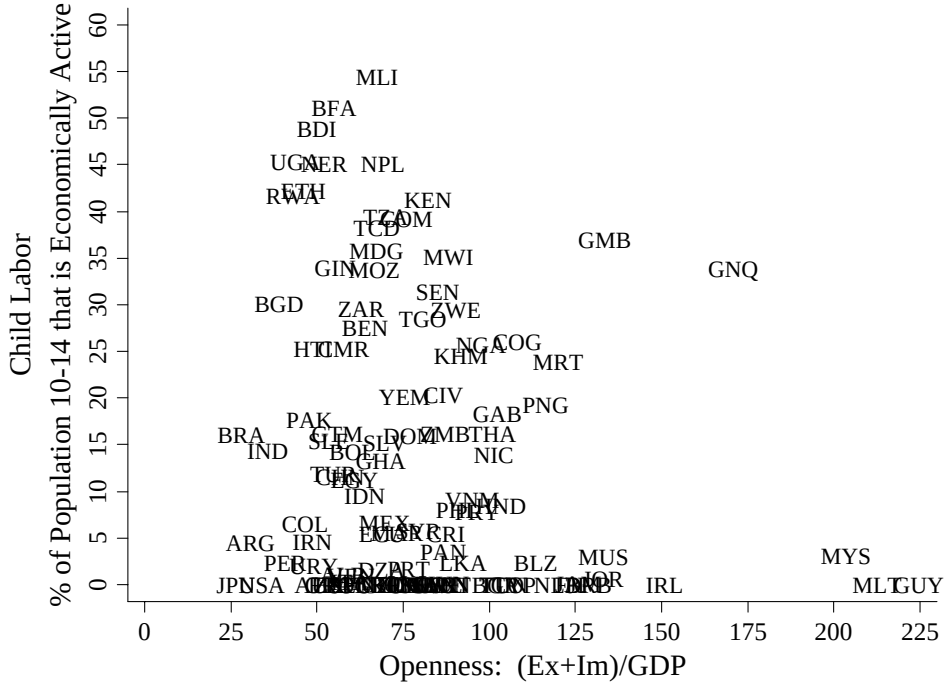
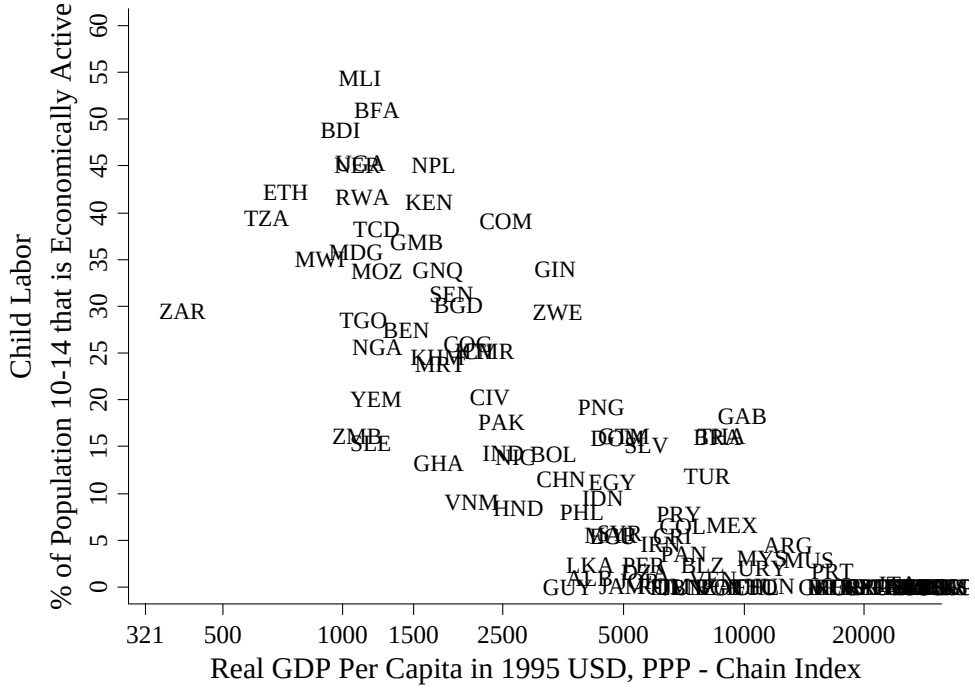
Figure 1: Child Labor and Trade 1995



Source: World Development Indicators (2003) and ILO (2000)

Note: Singapore and Hong Kong excluded from the picture.

Figure 2: Child Labor and Income 1995



Source: Penn World Tables 6.1 and ILO (2000)

Table 1: Summary Statistics

Variable	N	Mean	S.D.	Min	Max
Child Labor	113	13.12	15.33	0	54.53
Openness	113	74.17	48.04	16.78	339.99
GDP per capita (GDPPC)	113	7663.89	7717.68	321	28253
Ln(GDPPP)	113	8.38	1.14	5.77	10.25
Share of Rural Population (Rural)	112	47.47	24.22	0	94.34
Capital per Worker (1980)	108	9.02	1.58	5.72	11.36
Average Schooling Years (1990)	94	5.69	2.74	.82	11.74
Import Duty	72	8.59	7.77	.00	29.47
South Asia	113	.04	.21	0	1
East Asia	113	.11	.31	0	1
Subsaharan Africa	113	.29	.46	0	1
Latin America and the Carribean	113	.21	.41	0	1
Middle East and North Africa	113	.09	.29	0	1
OECD Member	113	.20	.40	0	1
Latitude	113	16.30	24.20	-41	65
ILO Convention 138	112	.27	.44	0	1
Freedom	112	1.79	.71	1	3
<u>Non-OECD countries</u>					
Child Labor	90	16.24	15.67	0	54.53
Openness	90	77.51	51.79	17.21	339.99
Openness with OECD countries	90	38.75	28.17	6.07	138.81
(Unskilled Labor Intensive Exports)/NGDP	89	7.00	8.53	0.07	51.52

See data appendix for definitions. Some observations have missing values for various variables.

Table 2: Child Labor and Openness

	(1)	(2)	(3)	(4)	(5)	(6)
Openness	-0.067	-0.12	-0.007	-0.015	0.002	-0.022
	[0.020]**	[0.041]**	[0.015]	[0.024]	[0.016]	[0.029]
Ln(Income)			-55.466	-50.859	-73.785	-68.043
			[16.374]**	[12.307]**	[15.579]**	[15.467]**
$(Ln(Income))^2$			2.665	2.744	3.715	3.703
			[0.952]**	[0.690]**	[0.899]**	[0.876]**
Latitude				0.035		0.028
				[0.035]		[0.033]
Freedom				1.425		1.892
				[1.941]		[1.893]
ILO Convention 138				-1.099		-1.532
				[1.472]		[1.540]
Rural				0.135		0.134
				[0.055]**		[0.057]**
Regional indicators	No	No	No	Yes	No	Yes
IV for Trade	No	Yes	Yes	Yes	Yes	Yes
IV for Income Terms	N.A.	N.A.	No	No	Yes	Yes
F-statistic on excluded instruments :						
Trade equation		93.72	83.11	57.06	28.62	16.39
Ln(income) equation					467.32	73.16
$Ln(income))^2$ equation					532.67	77.32
First stage R^2 (Trade equation)		0.46	0.46	0.49	0.46	0.48
First stage R^2 (Ln(income) equation)					0.93	0.96
First stage R^2 $((Ln(income))^2$ equation)					0.94	0.96
Observations	113	113	113	111	105	103
R^2	0.04	0.02	0.73	0.82	0.73	0.82

Robust standard errors in brackets. * significant at 10%; ** significant at 5%. The instrument for openness is the constructed index of trade based on geography (see section 3.2 of text). The IV procedure used in column 5 is to regress ln(income) on lagged ln(income), lagged investment, constructed trade based on geography, and all other listed covariates to obtain predicted ln(income). The predicted ln(income), its square, and constructed trade based on geography are used as instruments for openness, ln(income), and ln(income) squared. Similar procedure is followed in column 6 with additional covariates.

Table 3: Child Labor and Openness in Non-OECD Countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Openness	-0.132	0.012	-0.017	0.01	-0.062					
	[0.041]**	[0.038]	[0.036]	[0.044]	[0.056]					
Openness with OECD						-0.377	-0.053	-0.052	-0.054	-0.314
						[0.126]**	[0.066]	[0.084]	[0.104]	[0.213]
ln(income)		-44.935	-54.986	-71.49	-84.617		-51.298	-53.31	-75.119	-73.56
		[28.424]	[17.599]**	[28.948]**	[24.536]**		[22.972]**	[15.891]**	[20.779]**	[35.266]**
$(\ln(income))^2$		1.96	3.037	3.55	4.909		2.411	2.944	3.822	4.405
		[1.772]	[1.066]**	[1.809]*	[1.566]**		[1.408]*	[0.958]**	[1.272]**	[2.240]*
Latitude			0.076		0.084			0.091		0.2
			[0.062]		[0.069]			[0.069]		[0.124]
Freedom			1.084		2.247			1.029		2.307
			[2.020]		[2.064]			[2.007]		[2.583]
ILO Convention 138			-0.858		-1.546			-0.76		-1.197
			[1.938]		[2.025]			[1.935]		[2.404]
Rural			0.16		0.187			0.161		0.235
			[0.067]**		[0.078]**			[0.065]**		[0.129]*
Regional indicators	No	No	Yes	No	Yes	No	No	Yes	No	Yes
IV for Trade	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IV for Income Terms	N.A.	No	No	Yes	Yes	N.A.	No	No	Yes	Yes
F-statistic on excluded instruments :										
Trade equation	79.71	32.39	31.48	25.7	13.16	36.26	18.58	19.01	7.84	3.62
Ln(income) equation				212.48	48.64				198.55	46.62
Ln(income))^2 equation				235.11	50.05				217.14	47.44
First stage R^2 (Trade equation)	0.48	0.5	0.5	0.5	0.5	0.29	0.32	0.37	0.23	0.29
First stage R^2 (Ln(income) equation)				0.89	0.93				0.88	0.93
First stage R^2 ($(Ln(income))^2$ equation)				0.9	0.93				0.89	0.92
Observations	90	90	88	83	81	90	90	88	83	81
R^2	0.07	0.67	0.79	0.67	0.79	0.04	0.68	0.8	0.68	0.69

Robust standard errors in brackets. * significant at 10%; ** significant at 5%. See table 2 for additional explanations.

Table 4: Child Labor and Child-Labor Intensive Exports (Non-OECD countries)

	(1)	(2)	(3)	(4)	(5)	(6)
CL-Intensive Exports/NGDP	-1.972	-5.993	-1.139	-1.109	-0.508	-1.074
	[1.204]	[2.618]**	[0.802]	[0.977]	[0.533]	[0.936]
ln(income)			-47.3	-32.112	-67.323	-37.143
			[17.026]**	[23.713]	[19.987]**	[39.467]
$(\ln(\text{income}))^2$			2.171	1.778	3.307	1.992
			[1.051]**	[1.365]	[1.203]**	[2.224]
Latitude				0.168		0.156
				[0.129]		[0.139]
Freedom				0.536		0.586
				[2.171]		[2.333]
ILO Convention 138				-0.673		-1.51
				[2.502]		[2.649]
Rural				0.162		0.154
				[0.090]*		[0.109]
Regional indicators	No	No	No	Yes	No	Yes
IV for Trade	Yes	Yes	Yes	Yes	Yes	Yes
IV for Income Terms	N.A.	N.A.	No	No	Yes	Yes
F-statistic on excluded instruments :						
Trade equation	25.31	3.8	2.34	1.61	1.95	2.57
Ln(income) equation					237.45	52.94
Ln(income))^2 equation					259.26	55.06
First stage R^2 (Trade equation)	0.22	0.04	0.04	0.13	0.07	0.16
First stage R^2 (Ln(income) equation)					0.9	0.94
First stage R^2 ($(\text{Ln(income)})^2$ equation)					0.91	0.94
Observations	89	88	88	87	81	80
R^2			0.5	0.66	0.66	0.65

Robust standard errors in brackets. * significant at 10%; ** significant at 5%. There is one less observation than in table 3 because information on unskilled-labor intensive exports was missing for Gabon. In addition, columns 2-6 exclude Hong Kong because it is an outlier driving the result in column 1. Note that the coefficient magnitudes in this table cannot be compared directly to previous tables, because the scale of the CL-Intensive Exports/NGDP is different than that of openness in previous tables (see table 1). See table 2 for additional explanations.

Table 5: Child Labor, Openness, and Country Endowments

	(1)	(2)	(3)	(4)	(5)	(6)
Openness	-0.043	-0.33	-0.027	-0.022	-0.171	-0.005
	[0.148]	[0.706]	[0.037]	[0.157]	[1.237]	[0.029]
ln(Income)	-53.134	-36.494	-55.131	-78.975	-45.73	-74.302
	[14.426]**	[14.211]**	[16.696]**	[15.185]**	[34.617]	[15.017]**
$(\ln(\text{Income}))^2$	2.822	1.951	2.653	4.276	2.528	3.758
	[0.822]**	[0.825]**	[0.972]**	[0.852]**	[1.994]	[0.864]**
Openness*Years of schooling	0.004			0.001		
	[0.017]			[0.018]		
Years of schooling	-2.39			-1.847		
	[1.274]*			[1.393]		
Openness*ln(K/L)		0.03			0.013	
		[0.071]			[0.123]	
ln(K/L)		-7.214			-6.514	
		[3.071]**			[7.387]	
Openness*ILO Conv. 138			0.037			0.057
			[0.047]			[0.077]
ILO Convention 138			-3.812			-5.573
			[4.403]			[6.824]
IV for Trade and interactions	Yes	Yes	Yes	Yes	Yes	Yes
IV for Income Terms	No	No	No	Yes	Yes	Yes
F-statistic on excluded instruments :						
Trade equation	35.22	52.88	23.77	19.69	25.02	11.17
*Trade*interaction equation*	66.29	57.2	16.77	35.23	27.31	8.46
Ln(income) equation				78.07	45.23	354.27
$Ln(income))^2$ equation				88.86	58.84	400.84
First stage R^2 (Trade equation)	0.48	0.54	0.33	0.49	0.52	0.31
First stage R^2 (Trade*interaction equation)	0.72	0.6	0.5	0.72	0.58	0.85
First stage R^2 (Ln(income) equation)				0.93	0.94	0.94
First stage R^2 $((\text{Ln}(\text{income}))^2$ equation)				0.94	0.94	0.94
Observations	94	108	112	91	104	104
R^2	0.78	0.8	0.73	0.77	0.8	0.73

Robust standard errors in brackets. * significant at 10%; ** significant at 5%. See Table 2 for additional explanations.

Table 6: Child Labor and Import Duties

	(1)	(2)	(3)	(4)	(5)	(6)
Import Duty	0.006	-0.023	0.027	0.039	-0.002	-0.009
	[0.141]	[0.172]	[0.053]	[0.055]	[0.047]	[0.052]
ln(Income)	-48.498	-67.586	-26.415	-48.479	-27.692	-54.389
	[20.275]**	[22.866]**	[12.831]**	[25.016]*	[11.161]**	[20.201]**
$(\ln(\text{Income}))^2$	2.347	3.398	1.645	2.931	1.705	3.197
	[1.123]**	[1.237]**	[0.737]**	[1.374]**	[0.638]**	[1.103]**
Country Fixed Effects	N.A.	N.A.	Yes	Yes	Yes	Yes
Year Effects	N.A.	N.A.	Yes	Yes	Yes	Yes
Instrument for Income Terms	No	Yes	No	Yes	No	Yes
Data	1995	1995	Panel	Panel	Panel	Panel
F-statistic on excluded instruments :						
Ln(income) equation		172.57		27.33		33.76
Ln(income))^2 equation		181.61		29.86		38.3
First stage R^2 (Ln(income) equation)		0.92		0.99		0.99
First stage R^2 ($(\text{Ln(income)})^2$ equation)		0.93		0.99		0.99
Observations	72	65	235	227	328	293
R^2	0.68	0.68	0.99	0.99	0.99	0.99

Robust standard errors in brackets. Standard errors are clustered by country in column 3-6. * significant at 10%; ** significant at 5%. Column 3 and 4 limit observations to countries that do not have missing observations on child labor, openness, trade based on geography, and income up to 1995 so that they are comparable to the set of countries used throughout the paper. This amounts to data from 1970, 1980, 1990, and 1995. Columns 5 and 6 also include observations past 1995, as well as observations that had missing values for opennes or trade based on geography.