This version: May 2004

Trade Openness, Foreign Direct Investment and Child Labor

FINAL VERSION

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Summary. — The skeptics of globalization argue that increased trade openness and foreign direct investment induce developing countries to keep labor costs low, for example by letting children work. This article argues that there are good theoretical reasons why globalization might actually have the opposite effect. We test this with various measures of child labor and provide the first analysis of foreign investment in addition to trade. We present evidence that countries that are more open towards trade and/or have a higher stock of foreign direct investment also have a lower incidence of child labor. This holds for the labor force participation rate of 10 to 14 year old children, the secondary school non-attendance rate and a count measure of economic sectors with child labor incidence as the dependent variables. Globalization is associated with less, not more, child labor.

Key words — child labor, trade, FDI, globalization, MNCs, sanctions

ACKNOWLEDGEMENT

We would like to thank David Kucera from the International Labor Organization's International Institute for Labor Studies in Geneva for providing access to his original measure of the incidence of child labor across economic sectors. We also thank three anonymous referees for many helpful and constructive comments. All remaining errors are ours.

1. INTRODUCTION

Child labor is problematic on a number of counts, ranging from the welfare, health and physical integrity of the affected children to downward pressure on adult wages (Arat 2002). ILO (2002a, p. 16) estimates that in 2000 about 211 million children aged 5 to 14 years old have been engaged in some form of economic activity globally. Of these, only 25 million are deemed as acceptable by the standards set by various ILO conventions and recommendations (mainly light work by children aged 12 to 14 years old).

In recent years the impact of globalization on the incidence of child labor has started to spark both public and academic debate, and has become an issue that invokes passion because it brings together people concerned about the exploitation of children on moral and ethical grounds and organized labor interested primarily in protecting jobs (Basu 1999; Grote, Basu, and Weinhold 1998; Srinivasan 1998). We will argue that theoretically globalization, defined as increased trade openness and penetration by foreign direct investment, can have both positive and negative effects on the incidence of child labor in developing countries. Like most researchers we will focus on these countries since child labor takes place mainly within them (ILO 2002b). However, we will also present strong and robust evidence that more "globalized" developing countries also have a lower incidence of child labor than those that are less open to trade and less penetrated by foreign direct investment.

We improve upon the three main existing empirical cross-national studies on the subject, namely Shelburne (2001), Cigno, Rosati and Guarcello (2002) and Edmonds and Pavcnik (2004), in two important ways: First, unlike these studies that mainly address trade openness, we look also at penetration by foreign direct investment (FDI) defined as the stock of FDI over gross domestic product (GDP). Rather than trade openness alone, FDI is often directly accused of engaging in exploitative activities as

such notorious cases involving Nike exemplify (Grote, Basu, and Weinhold 1998). Second, like most studies we use the labor force participation rate of 10 to 14 year old children as the dependent variable in our main estimations, but we also test the robustness of our results on three other dependent variables that capture different aspects of the child labor problem. One of these has never been examined in this context and measures the number of economic sectors in developing countries, in which evidence for child labor can be found. The other two measure the primary school and the secondary school non-attendance rates.

The article is structured as follows: Section 2 discusses the fundamental determinants of child labor. Section 3 addresses in some detail the impact of globalization. Section 4 reviews existing empirical evidence. Section 5 describes the research design for our own study, results of which are discussed in section 6. Section 7 concludes.

2. THE FUNDAMENTAL DETERMINANTS OF CHILD LABOUR

To many people in developed countries it is shocking and morally repulsive that parents would willingly send their children to work. However, case studies show that it is often impoverished parents that send their children to work in order to survive as a family (Grootaert and Kanbur 1995). Even altruistic parents who care about the welfare of their children can thus be forced to see their children as a source of income (Basu and Van 1998). As Ahmed (1999) has put it: ‘There is by now a virtually unanimous view that poverty is the main, although not the only cause, of child labor’.

Despite extreme poverty, parents might not want to send their children to work full-time. However, if they are hit by a temporary economic crisis, then the additional

income from child labor could be essential for survival. In principle, short-run economic setbacks can be sustained through borrowing money. However, poor parents will often face binding credit constraints, and whilst they are unable to borrow money they are able to send their children to work (Baland and Robinson 2000). Child labor thus functions as a mechanism for consumption smoothing. However, what might have started as temporary work can translate into more permanent employment if the children lose their right to attend school, lose interest in school, or lose even their capability to pursue education.

If we assume selfish instead of altruistic parents, then children will be sent to work if the payoff to parents from such work is higher than the potentially larger, but uncertain and future return of sending the children into education in order to acquire better skills. Credit market constraints play again an important role here as investment in education is expensive, the cost of which is only recovered in the future. Selfish parents will also consider that whereas they will have more or less full control over any income from the child labor, they might not be able to control the future income of their better educated children once they enter the labor force as adults. More altruistic parents might derive utility from knowing that their better educated children will lead a better life as adults in the future even if they do not participate in the higher income of their grown-up children.

Schooling costs and conditions and the availability and quality of education options have an impact upon the demand for child labor in changing the opportunity costs of sending children to work rather than to school. In particular, a household's decision whether or not to withdraw a child from primary school is influenced by the availability and quality of secondary school options. This is because one of the benefits of primary school education is that it provides entrance to higher levels of schooling. Higher public

expenditures on education lower the costs for the poor in particular for sending their children to school and should therefore lower the incidence of child labor. Higher school quality raises the return from education. Many studies show that parents who have achieved a higher level of education are also more likely to ensure that their children similarly receive a good education (Basu and Tzannatos 2003). This opens the possibility for a virtuous circle in which the achievement of higher educational standards by one generations is passed on to following generations, thus escaping a 'dynastic trap' of child labor.

For a whole range of reasons, child labor is more prevalent in rural than in urban areas. In rural areas, there is more agricultural activity, which is one of the main sectors of child employment, often on commercial plantations and without any form of payment (Ahmed 1999; ILO 2002a). The educational system is likely to be of poorer quality and enforcement of school attendance regulations and child labor bans is likely to be lax. Also, parents in urban areas tend to be more educated, which spurs an interest in the education of their children. Rural households on average are poorer than their urban counterparts (Edmonds and Pavcnik 2002). Furthermore, social and cultural norms are more traditional in rural areas leading to a higher social acceptability of child labor (López-Calva 2001).

As concerns the demand side, children are often wanted by employers because they are cheaper than adults since their wages are lower and non-wage benefits such as medical insurance or pensions are virtually non-existent. They are also presumed to be more tolerant of bad working conditions and more flexible in their labor supply (Bachman 2000). In addition, it is often presumed that where excellent eyesight, "nimble fingers" and small stature is an advantage in such economic activities as in carpet weaving and mining, children can be more productive workers than adults.

However, an ILO study shows that this presumption is likely to be based more on myth than actual fact since it found no evidence that children in the carpet industry of Uttar Pradesh, India's carpet center, are more productive than their adult colleagues (Levison, Anker, Ashraf and Barge 1996). Instead, children are more likely to work on low-quality carpets, but are hired on lower wages, which also depresses the going wage rate for the adult workers.

Social regulations and outright bans of child labor are only successful in eradicating child labor if they are enforceable and actually enforced. Enforceability will be low if the socio-economic incentives for child labor are very powerful. Even where this is not the case, they might not be enforced, particularly in developing countries where state capacity is weak and priorities often elsewhere. This is true also for issues other than child labor.

3. THE IMPACT OF GLOBALIZATION ON CHILD LABOUR INCIDENCE

Let us now turn towards the effects of trade openness and foreign direct investment on child labor. Theory alone is ambiguous and we will analytically distinguish aspects of globalization that promote and factors that may hinder the incidence of child labor.

(a) Promoting child labor

As we have seen above, anything that lowers the return to education can be expected to promote the incidence of child labor. Trade liberalization in a developing country, which is abundant in unskilled labor, is likely to raise the relative rate of return to unskilled labor, thus reducing the incentive to invest in skills and education. As a

consequence, the returns to child labor increase with a substitution effect towards increased supply of child labor (Grootaert and Kanbur 1995).

Increased trade openness need not increase the demand for child labor if children mainly work in sectors that compete with imports or in the nontradeable sector. Given that estimates show that less than 5 per cent of working children are employed in the manufacturing export sector itself (U.S. Department of Labor 1994, p. 2), one might think that the effects of trade openness would be negligible. However, as Maskus (1997) shows, children need not work in the export sector itself for trade liberalization to increase the demand for child labor. As long as they work in a sector, formal or informal, which supplies inputs to the export sector, increased trade can lead to a greater child labor incidence.

More generally, globalization skeptics argue that free trade induces countries to a 'race to the bottom' (Palley 2002). A higher extent of child labor could cut costs to gain the country a competitive advantage over others. Since all countries face this incentive, increased trade openness could bring about an increased incidence of child labor all over the world. Developing countries with lax labor standards, low wages and an abundant supply of unskilled labor, including child laborers, are regarded as a haven for foreign investors – a perspective called the 'conventional wisdom' by Rodrik (1996, p. 57). High profile cases such as Nike, Reebook and Adidas show that multinational corporations do at times subcontract to enterprises that employ children. More radical views going back to Hymer (1979) and even Lenin's theory of imperialism see foreign investors and multinational corporations actively involved in repressing human rights and resisting improvements in labor conditions. According to dependency or world systems theory, foreign investors are the henchmen or lackeys of exploitation of the

peripheral and semi-peripheral developing countries to the benefit of the core of the developed world (Wallerstein 1974, Drenovsky 1992).

A whole host of studies within sociology and political science have purported to demonstrate that the stocks of accumulated FDI within LDCs, a measure of the structural power of MNCs over governments, 'cause' negative externalities with detrimental outcomes (Bornschier and Chase-Dunn 1985; Dixon and Boswell 1996; Wimberly 1990; Wimberly and Bello 1992). While some (Firebaugh 1996; de Soysa and Oneal 1999) have questioned these findings on methodological grounds, the tradition of dependency theorists carries over strongly into the globalization debate (see Hoogvelt 2001).

(b) Reducing child labor

Trade liberalization in a developing country, which is abundant in unskilled labor, will not only have a substitution, but also an income effect. Even if we cautiously assume that trade does not raise the growth rate of the general economy (see Rodriguez and Rodrik 2000), it will raise the relative rate of return of unskilled labor. This income effect can be expected to reduce the incentive for parents with little skills to send their children to work if we assume that child leisure and child education are normal goods. Indeed, Basu and Van (1998) and Basu (2002) show that there are likely to exist multiple equilibria in the labor markets in poor developing countries. If the income effect is strong enough then it becomes possible to switch from one equilibrium, in which very impoverished parents send their children to work, to another one, in which much less impoverished adults see no need to send their children to work. In the long run, trade liberalization might also lead to a sectoral shift towards higher skilled capital-intensive manufacturing and services and away from low-skilled, labor-abundant

production, thus making the employment of children less attractive. Globalization optimists suggest that countries have an incentive to invest in education and skills in order to spur economic development and their long-run competitiveness (Becker 1997). Increased trade openness could thus be associated with a reduced incidence of child labor.

Another potentially positive effect of increased trade on the incidence of child labor works through the effect of openness on interest rates and credit constraints. More open countries are likely to have lower interest rates and offer better access to credit. This lowers the opportunity cost of education and thereby the incidence of child labor (Ranjan (2001) and Jafarey and Lahiri (2002)).

From a political economy perspective, an open economy has less incentive to preserve the traditional culture and institutional framework that promotes child labor. This is because the return to skilled labor and to the owners of capital is also influenced by world markets and is less dependent on the domestic supply of unskilled labor, including that of children. In closed economies, on the other hand, skilled labor and the owners of capital unambiguously benefit by preserving the cultural and institutional conditions promoting a large supply of cheap unskilled labor, including that of children (Shelburne 2001). If child labor is officially banned, but continues to exist due to lack of enforcement, then as Aggarwal (1995) has noted violations of labor standards are more common in the nontradeables and less export-oriented sectors.

Foreign investors might be less interested in exploiting cheap labor, including that of child laborers, than is presumed by the conventional wisdom. Market size and market growth, political stability, infrastructure and high labor skills are often as important, if not more important, than low wages (Kucera 2001, 2002; Noorbakhsh, Paloni and Youssef 2001). Indicative of this is that empirical studies typically fail to find that

countries with low labor standards in general and a high incidence of child labor in particular attract a greater inflow of FDI (Rodrik 1996; Kucera 2001, 2002). In as much as foreign direct investment spurs economic growth (Firebaugh 1996; De Soysa and Oneal 1999), it will also have an indirect effect reducing the incidence of child labor.

Foreign investors might also find it more difficult to circumvent anti-child labor laws as they are possibly under higher scrutiny of regulators and definitely more exposed to the supervision of trade unions, the media, consumer, human rights and other activist groups (Spar 1998). Multinational corporations often have adopted voluntary codes of conduct, which commit the corporation to limit, or ban child labor from its operations and often that of its suppliers. Anxious not to be portrayed as exploiting poor helpless children and aware of the fact that brand name reputation plays an important role in selling physically similar products, firms like Nike and Reebok have started programs to combat child labor in their production chains (Spar 1999). Multinational corporations are more likely to join such institutions as the Rugmark International Foundation, founded by non-governmental organizations, some businesses, the Indo-German export promotion program and the United Nations Children's Fund (UNICEF) whose objective is the elimination of child labor in the carpet industry (McClintock 1999).

4. REVIEW OF EXISTING QUANTITATIVE STUDIES

Only few large sample quantitative studies exist examining the determinants of child labor in general and its relationship to trade and foreign direct investment in particular. Edmonds and Pavcnik (2002) provide a study of micro-data from the 4000 household panel Vietnam Living Standards Survey. They examine the effect of an increase in the

price of rice on child labor, finding that a 30 per cent price increase is associated with a nine percentage point decrease in child labor. This is a strong effect and the price increase can account for 47 per cent of the overall decrease in child labor in Vietnam between 1993 and 1998. The results show that even though the price increase has rendered child labor in rice farming more attractive via raising its rate of return, the income effect led to an even stronger reduction of child labor. The only exceptions are households in urban areas whose incomes suffer due to the price increase. Part of the price increase is likely to stem from a relaxation of a rice export quota, which was introduced in 1989 and by 1997 was no longer binding. The authors interpret this to the effect that, at least in this case, the income effect, which follows integration into global markets and trade liberalization and which reduces child labor, dominates the corresponding substitution effect promoting child labor.

At the cross-national level, Drenovsky (1992) found that the labor force participation rate of 10 to 14 year old children was not related to the commodity concentration in exports and an index of the presence of multinational corporations in a sample of 70 developed and developing countries in the early 1970s. Using the same dependent variable with reference to the mid-1990s, Shelburne (2001) found the trade ratio, that is the sum of imports and exports normalized by GNP, to be negatively associated with child labor. This holds true both in a sample of all developing countries as well as a more restricted sample excluding the former Communist countries of Eastern Europe and the former Soviet Union, which traditionally have low child labor incidence (or possibly under-reporting of such incidence).

Cigno, Rosati and Guarcello (2002) use the non-attendance rate in primary schooling as a complementary indicator of child labor in addition to the labor force participation rate in a pooled cross-sectional panel covering data from 1980, 1990, 1995

and 1998. The trade ratio is either not associated with child labor or in one model specification positively associated with it. Employing Sachs and Warner's (1995) dummy variable for trade openness instead, they find it to be negatively associated with the child labor force participation rate, but not with the primary school non-attendance rate.

Edmonds and Pavcnik (2004) analyze the effect of the trade ratio on the labor force participation rate of 10 to 14 year old children in 1995 with the help of instrumental variable estimation due to endogeneity concerns. They find that openness is negatively associated with child labor only if no other variables, particularly income, are included in the regression models. They conclude that trade openness might lower child labor, but only via its positive effect on per capita income.[1]

5. RESEARCH DESIGN

(a) The dependent variables

Article 32 of the Convention on the Rights of the Child requires State Parties to recognize 'the right of the child to be protected from economic exploitation and from performing any work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral or social development'. In reality, the incidence of child labor is difficult to measure reliably and any measure is fraught with problems. It is clear from the literature review that the traditional and most popular measure of the incidence of child labor is the labor force participation rate of children aged 10 to 14 years. It will also be the dependent variable in our main estimations and is taken from World Bank (2001). As mentioned in the introduction, we employ a sample that includes only developing countries, that is

Canada, the United States, Western Europe, Japan, Australia and New Zealand are excluded. World Bank (2001) reports data on labor force participation for 147 countries, but due to gaps in data availability for the explanatory variables our estimations cover up to 117 countries. These are listed together with their regional classification in the appendix.

The labor force participation rate of children aged 10 to 14 years suffers from both statistical and conceptual problems, however. Statistically, in many countries the rate is based on estimates and projections rather than reliable surveys, which are 'particularly problematic at the tails of the age distribution' (Mehran 2001, p. XI). In addition, children working in a domestic household or unofficially or illegally are not captured. Furthermore, as Cigno, Rosati and Guarcello (2002, p. 1579) observe, this measure of child labor suffers from the fact that in excluding children younger than 10 years old 'it leaves out a large, arguably the most worrisome, part of the phenomenon in question'.[2] On the other hand, the measure includes children aged between 12 and 14 years old undertaking light work, which under certain conditions is allowed by Article 7 of the ILO Convention 138 concerning the Minimum Age for Admission to Employment.

Some, like Cigno, Rosati and Guarcello (2002), therefore resort to using the non-attendance rate in primary school education as an additional proxy for the incidence of child labor. The idea is that children under 10 years old who are not attending primary school are presumed working, whereas those that do attend school are presumed not working. However, both assumptions are questionable. Those not attending could be unable to work or not be working for any reason. More importantly, often children attend school and yet are subjected to part-time employment. A survey amongst child workers on commercial plantations revealed that most of them attended school, but worked on weekends or during school vacations (ILO 2002a, p. 26). Murshed (2001, p.

176) and ILO (2002a, p. 26) also point out that some children may actually have to work in order to be able to attend school. In addition, statistics of school enrolment rates are of dubious quality, one of the problems being that children may drop out of school after having enrolled initially (Ahmed 1999). Nevertheless, in sensitivity analysis we will use both the primary (*%NON-PRIMARY*) and the secondary (*%NON-SECONDARY*) school non-attendance rate as further dependent variables, also taken from World Bank (2001). These rates are defined as 100 minus the net enrollment rate.

In addition, we will also employ an original dataset, which has been developed by David Kucera from the ILO's International Institute for Labor Studies in Geneva (Kucera 2001, 2002). Based on a wide variety of textual sources from the US State Department's Country Reports on Human Rights Practices and various ILO documents, the dataset indicates whether there is significant evidence of child labor in or around 1995 in any one of seven economic sectors in 170 countries around the world. The choice of sectors was not taken *a priori*, but followed from the source documents as the sectors, in which child labor is most prevalent (Kucera 2002, p. 46). The seven sectors are as follows:

1. textiles, apparel, rugs, leather goods (including tanning), or footwear.
2. other manufacture or craft production, including putting–out and home production of crafts for market.
3. mining.
4. market-oriented agriculture, forestry, or fishing, including processing of fish and foodstuff.
5. construction.
6. subsistence agriculture or fishing, including processing of fish and foodstuff.

7. informal (or small-scale) service sector, most commonly including street vendors, workers in small retail and repair shops, domestic servants (excluding own home but including home of relatives), porters, and restaurant workers.

In the first four sectors tradeable goods are produced and together with the fifth sector, construction, these five sectors roughly cover manufacturing plus primary commodity tradeables. The last two sectors, namely subsistence agriculture or fishing and the informal (or small-scale) service sector, do not produce tradeables.

One of the great advantages of this data is that contrary to the labor force participation measure it is not confined to children aged 10 to 14 years. If there is significant evidence of children of younger age working in any of these sectors, then this is recorded as well. Contrary to the non-attendance primary or secondary school rate, it measures directly whether child labor is existent in any of these sectors. The dependent variable is the count of sectors, in which child labor is apparent (*CLCOUNT*), which can run from zero (no evidence of child labor in any sector) to seven (evidence of child labor in all sectors). Of course, this measure is not without problems either. One problem is that we can only measure whether there is evidence for child labor, but not how many children are working. At the moment, no such estimates are available (Kucera 2001, p. 15). Another deficiency is that children working in their own household will not be covered unless these households engage in any of the economic activities listed above. Furthermore, the textual sources used for constructing this variable can be biased with some countries attracting more scrutiny than others. This might be particularly problematic for the sources from the US State Department, but even the ILO is under the influence of relevant stakeholders, which consciously or not

might bias the selection and gathering of information used in the creation of this variable.

Table 1 provides bivariate correlations between the four dependent variables. These suggest that the various measures are not redundant and that they possibly capture different aspects of the child labor problem. Employing the most common measure *LFPR10-14* as the dependent variable in the main estimations and the other measures in sensitivity analysis therefore helps us establishing some robustness of results.

< Insert Table 1 around here >

(b) The independent variables

Poverty is often cited as a fundamental determinant of child labor in the theoretical and empirical literature. However, there is a great paucity of direct measures of poverty that are internationally comparable. As a result we use the natural log of GDP per capita in purchasing power parity (*ln GDP p.c.*) as our measure of poverty. Where our dependent variable is the count of economic sectors with child labor incidence we suspect and test for a non-linear effect of per capita income.[3] This is because very poor countries tend to have economies that are not diversified.[4] Ideally, we would like to control for an economy's degree of diversification. Unfortunately, we do not have a variable that directly measures the number of economic sectors existent in a country.

To control for one of the potential biases in coding the CLCOUNT variable mentioned in the last section we include total economic size measured as the natural log of GDP (*ln GDP*).[5] This is because larger economies are likely to draw more closer attention and scrutiny from the ILO and the US State Department than smaller ones in the reports on which this variable's coding is based.

Two variables account for the fact that child labor is more common in rural areas and agricultural activities, namely the urbanization rate *(%URBAN*) and the value added by agriculture as a share of GDP (*%AGRICULT*). As further control variables we include regional dummies for Sub-Saharan Africa, Northern Africa and the Middle East, Eastern Europe and Central Asia, East Asia and the Pacific, and Latin America and the Caribbean, in order to capture some crude cultural, historical and labor force skills differences (on the latter, see the discussion below). South Asia represents the omitted category.[6] The appendix lists the countries included in the study together with their regional classification.

Our indicator of the extent of trade openness is the ratio of the sum of exports and imports to GDP (*%TRADE*). In theory, one could think of better indicators such as the differential between the international and domestic real price for tradeable goods, but no sufficient data exist to construct such a variable for a large number of developing countries. This measure is sometimes criticized for combining the effects of 'natural' openness and trade policy (Berg and Krueger 2003, p. 11). However, in our context this is less problematic since we are interested in establishing the effect of actual trade openness, whatever its determinants, rather than the effect of liberal trade policy on child labor incidence.

Cigno, Rosati and Guarcello (2002) also use Sachs and Warner's (1995) dummy variable for trade openness. A country is considered open if it passes each one of five tests. First, it must not have an average tariff rate above 40 per cent. Second, non-tariff barriers must not cover more than 40 per cent of trade. Third, any existing black market premium for the exchange rate must be below 20 per cent. Fourth, the country must not have a socialist economic system. Fifth, there must not exist an extractive state monopoly on major exports. This measure of trade openness has been questioned by, for

example, Rodriguez and Rodrik (2000). They argue that the strength of this variable in growth regressions mainly stems from two of its components referring to the black market premium and state monopoly of exports, which are a proxy 'for a wide range of policy and institutional differences' (p. 25) rather than a proxy for liberal trade policy itself. The more direct measures of trade policy, namely tariffs and non-tariff barriers, have comparatively little statistical power. Sachs and Warner's measure is also a very crude and simple 'black or white' measure that does not reflect actual existing variation, instead simply categorizing all countries as either open or closed. Another problem is that it is not available for all countries in our sample. Nevertheless, in sensitivity analysis we also use Sachs and Warner's measure for 1992, the latest year available (*SWOPEN*). In addition, we use a further measure derived from the Canadian Fraser Institute's Index of Economic Freedom (Gwartney and Lawson 2003). One of the sub-components of this index is called 'Freedom to Exchange with Foreigners'. Countries are ranked on a scale from 0 to 10 with respect to taxes and tariffs on international trade, regulatory trade barriers, the actual size of the trade sector compared to expected size, the difference between the official exchange rate and the black market rate and international capital controls. The average value of available factors represents overall trade restrictions. We reversed the measure such that higher values mean more liberal trade policies (*FRASEROPEN*).

As our measure of penetration by foreign direct investment we use the stock of FDI relative to GDP as it reflects much better the lasting impact of such investment than the rather volatile short-term inward investment flows (*FDISTOCK/GDP*). Finally, like Cigno, Rosati and Guarcello (2002) we include public health expenditures as a share of GDP (*%HEALTH*), but only in further regressions due to lower data availability. In addition, we include public education expenditures as a share of GDP

(*%EDUCATION*), which we believe to be more relevant to child labor than public health expenditures. However, public education expenditures do not tell us much about school quality and efficiency. We therefore also include the pupil to teacher ratio in primary schools (*PUPILS/TEACHERS*) and the share of primary school entrants that reach grade 5 (*%GRADE5*) as rough measures of these difficult to capture aspects of education. From a theoretical viewpoint, the share of school entrants reaching grade 9 or 10 is likely to be more relevant since children aged 11 to 17 are most at risk of leaving school to start working. However, unfortunately, no such data is available.

Contrary to Cigno, Rosati and Guarcello (2002), we do not include the share of labor force with primary and secondary education as further control variables. We acknowledge that ideally one would like to include measures of skill composition in estimations with the incidence of child labor as dependent variables. Unfortunately, however, these have very poor availability and would reduce our sample size from up to 127 countries down to 33 at maximum. Their inclusion would therefore turn a representative sample of developing countries into one that is very likely to be non-representative. We hope that the regional dummy variables pick up some of the effects of the omitted skill composition variables.

All data are taken from World Bank (2001) with the exception of *FDISTOCK/GDP*, which is taken from UNCTAD (2003), and *%GRADE5*, taken from UNICEF (2003). In principle, the data are from 1995. The agriculture and trade variables are averages over the period 1990 to 1995 as the 1995 data exhibited substantial gaps. For the same reason the primary and secondary school non-attendance and the school quality and efficiency data are averages from the 1990s. Table 2 provides summary descriptive variable information.

< Insert Table 2 around here >

(c) The estimation technique

We estimate the model with the labor force participation rate and the school non-attendance rates in a cross-sectional panel for the year 1995 with ordinary least squares (OLS). The count data nature of the *CLCOUNT* dependent variable suggests usage of an estimation technique that is particularly suitable for count data such as the negative binomial regression. For both OLS and negative binomial estimations we use standard errors that are robust towards arbitrary heteroscedasticity.

One needs to be concerned about the potential endogeneity of trade and FDI investment. First, this could be due to reverse causality. Critics argue that in developing countries child labor is used as a mechanism to preserve low labor costs in order to compete and expand on world markets. Busse (2002) provides evidence that countries with higher incidence of child labor have a comparative advantage in the export of unskilled labor-intensive manufactured products. Critics also argue that foreign investors not only seek countries with child labor incidence, but actively promote child labor. This would mean a positive association between child labor and globalization. In our estimates reported below we find a negative association between child labor and globalization, which implies that reverse causality does not represent too much reason for concern. At worst, it diminishes the strength of the negative effect of globalization on child labor incidence found in our estimations. The second reason why endogeneity might be a problem is because of omitted variables that might be correlated with globalization and child labor. To tackle this problem, we include a fairly comprehensive range of explanatory variables, including regional dummies. However, we cannot exclude the possibility that omitted variables might bias our estimations.

If endogeneity represents a significant problem, then OLS regression estimates would become inconsistent, which calls for the use of instrumental variable (IV) estimation.[7] IV estimation is consistent in case an explanatory variable is correlated with the error term. But it comes at the price of loss of efficiency in estimation as the standard errors are typically higher and often substantially so. Fortunately, one can test for the consistency of OLS estimations with the help of the so-called Durbin-Wu-Hausman test to see whether IV estimation is warranted (Davidson and MacKinnon 1993). This test compares the coefficients from the efficient, but potentially inconsistent, OLS estimates to the ones from the inefficient, but consistent, IV estimates. If the test rejects the null hypothesis of consistency of the OLS estimates, then IV estimation is warranted.

Instrumental variables need to fulfil three conditions (Wooldridge 2002, 84-86 and 105): First, they need to be sufficiently strongly partially correlated with the endogenous variables in the sense that the correlation persists after all other exogenous variables are controlled for. Second, they must not be correlated with the error term since otherwise they would suffer from the very same problem they are supposed to remedy. Third, the instruments need to be redundant in the child labor regressions. That is, conditional on the explanatory variables, they must not affect child labor directly, but only via their effect on trade and FDI penetration. We use demographic, geographical and language instruments here, namely population size, size of land area, a dummy for countries that are landlocked, the minimum distance to New York, Brussels or Tokyo and a dummy variable for countries, which share the same language with a developed country.[8] Data are taken from Easterly and Yu (2002) and Bennett and Stam (2001). These instruments fulfil the first condition. Fulfillment of the second condition is tested via so-called over-identification tests. These compare the just-identified to the over-

identified estimation and a systematic difference provides evidence against the exogeneity hypothesis. The third condition typically needs to be assumed. This exclusion restriction is always debatable of course, but we see little reason why our instruments should directly affect child labor incidence.

Below, we report over-identification test results, which do not reject our hypothesis of exogenous instruments. We report Durbin-Wu-Hausman tests, which do not reject our hypothesis that the trade and FDI variables are exogenous regressors. We therefore prefer OLS to IV estimation.

6. RESULTS

(a) Main estimation results

Column I of table 3 presents OLS estimation results for the labor force participation rate of 10 to 14 year old children as the dependent variable. We start with a model that excludes public spending on education and health as well as our variables of school quality and efficiency in order to maximize sample size. Higher per capita income levels and a higher urbanization rate are associated with lower child labor incidence as expected. The coefficient of the GDP share of agriculture is positive, but marginally insignificant. Both trade openness and the stock of FDI per GDP are highly significant and negatively associated with the labor force participation rate of children. As we would expect, all other things equal, Eastern European and Central Asian countries have a lower labor force participation rate than South Asia, the reference category. The opposite is the case for Sub-Saharan Africa, whereas the other regions do not exhibit a difference that is statistically significant. In column II the pupil to teacher ratio and the share of primary school children reaching grade 5 are added as further variables. A

higher pupil to teacher ratio is positively associated with child labor as one would expect. %GRADE5 is statistically insignificant. The other variables are largely unaffected in terms of coefficient sign and statistical significance, with the exception of the dummy variable for Eastern Europe and Central Asia, which becomes insignificant. Public spending on health and education are added in column III, leading to a further reduction in sample size. Neither of the two variables assumes statistical significance and the other variables are hardly affected. Per capita income becomes marginally insignificant, however.

< Insert Table 3 around here >

To see whether we need to be concerned about the potential endogeneity of the trade and FDI variables, Durbin-Wu-Hausman tests together with robust Sargan tests of over-identification restrictions were employed. The reported test results clearly fail to reject the hypothesis of exogenous instruments and regressors.

(b) Sensitivity analysis

As mentioned above, the incidence of child labor is not easily measured and the labor force participation rate of children between 10 and 14 years old used in our main estimations is not without problems. For this reason, table 4 reports results from alternative dependent variables, which might capture different aspects of the problem. To save space, we report just two models for each dependent variable, the one with the largest sample size and the model with the smallest sample size. Column I presents negative binomial regression results for the dependent variable counting the sectors of the economy with incidence of child labor (*CLCOUNT*). Per capita income shows the

expected non-linear effect. Very poor countries do not have diversified economies and therefore a lower count of economic sectors with the incidence of child labor is reasonable. However, at higher levels of income the familiar negative association of per capita income and child labor obtains. The turning point can be estimated as $(-\delta/2\phi)$, where δ is the coefficient of the income variable and ϕ the coefficient of the squared term, and lies at about US$2660. Total economic size is also positively associated with higher incidence of child labor. As argued above, this is possibly because large economies might have gained greater scrutiny in the coding of this variable. The agricultural share of GDP variable is clearly insignificant, which is not surprising given that our dependent variable counts the number of economic sectors with incidence of child labor. The urbanization rate has the expected negative coefficient, which is statistically significant. This is also the case for our trade and FDI stock variables. As expected, Eastern Europe and Central Asia has less incidence of child labor than South Asia. The dummy variable for the Middle East and North Africa is also marginally significant with a negative sign. Adding the proxy variables for school quality and efficiency as well as the public education and health expenditure variables to the model in column II leaves most other variables unaffected with one important exception. The FDI stock variable retains its negative coefficient, but becomes statistically insignificant.

< Insert Table 4 around here >

Columns III and IV repeat the estimations for the primary school non-attendance rate as the dependent variable. Richer countries and East Asian countries have lower non-attendance. The same applies to Eastern European and Central Asian countries, but

only in the regression with larger sample size. The opposite is the case for Sub-Saharan African countries as well as, surprisingly, countries with a higher urbanization rate. The latter variable becomes insignificant in the model with lower sample size, however. Neither trade openness nor foreign investment penetration has any statistically significant effect. Finally, columns V and VI estimate the two models with the secondary school non-attendance rate as the dependent variable. Besides the Eastern Europe and Central Asia and Sub-Saharan Africa dummy variables, only per capita income and trade openness are statistically significant in column V with the expected coefficient sign. Both become insignificant in column VI. However, trade openness is only very marginally insignificant (p-value 0.116). A higher share of primary school children progressing to grade 5 is associated with a lower secondary school non-attendance rate as one would expect. The same is true for higher public spending on education.[9] As with the dependent variable in our main estimations, Durbin-Wu-Hausman and Sargan over-identification test results fail to reject the hypothesis of exogenous instruments and regressors.[10] The only exception is column V where we reject the hypothesis that our instruments are truly exogenous at the 5 per cent level.

In table 5 we explore the effects of replacing our preferred measure of trade openness, namely the sum of exports and imports as a share of GDP, with measures of liberal trade policy on our main dependent variable, labor force participation. Columns I and II include the Sachs-Warner measure and columns III and IV the Fraser Institute measure. None of these variables of liberal trade policy assume statistical significance. The FDI stock variable remains significant throughout, however. Results for the other variables are generally similar to the main estimation results reported in table 3. There is no evidence against our hypothesis of exogenous instruments and regressors.

< Insert Table 5 around here >

In a cross-sectional research design one must be particularly careful to check whether the results are driven by a few outlying observations. Belsley, Kuh and Welsch (1980) suggest that observations with both high residuals and a high leverage deserve special attention. The residual of an observation measures the deviation from predicted to actual values, whereas leverage is a measure of the relative influence of an observation. An observation with high leverage is one for which the estimates would change markedly if it were deleted from the sample. We exclude an observation from the sample if its so-called DFITS is greater in absolute terms than twice the square root of (k/n), where k is the number of independent variables and n the number of observations. DFITS is defined as the square root of ($h_i/(1-h_i)$), where h_i is an observation's leverage, multiplied by its studentized residual. Applying this criterion leads to the exclusion of Bahrain, Guyana, India, Mali, Mauritius, Nepal, South Africa, Sierra Leone and Sri Lanka from the sample. Our results are mainly upheld as columns I and II of table 6 show. The only main difference following the exclusion of outliers is that per capita income is no longer statistically significant. This suggests that our main results are not driven by the presence of a few very influential outliers in the sample. Following Shelburne (2001) we also estimate the model with Eastern European and Central Asian countries excluded from the sample due to the much lower incidence of child labor relative to other developing country regions (ILO 2002b). Results are reported in columns III and IV of table 6. They are similar in terms of the sign of the coefficients and statistical significance to those of the full sample estimation. Again, Durbin-Wu-Hausman and Sargan over-identification tests fail to reject the hypothesis of exogeneity for the trade and FDI variables.

< Insert Table 6 around here >

7. CONCLUSION

Our analysis provides some evidence that countries that are more open towards trade and are more penetrated by FDI display a lower incidence of child labor. The primary school non-attendance rate is the only dependent variable, for which we find no effect of globalization throughout, a result, which confirms Cigno, Rosati and Guarcello's (2002) analysis. Indeed, our model does not explain well variation in this dependent variable. Part of the reason for this is likely to be found in the non-availability of data on options for higher levels of schooling and the costs of schooling. For all other dependent variables, either the trade openness or the FDI stock variable is statistically significant, with the exception of the secondary non-attendance rate where trade openness becomes marginally insignificant in the reduced sample size model. For our preferred dependent variable, the labor force participation rate of children between the age 10 and 14, both measures of globalization are significant with the expected sign. This is confirmed by outlier analysis and the exclusion of Eastern European and Central Asian countries from the sample. Both trade openness and FDI are also significant for the dependent variable, which counts the number of economic sectors with child labor incidence, if only in the full sample.

What is new in our analysis is that we find evidence that greater penetration by foreign direct investment is associated with lower child labor incidence, a topic neglected before despite the great importance attached to FDI by critics of globalization. With respect to trade openness, our results generally support the evidence reported in

Cigno, Rosati and Guarcello (2002) and Shelburne (2001). However, contrary to Cigno, Rosati and Guarcello (2002) we find that what matters to child labor is actual trade openness as commonly measured by the sum of imports and exports divided by GDP rather than a liberal trade policy regime as measured by Sachs and Warner's (1995) openness dummy variable or the freedom to exchange with foreigners sub-component of the index of economic freedom produced by the Fraser Institute. This is perhaps not surprising since many of the theoretical arguments that link globalization to child labor refer to actual trade openness rather than a liberal trade policy per se. What drives the difference in results between our and Shelburne's (2001) analysis on one hand and that of Cigno, Rosati and Guarcello (2002) on the other hand is difficult to say. Importantly, many more countries are included in our sample rendering it much more representative than their rather restrictive sample.

In future research, we would like to explore further the exact mechanisms by which trade and FDI affect child labor. Given that we control for per capita income, the significant results of the trade and FDI variables should be interpreted to the effect that globalization reduces child labor incidence in addition to any reduction in child labor globalization might cause via raising average per capita incomes. That Edmonds and Pavcnik (2004) find no such effect might be due to inefficient IV estimation, the absence of some determinants of child labor from their model, the smaller sample size or some other factor. Standard errors in IV estimation are so high as to render the coefficients of the instrumented variables insignificant. Fortunately, our Durbin-Wu-Hausman test results suggest that IV estimation is not warranted.

It is important to be aware of the limitations of our analysis. In particular, whilst we clearly demonstrate negative correlation between trade openness, foreign investment penetration and the incidence of child labor, we do not and cannot really demonstrate

causality. This is despite our best efforts. Besides the problem that causality is in some sense impossible to establish in a cross-national research design in any case, endogeneity bias represents a distinct possibility. As argued above, reverse causality is not a problem here since, if existent, it would dampen the strength of the negative correlation. We use a fairly comprehensive set of explanatory variables, including regional dummies, to reduce omitted variable bias. The Durbin-Wu-Hausman test results generally fail to reject the hypothesis of exogeneity of our trade and FDI variables. But comprehensive specification and favorable statistical test results can never fully exclude the possibility of spurious regression results due to omitted variables. Rural and informal sectors of an economy are particularly prone to child labor, but are likely to attract less FDI than other sectors, which might not be fully captured by our agricultural and urban variables. It might also be that economies with less incidence of child labor also have a more trade friendly environment and attract more FDI. This concern is perhaps less relevant given that we find that what matters to child labor is actual trade openness rather than a liberal trade policy. Be that as it may, in future research we would like to tackle the issue of causality more comprehensively.

Despite the caveat with respect to causality, our results do warn against policy recommendations for using trade or investment restrictions as a sanction mechanism to penalize countries that export goods with some contribution of child labor (for example, Palley 2002). Senator Tom Harkin has tried, without success, to get various bills through the US Senate prohibiting the import of goods produced wholly or partly by children (McClintock 2001). Whether such policies would be enacted for altruistic reasons or to protect low-skill jobs in developed countries from ‘unfair’ competition, they might still achieve the opposite effect of what is intended. This holds true even if they can be well targeted at export goods with child labor content, which in itself is

questionable. As Arat (2002, p. 198) points out, ‘banning child labor in export industries could push children from these relatively (though not always) more secure and better paying jobs to seeking employment in less protected informal sectors’ (similarly, Hasnat 1995). Rather, a greater integration of poor developing country economies into the world economy should be pursued. This does not mean that carefully selected and targeted trade and investment sanctions can never be justified. However, as a general weapon such sanctions are counter-productive. Globalization is likely to represent a promise, not a threat, for the eradication of child labor across the globe.

NOTES

[1] While their central focus is on credit constraints, Deheija and Gatti (2002) similarly find no relationship in one of their estimations between export and import openness on the labor participation rate of children aged between 10 and 14 years.

[2] About 35 per cent of economically active children between the age of 5 and 14 are less than 10 years old according to ILO (2002b). At the upper end, a minimum age of 14 is allowed by the *ILO Convention 138 concerning the Minimum Age for Admission to Employment* only 'initially' and only in countries 'whose economy and educational facilities are insufficiently developed' (Article 2.4). Indeed, Article 1 of the *Convention on the Rights of the Child* and Article 2 of the *ILO Worst Forms of Child Labor Convention 182* explicitly define a child as a human being below the age of eighteen. Of course, one might be more concerned about working children of younger age.

[3] No non-linear effect of per capita income was found in pre-testing for the other dependent variables.

[4] A low level of economic diversification used to be one of the criteria determining the list of least developed countries (LDCs) supporting our view that the level of diversification is correlated with per capita income. Unfortunately, the index of economic diversification is not available for all developing countries.

[5] With respect to the other dependent variables, Shelburne (2001) argues that big countries might have lower child labor incidence as they could improve their terms-of-trade by restricting the supply of unskilled labor, one form of which is child labor. We do not have much faith in the actual relevance of this argument. If *GDP*, or total economic size, is included in the estimations for the other dependent variables then it turns out to be statistically insignificant with the other variables hardly affected.

[6] Regional classification follows that of the World Bank.

[7] The same applies to Poisson.

[8] The results reported below are broadly similar if, similar to Edmonds and Pavcnik's (2004) approach, in addition income is instrumented by income and the investment share of GDP lagged 15 years. For the *CLCOUNT* regressions, population size is not included as an instrument to avoid perfect collinearity among GDP, GDP per capita and population size.

[9] An anonymous reviewer raised the concern that including public education spending as an explanatory variable with school non-attendance rates as the dependent variables might be problematic since the

equation risks becoming an identity. We see less reason for concern. In any case, if we take out this variable from the estimations then results for the other explanatory variables are hardly affected.

[10] Note that this test refers to OLS rather than Poisson estimation as there is no easy-to-use routine for IV estimation with Poisson in STATA, the statistical package used.

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Table 1. *Bivariate correlation matrix of dependent variables (N = 86)*

	LFPR10-14	CLCOUNT	%NON-PRIMARY	%NON-SECONDARY
LFPR10-14	1			
CLCOUNT	0.29	1		
%NON-PRIMARY	0.75	0.06	1	
%NON-SECONDARY	0.83	0.34	0.69	1

Table 2. *Descriptive variable information*

	N	Mean	Std. Dev.	Min.	Max.
LFPR10-14	117	13.86	15.23	0	54.53
CLCOUNT	127	2.01	1.62	0	7
%NON-PRIMARY	105	20.33	19.83	0	76.04
%NON-SECONDARY	92	55.85	25.24	8.62	95.21
ln GDP p.c.	127	7.99	0.88	6.21	9.86
ln GDP	127	23.71	1.91	19.57	28.72
%AGRICULT	127	23.10	14.67	0.89	65.45
%URBAN	127	47.20	20.75	5.70	90.30
%TRADE	127	76.76	38.22	16.28	228.86
FDISTOCK/GDP	127	22.03	31.91	0.09	238.53
%GRADE5	121	80.86	18.24	4	100
PUPILS/TEACHERS	124	31.35	12.93	11.35	77.03
%HEALTH	121	2.79	1.60	0.40	8.90
%EDUCATION	114	4.49	1.85	0.70	9.79
SWOPEN	78	0.54	0.50	0	1
FRASEROPEN	87	6.38	2.82	0	10

Table 3. *Main estimation results*

	I	II	III
	LFPR10-14	LFPR10-14	LFPR10-14
ln GDP p.c.	-3.387	-2.486	-2.609
	(3.14)***	(1.95)*	(1.53)
%AGRICULT	0.102	0.085	0.074
	(1.45)	(1.07)	(0.82)
%URBAN	-0.174	-0.178	-0.198
	(3.79)***	(3.80)***	(4.34)***
%TRADE	-0.059	-0.051	-0.064
	(2.73)***	(2.35)**	(2.81)***
FDISTOCK/GDP	-0.032	-0.030	-0.032
	(2.93)***	(2.36)**	(2.62)**
East Europe & Central Asia	-9.247	-5.102	-4.731
	(1.73)*	(0.89)	(0.77)
Latin America & Caribbean	-2.192	-0.655	-0.216
	(0.43)	(0.13)	(0.04)
Sub-Saharan Africa	10.765	9.756	10.876
	(2.04)**	(1.89)*	(2.04)**
Middle East & Northern Africa	-4.534	-1.406	-1.588
	(0.89)	(0.26)	(0.29)
East Asia	-4.732	-2.960	-2.950
	(0.89)	(0.56)	(0.53)
%GRADE5		-0.057	-0.027
		(1.05)	(0.46)
PUPILS/TEACHER		0.171	0.167
		(1.71)*	(1.68)*
%HEALTH			0.385
			(0.95)
%EDUCATION			-0.460
			(0.97)
Constant	51.237	41.923	43.121
	(5.37)***	(3.26)***	(2.76)***
Observations	117	112	103
R-squared	0.82	0.83	0.83
Durbin-Wu-Hausman test	0.2428	0.7920	0.0935
	(0.8857)	(0.6730)	(0.9543)
Robust Sargan over-identification test	3.212	2.286	4.659
	(0.3602)	(0.5151)	(0.1986)

Notes: Absolute t-values in parentheses. Standard errors robust towards arbitrary heteroscedasticity.

* significant at .1 level ** at .05 level *** at .01 level.

Durbin-Wu-Hausman and Sargan test are asymptotically chi-sq distributed under the null of exogeneity, with p-values reported in brackets.

Table 4. *Different dependent variables*

	I	II	III	IV	V	VI
	CLCOUNT	CLCOUNT	%NON-PRIMARY	%NON-PRIMARY	%NON-SECONDARY	%NON-SECONDARY
ln GDP p.c.	2.758	2.378	-10.089	-8.181	-7.366	-3.957
	(2.34)**	(1.95)*	(3.78)***	(2.68)***	(2.85)***	(1.24)
(ln GDP p.c.)^2	-0.175	-0.147				
	(2.39)**	(1.90)*				
ln GDP	0.126	0.122				
	(3.32)***	(2.81)***				
%AGRICULT	-0.006	-0.006	0.188	0.125	0.171	0.069
	(1.09)	(1.16)	(1.00)	(0.55)	(0.95)	(0.36)
%URBAN	-0.012	-0.013	0.222	0.118	-0.081	-0.152
	(2.28)**	(2.51)**	(2.00)**	(1.14)	(0.49)	(1.00)
%TRADE	-0.004	-0.004	-0.001	-0.007	-0.139	-0.094
	(2.19)**	(2.44)**	(0.04)	(0.19)	(2.65)***	(1.59)
FDISTOCK/GDP	-0.004	-0.002	-0.037	-0.008	0.079	0.117
	(1.93)*	(1.21)	(0.64)	(0.14)	(0.79)	(1.22)
EE & Central Asia	-0.938	-0.766	-9.646	-1.854	-19.192	-7.953
	(2.92)***	(1.75)*	(1.66)*	(0.27)	(2.98)***	(0.77)
LA & Caribbean	-0.239	-0.102	-9.001	-5.061	5.648	11.470
	(1.00)	(0.40)	(1.60)	(0.79)	(0.91)	(1.59)
Sub-Saharan Africa	-0.236	-0.234	13.428	14.108	19.483	22.004
	(1.26)	(1.22)	(2.58)**	(2.19)**	(6.16)***	(4.65)***
Middle East & NA	-0.644	-0.421	-3.690	4.116	-1.944	8.721
	(1.87)*	(1.21)	(0.52)	(0.55)	(0.26)	(0.98)
East Asia	-0.327	-0.180	-12.847	-10.002	-0.439	2.363
	(1.51)	(0.79)	(2.88)***	(1.84)*	(0.07)	(0.28)
%GRADE5		-0.004		-0.051		-0.312
		(1.11)		(0.35)		(2.20)**
PUPILS/TEACHER		0.005		0.196		0.106
		(0.84)		(0.85)		(0.47)
%HEALTH		-0.017		0.673		0.012
		(0.33)		(0.81)		(0.01)
%EDUCATION		0.011		-1.095		-2.048
		(0.26)		(1.08)		(1.92)*
Constant	-11.672	-10.252	88.187	75.866	119.611	118.958
	(2.45)**	(2.05)**	(3.60)***	(2.25)**	(5.77)***	(3.49)***
Observations	127	107	106	95	93	84
(Pseudo) R-squared	0.15	0.16	0.63	0.64	0.73	0.78
Durbin-Wu-Hausman test	3.368	4.009	1.837	2.256	1.162	2.725
	(0.1857)	(0.1347)	(0.3990)	(0.3236)	(0.5594)	(0.2561)
Robust Sargan over-identification test	0.337	0.097	0.171	0.354	9.707	3.376
	(0.8450)	(0.9526)	(0.9821)	(0.9495)	(0.0078)	(0.1849)

Notes: Absolute t-values or z-values in parentheses. Standard errors robust towards arbitrary heteroscedasticity. * significant at .1 level ** at .05 level *** at .01 level.

Durbin-Wu-Hausman and Sargan test are asymptotically chi-sq distributed under the null of exogeneity, with p-values reported in brackets.

Table 5. *Different measures of trade openness*

	I	II	III	IV
	LFPR10-14	LFPR10-14	LFPR10-14	LFPR10-14
ln GDP p.c.	-5.631	-4.486	-4.668	-3.723
	(4.66)***	(2.13)**	(3.66)***	(1.68)*
%AGRICULT	0.194	0.174	0.181	0.139
	(1.84)*	(1.13)	(1.62)	(0.89)
%URBAN	-0.178	-0.184	-0.123	-0.160
	(2.69)***	(2.13)**	(1.92)*	(2.13)**
SWOPEN	-0.991	-0.416		
	(0.41)	(0.16)		
FRASEROPEN			0.061	0.025
			(0.19)	(0.07)
FDISTOCK/GDP	-0.158	-0.150	-0.132	-0.171
	(2.16)**	(2.16)**	(2.05)**	(2.40)**
East Europe & Central Asia	1.991	6.301	-7.848	-3.659
	(0.37)	(1.01)	(1.54)	(0.56)
Latin America & Caribbean	2.270	4.678	-2.258	1.096
	(0.45)	(0.85)	(0.45)	(0.21)
Sub-Saharan Africa	9.869	10.581	8.866	9.302
	(2.14)**	(2.10)**	(1.75)*	(1.74)*
Middle East & Northern Africa	-4.113	-1.195	-5.383	-3.567
	(0.87)	(0.22)	(1.08)	(0.63)
East Asia	-0.525	0.463	-4.270	-2.711
	(0.11)	(0.09)	(0.85)	(0.51)
%GRADE5		-0.040		0.044
		(0.54)		(0.46)
PUPILS/TEACHER		0.130		0.228
		(1.09)		(1.85)*
%HEALTH		-0.823		-0.045
		(1.17)		(0.09)
%EDUCATION		-0.044		-0.063
		(0.07)		(0.11)
Constant	64.214	54.646	55.208	38.477
	(6.39)***	(2.80)***	(5.08)***	(1.87)*
Observations	78	70	87	77
R-squared	0.82	0.82	0.81	0.82
Durbin-Wu-Hausman test	2.102	3.444	2.428	2.403
	(0.3496)	(0.1787)	(0.2971)	(0.3007)
Robust Sargan over-identification test	1.884	1.772	3.756	5.008
	(0.5968)	(0.6210)	(0.2890)	(0.1712)

Notes: Absolute t-values in parentheses. Standard errors robust towards arbitrary heteroscedasticity.

* significant at .1 level ** at .05 level *** at .01 level.

Durbin-Wu-Hausman and Sargan test are asymptotically chi-sq distributed under the null of exogeneity, with p-values reported in brackets.

Table 6. *Outlier analysis*

	(1)	(2)	(3)	(4)
	LFPR10-14	LFPR10-14	LFPR10-14	LFPR10-14
ln GDP p.c.	-1.177	-0.602	-3.916	-3.002
	(1.46)	(0.44)	(3.69)***	(1.85)*
%AGRICULT	0.039	0.019	0.197	0.189
	(0.71)	(0.24)	(2.45)**	(1.71)*
%URBAN	-0.235	-0.232	-0.176	-0.188
	(6.22)***	(5.39)***	(3.35)***	(3.17)***
%TRADE	-0.078	-0.069	-0.053	-0.069
	(3.97)***	(2.90)***	(1.87)*	(2.59)**
FDISTOCK/GDP	-0.040	-0.036	-0.030	-0.028
	(4.00)***	(2.92)***	(2.80)***	(2.51)**
East Europe & Central Asia	-10.422	-6.086		
	(3.08)***	(1.27)		
Latin America & Caribbean	-3.890	-1.710	-0.379	2.216
	(1.20)	(0.43)	(0.08)	(0.45)
Sub-Saharan Africa	11.216	12.227	10.446	11.165
	(3.56)***	(3.50)***	(2.12)**	(2.23)**
Middle East & Northern Africa	-6.536	-2.659	-2.908	-1.000
	(2.01)**	(0.64)	(0.61)	(0.19)
East Asia	-5.838	-3.605	-4.502	-2.660
	(1.74)*	(0.90)	(0.90)	(0.51)
%GRADE5		-0.079		-0.023
		(1.81)*		(0.37)
PUPILS/TEACHER		0.070		0.136
		(0.81)		(1.33)
%HEALTH		0.154		-0.340
		(0.47)		(0.66)
%EDUCATION		-0.388		0.081
		(0.94)		(0.15)
Constant	40.592	38.668	52.152	42.675
	(5.66)***	(3.06)***	(5.69)***	(2.82)***
Observations	108	96	92	81
R-squared	0.88	0.88	0.82	0.83
Durbin-Wu-Hausman test	0.005	0.311	0.5195	0.083
	(0.9976)	(0.8558)	(0.7712)	(0.9593)
Robust Sargan over-identification test	0.288	0.484	3.912	3.685
	(0.9623)	(0.9224)	(0.2712)	(0.2976)

Notes: Absolute t-values in parentheses. Standard errors robust towards arbitrary heteroscedasticity.

* significant at .1 level ** at .05 level *** at .01 level.

Durbin-Wu-Hausman and Sargan test are asymptotically chi-sq distributed under the null of exogeneity, with p-values reported in brackets.

Appendix. *Countries in sample and their regional classification*

Albania	eca	Costa Rica	lac	Kyrgyz Republic	eca
Algeria	mena	Côte d'Ivoire	ssa	Lao PDR	eap
Angola	ssa	Croatia	eca	Latvia	eca
(Antigua & Barbuda)	lac	Czech Republic	eca	Lebanon	mena
Argentina	lac	(Djibouti)	ssa	Lesotho	ssa
Armenia	eca	(Dominica)	lac	Lithuania	eca
Azerbaijan	eca	Dominican Republic	lac	Macedonia, FYR	eca
Bahrain	mena	Ecuador	lac	Madagascar	ssa
Bangladesh	sa	Egypt	mena	Malawi	ssa
Barbados	lac	El Salvador	lac	Malaysia	eap
Belarus	eca	Estonia	eca	Mali	ssa
Belize	lac	Ethiopia	ssa	Mauritania	ssa
Benin	ssa	Fiji	eap	Mauritius	ssa
Bolivia	lac	Gabon	ssa	Mexico	lac
Bosnia and Herzegovina	eca	Gambia	ssa	Moldova	eca
Botswana	ssa	Georgia	eca	Mongolia	eap
Brazil	lac	Ghana	ssa	Morocco	mena
Bulgaria	eca	Guatemala	lac	Mozambique	ssa
Burkina Faso	ssa	Guinea	ssa	Namibia	ssa
Burundi	ssa	Guinea-Bissau	ssa	Nepal	sa
Cambodia	eap	Guyana	lac	Nicaragua	lac
Cameroon	ssa	Honduras	lac	Niger	ssa
Cape Verde	ssa	Hungary	eca	Nigeria	ssa
Central Afr. Republic	ssa	India	sa	Oman	mena
Chad	ssa	Indonesia	eap	Pakistan	sa
Chile	lac	Iran, Islamic Rep.	mena	Panama	lac
China	eap	Jamaica	lac	Papua New Guinea	eap
Colombia	lac	Jordan	mena	Paraguay	lac
Comoros	ssa	Kazakhstan	eca	Peru	lac
Congo, Dem. Rep.	ssa	Kenya	ssa	Philippines	eap
Congo, Rep.	ssa	Korea, Rep.	eap	Poland	eca

Romania	eca	(St. Kitts and Nevis)	lac	Turkmenistan	eca
Russian Federation	eca	(St. Lucia)	lac	Uganda	ssa
Rwanda	ssa	(St. Vincent and the Grenadines)	lac	Ukraine	eca
(Samoa)	eap			Uruguay	lac
(Sao Tome e Principe)	ssa	Suriname	lac	Uzbekistan	eca
Saudi Arabia	mena	Swaziland	ssa	(Vanuatu)	eap
Seychelles	ssa	Syrian Arab Republic	mena	Venezuela	lac
Sierra Leone	ssa	Tanzania	ssa	Vietnam	eap
Slovak Republic	eca	Togo	ssa	Yemen	mena
Somalia	ssa	Trinidad and Tobago	lac	Zambia	ssa
South Africa	ssa	Tunisia	mena	Zimbabwe	ssa
Sri Lanka	sa	Turkey	eca		

Note: Countries in brackets have data for CLCOUNT, but not for LFPR10-14. eca: Eastern Europe and Central Asia; eap: East Asia and the Pacific; lac: Latin America & the Caribbean; mena: Middle East and North Africa; sa: South Asia; ssa: Sub-Saharan Africa.