The child labour-GDP per capita relationship: is there something beyond it ?[1]

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The paper tests the theoretical predictions of a simplified intra-household bargaining model which, under reasonable assumptions, shows that child labour is significantly related to parental income, quality of education, international aid, trade liberalization, share of export of primary products and the competitiveness of the labour market. Cross-sectional and panel negative binomial estimates in a sample of emerging countries show that selected proxies of the above mentioned variables are significantly related to child labour.
The positive impact of the share of primary product export on child labour outlines the existence of a potential paradox. The paradox suggests that trade liberalisation has not always straightforward positive effects on social indicators and that its short run effects on income distribution and distribution of skills and market power across countries need to be carefully evaluated.

Keywords: child labour, cross-section panel estimates, primary product exports

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di

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1. Introduction

A typical issue in the debate on economic development is the relationship between GDP and social indicators with always more people questioning the relationship among GDP growth, quality of life and social development. Stylised facts not always known to the general public clearly show that GDP and social indicators exhibit quite different dynamics and cross-sectional distributions across countries.[2] This paper aims to provide a contribution to this debate by investigating whether and how GDP affects a social indicator such as child labour and what are the additional crucial factors affecting it.

In this direction we try to follow the advice of Basu (1999) who observes, in his survey on the child labour literature, that there are many empirical papers without any theory and many theoretical insights[3] in purely descriptive papers. He therefore encourages not just further theoretical research but also empirical work which is analytically better founded.

Our research project goes in this direction by testing predictions from a modified intra-household barganining model of child labour on a panel of emerging countries. Beyond the classical

[2] In the last decades we assisted to an increased divergence in GDP per capita and to a partial convergence in several social indicators. The 20 richest countries had in the year 2000 a GDP per capita 30 times higher than the 20 poorest countries (it was 15 times higher in 1960) (Dollar-Kraay,2000), whereas poor countries have partially converged in terms of child labour, infant mortality, and life expectancy at birth.

[3] The author proposes a classification of theoretical models on child labour identifying three main classes of models: i) intra-household bargaining models; ii) extra-household bargaining models; iii) models with altruism.

investigation of the relationship between child labour, parental income and quality of education, its marginal contribution with respect to previous empirical papers is its explicit focus on the controversial effects of globalisation and trade openness on child labour. The paper documents theoretically and empirically that low skilled workers may benefit from the increased labour demand generated by trade liberalisation only if the labour market is competitive and they have enough bargaining power to climb up the value chain. For this reason, permanence in the low added value part of the export market is highly likely to have negative effects on their income and on child labour and may therefore offset the benefits of liberalisation.

The paper is divided into four sections including introduction and conclusions. In the second section we resume the main testable hypotheses in the child labour literature by focusing in particular on the relationship of the dependent variable with parental income and education, labour market structure in tradable goods and the quality of children education. In the third section we describe our methodological approach discussing the choice of the dependent variable and the decision to limit the sample to LDC countries. In the fourth section we finally present static and dynamic empirical findings.

2. Testable hypotheses from child labour literature

According to ILO data in 1995 120 millions of children under 14 years worked in paid job.

Child labor has been a characteristic of almost all economic systems at some stage of their life. In this perspective, what occurred in Europe during the industrial revolution is somewhat similar to what is currently happening in LDCs.

In spite of these historical considerations the dynamic of child labour is far from being deterministic and has been regarded as

significantly related to several factors clearly identified in the economic literature.

2.1 GDP

A well defined negative relationship between per capita GDP and participation rates of children aged 10-14 seems to emerge when we inspect cross-sectional country evidence. To quote an example of two non-OECD countries, China passes from around 40 percent in 1970, to 15 percent in 1990 and 7 percent in 2000, while the same participation rate in Ethiopia declines from 48 percent in 1990 to only 38 percent in 2000. A cursory look at these data seems to suggest that a rise in per capita income is by far the strongest antidote against child labour.

Several theoretical explanations support and illustrate this intuition. Basu and Van (1998) observe that child labor is a result of poverty and occurs when the household is below a given subsistence level. A well known principle in the literature, the *luxury axiom*, postulates that children are sent out to work if household income does not overcome a given subsistence threshold (Basu, 1999). Baland and Robinson (1998) explain the child labour-GDP per capita relationship by combining incomplete markets, parental altruism and chronic poverty. Child labour exists because of the difficulty of enforcing inter-generational contracts, which makes it difficult to borrow against the future income of the child. Without direct reference to child labour in developing countries, Schultz (1961) and Becker (1993) also highlight the problem that markets for credit and insurance to human capital investments tend to fail. Lahiri and Jaffrey (1999), Ranjan (1999) and Grote, Basu and Weinhold (1998) present models in which child labour arises as the result of imperfect credit markets. Clearly, credit constraints are more likely to bind for the rural poor, not only because their average incomes are low but also because they often lack of collateral and their incomes are particularly volatile. Finding that poverty compels child work

is therefore consistent with households being chronically poor or else with their being transiently poor and credit-constrained.

While definitely beneficial in the medium run GDP growth may have negative effects on the reduction of child labour in the short run. Cigno and Rosati (2001) comment results from Vietnam and Morocco household survey observing that the relationship between child labour and per capita income is highly nonlinear (see also Fallon-Tzannatos, 1998). Swinnerton and Rogers (1999) explain this finding by showing that an improved distribution of income for a given level of per capita income may reduce child labour. Therefore, a growth with distributional costs may on the contrary generate a temporary slowdown of child labour reduction or even an increase as far as GDP rises.
Several other authors mention the existence of counterintuitive dynamics and of a potential perverse relationship between economic growth and child labour in the short run. On the empirical side Ray (2001) finds that the luxury axiom which is a crucial assumption for the beneficial effects of GDP growth on child labour is supported in Peru but not in Pakistan. Cigno-Rosati (2001) argue that without redistribution a country must achieve a very large increase in per capita income to have positive effects on child labour and that policies aimed at fostering growth may not have significant effects on child labour in the short run. Basu (1993) finds evidence of a perverse causation which may generate a positive GDP growth/higher child labour effect in the short run. In his model the increase of GDP obtained by raising female wages, generates higher female participation to the labour market so that mothers may decide to move child from school to work.

2.2 Parental education

The relationship between parental education and child labour was already evidenced by Marshall (1920).[4] More recent theoretical and empirical literature (Haddad-Hoddinot, 1994; Hoddinod-Haddad, 1995; Manser-Brown, 1980) stresses the role of mother educational and working status emphasising that female empowerment may benefit children (*the women's agency hypothesis*). Recent results from household surveys seem to support this hypothesis. In rural India mothers' education has a significant influence on the decision to send a child to school (Cigno-Rosati and Tzannatos, 2001). In Vietnam children with more educated parents are less likely to work full time (Rosati and Tzannatos, 2001). Furthermore, poor educational status of women may generate self-reinforcing mechanisms. Mothers with poor human capital and low wage may confirm the expectation that women's human capital has low returns (Cigno, 1991).
Other authors suggest that mother's education has a strong positive effect because mothers care more than fathers for children (Folbre, 1986; Eswaran, 2001). Alternative points of view cannot be excluded. Basu (1993) argues that if mothers have outside employment children are called to substitute them at home.

2.3 Trade liberalisation

Another variable which is traditionally expected to affect child labour is trade openness. What is usually argued is that, in the framework of standard neoclassical trade models, trade openness

[4] *"the less fully children's faculties are developed, the less will they realise the importance of the faculties of their children, and the less will be their power of doing so. And conversely any change that awards to the workers of one generation better earnings, together with better opportunities of developing their best qualities, will increase the material and moral advantages which they have the power to offer to their children"*

raises wages of low skilled workers in countries in which this factor is abundant. An easy prediction is therefore that trade liberalisation should increase household income in poor families thereby reducing the need for child labour when the luxury axiom holds.

In our paper we argue that this is not always the case since this approach is too optimistic and neglects the role of product and labour market structure in the lower part of the product value chain. In other terms we say that increased product demand induced by trade liberalisation benefits low skilled only in case they have sufficient market power. This may not be the case if they are sellers or subcontractors of raw materials and are employed under monopsonistic conditions.

Recent empirical evidence provides support in favor of this hypothesis. Skill wage differentials have continued to increase in some LDCs even after trade liberalisation (Deadorff, 2000; Feenstra-Hanson, 2001). Evidence recently provided by Deaton (1999) shows that terms of trade have been persistently flat in spite of repeated forecasts of improvement by development institutions. His interpretation is that they do depend not only on the combined effect of low demand elasticities and technological progress,[5] but also on the presence of an unlimited supply of unskilled labour.

Our hypothesis is that unskilled workers or raw material producers (above all in the agricultural sector) have, by definition, low bargaining power and therefore do not benefit of the increased demand unless they exit the "low skill trap." This hypothesis will be tested in the empirical section.

[5] If low demand elasticity is the only rationale it is difficult to explain why agricultural wages have risen in developed countries while not in the LDCs (Deaton, 1999).

2.3 Rural life

The share of population working in the agricultural sector may be positively associated with child labour not only because the variable is generally considered as an indicator of poor human capital but also for some characteristics of rural life.
Children belonging to farm households with more land are more likely to work, because their services are more valuable. Cigno, Rosati and Tzannatos (2000) and Rosenzweig-Everson (1977) find a positive relationship between farm size and child work. The higher the probability that a child will work, the higher the probability of an additional birth (Cigno, Rosati and Tzannatos, 2000).

2.3 Quality of education

Several authors have found that the decision to send children to primary school is positively affected by the quality of education and, specifically, by the presence of secondary schools (Lavy, 1996; Cigno, Rosati and Tzannatos, 2000). With higher school quality the same level of education is reached in less time (Cigno-Rosati, 2001). Evidence on the links between school quality and child labour is provided by Schultz (1997) and by Dreze and Kingdom (2000).

3. The model

To work out simple relationships between child labour and some of the above considered variables abstracting from any specification of the utility function, consider the following simple intra-household bargaining model which closely follows Basu (1999). In the model $e \hat{I} [0,1]$ is the work done by the child, (and $1-e$ is child leisure), a is the weight attached to parental utility, w_1 and w_2 are respectively parental and child wages, while x_1 and x_2 respectively represent the amount

consumed by both parents and by the child. Assume that wages reflect the value of the marginal product in proportion to the degree of competitiveness of the labour market $w_1 = pMP(h)/[1+1/h]$ where $h = ¥$ is the special case of perfect competition[6] and h is human capital affecting worker productivity. The maximand is

Max $au(x_1,x_2,e)+[1-a]u_2(x_1,x_2,e)$

s.t. $x_1+x_2=w_1(.)+w_2e$

by using the Lagrangean and maximising with respect to parent consumption and child consumption and to child labour we have the following four first order conditions.

(1) $a\,u_1'(x_1)+(1-a)u_2'(x_1)+\lambda=0$

(2) $a\,u_1'(x_2)+(1-a)u_2'(x_2)+\lambda=0$

(3) $au_1'(e)+(1-a)u_2'(e)-\lambda w_2=0$

(4) $x_1+x_2=w_1(.)+w_2e$

By replacing x_2 from(4) in (2), and by replacing λ from (3) in (1) and (2) we get

(1') $a\,u_1'(x_1)+(1-a)u_2'(x_1)+[au_1'(e)+(1-a)u_2'(e)]/w_2=0$
and
(2') $a\,u_1'(w_1(.)+w_2e-x_1)+(1-a)u_2'(w_1(.)+w_2e-x_1)+[au_1'(e)+(1-a)u_2'(e)]/w_2=0$

By equating and taking the total differential we have

[6] We analyse for simplicity the case in which parents are workers which can be or not in competitive labour markets. The same reasoning applies if they are subcontractees and the wage is replaced by the price of their products sold to an upstream producer with a given degree of market power.

$[-a(\partial^2 u_1 \backslash \partial x_1 \partial w_1) - (1-a)\ \partial^2 u_2 \backslash \partial x_1 \partial w_1\ ] d\ w_1 = [w_2\ [a\partial^2 u_1 \backslash \partial x_2 \partial e + (1-a)\ \partial^2 u_2 \backslash \partial\ x_2 \partial e] de$ (5)

Under the reasonable assumption that all cross derivatives have the same sign,[7] the negative sign of de/dw_1 confirms, as expected, that a higher parental wage reduces child labour. This prediction is consistent with the luxury axiom which suggests that parents send children to work only if household income is below a given threshold.

Consider now the potential effect of trade liberalisation by assuming that it generates delocalisation and an increased demand for products intensive in the factor which is relatively abundand in the country (i.e. the low skilled factor in emerging countries). The increased product demand generates a positive shock on the price p. The transmission of the shock to wages depends on the relative competitiveness of the labour market and therefore on h. The consequence is that countries in which the labour market is not competitive will have reduced gains from trade liberalisation.

To evaluate the impact of educational quality on child labour consider a simple two period extension of the model in which wages and consumption have two subscripts (the first indicating individuals and the second time). In the second period children become adult. The maximand becomes

$$\text{Max } a(w_{11}, w_{12,} w_{21,} w_{22})u_1\ (x_{11}, x_{12,} x_{21}, x_{22,} e) + [1-a(w_{11}, w_{12,} w_{21,} w_{22})]u_2(x_{11}, x_{12,} x_{21}, x_{22} e)$$

$$\text{Sub } x_{11} + x_{12} + x_{21} + x_{22} = w_{11} + w_{12} + w_{21} e + w_{22}(e, q_E)$$

By reasonably assuming that the second period child wage is increasing in the quantity and quality of education received in

[7] The concavity of $U_i(x_j)$ for any i (i=1,2) is a sufficient condition for having all cross derivatives in (5) with the same sign.

the first period, where the former is negatively related to child labour - $w_{22}'(e)<0$, $w_{22}'(q_E)>0$, $\partial^2 w_{22}/\partial e \partial q_E<0$ - we easily obtain that child labour is decreasing in the quality of education.

4.1 The methodological approach: the dependent variable

The empirical section tests predictions from the simple intra-household bargaining model described above on a panel of emerging countries using World Bank data combined with data on political and institutional development taken from various sources (i.e. *Economic Freedom of the World: 2000 Annual Report).*

Examples of empirical papers working on the World Bank database are Shelburne (2001) and Cigno-Rosati-Guarciello (2001). Shelburne (2001) cross-sectional estimate finds a negative relationship of child labour with country size, per capita GDP and country's openness. Cigno et al. (2001) also propose a static estimate and identify a significant negative impact of country trade openness on child labour.

In the light of what described above, our contribution aims to identify additional factors affecting child labour. In particular, we want to identify the limits of the trade openness rationale checking whether proxies of poor bargaining power in the value chain of agricultural products are a barrier to gains from trade liberalisation. Furthermore, we want to propose a dynamic estimate in which the significance of potential regressors identified by the literature may be tested.

The dependent variable adopted for the empirical analysis is the same as in the empirical papers mentioned above: participation rates of children aged 10-14 years. This variable measured by ILO has several limits since it does not consider participation of

children younger than 10, household child labour and children neither working nor studying.[8]

Moreover, the 10-14 participation rates assimilate the work and study status to the work only status. Theoretical and empirical findings have shown that the former is not so bad as the latter, since part time working may improve children nutritional status (Cigno, Rosati and Tzannatos, 2000) and finance their school attendance.

For these reasons primary school enrolment is an alternative variable generally used for measuring child labour. The problem with this variable, though, is that net enrollment ratios are hardly available. The solution of using gross enrollment ratios is highly questionable since the share of individuals older than 14 still attending primary school in these countries is quite high. This "noisy element" prevents us for instance from considering the difference between child labour rates and the difference between 1 and the primary school enrollment ratios as the share of children which both work and study. By using gross enrollment rates this difference becomes always negative and even when positive, it seriously underestimates the share of part time workers.

For these considerations we work on participation rates of children aged 10-14 years only.

We also choose to limit our empirical analysis to all those countries having nonzero child participation rates.[9] This is because the presence of wealthy countries which, at least officially, have successfully moved in the past to zero child labour rates would grossly overstate the impact of common characteristics of LDCs on our dependent variable. Furthermore, our focus is somewhat different and aims to individuate those

[8] A recent household survey in Morocco shows that the group of children doing nothing can be relatively large (20 percent or more of the population cohort), while the NCAER survey in rural India shows that female child labour is seriously underestimated by neglecting household labour (Cigno-Rosati, 2001).

[9] The list of countries is reported in an Appendix available from the authors upon request.

variables which positively affect the reduction of child labour within the group of countries which still present this phenomenon.
The World Bank database reports child labour rates for a reasonably large number of countries in 1980, 1990, 1995 and 1997 but many of the variables considered as regressors in the estimates which follow have been recorded only in 1980 and 1990. Our static analysis is therefore necessarily confined to the first two years, while in the panel we may also use information from 1995 and 1997.

4.2 Selection of variables and descriptive empirical findings

A first step in our research is the graphical identification of a child labour-GDP per capita relationship. From figures 1-3 in which this relationship is drawn, it seems that GDP per capita is a crucial determinant of child labour. The challenge is to discover if other factors are relevant.
Our a priori hypotheses from the literature and theoretical predictions from the simple sketch of the intra-household bargaining theoretical model are that at least other six factors (transfers, trade openness, parental education, quality of child education, rural life and labour market conditions) should matter. To verify this we consider the descriptive and econometric impact of the following proxies of these factors:

i) aid per capita (AIDCAPIT) as a proxy of transfers integrating household per capita income;
ii) proxies of the educational level of adult males and females (among which ILLETFEM: the illiteracy rate of adult females);
iii) the number of pupils per teacher in primary schools (PUPTEACH) as a measure of the quality of child education;

iv) the share of females working in the agricultural sector as a combined proxy of the lack of urbanisation and parental education (AGRFEM)

v) the share of agricultural raw material exports on total export (AGROWEX). In general, this last variable may be though as a proxy of the inverse of the capacity of a country of climbing the value chain in international traded goods. We therefore believe that this last variable individuates how much country exports depend from a sector in which the labour market is more likely to be noncompetitive and low skilled workers are likely to be a large part of manpower.

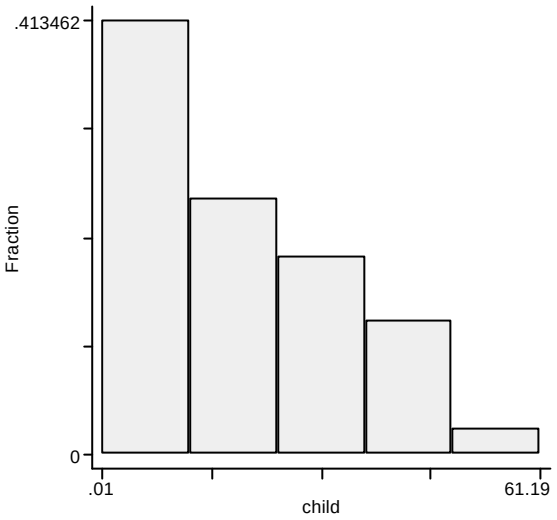
When we inspect the partial correlation matrices among the selected variables (Tables 1.a and 1.b) we find that child labour is positively and significantly related with the share of females working in the agricultural sector, the pupil-teacher ratio in primary school, the share of agricultural raw material exports on total exports, the share of illiterate females and the institutional indicator of trade liberalisation in 1980 and 1990. A similar (inverted) relationship holds between the considered regressors and male and female enrolment rates to primary school.

We also observe that the partial correlations between three of the explanatory variables mentioned above (AGRFEM, ILLETFEM, PUPTEACH) are quite high (above .5 percent) in all of the three periods, while they are much lower with the variable proxying the lack of competitiveness of the unskilled labour market (AGROWEX). The correlation of this variable with child labour is much higher in 1990 than in 1980.

By inspecting the distribution of these variables in the sample of countries exhibiting nonnegative child labour and the rest of the world we find evidence of stochastic dominance in almost all of them (Tables 2.a-2.c and 3.a-3.c). This means that parental education, quality of child education, rural life and labour market conditions have significantly different values in child labour countries than in the rest of the world at any observed level of the variables distribution.

4.3 The econometric model

By inspecting the histogram of our dependent variable (participation rates of children aged 10-14 years) we can clearly see that it is nonnormal and that it seems to follow a Poisson distribution.



This variable is nonnegative by definition and we can interpret it as an event (participation to the labour market for an individual aged 10-14 in a given country) that can be conceived as a realization of a point process governed by some specific rate of occurrence.
Another problem in our database is that the dependent variable is measured at irregular time intervals. In this case the Poisson model based on:

$$Pr[Y = y] = \frac{e^{-mt}(mt)^y}{y!}, \quad y = 0,1,2,....$$

cannot correctly consider the existence of different time intervals. A likely consequence of it is that the variance is higher than the mean, i.e. the estimate exhibits overdispersion.

The standard methodology to be applied in this case is the negative binomial regression model (Cameron and Trivedi, 1986 and 1998). Several interpretations may justify the assumption of a negative binomial distribution. The most relevant is that the data match a Poisson distribution but there is unobserved individual heterogeneity that follows a gamma distribution given that the true mean cannot be correctly observed. The gamma distribution is usually adopted in these cases since it represents the only exponential-form conjugate distribution of the Poisson distribution: hence the marginal likelihood is still tractable (Greenwood and Yule, 1920). The unobserved individual heterogeneity therefore determines overdispersion, that is, the standard model cannot capture the heterogeneity by only adopting the covariates in the conditional mean function (Kingman 1993).

Another motivation for the adoption of a negative binomial regression is that we are handling panel data in which the conditional independence assumption is known to fail. Panel estimates are generally designed to tackle heterogeneity by considering fixed or random effects (see Lancaster, 1990 for a good survey on the consequences of misspecified heterogeneity). But in our case the existing overdispersion suggests that it is advisable to use the negative binomial together the longitudinal design (Cameron and Trivedi, 1998).

On the above mentioned grounds the negative binomial can be viewed as a gamma mixture of a Poisson kernel (Greenwood and Yule, 1920). In a standard Poisson regression model the heterogeneity is correctly evaluated by the observable covariates, that is $(y_i|\mathbf{x}_i)$. In a mixture model we represent the heterogeneity as $u_{i,}$ that is the distribution becomes $(y_i|\mathbf{x}_i, u_i)$. In this way we

assume that the individuals differ randomly and the covariates cannot fully capture this individual heterogeneity. The marginal distribution of $(y_i|\mathbf{x}_i, u_i)$ can be derived from the average of y_i respect to u_i [10]. In this way we have to specify the correct functional link between y_i and $(\mathbf{x}_i, u_i)$. The standard functional form is the exponential mean with multiplicative error. This form can be modeled by $E(y_i|\mathbf{x}_i, u_i) = \exp(\mathbf{x}_i^T b)u_i$, in which the stochastic term u_i is assumed to be independent from the regressors. By this methodology we avoid to consider an additive form for the errors and we can assume a distribution for u_i from which the marginal distribution of y_i can be derived.

We can therefore write the conditional likelihood as:

$$f(y_i|u_i) = \frac{(u_i, m_i)^{y_i} \exp[-(u_i, m_i)^{y_i}]}{\Gamma(y_i + 1)}$$

where $m_i = exp(\mathbf{x}_i^T b + exposure_i)$ has the following the Gamma density:

$$g(u) = \frac{u^{(1-a)/a}_e - u_i/a}{\Gamma(1/a)}$$

with unit mean and variance equal to α. Since the gamma distribution measures heterogeneity, an α significantly different from zero implies that the assumption of mean-variance equality of the Poisson distribution is rejected and that there is overdispersion (Cameron and Trivedi, 1998).

The marginal likelihood for the *i*-th observation is therefore:

$f(y_i) = \int_0^\infty f(y_i|u)g(u)du$.

Based on this model we perform two different kinds of estimates.

[10] For more details on the negative binomial function see Cameron and Trivedi (1998)

The first is a cross-country regression in which the negative binomial regression is adopted to control for overdispersion in the different years.
In this case the significance of α may be interpreted by considering that the unobserved heterogeneity does not depend on the irregular time spacing but by cross-sectional individual country heterogeneity.
The second approach is an autoregressive negative binomial model in which we have both sources of (cross-sectional and determined by irregular time spacing) heterogeneity.

4.4 Results from static and dynamic econometric estimates

The base equation estimated is

$$Childlab = epx(a_0 + a_1 GDPcapit + a_2 AGROWEX + a_3 AGRFEM + \\ + a_4 AIDCAPIT + a_5 ILLETFEM + a_6 PUPTEAC + \sum_k b_k EFW_k + \\ + offset + e_1)$$

where the omitted variable e, which is source of the heterogeneity, follows a Gamma distribution with parameter a and *Offset* is the distance from the first year of the sample period measured in years.[11] *GDPcapit* is GDP per capita in purchasing power parities, EFW_k is the k[th] indicator of institutional freedom,[12] *AGROWEX* is the share of agricultural raw material

[11] The presence of this variable in negative binomial regressions filters the heterogeneity arising from irregular time spacing.
[12] The indicators are taken from the index of economic freedom published in the *Economic Freedom of the World: 2000 Annual Report* (EFW COMPOSITE) is a weighted average of the seven following composed indicators designed to identify the consistency of institutional arrangements and policies with economic freedom in seven major areas: EFW(I) Size of Government: Consumption, Transfers, and Subsidies [11.0%], i) General Government Consumption Expenditures as a Percent of Total Consumption (50%), ii) Transfers and Subsidies as a Percent of GDP (50%). EFW(II) Structure of the Economy and

exports on total export, *AGRFEM* is the share of females working in the agricultural sector, *AIDCAPIT* is aid per capita and is used as a proxy for transfers to poor domestic households; *ILLETFEM* is the illiteracy rate among adult females and *PUPTEACH* is the pupil/teacher ratio in primary schools as a measure of the quality of child education (Tables 4a and 4b).

Use of Markets *(Production and allocation via governmental* [14.2%] *and political mandates rather than private enterprises and markets*) i) Government Enterprises and Investment as a Share of the Economy (32.7%); ii) Price Controls: Extent to which Businesses Are Free to Set Their Own Prices (33.5%); iii) Top Marginal Tax Rate *(and income threshold at which it applies*) (25.0%); iv) The Use of Conscripts to Obtain Military Personnel (8.8%). EFW(III) Monetary Policy and Price Stability *(Protection of money as a store of value and medium of exchange*)[9.2%], i) Average Annual Growth Rate of the Money Supply during the Last Five Years (34.9%) minus the Growth Rate of Real GDP during the Last Ten Years; ii) Standard Deviation of the Annual Inflation Rate during the Last Five Years (32.6%); iii) Annual Inflation Rate during the Most Recent Year (32.5%). EFW(IV) Freedom to Use Alternative Currencies *(Freedom of access to alternative currencies*) [14.6%] i) Freedom of Citizens to Own Foreign Currency Bank Accounts Domestically and Abroad (50%); ii) Difference between the Official Exchange Rate and the Black Market Rate (50%). EFW(V): Legal Structure and Property Rights *(Security of property rights and viability of contracts*) [16.6%] i) Legal Security of Private Ownership Rights *(Risk of confiscation*) (34.5%); ii) Viability of Contracts *(Risk of contract repudiation by the government*) (33.9%); iii) Rule of Law: Legal Institutions Supportive of the Principles of Rule of Law (31.7%) and Access to a Nondiscriminatory Judiciary. EFW(VI) International Exchange: Freedom to Trade with Foreigners [17.1%] i) Taxes on International Trade, ia Revenue from Taxes on International Trade as a Percent of Exports plus Imports (23.3%), ib Mean Tariff Rate (24.6%), ic Standard Deviation of Tariff Rates (23.6%), ii) Non-tariff Regulatory Trade Barriers, iib Percent of International Trade Covered by Non-tariff Trade Restraints (19.4%), iic Actual Size of Trade Sector Compared to the Expected Size (9.1%). EFW(VII) Freedom of Exchange in Capital and Financial Markets [17.2%], i) Ownership of Banks: Percent of Deposits Held in Privately Owned Banks (27.1%); ii) Extension of Credit: Percent of Credit Extended to Private Sector (21.2%); iii) Interest Rate Controls and Regulations that Lead to Negative Interest Rates (24.7%); iv) Restrictions on the Freedom of Citizens to Engage in Capital Transactions with Foreigners (27.1%). *Any of the considered freedom indicators has a 0-10 value range. A higher value means a higher level in the item considered by the indicator .*

When passing to a dynamic regression model we start from the following base equation:

$$Childlab_t = \exp(a_0 + a_1 Childlab_{t-1} + a_2 GDPgrwt_t + a_3 GDPcapit_t + \\ + a_4 AGROWEX_t + a_5 AGRFEM_t + a_6 AIDCAPIT_t + a_7 ILLETFEM_t + \\ + a_8 PUPTEAC + \sum_k EFW_{kt} + offset + e_2)$$

where the difference with the previous equation in the set of regressors is given by the presence of the lagged dependent variable and the rate of GDP growth (Table 4c).

A first general point is that all estimation diagnostics confirm the existence of overdispersion with α significantly different from zero thereby rejecting the simple Poisson model and confirming the validity of the choice of the binomial regression model.

A second general result is that the existence of additional factors different from per capita GDP affecting child labour is confirmed. In all of the three tables (3 to 5) the base estimate including only per capita GDP is significantly improved by the introduction of additional regressors at the cost of reducing significantly sample size. In the 1980 estimate (Table 4a) R^2 the best estimate as an R^2 three times higher and an almost five times lower overdispersion.[13] In the 1990 estimate (Table 4a) the R^2 is three times higher and overdispersion three times lower. In the dynamic estimate (Table 4b) the R^2 is more than twice higher and overdispersion is more than three times lower.

In static estimates the variable with the strongest and more stable significant influence on child labour (after per capita GDP) results to be the share of females working in the agricultural sector (AGRFEM). If we consider this variable as a proxy of skills and wage capacity of women we find in it a support to theoretical predictions from the model presented in section 3. The estimates show something more, though, since the share of males working in agriculture and the share of illiterate women have not the same

[13] We cannot use all indicators of economic freedom as regressors in the static 1980 equation for lack of a sufficient number of observations

effects. A plausible interpretation is that the AGRFEM variable probably resumes more than one factor affecting child labour as described in the short survey of the literature presented in section 2.

Empirical findings from static binomial regression estimates also document the significance of the positive impact of the dependence of exports from agricultural raw materials and of the negative impact of trade openness on child labour (only in some estimates). These findings confirm that benefits of globalisation on social indicators may be mitigated if poor skills, trade or non trade barriers prevent emerging countries from climbing up the value chain of tradable goods.

Our findings has several parallels in the relationship between specialization in primary product exports and growth. Young (1991) argues that a trade-off exists between static and dynamic comparative advantages. This is because learning by doing in technologically intensive production is an important source of human capital development and growth and LDC countries specialized in exporting primary goods miss it. Bleaney and Greenaway (2001) find that high variance of primary product prices has negative effects on investment and growth for 14 Sub-Saharian countries between 1980 and 1995.

It significant to note that we try several other proxies of parental education but none of them is significant.[14] It therefore seems that the share of adult females working in the agricultural sector captures all the parental education effect or that this effect is not relevant per se and absorbed by the impact of the other regressors.

Regression diagnostics in panel results (Table 4b) reveal a degree of overdispersion significantly different from zero and larger than in the cross-sectional estimate confirming that the autoregressive model with irregular time spacing has an additional source of heterogeneity.

[14] Estimates are available from the authors upon request.

Empirical findings show that the significance of some variables (AGRFEM, AGROWEX, GDPCAPIT) is robust and confirmed in the dynamic estimate, while others loose significance (EFW3, EFW6).

5. Conclusions and policy suggestions

Theoretical models of endogenous growth and empirical findings of conditional convergence are an important contribution of economists to the current discussion on the capacity of economic systems to reduce existing inequalities. These findings often suggest that both extreme optimistic and pessimistic "deterministic" approaches to the problem are not correct and that less developed countries may catch up if they bridge their gap with industrialised countries in terms of those factors to which growth is conditioned (i.e. human capital, institutions, etc.). But what is the relationship between per capita GDP (an average indicator) and social variables (such as child labour among others) which are highly sensitive to the distributional implications of growth and to the capacity of the latter reduce some pathological effects of poverty ?

In this paper we discover that beyond the expected negative relationship between GDP growth and child labour the social indicator is affected by many other factors such as household income, parental education, quality of child education, international aid and country permanence in the lowest part of the agricultural goods value chain.

These findings suggest that ethical consuming and, in particular, private "minimum wage" transfers from consumers of final products in the North to agricultural raw producers in the South – being workers or subcontractors in noncompetitive markets - through consumption may be a successful policy measure to reduce child labour.

The advantage of this solution is that, while government redistribution policies are costly and not too effective - increases

of 10-20 percent of household income through redistribution transfers have been shown to modify not much child labour (Cigno-Rosati, 2000) -, these transfers are directly targeted to the poor rural households, entirely privately financed and correspond to three-fourfold increases of workers' market wages.[15]

The difference with respect to domestic government minimum wage transfers in terms of marginal cost of the donour is therefore enormous since fair trade allows consumers in the North to buy products almost at market prices and exploits large differences in purchasing power. When the fair trade transfer to low skilled workers in the South is oriented to education it may have powerful direct and indirect effects on child labour by accompanying a large increase in poor household income with a subsidy for education.

[15] According to Cigno and Rosati (2001) universal income subsidies are an expensive way of subsidising parents, while income subsidies targeted at poorer families are more cost-effective.

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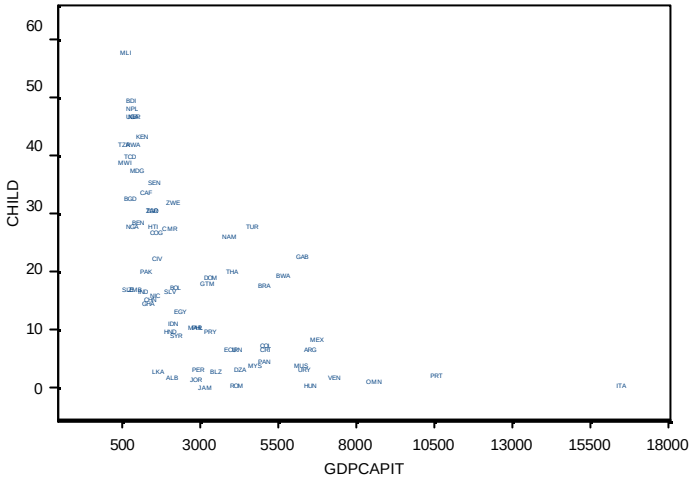

Figure 1. The relationship between per capita GDP and child labour in 1980

Figure 2. The relationship between per capita GDP and child labour in 1990

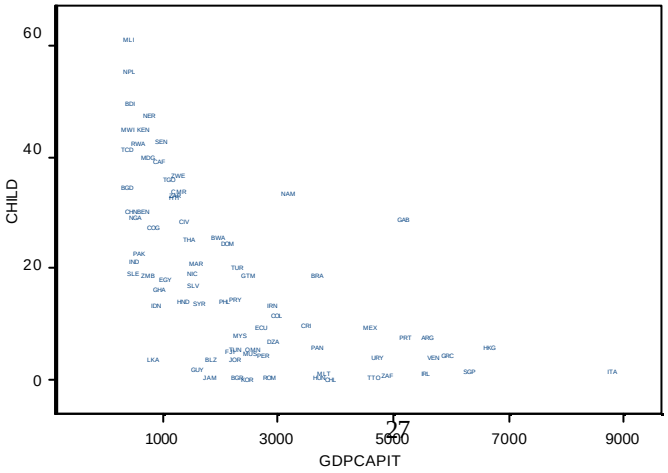

Figure 3. The relationship between per capita GDP and child labour in 1997

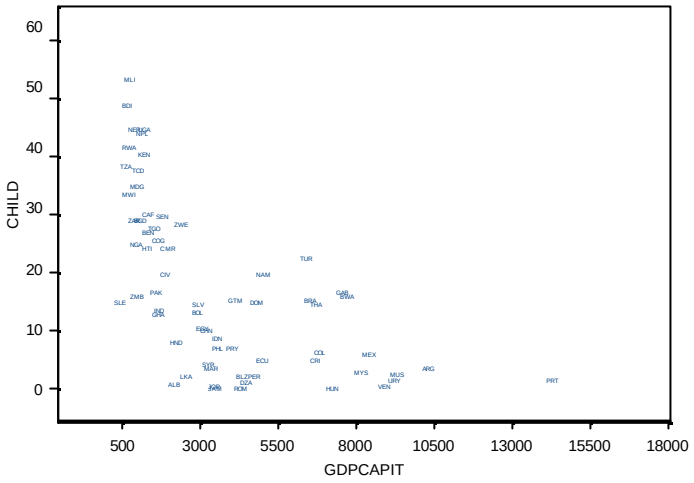

Table 1a Correlation matrix of variables used in empirical estimates (1980)

	malenr	femenr	agrfem	pupteac	agrowex	illetfem	child	aidcapit	gdpcapit	efw1	efw2	efw3	efw4	efw5	efw6	efw7
malenr	1															
femenr	0.883	1														
agrfem	-0.309	-0.578	1													
pupteac	-0.298	-0.477	0.571	1												
agrowex	-0.375	-0.272	0.118	-0.307	1											
illetfem	-0.554	-0.840	0.812	0.543	0.147	1										
child	-0.382	-0.524	0.761	0.549	0.089	0.633	1									
aidcapit	-0.009	-0.129	0.284	0.274	-0.344	0.246	0.041	1								
gdpcapit	0.343	0.560	-0.818	-0.575	-0.102	-0.746	-0.626	-0.389	1							
efw1	-0.335	-0.381	0.064	0.069	0.295	0.311	0.254	-0.625	-0.083	1						
efw2	-0.049	0.225	-0.614	-0.331	0.295	-0.463	-0.213	-0.310	0.384	0.126	1					
efw3	-0.155	-0.221	0.183	0.483	-0.072	0.250	0.209	0.296	-0.309	-0.106	0.082	1				
efw4	0.259	0.400	-0.513	-0.524	0.348	-0.450	-0.406	-0.505	0.515	0.074	0.607	0.076	1			
efw5	0.402	0.500	-0.206	-0.204	-0.029	-0.451	-0.289	-0.298	0.506	-0.431	-0.046	-0.116	0.296	1		
efw6	0.274	0.419	-0.228	-0.111	-0.136	-0.451	-0.332	0.364	0.188	-0.691	0.063	0.306	0.277	0.333	1	
efw7	0.018	0.232	-0.567	-0.339	0.209	-0.486	-0.242	-0.220	0.611	-0.079	0.691	0.301	0.624	0.274	0.295	1

Variable legend: MALENR: gross primary school enrolment ratio – males; FEMENR: gross primary school enrolment ratio – females; CHILD: participation rate of the population aged 10-14; ILLETFEM: illiteracy rate of adult females; PUPTEAC: number of pupils per teacher in primary schools; AGRFEM share of females working in the agricultural sector education; AGROWEX: the share of agricultural raw material exports on total export; GDPCAPIT: per capita GDP. EFW(I) Size of Government: Consumption, Transfers, and Subsidies [11.0%], i) General Government Consumption Expenditures as a Percent of Total Consumption (50%), ii) Transfers and Subsidies as a Percent of GDP (50%). EFW(II) Structure of the Economy and Use of Markets *(Production and allocation via governmental* [14.2%] *and political mandates rather than private enterprises and markets*) i) Government Enterprises and Investment as a Share of the Economy (32.7%); ii) Price Controls: Extent to which Businesses Are Free to Set Their Own Prices (33.5%); iii) Top Marginal Tax Rate *(and income threshold at which it applies*) (25.0%); iv) The Use of Conscripts to Obtain Military Personnel (8.8%). EFW(III) Monetary Policy and Price Stability *(Protection of money as a store of value and medium of exchange*)[9.2%], i) Average Annual Growth Rate of the Money Supply during the Last Five Years (34.9%) minus the Growth Rate of Real GDP during the Last Ten Years; ii) Standard Deviation of the Annual Inflation Rate during the Last Five Years (32.6%); iii) Annual Inflation Rate during the Most Recent Year (32.5%). EFW(IV) Freedom to Use Alternative Currencies *(Freedom of access to alternative currencies*) [14.6%] i) Freedom of Citizens to Own Foreign Currency Bank Accounts Domestically and Abroad (50%); ii) Difference between the Official Exchange Rate and the Black Market Rate (50%). EFW(V): Legal Structure and roperty Rights *(Security of property rights and viability of contracts*) [16.6%] i) Legal Security of Private Ownership Rights *(Risk of confiscation*) (34.5%); ii) Viability of Contracts *(Risk of contract repudiation by the government*) (33.9%); iii) Rule of Law: Legal Institutions Supportive of the Principles of Rule of Law (31.7%) and Access to a

Nondiscriminatory Judiciary. EFW(VI) International Exchange: Freedom to Trade with Foreigners [17.1%] i) Taxes on International Trade, ia Revenue from Taxes on International Trade as a Percent of Exports plus Imports (23.3%), ib Mean Tariff Rate (24.6%), ic Standard Deviation of Tariff Rates (23.6%), ii) Non-tariff Regulatory Trade Barriers, iib Percent of International Trade Covered by Non-tariff Trade Restraints (19.4%), iic Actual Size of Trade Sector Compared to the Expected Size (9.1%). EFW(VII) Freedom of Exchange in Capital and Financial Markets [17.2%], i) Ownership of Banks: Percent of Deposits Held in Privately Owned Banks (27.1%); ii) Extension of Credit: Percent of Credit Extended to Private Sector (21.2%); iii) Interest Rate Controls and Regulations that Lead to Negative Interest Rates (24.7%); iv) Restrictions on the Freedom of Citizens to Engage in Capital Transactions with Foreigners (27.1%).

Table 1b Correlation matrix of variables used in empirical estimates (1990)

	child	malenr	femenr	agrfem	pupteac	agrowex	illetfem	aidcapit	gdpcapit	efw1	efw2	efw3	efw4	efw5	efw6	efw7
child	1.000															
malenr	-0.436	1.000														
femenr	-0.566	0.897	1.000													
agrfem	0.792	-0.193	-0.408	1.000												
pupteac	0.623	-0.130	-0.385	0.518	1.000											
agrowex	0.444	-0.293	-0.361	0.089	0.206	1.000										
illetfem	0.566	-0.466	-0.744	0.628	0.561	0.186	1.000									
aidcapit	0.245	-0.205	-0.278	0.069	0.520	0.042	0.347	1.000								
gdpcapit	-0.716	0.211	0.366	-0.717	-0.516	-0.293	-0.499	-0.358	1.000							
efw1	0.347	-0.137	-0.167	0.243	0.186	0.251	0.079	0.023	-0.337	1.000						
efw2	-0.279	-0.005	0.188	-0.462	-0.273	-0.033	-0.372	0.051	0.406	0.268	1.000					
efw3	0.287	-0.152	-0.331	0.468	0.245	0.085	0.404	0.111	-0.376	0.032	-0.152	1.000				
efw4	-0.160	0.036	0.133	-0.393	-0.134	0.087	-0.242	-0.138	0.431	0.234	0.668	-0.389	1.000			
efw5	-0.492	0.450	0.548	-0.474	-0.264	-0.159	-0.635	-0.387	0.621	-0.184	0.255	-0.073	0.327	1.000		
efw6	-0.413	0.075	0.149	-0.530	-0.123	0.125	-0.313	-0.063	0.337	-0.139	0.269	-0.133	0.521	0.394	1.000	
efw7	-0.038	-0.039	-0.008	-0.288	0.062	0.167	-0.137	0.284	0.283	0.285	0.751	-0.019	0.673	0.280	0.336	1.000

Variable legend: see Table 1a

Table 2a Percentiles of nondiscrete variables used in empirical estimates (1980) – child labour countries

Percentiles	Child	Agrfem	Pupteac	Agrowex	Illetfem	Gdpcapit	Malenr	Femenr
10	0.58	7.94	20.39	0.25	7.20	490.00	60.80	42.04
20	3.88	15.76	24.23	1.01	15.32	770.00	81.66	50.84
30	5.61	25.09	27.56	2.12	20.32	1060.00	92.38	73.64
40	9.59	38.02	30.77	2.46	26.72	1480.00	97.96	88.60
50	16.66	57.55	33.80	3.26	40.35	1980.00	101.10	95.35
60	20.77	72.92	36.86	5.82	51.70	2310.00	105.36	99.94
70	28.28	81.01	38.87	9.21	67.25	2870.00	108.46	103.09
80	34.61	87.98	44.66	15.67	75.18	3710.00	115.06	106.10
90	42.91	92.61	53.15	27.76	86.91	5200.00	120.28	111.89
100	61.19	98.00	64.58	80.69	97.30	8790.00	148.10	134.50

Variable legend: see Table 1a

Table 2b Percentiles of nondiscrete variables used in empirical estimates (1980) – no child labour countries

Percentiles	Child	Agrfem	Pupteac	Agrowex	Illetfem	Gdpcapit	Malenr	Femenr
10	0	0.20	13.79	0.05	1.44	5210.00	66.07	50.66
20	0	1.68	14.42	0.94	2.54	6834.00	89.84	84.82
30	0	2.97	14.91	1.23	5.68	8458.00	95.81	94.10
40	0	4.98	18.30	1.62	6.34	8900.00	98.34	95.64
50	0	7.30	18.80	2.49	7.60	9250.00	99.45	98.05
60	0	10.24	22.43	3.37	10.78	9534.00	1.40	99.26
70	0	12.65	24.19	5.22	32.04	10116.00	104.51	101.09
80	0	13.42	26.28	9.63	40.58	10568.00	109.00	104.00
90	0	24.17	35.03	15.08	40.87	12773.00	113.60	111.04
100	0	31.90	45.18	26.39	40.90	24610.00	131.30	129.00

Table 2c Percent difference between child labour and non child labour countries (on child labour country basis value) - 1980

Percentiles	Child	Agrfem	Pupteac	Agrowex	Illetfem	Gdpcapit	Malenr	Femenr
10		-97.48	-32.37	-80.00	-80.00	963.27	-5.27	-48.91
20		-89.34	-40.49	-6.93	-83.42	787.53	-8.18	-33.98
30		-88.16	-45.90	-41.98	-72.05	697.92	-91.95	-20.46
40		-86.90	-40.53	-34.15	-76.27	501.35	-0.38	-7.04
50		-87.32	-44.38	-23.62	-81.16	367.17	-95.23	-94.07
60		-85.96	-39.15	-42.10	-79.15	312.73	-96.00	0.68
70		-84.38	-37.77	-43.32	-52.36	252.47	-99.98	-96.79
80		-84.75	-41.16	-38.54	-46.02	184.85	-104.20	-99.58
90		-73.90	-34.09	-45.68	-52.97	145.63	-108.58	0.85
100		-67.45	-30.04	-67.29	-57.97	179.98	-125.13	-123.38

Variable legend: see Table 1a

Table 3a Percentiles of nondiscrete variables used in empirical estimates (1990)

Percentiles	Child	Agrfem	Pupteac	Agrowex	Illetfem	Gdpcapit	Malenr	Femenr
10	1.9	7.18	7.18	20.83	7.28	70.31	41.63	41.63
20	3.98	14.06	14.06	22.26	13.32	78.02	60.28	60.28
30	7.9	24.46	24.46	24.70	20.32	81.16	68.55	68.55
40	13.21	46.86	46.86	27.60	28.04	92.32	82.8	82.8
50	17.22	59.35	59.35	30.38	34	100.05	92.45	92.45
60	21.53	71.4	71.4	31.80	46.76	103.1	96.84	96.84
70	27.71	80.64	80.64	36.71	61.04	108.37	102.7	102.7
80	33.77	86.42	86.42	41.75	70.26	112.8	105.8	105.8
90	42.07	91.07	91.07	61.83	80.46	122.68	114.72	114.72
100	57.92	98	98	77.03	94.9	140.9	135.4	135.4

Table 3b Percentiles of nondiscrete variables used in empirical estimates (1990)

Percentiles	Child	Agrfem	Pupteac	Agrowex	Illetfem	Gdpcapit	Malenr	Femenr
10	0	0.91	15.362	0.124	0.74	4384		
20	0	1.64	17.555	0.542	2.98	5668		
30	0	3.03	18.355	1.057	4.26	7208		
40	0	4.02	20.223	1.406	5.6	9604		
50	0	5.35	20.730	1.970	6.7	12340		
60	0	8.14	22.461	2.556	9.4	15810		
70	0	9.76	25.923	3.880	14.64	16796		
80	0	13.28	27.070	4.419	19.16	17842		
90	0	22.04	31.902	9.210	27.92	19484		
100	0	42	35.589	18.480	53.6	22660		

Table 3c Percent difference between child labour and non child labour countries (on child labour country basis value) - 1990

Percentiles	Child	Agrfem	Pupteac	Agrowex	Illetfem	Gdpcapit	Malenr	Femenr
10	0	-87.33	113.96	-99.40	-89.84	6135.24		
20	0	-88.34	24.86	-97.57	-77.63	7164.80		
30	0	-87.61	-24.96	-95.72	-79.04	8781.22		
40	0	-91.42	-56.84	-94.91	-80.03	10302.95		
50	0	-90.99	-65.07	-93.52	-80.29	12233.83		
60	0	-88.60	-68.54	-91.96	-79.90	15234.63		
70	0	-87.90	-67.85	-89.43	-76.02	15398.75		
80	0	-84.63	-68.68	-89.42	-72.73	15717.38		
90	0	-75.80	-64.97	-85.10	-65.30	15781.97		
100	0	-57.14	-63.68	-76.01	-43.52	15982.33		

Variable legend: see Table 1a

Table 4a The determinants of child labour (1980 and 1990) – Dependent variable, participation rates of children aged 10-14 years.

1980	Base equation			*1990*	Base equation			
Gdpcapit	-0.0004	-0.0002	-0.0003	*Gdpcapit*	-0.0003	-0.0002	-0.0002	-0.0002
	-7.25	-1.83	-3.25		-7.58	-2.82	-2.94	-3.08
Agrfem		0.011	0.011	Agrfem		0.014	0.014	0.015
		3.05	4.17			2.47	2.58	3.13
Pupteac		0.014		Pupteac		0.013	0.014	0.015
		1.75				1.23	1.56	1.63
Agrowex		0.008	0.007	Agrowex		0.013	0.014	0.012
		2.04	1.74			1.81	2.03	1.69
Illetfem		0.001		Illetfem		0.002		-0.0003
		0.3				0.25		-0.06
Efw1				Efw1		0.138	0.128	
						1.17	1.2	
Efw2				Efw2		0.039	0.039	
						0.51	0.57	
Efw3		-0.020	-0.009	Efw3		-0.137	-0.131	-0.128
		-0.55	-0.3			-2.93	-3.13	-3.43
efw4				Efw4		0.022	0.025	
						0.38	0.47	
efw5				Efw5		0.089	0.078	
						0.98	1.05	
efw6		-0.059	-0.070	Efw6		-0.223	-0.223	-0.082
		-1.67	-2.04			-2.00	-2.12	-1.05
efw7				Efw7		0.010	0.008	
						0.13	0.11	
Aidcapit		-0.002	-0.002	Aidcapit				-0.004
		-2.03	-2.42					-1.81
Constant	3.589	2.315	3.123	Constant	3.643	2.287	2.414	3.431
	25.12	4.53	8.59		26.62	2.04	2.32	4.96
α	.58	.07	.12	α	.43	0.13	.11	.14
χ^2 α=0	316.87 (0.00)	29.12 (0.00)	43.26 (0.00)	χ^2 α=0	227.01 (0.00)	16.43 (0.00)	11.70 (0.00)	18.76 (0.00)
LR (χ^2 (11))	36.18	62.95	64.81	LR (χ^2 (n-k))	42.28	50.84	53.97	43.15
R^2	.05	.16	.14	R^2	.07	.20	.21	.17
Countries	79	47	56	Countries	70	33	34	32

Variable legend: see Table 1a

Table 4b The determinants of child labour (negative binomial regression panel estimates). Dependent variable, participation rates of children aged 10-14 years.

	Base equation				
Childlab (-1)		0.002	0.002	0.003	0.003
		0.29	0.33	0.68	0.56
Gdpcapit	-0.0003	-0.0002	-0.0002	-0.0003	-0.0002
	-12.9	-5	-4.77	-8.64	-2.25
Pupteac					0.016
					2.12
GDPgrwthca		-0.061	-0.060		-0.092
		-1.72	-1.61		-2.15
GDPgrwth			0.026	0.027	-0.001
			1.3	1.37	-0.03
Illetfem		0.010			
		2.36			
Agrfem					0.015
					3.69
Agrowex		0.016	0.018	0.017	0.012
		1.81	1.88	1.92	2.01
Expgdp					
Efw1			0.0002		
			0		
Efw2			0.037		
			0.58		
Efw3		-0.058	-0.024	-0.050	-0.104
		-1.95	-0.74	-1.8	-3.13
Efw4			0.022		
			0.55		
Efw5			-0.159		
			-2.74		
efw6		-0.064	-0.078	-0.060	-0.056
		-1.21	-1.28	-1.23	-0.77
efw7			-0.022		
			-0.34		
Aidcapit		-0.004	-0.004	-0.005	-0.004
		-1.69	-1.69	-2.31	-2.06
Constant	0.995	1.265	1.999	1.656	0.642
	11.74	2.75	2.22	4.47	1.07
α	0.53	0.42	0.44	0.49	0.08
χ^2 α=0	832.08 (0.00)	259.4 (0.00)	253.44 (0.00)	356.81 (0.00)	7.7 (0.003)
LR (χ^2 (n-k))	120.54	82.02	79.27	83.22	53.52
R2	0.07	0.10	0.10	0.10	0.21
Countries	206	104	104	121	33

Variable legend: see Table 1a

Appendix (not to be published). The sample

1980	1990	1995	1997
Albania	Albania	Albania	Albania
Algeria	Algeria	Algeria	Algeria
Argentina	Argentina	Argentina	Argentina
Bangladesh	Bangladesh	Bangladesh	Bangladesh
Belize	Belize	Belize	Belize
Benin	Benin	Benin	Benin
Bolivia	Bolivia	Bolivia	Bolivia
Botswana	Botswana	Botswana	Botswana
Brazil	Brazil	Brazil	Brazil
Bulgaria			
Burundi	Burundi	Burundi	Burundi
Cameroon	Cameroon	Cameroon	Cameroon
Central African Republic	Central African Republic	Central African Republic	Central African Republic
Chad	Chad	Chad	Chad
Chile			
China	China	China	China
Colombia	Colombia	Colombia	Colombia
Congo, Dem. Rep.	Congo, Dem. Rep.	Congo, Dem. Rep.	Congo, Dem. Rep.
Congo, Rep.	Congo, Rep.	Congo, Rep.	Congo, Rep.
Costa Rica	Costa Rica	Costa Rica	Costa Rica
Cote d'Ivoire	Cote d'Ivoire	Cote d'Ivoire	Cote d'Ivoire
Croatia			
Cyprus			
Dominican Republic	Dominican Republic	Dominican Republic	Dominican Republic
Ecuador	Ecuador	Ecuador	Ecuador
Egypt, Arab Rep.	Egypt, Arab Rep.	Egypt, Arab Rep.	Egypt, Arab Rep.
El Salvador	El Salvador	El Salvador	El Salvador
Fiji			
Gabon	Gabon	Gabon	Gabon
Ghana	Ghana	Ghana	Ghana
Greece			
Guatemala	Guatemala	Guatemala	Guatemala
Guinea-Bissau	Guinea-Bissau	Guinea-Bissau	Guinea-Bissau
Guyana			
Haiti	Haiti	Haiti	Haiti
Honduras	Honduras	Honduras	Honduras
Hong Kong, China			
Hungary	Hungary	Hungary	Hungary
India	India	India	India
Indonesia	Indonesia	Indonesia	Indonesia
Iran, Islamic Rep.	Iran, Islamic Rep.	Iran, Islamic Rep.	Iran, Islamic Rep.
Ireland			
Italy	Italy	Italy	Italy

Jamaica Jordan	Jamaica Jordan	Jamaica Jordan	Jamaica Jordan
Kenya	Kenya	Kenya	Kenya
Korea, Rep.			
Madagascar	Madagascar	Madagascar	Madagascar
Malawi	Malawi	Malawi	Malawi
Malaysia	Malaysia	Malaysia	Malaysia
Mali	Mali	Mali	Mali
Malta			
Mauritius	Mauritius	Mauritius	Mauritius
Mexico	Mexico	Mexico	Mexico
Morocco	Morocco	Morocco	Morocco
Myanmar	Myanmar	Myanmar	Myanmar
Namibia	Namibia	Namibia	Namibia
Nepal	Nepal	Nepal	Nepal
Nicaragua	Nicaragua	Nicaragua	Nicaragua
Niger	Niger	Niger	Niger
Nigeria	Nigeria	Nigeria	Nigeria
Oman	Oman	Oman	Oman
Pakistan	Pakistan	Pakistan	Pakistan
Panama	Panama	Panama	Panama
Papua New Guinea	Papua New Guinea	Papua New Guinea	Papua New Guinea
Paraguay	Paraguay	Paraguay	Paraguay
Peru	Peru	Peru	Peru
Philippines	Philippines	Philippines	Philippines
Portugal	Portugal	Portugal	Portugal
Romania	Romania	Romania	Romania
Rwanda	Rwanda	Rwanda	Rwanda
Senegal	Senegal	Senegal	Senegal
Sierra Leone	Sierra Leone	Sierra Leone	Sierra Leone
Singapore			
Slovenia			
Somalia	Somalia	Somalia	Somalia
South Africa	Sri Lanka	Sri Lanka	Sri Lanka
Sri Lanka			
Syrian Arab Republic	Syrian Arab Republic	Syrian Arab Republic	Syrian Arab Republic
Tanzania	Tanzania	Tanzania	Tanzania
Thailand	Thailand	Thailand	Thailand
Togo	Togo	Togo	Togo
Trinidad and Tobago			
Tunisia			
Turkey	Turkey	Turkey	Turkey
Uganda	Uganda	Uganda	Uganda
Uruguay	Uruguay	Uruguay	Uruguay
Venezuela	Venezuela	Venezuela	Venezuela
Zambia	Zambia	Zambia	Zambia
Zimbabwe	Zimbabwe	Zimbabwe	Zimbabwe