Developing Country Studies
ISSN 2224-607X (Paper) ISSN 2225-0565 (Online)
Vol.3, No.7, 2013

A Macro Economic Analysis of Child Labour in Sub-Saharan Countries

Mustafa Seref Akin

Department of Economics, Fatih University, Istanbul, Turkey

e-mail: msakin@fatih.edu.tr

Abstract

The aims of the research are to assess child labor at the macro level-focusing on education- and to formulize national policies to address this problem in sub-Saharan Africa. We will investigate if some policies such as compulsory education, export banned, credit market, reduction of poverty and increase welfare programs, mechanization of land, population growth and foreign aid are effective to reduce child labor.
Key Words: Child Labor, Macro Economy, Sub Saharan Africa

1. Introduction

Much theoretical and empirical research has been conducted at the micro level to deal with child labor (Maitra and Raj 2002, Jafarey and Lahiri 2002). On the other hand, not much macro analysis of child labor has been conducted (Cigno et al. 2002). The aims of the research are to assess child labor at the macro level-focusing on education- and to formulize national policies to address this problem. This paper focuses on sub-Saharan Africa1, which has the highest incidence of child labor. Participation rates in labor markets for children aged 10-14 years is 26 % in Africa, 13 % in Asia, 10 % in Latin America and only .06 % in Europe in 1995 (Ray, 2000). 41% of children between 5 to 14 years of age are working in sub-Saharan Africa (Andvig, 2001).

In this paper, the main research question is why child labor exists? We will investigate if policies are suitable to reduce child labor: 1) compulsory education 2) export banned 3) credit market 4) reduction of poverty and increase welfare programs 5) mechanization of land 6) population growth 7) foreign aid.

Child labor has been extensively researched at the micro level (Maitra and Ray 2002, Jafarey and Lahiri 2002). On the other hand, not much macro analysis of child labor has been conducted (Cigno et al. 2002). Cigno et al. (2002) searched for the potential link between international trade and child labor. They concluded that at a macro level, globalization does not increase child labor. The aims of this research are to assess the impact of education on child labor at the macro level and to suggest national policies to address this problem.

Some have advocated restricting child labor due to two reasons: health conditions and foregone earnings. Many children are working under hazardous and unhygienic conditions during long time (Majumdar (2001), Basu, (1999)). Children have physical and psychological weaknesses when they start working too early (Lopez-Calva, 2001). Some argue that child labor is a welfare loss for developing countries since children who are working at an early age may not attend schools. Children miss opportunities to acquire human capital for their potential earnings. In their theoretical model and in their empirical research on Brazilian child labor, Emerson and Seuza (2002) state that children who did not work, receive higher salaries later, therefore, the potential human capital earnings through working as children are prevailed over by the human capital earnings receiving through education. Moreover, they found that children who are working end up with lower gains. Consequently, according to them, the most appropriate policy is to assist families rather than children. According Emerson and Seuza (2002) policies should focus on breaking the vicious cycle: involve a one-time transfer of a critical level of resources to a family rather than general support of children's education. So, compulsory education is a limited option to solve the problems. Since, there is a significant relationship between a parent's labor incidence and years of schooling and those of their children (Emerson and Seuza, 2002). Thus, child labor as an adult earns less than an individual who was not a child labor and child labor more likely sends his own children to work.

Lopez-Calva (2001) has a similar argument since according to her, Progresa in Mexico and Bolsa Scola in Brazil are the examples for which compulsory education is not sufficient reducing of child labor can be attained by financially compensation the
families for the economic cost of sending their children to work. Moreover, Buchmann (2000) argues that child labor is not a reason for forgoing school. Majumdar (2001) also states that school attendance is not the exact inverse of child labor, since children either combine these two activities and do none and remain idle.

Contrarily, Fentiman and Hall (1999) indicate that child labor is a major reason for low enrollment and dropouts in developing countries. Agricultural occupations (farming, fishing and cattle rearing) are labor intensive and households depend on child labor to support farms. However, Buchmann (2000) argues that child labor consists of only a small portion of school absences. Her analysis in Kenya indicates that less than 2% of absences are due to child labor. The main reasons for absences from school are sickness or failure to pay school expenses. Maitra and Ray (2002) state that schooling decreases with age, number of children, and poverty, and schooling increases with urbanization, female education, and infrastructure (road, electricity, and water). Fentiman and Hall (1999) suggest that school schedules can fit children's labor-intensive periods (such as the planting or harvesting seasons). Buchmann (2000) advises to educate children according to needs of labor markets, to avoid gender discrimination in employment, and to decrease the excessive costs of schooling for poor families rather than to convince parents to favor education and abolish child labor.

Andvig (2001) points out that family controls play key roles for child labor in sub-Saharan Africa. For instance, 95 % of child labor in Africa takes place in relatives' houses or businesses. Families retain strict control over children even though they may work outside or even live outside of the family home (Andvig, 2001).

Psacharapoulos (1997) has advocated restricting child labor due to two reasons: health conditions and foregone earnings. Many children are working under hazardous and unhygienic conditions for extended periods of time (Majumdar (2001), Basu, (1999)). Children exhibit physical and psychological weaknesses when they start working at early ages. (Lopez-Calva, 2001). Child labor is a welfare loss for developing countries since children who are working at an early age usually cannot attend schools (Psacharapoulos, 1997). In this paper, I do not examine the welfare implications of child labor but focus on how education enrollment is associated with child labor.

This paper is organized as follows. Section 2 will discuss education and poverty arguments. Section 3 will deal with methodology and variables. Section 4 presents empirical results and a conclusion will follow in section 5.

2. Theoretical Background

2.1. Poverty Arguments

Children miss opportunities to acquire human capital for their potential earnings. In their theoretical model and in their empirical research on Brazilian child labor, Emerson and Seuza (2002) state that people who did not work as children receive higher salaries later in life; therefore, the potential human capital earnings from child labor are dwarfed by the potential human capital earnings received through education. Moreover, they found that children who are working end up with lower gains. Consequently, according to them, the most appropriate policy is to assist families rather than children. According to Emerson and Seuza (2002) policies should focus on breaking the vicious cycle: involve a one-time transfer of a critical level of resources to a family rather than general support of children's education. Therefore we see that compulsory education alone has limited capability to reduce child labor. There is a significant relationship between a parent's labor incidence and years of schooling and those of their children (Emerson and Seuza, 2002). A child laborer will be more likely to send his own children to work.

Lopez-Calva (2001) has a similar argument. According to her, Progresa in Mexico and Bolsa Scola in Brazil are examples showing that compulsory education alone is not sufficient to reduce the incidence of child labor. For such reductions to take place, families must be financially compensated for the income lost when they send their children to school. Moreover, Buchmann (2000) argues that child labor is not a reason for foregoing school.

Contrarily, Fentiman and Hall (1999) indicate that child labor is a major reason for low educational enrollment and dropouts in developing countries. Agricultural occupations (farming, fishing and cattle rearing) are labor intensive and households depend on child labor to support farms. However, Buchmann (2000) argues that child labor accounts for only a small portion of school absences. Her analysis in Kenya indicates that less than 2% of absences are due to child labor. The main reasons for absences from school are sickness or inability to pay school expenses. Maitra and Ray (2002) state that schooling decreases with age, number of children, and poverty, while schooling increases with urbanization, female education, and infrastructure (road, electricity, and water). Fentiman and Hall (1999) suggest that school schedules can fit children's labor-intensive periods (such as the planting or harvesting seasons). Buchmann (2000) advises that children should be educated according to the needs of the labor markets in order to avoid gender discrimination in employment. He suggests that this will also decrease the excessive costs of schooling for poor families and will convince parents to favor education and abolish child labor.

Basu (1999) also argues that education does not only provide higher income opportunities to children but also keeps children away from work. He concludes that compulsory education is a more desirable policy than banning child labor.

According to Basu (1999), labor market equilibria take two possible forms: either wages are insufficient for subsistence and children must work or wages are high enough and children do not work. Income level is important since people with higher incomes meet their needs and do not need their childrens' wages. Child labor mainly starts from poverty. Table 1 presents education and labor participation according to income quintiles in Ghana. As we climb the expenditure quintiles (from 1 to 5), participation in the labor market decreases and enrolment in schooling increases. Moreover, the decrease of work and the increase of school are not proportional. This indicates that schooling and working are not opposites of each other. The micro-based research by Ravallion and Wodon (2000) support our conclusion since they find that subsidies for education raise the enrollment rate but do not have any impact on child labor in Bangladesh.
Grooataert (1988) also shows that the ratio of children working falls with income in Ivory Coast (Table 2). The straightforward result is that almost half of child workers come from very poor families. Maitra and Ray (2002) argue that **in developing countries the income contributions from child laborers are high.** They indicate that the shares of household income contributed by child labor earnings are 10%, 24% and 30% in Peru, Pakistan and Ghana. Manabi (2001) also emphasizes that the existence of child labor is due to the need for economic security. In that sense, child labor may exist to stabilize as well as increase income.

2.2. Income Inequality Argument

Swinnerton and Rogers (1999) argue that if income is equally distributed in a country, child labor will not exist. Chiu (1998) states that greater income inequality implies lower human capital, which impedes economic growth. The link between income inequality and low educational attainment may work through child labor.
Those families, whose incomes are high, do not send their children to the labor market, which refers to a luxury axiom (Basu and Van, 1998). On the other hand, high-income level is not sufficient regarding distribution axiom, income should be more equitably distributed among families (Swinnerton and Rogers, 1999). Hence, the vicious circle is established: children are working due to unequal income distribution. Since they could not become skillful workers (or involve in entrepreneurial activities), they constantly earn a subsistence income.
In the basic model of Basu and Van (1998), a family sends its children to the labor market if each individual's consumption falls below the subsistence consumption, c in the first equation. More formally, Basu and Van (1998) note labor participation of child labor as follows:

$$e(w_A) = 0 \quad \text{if } w_A \geq c$$
$$e(w_A) = 1 \quad \text{if } w_A < c \qquad (1)$$

In this equation, e indicates whether children work or not. When the wage of adult, wa is greater than subsistence consumption, children do not work.
According to Swinnerton and Rogers (1999), macro economic conditions of child labor regarding income inequality reflect the "distribution axiom." Swinnerton and Rogers (1999) makes an additional assumption about the budget of the family:

$$e(w_A, X) = 0 \quad \text{if } w_A + X \geq c$$
$$e(w_A, X) = 1 \quad \text{if } w_A + X < c \qquad (2)$$

X stands for dividends. According to them, dividends will improve income distribution. Hence, households will not send their kids to school. We may categorize the countries as follows: for those whose have equal income distribution, e (*, *) is equal to zero, and for those who have unequal income distribution, e (*, *) is equal to one.

2.3. Capital Market Argument

Jafarey and Lahiri (2002) argue that those families whose incomes fall below a poverty threshold level send their children to the labor market. They state that an enlargement of credit opportunities can be an effective policy. They also argue that under imperfect credit markets, subsidizing education is a better option than increasing returns to schooling since they claim that the primary obstacle to schooling is poverty rather than the poor return

to education. They state that an increase of credit opportunities can be an effective policy. They also argue that under imperfect credit markets, subsidizing education is a better option than increasing returns to schooling since they claim that the primary obstacle to schooling is poverty rather than the poor return to education. In this context, Basu (1999) supports this argument since he states that in most cases leaving school is not due to persistent poverty but to a temporary but severe income reduction in the household.

2.4. Rural Economy Argument

According to Manabi (2001), child labor is largely a rural phenomenon in India. 92% of the total child workers reside in rural areas and are employed in agricultural activities. Education opportunities may concentrate in urban areas1 and rural families may send children to work. Based on research for Ghana and Ivory Coast, rural population and the relative size of agriculture are potential determining factors for child labor (Maitra and Ray, 2002 and Grootaert, 1998). The sub-Saharan African cases support the distinctions in child labor regarding rural and urban economies. Table 3 shows that children from rural areas are more likely to work and forgo schooling. World Bank (1998) confirms this conclusion for Ethiopia.
Table 4 indicates that in Botswana, boys usually allocate their time to animal tending when they are working. Girls usually work in the house and very rarely involved in crop husbandry.

2.5. Export Banned Argument

Opponents' of child labor argue to implement high tariffs (Basu, 1999). On the other hand, Jafarey and Lahiri (2001) (2002) stress that tariff sanctions from developed countries to developing countries will not work since only 5 % of children are employed in the tradable sector. Moreover, they state that child workers in the tradable sectors do not choose education but switch to more hazardous jobs. Basu (2003) analyzes this argument as part of an effort to protect jobs from foreign competition concealed as a concern for impoverished children. For instance, in the 1990s, opponents of child labor implement restrictions for hand-knotted carpets made by children. Many Nepalese carpet makers laid children off. As a result, between 5000 and 7000 girls became prostitutes (Basu, 2003).

2.6. Other Arguments

An important fraction of foreign aid (% of GDP) is allocated for reducing child labor. U.S. Department of Labor's International Child Labor Program has donated $112 million to eliminate child labor since 1995. This foreign aid has been used to diminish child trafficking and the prevalence of child soldiers as well as to limit children's role in commercial agriculture.
Fentiman and Hall (1999) and Andvig (2001) stress the lack of infrastructure as a determinant of child labor. In western countries, child labor was decreased by technological improvements in the agricultural sector (Riney-Kehrberg, 2001). Advances in mechanization allow machines to replace human and often child labor (Riney-Kehrberg, 2001). Grootaert and Kanbur (1995) and Riney-Kehrberg, (2001) state that technological development, industrialization and the mechanization of agriculture lower child labor dependency in economic activities.
Low population growth (annual %) may associate with low child labor participation since parents may emphasize the quality of children rather than quantity and so send their children to schools (Becker and Tomes, 1976).

3. Methodology and Data Analysis

To evaluate whether education conditions are strongly linked to child labor, a pooled cross-sectional time series fixed-effect GLS model for 44 Sub-Saharan African countries between 1960 and 1999 is applied. The dependent variable is child labor (% of total). The weakness of the dependent variable is that it takes into account only those who are working outside the home. The structure of the regression equation is the following:

1 For a survey of the urban bias literature, see Lipton (1993).

Child labor= $\alpha i + \beta$ (Primary education) + $\prod$ (Control Variables)+ uit (1)
i=1,2,..44 countries. t=1960, 1970, 1980, 1990, 1995, 1998, 19992.

αi is a country specific intercept, β and $\prod$ are the estimated coefficients on the independent variables and uit is an error term.

The impact of education is measured in the participation of primary school enrollment as a proxy of educational attainment. The weakness is that the measurement of primary school enrollment indicates a gross enrollment ratio regardless of age. However, child laborers only span the 10-14 age group.

GDP per capita is used to control for the level of development. Not only might this influence current income but also might be associated with future returns to current education. Moreover, poverty makes the marginal utility of income very high and induces substitution away from non-labor activities such as leisure and education (Jafarey and Lahiri, 2004). On the other hand, GDP per capita as a poverty proxy has some weaknesses. First, GDP per capita omits many economic activities (especially, home activities). Second, economic agents do not report their income due to tax evasion in developing countries.

Technological backwardness may force children to work rather than attend school. In western countries, child labor was decreased by technological improvements in the agricultural sector (Riney-Kehrberg, 2001). Advances in mechanization allow machines to replace human and often child labor (Riney-Kehrberg, 2001). In terms of mechanization of agriculture,3 the number of tractors (per hectare) is used as a proxy.

The lack of credit facilities makes borrowing more costly for poor families to forego present income by sending their children to school (Jafarey and Lahiri, 2002). The depth of the credit market has been calculated in different ways (Asiedu, 2002 and Levine4, 2003). As in Asiedu (2002), I use M2/GDP as a proxy for the depth of the credit market.

The distance to a school can influence school enrollment, especially in rural areas (Jensen and Nielsen, 1997). In this research, rural population (%) as a percent of the total population is an additional control variable and falls in line with Jensen and Nielsen (1997). Educational opportunities are concentrated in urban areas and rural families are most likely to send children to work. Moreover, the distance to school can be an obstacle in rural areas (Jensen and Nielsen, 1997).

The quality-quantity argument is important for the schooling decision. It is anticipated that those families who care about quality rather than the quantity of children will send children to school. To control for the quality-quantity tradeoff, I use the population growth rate. Low population growth may be associated with low child labor participation since parents with fewer children will be more likely to emphasize the quality of their children rather than the quantity. In other words, they will not view children as immediate income resources for their families and they will send their children to school (Becker and Tomes 1976).

Table 5 presents summary statistics and indicates that child labor has fallen by 40% from 1960 to 1999. In the same period, the rural population fell by 25% and GDP per capita increased by 100%. Education in the primary level reached over 80%. The average number of tractors has increased from 7 tractors per 10,000 hectares to 21 tractors per 10,000 hectares. Population growth is above 2% in the entire period. Money usage extended from 2% to 21%.

4. Empirical Results

In model in table 6, the arable land and GDP per capita are negatively associated while the hectare per person and rural population are positively associated with child labor. They are highly statistically significant except hectare per person. This may confirm that the African child labor phenomenon is a rural characteristic as in the U.S. and New Zealand (Riney-Kehrberg , 2001) or in some other developing countries (Fentiman and Hall, 1999 and Manabi , 2001). We may expect that child labor will fall down with urbanization. Results about GDP per capita show that income is an important factor in child labor (Maitra and Ray, 2002). Perhaps, being poor and residing in rural areas are interrelated each other. An interesting result is that arable land is negatively associated with child labor. This may indicate that easily cultivable land requires less human power, but fishing and cattle rearing need more intensive labor activity than farming. Table 7 confirms this conclusion since in Botswana,

[2] The data of World Bank (2003) for child labor is available for these years.

3 Mechanization of agriculture is a broad concept and can include both fisheries and land. World Bank data (2003) is available for tractors, which is not relevant for fisheries. On the other hand, enlargement of the use of tractors can be an indicator of the general improvement in other agricultural sectors.

4 Levine (2003) used the stock market.

boys mostly allocate their time for animal tending when they are working. Girls usually work in the house and very rarely in crop husbandry.

Model 2 includes primary education variable. Primary education is negatively correlated and statistically significant. All variables keep their signs and significance levels but hectare per person. This variable becomes positive. This concludes that small or large land lots do not necessarily increase child labor usage. When we add secondary education into model 3, the coefficient of secondary education is negative and significant. When we test education in gender level in model 4, female primary education and male
secondary education enrollments are effective lowering child labor. The sign of tertiary education in model 5 is negative but not significant. Primary education and secondary education keep their negative sign and statistical significance. This may conclude that age overlapping in education is crucial for reducing child labor. In this model, mechanization of agriculture significantly reduces child labor. This result supports Levy (1995)'s research in rural Egypt. According to Levy (1995), mechanization may decrease in child labor (hence, fertility). Children are charged of the cultivation of cotton, especially weeding and picking. Technological advancement in cropping reduces child labor. In model 6, the industrialization variable is negative but not significant. Our research results up to this point confirm the experiences of developed countries since compulsory education, substitution of labor by capital (mechanization), industrialization, and urbanization reduce child labor significantly (Riney-Kehrberg, 2001). The same model shows that high population growth is associated with child labor.

Table 8 starts with model 7, which is testing the impact of export on child labor. It is negative and statistically significant. Certainly, it is difficult to implement a policy for increasing export to reduce child labor. On the other hand, at least we are certain that export does not necessarily associate with child labor in sub-Saharan Africa (Jafarey and Lahiri , 2001). Model 8 is testing M2/GDP as a proxy of the depth of financial instruments. The result shows that the enlargement of financial instruments lowers child labor significantly. This finding supports Jafarey and Lahiri's (2001) mathematical models on financial constraints and child labor. Their argument was that access to the financial market would reduce the needs of child labor for poor families. Model 9 includes foreign aid, which is negative and significantly correlated with child labor. So,
international efforts may reduce child labor. Infant mortality rate under five year old in model 10 shows that families need less child labor force with the improvement of health conditions for children. Telephone lines per 1000 are added into model 11 as a proxy of infrastructure. The result shows that improvement of infrastructure does not lower child labor. We may conclude that welfare improvement programs specifically designed for children such as the reduction of infant mortality rather than general welfare improvement programs such as the increase of telephone mainlines work better to overcome child labor problem.

5. Conclusion

We can conclude the paper on child labor in sub-Saharan Africa:

1. The African child labor phenomenon is a rural characteristic. We may expect that child labor will fall down with urbanization.
2. Income is an important factor in child labor. Perhaps, being poor and residing in rural areas are interrelated each other.
3. Arable land is negatively associated with child labor. This may indicate that easily cultivable land requires less human power but fishing and cattle rearing need more intensive labor activity than farming. Moreover, small or large land lots do not necessarily increase child labor usage.
4. Primary, secondary and tertiary education is negatively correlated with child labor but primary and secondary education are significant. This may conclude that age overlapping in education is crucial for reducing child labor.
5. Mechanization of agriculture significantly reduces child labor.
6. Countries with high population growth have a larger child labor market. Lowering fertility rate can be a policy suggestion.
7. Export does not necessarily associate with child labor in sub-Saharan Africa so putting tariffs on sub-Saharan African countries' goods have no empirical grounds.
8. The enlargement of financial instruments lowers child labor significantly. Access to the financial market will reduce the needs of child labor for poor families.
9. Foreign aid is negative and significantly correlated with child labor. So, international efforts may reduce child labor.
10. Our results also show that welfare improvement program specifically designed for children such as the reduction of infant mortality rather than general welfare improvement programs such as the increase of telephone mainlines works better to overcome child labor problem.

References

Andvig, J. "Family-Controlled Child Laobr in Sub-Saharan Africa. A Survey of Research." Social Protection Discussion Paper Series, 0122, 2001. World Bank.

Asiedu, E. "On the Determinants of Foreign Direct Investment to Developing Countries: Is Africa Different?" World Development, 2002, 30 (1), 107-119.

Basu, K. "Child Labor: Cause, Consequences, and Cure, with Remarks on International Labor Standards." Journal of Economic Literature, 1999. 37(3), 1083-1119.

---------- "The Economics of Child Labor." Scientific American, (2003). 289(4), 84-92.

Buchmann, C. "Family Structure, Parental Perceptions, and Child Labor in Kenya: What Factors Determine Who Is Enrolled in School?" Social Forces, 2000, 78 (4), 1349-79

Canajarajah, S and Coulombe, H. "Child Labor and Schooling in Ghana." 1997, World Bank, Washington D.C.

Chernichovsky, D., Lucas, R.B., and Meller, E. "The Household Economy of Rural Botswana." World Bank Staff Working Paper No.715, 1985.

Chiu, W.H. Income Inequality, Human Capital Accumulation and Economic Performance. The Economic Journal, 1998, 108 (444), 44-59.

Cigno, A, Rosati, F. and Guarcello,L. "Does Globalization Increase Child Labor?" World Development, 2002, 30 (9), 1579-1589.

Doglish, N. "Education Policy and the Question of Child Labor: the Lancashire Cotton Industry and R.D. Dennan's Bill of 1914." History of Education, 2001, 30 (3), 291-308.

Emerson, P. and Seauza, A.P. "Is there a Child Labor Trap? Inter-Generational Persistence of Child Labor in Brazil." Vanderbilt Working Paper, No. 02-W14, 2002.

Fentiman, A. and Hall, A. "School Enrolment Patterns in Rural Ghana: a Comparative Study of the Impact of Location, Gender. "Comparative Education, 1999, 35 (3), 331-50.

Grootaert, C. "Child Labor in Cote d'Ivoire." World Bank Policy Working Paper, No. 1905. 1998.

Jafarey, S. and Lahiri, S. "Child labor: Theory, policy and evidences." World Economics, 2001, 2(1), 69-93.

----------. "Will Trade Sanction Reduce Child Labor? The Role of Credit Markets." Journal of Economic Development, 2002, 68 (1), 137-156

Levy, V. "Cropping Patern, Mechanziation, Child Labor, and Fertility Behaviour in a Farming Economy: Rural Egypt." Economic Development and Cultural Change, 1985, 33 (4), 777-791.

Lipton, M. "Urban Bias: of Consequences, Classes and Causality." Journal of Development Studies, 1993, 29 (4), 229-259.

Lopez-Calva, L. "Child labor: Myths, Theories, and Facts." Journal of International Affairs, 2001, 55 (1), 59-74.

Maitra, P. and Ray, R. "The Joint Estimation of Child Participation in Schooling and Employment: Comparative Evidence from Three Continents." Oxford Development Studies, 2002, 30 (1), 41-63.

Majumdar, M. "Child Labor as a Human Security Problem: Evidence from India." Oxford Development Studies, 2001, 29 (3), 279-305.

Ravallion, M. and Wodon, Q. "Does Child Labor Displace Schooling? Evidence on Behavioral Responses to an Enrollment Subsidy." Economic Journal, 2000, 110 (462), C158-175.

Ray, R. "Analysis of child Labor in Peru and Pakistan: A comparative Study." Journal of Population Economics, 2000, 13, 3-19

Reigart, J. R. and Etzel, R.A.)."The hazards of child labor." Pediatrics, 1995, 95 (2), 311-314

Riney- Kehrberg, P. "The limits of policy: Rural children and work in the United States and New Zealand, 1870--1920." History of the Family, 2001, 6 (1), 51-68

Swinnerton, K.A. and Rogers, C.A. (1999). The Economics of Child Labor: Comment. The American Economic Review, 89 (5), 1382-1385.

U.S. Department of Labor. www.dol.gov/ilab

World Bank. Social Indicators. 2003. (CD-ROM).

World Bank. "Ethiopia: Social Sector Note." Report. No: 16860-ET. 1998.

Author: Mustafa Seref Akin is associated professor at Fatih University, Istanbul, Turkey. He received his Ph.D. in Southern Illinois University (USA) in Economics. He taught in University of Missouri (USA), Maltepe University (Turkey), Ataturk Alato (Kyrgyzstan) and Suleyman Demirel (Kazakhstan). He currently teaches economics in Fatih University (Turkey).

His research interests are economic development, entrepreneurial economics and economic policies for competitive economics. His current research focuses on the quality of education.

Table 1: Income and Education in Ghana

Expenditure Quintile	Work Only	School Only	Work and School	None Working
1	13.1	46.4	15.5	24.9
2	6.8	54.1	21.7	17.3
3	10.5	53.8	18.6	17.1
4	8.7	55.2	19.2	17
5	5.7	64.6	19.1	10.6

Source: Canagarajahand and Coulombe (1997)

Table 2: Child Labor Participation Rate in Ivory Coast

Income Level	Participation Rate
Very Poor	43.9
Mid Poor	21.9
Not Poor	10.2
All	15.3

Source: Grootaert (1998)

Table 3: Urban versus Rural in the Ivory Coast

Location	Schooling	School and Work	Work Only	Home Caring and Idling
Urban	39.3	36.6	3.7	20.3
Rural	21.3	28.4	27.9	22.4
All	28.5	31.7	18.3	21.5

Source: Grootaert (1998)

Table 4: Children's Time Allocation in Botswana (%)

Activities	Boys	Girls
Animal Tending	28.8	3.5
Trading	.1	3.5
Crop Husbandry	3	.5
Wage Labor	.4	3.5
Hunting and Gathering	1.6	.8
Repairing	.5	2.6
Child Care	1.7	.8
Water Collection	2.3	5.5
Housework	4.4	15.5
Illness	1.5	2
Schooling	13.7	17.4
Leisure	43.5	41

Source: Chernichovsky et al. (1985)

Table 5: Summary Statistics by year: average values over 44 sub-Saharan African Countries

	Labor force, children 10-14 (% of age group)	Rural population (% of total population)	GDP per capita (constant 1995 US$)	School enrollment, primary (% gross)	Agricultural machinery, tractors per 100 hectares of arable land	Population growth (annual %)	Money and quasi money (M2) as % of GDP
1960	40.33	83.18118	306.4543	0	0.079905	2.138477	2.217914
1970	33.99	79.30486	443.9764	43.47677	0.159932	2.154725	9.112622
1980	35.31477	75.86225	591.56	65.77336	0.199251	2.756098	15.00523
1990	31.92045	69.73882	743.3984	67.74066	0.235399	2.73663	20.57893
1995	29.87318	66.53602	724.2378	73.74437	0.229661	2.664527	35.30724
1998	28.60214	64.65455	783.4252	77.29975	0.22101	2.547836	21.40339
1999	28.12973	63.94161	796.3234	77.94298	0.219591	2.440439	21.03718

Table 6: Dependent Variables: Child Labor(%)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Arable Land	-0.201 (-7.346)***	-0.131 (-3.885)***	-0.1089 (-2.786)***	-0.17 (-3.675)***	-0.0249 (-0.428)	-0.051 (-.747)
Hectare per person	0.015 (1.562719)	-0.0159 (-0.583)	-0.014237 (-.388)	0.0081 (.201)	-1.699 (-.783)	-1.089 (-.423)
Rural Population	0.401 (30.562)***	0.387 (18.277)***	0.345633 (14.3)***	0.295416 (11.58)***	0.323 (9.594)***	0.331 (8.228)***
GDP capita	-0.0029 (-13.51)***	-0.003 (-9.10)***	-0.001631 (-4.759)***	-0.00247 (-6.009***	-0.0026 (-4.571)***	-0.0026 (-3.75)***
Education primary		-0.0575 (-6.825)***		-0.055861 (-5.138)***	-0.051 (-3.44)***	-0.0781 (-5.314)***
Education Secondary			-0.058302 (-3.502)***		-0.045 (-2.059)**	0.0154 (.486)***
Education primary (female)				-0.081 (-4.61)***		
Education primary (male)				0.032266 (1.912)**		
Education Secondary (female)				-0.020813 (-.719)		
Education Secondary (male)				-0.064138 (-2.18)**		
Education Tertiary					-0.226 (-1.449)	-0.244 (-1.413)
Agriculture Mechanization					-0.0682 (-2.218)**	-0.0992 (-3.05)***
Industry Value Added						-0.0184 (-.732)
Pop. Growth						1.412 (3.803)***
N	250	211	199	197	168	164

Note: the values in the parentheses are t-statistics
* denotes significance at the 10%
** denotes significance at the 5% level
*** denotes significance at the 1% level

Table 7: Children's Time Allocation in Botswana (%)

Activities	Boys	Girls
Animal Tending	28.8	3.5
Trading	.1	3.5
Crop Husbandry	3	.5
Wage Labor	.4	3.5
Hunting and Gathering	1.6	.8
Repairing	.5	2.6
Child Care	1.7	.8
Water Collection	2.3	5.5
Housework Illness	4.4 1.5	15.5 2
Schooling	13.7	17.4
Leisure	43.5	41

Source: Chernichovsky et al. (1985)

Table 8: Dependent Variables: Child Labor(%)

	Model 7	Model 8	Model 9	Model 10	Model 11
Arable Land	-0.0051 (-.082)	-0.0836 (-0.997)	-0.085 (-1.22)	-0.106582(-.765)	-0.0718 (-.94)
Hectare per person	1.272179 (.656)	0.054031 (0.019378)	-1.134606 (-.49)	0.314801 (.061)	-1.794 (-.536)
Rural Population	0.284 (8.608)***	0.284602 (7.050898)	0.308057 (8.869)***	0.324408(4.739)***	0.3134 (7.44)***
GDP capita	-0.0025 (-3.916)***	-0.00258 (-2.908981)	-0.001950 (2.51)***	-0.000141 (-.078)	-0.000632 (-.5)
Education primary	-0.0743 (-5.07)***	-0.0599 (-3.900404	-0.059408 (-4.58)***	-0.126296 (-3.39)***	-0.135863 (-5.58)***
Education Secondary	0.0134 (.419)	-0.0214 (-0.549828)	-0.026149 (-.78)	0.015736 (.239)	0.016995 (.37)
Education Tertiary	-0.1919 (-1.247)	-0.127 (-0.650996	-0.234 (-1.45)	-0.392750 (.97)	-0.539775 (2.27)**
Agriculture Mechanization	-0.0906 (-2.76)***	-.116 (-2.29)	-0.122 (-3.06)***	-0.179653 (-1.42)	-0.157 (-2.27)**
Pop. Growth	1.319 (3.25)***	1.338 (2.893)	1.655 (4.19)***	3.230065 (2.92)***	3.1529 (4.12)***
Exports of goods	-0.1 (-4.89)***				
M2/GDP		-0.096 (-3.0182)***	-0.078 (-2.84)***	-0.087532 (-1.24)	-0.0712 (-1.43)
Foreign Aid			-0.0723 (-2.95)***	-0.078461 (-1.40)	-0.0796 (-2.31)**
Infant Mortality Rate				-0.039478 (-1.93)**	-0.0358 (-2.55)**
Telephone Mainlines					0.016198 (.41)
N	162	158	156	121	115

Note: the values in the parentheses are t-statistics
* denotes significance at the 10%
** denotes significance at the 5% level
*** denotes significance at the 1% level