Understanding child labour beyond the standard economic assumption of monetary poverty

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Child labour is pervasive across sub-Saharan Africa. The common assumption is that monetary poverty is its most important cause. This paper investigates this hypothesis with empirical evidence by exploring structural, geographic, monetary, demographic, cultural, seasonal and school-supply factors simultaneously that can influence child labour. It is a first attempt in the literature to combine quantitative with qualitative methods to identify a broader range of potential factors—on the demand- and supply-side and at the micro and macro levels—for why children work in agrarian economies like Ghana. Interviews with the Minister of Education and with children enrich the multivariate regression results. The multiple sources of child labour appear to include, in particular, the structure of the economy, social norms and no returns to rural basic education. Policy responses are outlined especially on the demand side that are needed to help reduce harmful child labour that affects children's education and later opportunities.

Key words: Child labour, Poverty, Agriculture, Africa, Child work, Ghana, Mixed methods
JEL classification: D13, I31, J23, J24

1. Introduction

Child labour is pervasive in most sub-Saharan African countries and it can at times constrain the choices and freedoms of children and their education and human welfare later in life. About 38% of children aged 7–14 in sub-Saharan Africa are engaged in work (UNICEF 2005). In Ghana, about one in every six children aged 7–14 is working in 2005–2006 (15.6%), accounting for about 317,000 children actively working for economic gain. The common assumption in the literature—led by the influential, theoretical work of Basu and Van (1998)—is that child labour is driven by income poverty. In analysing quantitative and qualitative evidence in the agrarian economy of Ghana, this paper tests the hypothesis of the 'luxury axiom' by Basu and Van that a child only

works when household income drops very low. Not only has no research topic on child labour received more attention than this relationship between child labour and monetary poverty[1], but also much research on child labour, while often citing its non-poverty influences, views household poverty as the most important determinant.[2] This is not unexpected as the majority of papers on child labour are written by economists who tend to focus their analysis on the economic sources of child labour.

Yet household decisions for or against child labour are rarely the consequence of one single factor (for example, monetary poverty) or event (for example, an income shock). Rather, they are often—as the case in Ghana—related to a set of events and factors ranging from the structure of the economy (which is largely led by family farming), cultural influences (social norms viewing child labour as part of socialisation), occupational choices (with no higher reported economic returns to basic education in rural areas), to low government priority and capacity (to enforce anti–child labour laws), the seasonal demand for agricultural work and, among others, demographic variables (such as low parental education and children's 'economic value' increasing with age). This paper thereby postulates that the 'luxury axiom' can often poorly define and delimit the realm of analysis on child labour to economic factors. Applying it as a point of departure—which is a common approach in the literature—can constrain a more holistic, cross-disciplinary understanding of why both poor and non-poor children work in agrarian economies like Ghana.

On the empirical side, because most studies do not combine and enrich household survey analysis with qualitative data analysis, they often ignore important factors such as cultural norms or attitudes about child labour that are generally not well captured in household surveys. On the theoretical side, the discussion on child labour is driven by theoretical models that at times implicitly claim to identify universal 'truths' as they often *a priori* contain the causes of and solutions for why children work. They often neglect the idiosyncratic and heterogeneous sources of child labour, i.e. the specific traits of different groups of children of different gender and age involved in different economic activities in different geographic areas within different countries with different norms and institutions over different seasons and time periods. Thus, while a strong interrelationship between household poverty and child labour appears intuitive and is argued and modelled theoretically at the global level (e.g. Basu and Van 1998; Bardhan and Udry 1999; Dessy and Vencatachellum 2003), this paper argues that neither such intuition nor such theory seems to hold strongly with quantitative or qualitative evidence in agrarian economies like Ghana. It provides some empirical evidence against such universal theories and aims to expand the other strand of literature that questions the high importance of poverty.[3] Results presented here suggest that increases in household wealth in Ghana (which have largely been accrued by those in services and manufacturing) will not inevitably result in significant reductions in child labour, unless such increases are a result of other, more important influencers, including a reduction in agricultural dependency and thus reduced levels of social acceptance of child labour and greater returns to rural schooling. This has important implications for the typical way most economists view and try to mitigate child labour, with the paper outlining a different set of needed policy responses.

This paper thus has several contributions to the existing child labour literature. It assesses a wider range of potential sources of child labour simultaneously than currently

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[1] For a comprehensive overview of this discussion, see Edmonds (2008).

[2] Some examples are Grootaert and Kanbur (1995); US Department of Labor (2000); Canagarajah and Nielsen (2001); Blunch and Verner (2001); ILO (2002); Ray (2003); Amin *et al*. (2004); Edmonds and Pavcnik (2005); Edmonds (2005); Huebler (2008).

[3] For example, Barros *et al*. (1994); Rogers and Swinnerton (2004).

in individual papers in the literature that often only focus on a specific issue, allowing here for a broader understanding of the importance of potential structural, geographic, monetary, cultural, seasonal and school-supply factors, as well as gender and other demographic traits in a single paper. It broadens the standard analytical approach by applying quantitative and qualitative methods and thereby provides some new insight into the critical role of social norms in influencing the demand for child labour especially in family farming, which is an area not well understood in child labour research that typically only applies survey data. It identifies potential effects that influence some subgroups but not others by conducting disaggregated analysis, for example, on child labourers in and outside of household farming, across different seasons of the year and for a number of other subgroups. In contrast, most existing studies pool data and neglect the heterogeneity of child labourers, which reduces the usefulness of results for policymakers. It also offers some insight into why levels of child labour can stagnate in growing economies or poverty-reducing economies like Ghana.

This paper is organised as follows. Section 2 explains the data sources. Section 3 presents the basic descriptive household survey results, enriched by the results from interviews conducted in Ghana in 2010. Section 4 describes the statistical model, outlines its methodological limitations and illustrates the multivariate regression results, providing some insight into the importance of a number of potential sources of child labour beyond monetary poverty. In response to the results, Section 5 discusses what combination of programmes and policy reforms in the short and longer term is likely to help mitigate harmful child labour that is defined as conflicting with children's education and thus later opportunities. Section 6 concludes, while outlining some theoretical and methodological limitations facing economic analyses. In particular, the primary objective guiding this paper is to try and identify which potential constraints and enabling factors beyond monetary poverty are important—i.e. to empirically test the 'luxury axiom' in the agrarian economy of Ghana—and thereby to identify which policies may be best in mitigating harmful child labour in the country. Answers to these questions are critical for policy planners and -makers.

2. Data sources

This paper is based on research carried out in Ghana between 2010 and 2011, employing household survey data together with qualitative interviews and fieldwork trips. This Q-squared approach allows for a broader and more nuanced understanding of multiple potential sources of child labour.

The Ghana Living Standards Surveys (GLSS) analysed here are vital for the planning of Ghanaian development and are commonly used and recognised as one of the most comprehensive and reliable sources of household data in the country. GLSS is carried out by the government of Ghana and used as one of the principal means to inform policy by the government itself. GLSS is the only nationally representative household survey in Ghana that includes an employment activity module and collects information on child labour.[4] Data from GLSS 2005–2006 covers 8,687 households (37,128 individuals) and is the latest available survey data at the time of the study and

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[4] However, it is important to note that participatory observations of street children in the capital city suggest that the 'nationally representative' GLSS survey very likely underestimates the prevalence of child labour (see also Edmonds 2008), as GLSS collects data from households and their heads, not from children living alone on the streets who may not have parents.

the main data source for the household survey analysis here, while data from GLSS 1998–1999 covering 5,998 households (25,855 individuals) is also applied at times for comparative and robustness purposes. The surveys are stratified by region and then urban/rural location and are clustered as census enumeration areas by applying the 'probability proportional to size' method (for more information on the sample design and questionnaire, see GLSS 2008). While these national, cross-sectional surveys have limitations on drawing policy implications from the results at the district level, it is possible to derive conclusions and discuss policy options on a regional and national scale.

With child labour identified as the leading alternative to schooling in Ghana using GLSS household survey data, further insight into the interdependencies between child labour and schooling is gathered through an interview with the Minister of Education, the Hon. Alex Tettey-Enyo, on 19 October 2010. The interview allows for a more nuanced interpretation of the potential sources of child labour and helps provide further clues and narratives to try and disentangle these sources that cannot be well understood alone with household survey data, as such data forces dynamic household decisions about child labour into clear-cut quantifiable survey variables.[5] In addition, as part of the qualitative data collection, fifteen children and youth from two schools (one primary and one junior high school) in the capital Accra were randomly selected and interviewed after school on 23 and 24 September 2010 using semi-structured questions and methods (see Van Evera 1997). The primary school provides services for poorer children while the junior high school for wealthier youth, based on the author's observation. While it cannot yield representative information and only represents a small sample of urban children and youth (with 51% of all Ghanaians living in urban areas in 2009) this qualitative field research is only intended to offer additional micro-level insight that at times helps enrich some of the results from the household data analysis. Names have been omitted to preserve confidentiality. Indication of field research throughout this paper, unless otherwise indicated, refers to this data collection.[6]

In defining child labour, this paper differentiates—in line with the International Labour Organisation (2008)—between unharmful assistance with household chores and harmful child labour. The latter is defined as the employment of children under the age of 15 on a regular basis in work that conflicts with their schooling in order to make a living or compliment household earnings, either as a wage worker or through self-employment.[7] In contrast, children in Ghana typically assist with non-economic household chores before and after school, on weekends and during holidays, such as

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[5] In terms of the semi-structured interview with the Minister, it is important to emphasise that the views expressed reflect his subjective standpoint and not necessarily those of the government of Ghana. Excerpts from the interview are found throughout the text (for the transcript of the interview, contact the author).

[6] The interviews conducted here target children and the Minister of Education in order to help best complement household survey data that only collects information from household heads/parents.

[7] Employing children under 15 is also prohibited under Ghana's labour decree from 1967, while legislation allows for undefined 'light' work. According to Article 32 of the Convention on the Rights of the Child from 1989, to which Ghana is a signatory, 'state parties recognise the right of the child to be protected from economic exploitation and from performing any work that is likely to be hazardous or to interfere with the child's education' (OHCHR, 1989). Although the enactment of legislation is an important step to mitigate child labour, field research in Ghana illustrates that law enforcement officials generally do not *de facto* enforce laws restricting child labour, while institutional capacity to identify and penalise child labour is constrained, especially in rural, agricultural areas.

fetching water and/or wood, cooking, washing clothes, buying household items, looking after siblings and other similar chores, with children interviewed in 2010 indicating that they contribute on average about 1–1.5 hours per day to such non-economic household tasks. A definition of child labour is adopted here in line with the ILO definition that is used by GLSS and therefore endorsed by the government of Ghana: a child is employed if he or she did 'any work for pay, profit, family gain or produce[d] anything for barter or home use during the last 7 days' (GLSS, 2008).[8] Child labour and assistance with household chores are thus two separate issues, for which respondents are asked separate questions in the GLSS survey. That is, while 87.5% of all children aged 7–14 assisted with non-economic household chores in the last 7 days (averaging 12.7 hours of *assistance* per child), this paper only focuses on child labour for economic gain in which 15.6% of children are active in the last 7 days (averaging 26.3 hours of *work* per child), with the average child labourer also contributing 13.5 hours to household chores in the last 7 days.

3. Descriptive results

The aim in this section is to first demonstrate that child labour research should not just focus on monetary income as many non-poor children are working, and then secondly to lay out other potential sources of child labour that demand greater attention. These include the country's agricultural dependency, social norms and a lack of higher returns to basic schooling, followed by other factors such as the demand for schooling, the geographic distribution of child labourers, demographic factors such as children's age and parental education, and seasonality of child labour (discussed in that order).

In Ghana, 15.6% of children aged 7–14, the age group analysed throughout this paper, are working in 2005–06. In merging levels of household consumption expenditure with children's labour participation rates, Figure 1 shows that while 21.7% of children falling into the bottom two wealth quintiles are working, labour participation rates remain high for children in the middle quintile (12.4%), fourth quintile (8.4%) and richest quintile (4.6%). In terms of the geographic concentration of working children, 29% of children in the top three quintiles in the North (which incorporates the Upper West, Upper East and Northern regions) are engaged in labour activities compared to 34.1% of their counterparts in the bottom two quintiles in this part of the country. Illustrating the distribution of child labourers in relation to their total household expenditure, Figure 1 also indicates that only in the three regions of the North do over 50% of child labourers fall below the national poverty line, while in all seven regions of the South most child labourers live in households above the poverty line.[9] Among all child labourers in the country 49.5% live above the national poverty line—i.e. in households that are not characterised as subsistence-poor.

In terms of land, children are more likely to work in households owning land, especially for those in richer households. In the richest quintile, for example, 9% of all children are working in households owning land compared to 2% of children in landless households. Ownership of productive assets like land is an important source of

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[8] The prevalence of child labour varies by how labour is defined and how a child is defined, while this paper adopts this definition of child labour and a definition of a child as being 7–14 years old, with GLSS collecting employment data for those aged 7 and above.

[9] In 2005–2006, 28.5% of the population lives below the national poverty line.
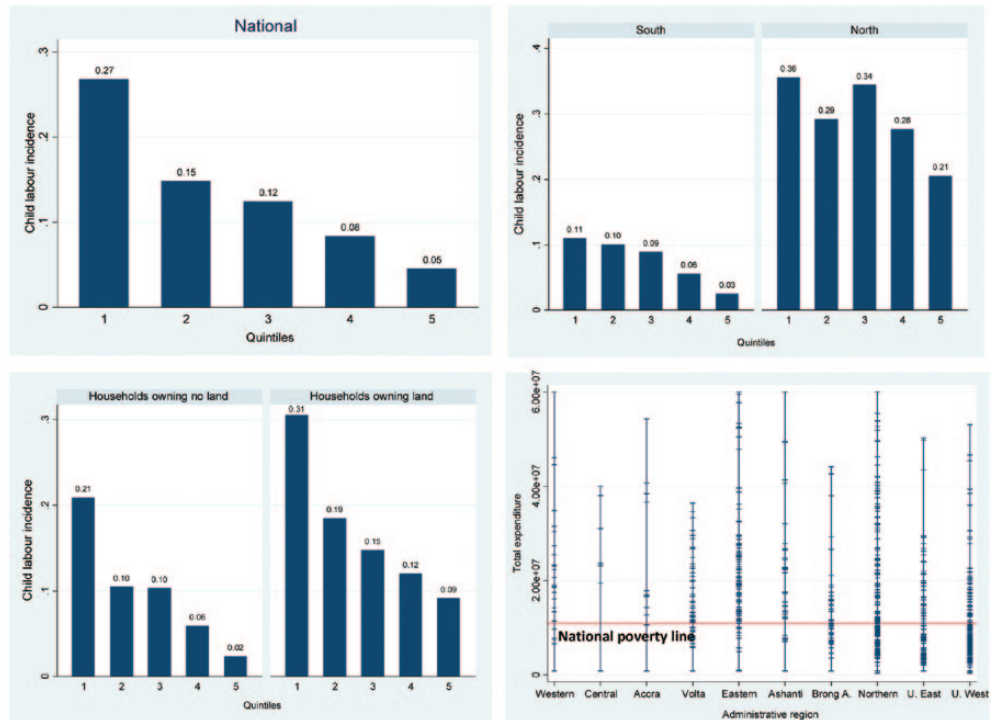
Figure 1. *Labour Participation Rates for 7–14-Year-Old Children by Quintile Levels/Total Household Expenditure, 2005–2006.*
Source: Author's illustration based on calculations of GLSS data. Note: The survey sample for the group of children covers 7,695 observations nationally, with 5,264 observations for the South and 2,367 observations for the North. Wealth quintiles are calculated throughout this paper based on annual household consumption expenditure (including food, housing and other non-food items) and adjusted for household size and composition, following the method used by the government of Ghana (for details, see Ghana Statistical Service 2007). In the bottom right figure, each dot represents an observation of a child in relation to their total household expenditure (in cedis) and their region of residence.

wealth and collateral in agrarian economies and about half of all households in the country own land. On the other hand, land is an opportunity for children to be productively employed, with 70.5% of all child labourers living in a household owning land. While 33.1% of all child labourers in the country live in non-poor households that own land, only 13.9% of all child labourers live in poor households that own no land, illustrating that land ownership can be more closely correlated with child labour than household consumption expenditure (see also Bhalotra and Heady 2003).

The country's agricultural dependency is one important factor among a broader range of factors that appears to create much demand for child labour. In fact, 57% of Ghanaians are employed in agriculture, and the share is over 70% in the North. It is therefore not unexpected that nearly all child labourers in Ghana at 93.7% are employed in general agricultural work that is unpaid (GLSS 2005–2006 data),[10] whereas over 70%

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[10] A total of 88.4% of child labourers work on the farm/land, 2.3% on a river/at the ocean (fishing) and 5.1% at home, while the remaining 4.2% work in other places.

of working children in developing countries are engaged in agriculture (ILO 2002). It is important to note that the prevalence of child labour remained at 16% for the 7–14-year-old population in both 1998–1999 and 2005–2006, while employment in agriculture for the total labour force also stagnated between 1999 and 2006 at 55 and 57%, respectively.[11] In contrast, annual GDP growth averaged 5% over the period 1998–2006 (which has been stronger in manufacturing and services than in agriculture) and the total poverty headcount at the national poverty line reduced from 39.5 to 28.5% over the same period (WDI data), neither of which have led to inevitable reductions in child labour.

Child labour on the farm is often viewed as a basic component of socialisation rather than a form of exploitation. Social norms or attitudes towards child labour and the role they play are poorly understood in child labour research (see e.g. Edmonds 2008; Patrinos and Shafiq 2010).[12] The interview with the Minister of Education provides some insight into their role and he culturally relativises child labour as part of life for many farming families, while he views, on the other hand, that children and youth should not be formally engaged as wage workers. The Minister states:

> We are doing the orientation and sensitisation for the parents also to understand the issues of economic activities for minors—child labour—so that they can desist from holding their children back because of economic advantages they have. ... At the moment, I think we, in Ghana, are at home with the farming peoples. But what is happening is that some parents still want to engage their children as a way of training them for the future in the occupations in which they are, at the moment, engaged. I belong to the old school, where you 'bring up the child the way he should go' so that if you are a child in a farming family you should be able to learn about farming from your parents. But it is not the major issue now. ... They are engaged because they belong to families undertaking farming. And they are just helping their parents. ...We have family farms and you have to take your children to the farm to grow some cassava, to plant some maize in good season and harvest it to supplement the household food sources.

Social norms can thus help explain why shares of children assist on the farm even within households falling into the highest income groups. The Minister highlights that children's contribution to family farming is not only a cultural norm but also has an established, positive cultural value and is even cultural heritage worth preserving.[13] In line with this rationale, the Food and Agriculture Organisation (2010) highlights the positive dimensions of child labour and states that 'working on the farm or on the fishing boat or herding cattle can, if it doesn't get in the way of school and occurs under safe circumstances, be very valuable. It's a means of acquiring skills, giving children a sense of belonging and cultural identity' (see also Grootaert and Kanbur 1995; Canagarajah and Coulombe 1997; Patrinos and Shafiq 2010).[14] Field research suggests that for many Ghanaians, child labour is seen as part of growing up in that working, as opposed to just schooling, helps children get better accustomed to the skills needed later for employment, i.e. a kind of informal apprenticeship. Beyond core cognitive skills mediated in school such as literacy and numeracy, working with

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[11] Likewise, value added agriculture as a share of GDP did not reduce but rather remained stable at 40% in 1998 and 41% in 2005 (WDI data).

[12] See also Berlan (2013) for a study that employs ethnographic methods to examine potential socio-cultural influences on child labour within the Ghanaian context.

[13] It is possible that cultural norms may be—at least in part—endogenous to some economic characteristics in the longer run, especially the country's agricultural dependency.

[14] Humphries (2011) illustrates that during the British Industrial Revolution parents also often viewed work as more beneficial for their children than schooling in terms of the competences acquired.

parents on the farm could be viewed as a complement to school as it can mediate not only technical skills needed for farming but also non-cognitive skills such as work habits (greater effort and discipline), behavioural traits (self-confidence) and physical characteristics (greater physical strength and endurance). This questions the common view that benevolent parents do not want their children to work—a strong assumption defended by Basu and Van (1998). It is however likely that some parents believe that they are being benevolent if their children are spending time and working with them, learning their trade and acquiring such practical life skills. Some parents working on the farm will also want their children with them as they can be better supervised when not in school, while conceivable that (especially older) children would then assist their parents rather than just watch them work.

Basic descriptive evidence suggests that much child labour in the country is not economically necessary or a result of poverty given the quantitative evidence from GLSS that 9% of all children in households in the richest quintile that own land are working (assisting) in family farming, together with the qualitative evidence from field research and from the Minister about his own children assisting on the farm during planting and harvest seasons. Even though the vast majority of child labourers work on a family farm, there are other forms of child labour in the country ranging from those who chase tro-tros (mini-buses) in motion to sell products like fan-ice (ice cream), to others who are exploited or engaged in bondage labour within fishing communities, as participatory observations in 2010 illustrate.[15]

The principal occupation of child labourers (agricultural work) typically involves assisting with planting and harvesting crops (primarily maize, yam, cassava), watching over animals during harvest seasons and/or ensuring that birds do not damage crop fields, as field research in 2010 illustrates. In certain cases some children can nonetheless be exposed to chemicals (fertilisers or pesticides), intense heat, injuries[16] or threats posed by some animals, parasites or plants (Edmonds and Pavcnik, 2005).[17]

A lack of higher returns to basic schooling for those employed in agriculture can help reduce school demand and increase child labour demand in agricultural households. An important result is that the annual income of household heads aged 15 or older who are self-employed in agriculture is basically the same for those with no schooling (US$59) as for those with 9 years of completed basic education (US$56), as shown in Table 1.[18] However, those who reach this level of schooling but work in another occupational group earn higher average annual income. The low returns to education for the large share of self-employed in agriculture are of policy concern since lower secondary is generally the highest level of education attained in rural areas, so that economic incentives to complete basic schooling are largely lacking in a country where most are employed in agriculture. This is important policy information because for many households the decision to bring a child or adolescent to the field to assist in farming activities or send

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[15] In extreme cases some parents at times deny their children schooling and engage them in illegal gold mining, as children were observed mining during school hours in 2010 in Bonsaaso, a poor rural village located in the Amansie-West district (Ashanti region).

[16] The ILO (1997) found that children's self-reported injury rate of working in agriculture is about 12% based on child labour surveys.

[17] Yet, while the worst forms of child labour are generally outside of agriculture and include trafficking, forced labour, child soldiering and prostitution, they are rare although difficult to capture in randomised surveys (Edmonds, 2008).

[18] It is important to bear in mind that income levels are likely higher than reported because individuals active in subsistence farming often do not state a portion of their income as it is consumed.

Table 1. *Annual income for household heads aged 15 or older relative to their level of skills/education and occupational group, 2005–2006*

US$	Level of skills/education acquired:						Avg. income	# of obs.
	Unskilled			Semi-skilled (/skilled)		(Highly-) Skilled		
	No education	Primary	Lower secondary	Upper secondary	TVET	Higher educ.		
National average	*127*	*183*	*368*	*763*	*1,130*	*3,652*	*518*	*7,668*
Public	390	754	1,217	1,761	2,120	4,033	2,130	565
Wage private formal	846	835	1,130	1,391	1,913	5,185	1,489	613
Wage private informal	760	771	902	882	1,250	4,815	923	544
Self-employed, agriculture	59	47	56	117	218	1,446	680	3,603
Self-employed, business (non-agri.)	33	67	151	224	337	2,467	184	1,890

Source: Author's calculations based on GLSS data. *Note:* Household income is measured here as income from employment, which better captures actual earnings related to one's level of schooling attained compared to using all sources of household income including income from rent, remittances and other sources. Of the respondents, 6% are not working, for whom data is missing and calculations are not possible. Data for employment in agriculture has been merged to refer to engagement in either crop or export agriculture. TVET stands for Technical Vocational Education and Training.

them to school and for what duration may be assessed using cost-benefit analysis. This can involve comparing—for primary school for example—the direct private costs per child (GH¢52.81 annually based on 2005–2006 GLSS data)[19] and the opportunity costs of schooling (the forgone earnings from child labour) together with the public costs (GH¢91.49 annually based on 2006 government EMIS data) on one hand with the future benefits to the household, including income returns, on the other (see also Krauss 2012).[20] That is, parents can gain in the shorter term from children who work through their immediate contribution to household productivity and at the same time they can save on costs for education if their children do not attend school. In the longer term, however, such children can have fewer opportunities and earn less later in life as a consequence of a weaker educational background (except when compared to the agricultural self-employed with basic education or less—Table 1). Yet some agriculturally dependent households that perceive post-basic education to be unattainable for their children due to the associated expenses may be less inclined to send them to primary or lower secondary at all given the lack of returns to formal basic education in rural areas and simply train them on the farm instead. Many farming families may thereby view child labour as an optimal choice and as a kind of practical education that may be more relevant and valuable for their children's future occupation (see also Humphries 2011).

No returns to rural basic education can be explained by agriculture generally requiring little formal schooling and farming households requiring much manual labour, with labour (and not 'human capital') commonly recognised as the principal asset that agricultural households own. Field research in 2010 in Ghana also illustrates that demanded skills and competencies for those living in rural areas are largely attained through 'learning by doing' in family farming. Furthermore, although education opportunities in rural areas have begun opening from low levels, there are limited possibilities to apply acquired knowledge and skills outside of the agriculture sector and thus limited labour mobility, i.e. higher completion rates do not appear to have led to many alternative options beyond agricultural livelihoods, especially in the formal sector (World Bank, 2011).

The demand for schooling can compete at times with the demand for child labour, often because of labour-intensive agricultural livelihoods. Map 1 illustrates that in the Upper West region only two-thirds of children attended school (66.9%) and almost half engaged in labour activities (44.7%), while at the other end of the spectrum almost all children in the Ashanti region attended school (96.9%) and child labour is almost nonexistent there (2.9%). The Eastern region is (despite a schooling rate of 97.2%) the outlier in the South for higher levels of child labour which is likely in part explained by the direct labour demand within fishing communities on Lake Volta, as multiple participatory observations in 2010 illustrate.

Child labour and schooling are not mutually exclusive: 8.6% of all 7–14-year-olds combine the two. Table 2 illustrates that households are able to decide between one of four choices in relation to their children's work and schooling. Of these children, 77.2% are schooling and not working, 8.6% are simultaneously working and schooling and

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[19] These household expenses for schooling persist despite the adoption of national legislation to abolish fees for basic education (World Bank and UNICEF, 2009).

[20] Beyond such a standard economic cost-benefit analysis, households likely also consider the less quantifiable benefits of education including its intrinsic value as an end in itself and its social benefits on improved health, reduced fertility, empowerment, among others (Krauss, 2012).
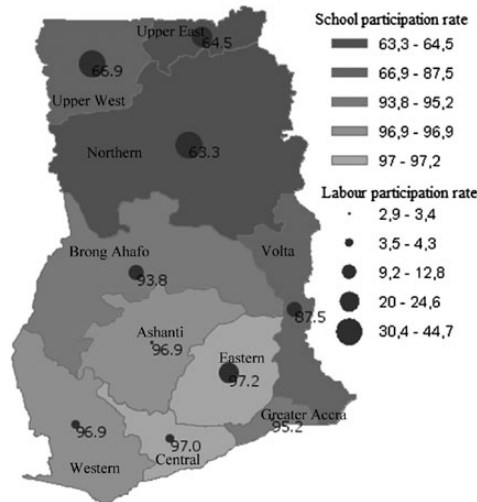
Map 1. *Labour and school participation rates for 7–14-year-olds across Ghana, 2005–2006*
Source: Author's illustration based on GLSS data. *Note:* The values reported on each region in the map refer to school participation rates, while labour partici-pation rates are reflected by the size of the circle in each region.

7% are working but not schooling, while the remaining 7.2% are neither working nor schooling (classified as being idle).[21] Interestingly, more children combine work with school, which can be facilitated by the flexibility of family farming, than those only working.[22] In some households children may at times take on a job because they are not in school or may be in school because they are not currently working. For the most at risk and those living at the level of subsistence, the decision can be difficult: a family that decides to send their children to school and subsequently lacks sufficient labour on the farm and has a poor harvest could potentially even experience an unexpected and negative effect from school. Schooling combined with labour can be positive espe-cially when the alternative is to only be working on the farm.

Where and when work demand and rewards at home or within the community are high and the returns to education are low, such as in rural, farming areas (Table 1), the opportunity costs of going to school can be high. The issue of opportunity costs was highlighted in the interview with the Minister of Education, who stated that 'most of the parents do not think that it is easy for them to … do away with the services … even at that tender age of 5 to 6 years, some of them [parents] receive services, petty-petty services, from these little children.'

Child labourers are highly concentrated within the North. If the South constituted its own country, nearly all 7–14-year-olds would not be working (92.2%), while if the North formed its own country, one-third of children would be engaged in labour activities

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[21] It is likely that the actual share of child labourers is higher as there may be measurement error in activi-ties classifying children as 'idle' especially in relation to domestic work, but also temporary unemployment or temporary non-school attendance, or longer-term unobserved health issues—see Biggeri *et al.* (2003) for a discussion on idle status within household surveys.

[22] Yet children who miss school many times are more likely to have to repeat a year or be expelled from school while greater flexibility may exist for most children to miss work in family farming.

Table 2. *Descriptive data on labour and school participation rates for 7–14-year-old children, 2005–2006*

	School, with		No schooling, with		Total	# of obs.	School	Work	
	no work	work	no work	work					
National average	77.2	8.6	7.2	7.0	100	7,694	85.8	15.6	
	All shares refer to labour or school participation rates out of 100%						Shares are not to add up to 100%*		
Child, parent, household and regional characteristics									
Age 7–8	78.0	5.0	12.1	4.9	100	1,968	83.0	9.9	Typical profile of a child labourer (whether also schooling or not) in the last column
Age 9–11	77.6	8.7	7.0	6.7	100	2,832	86.3	15.4	
Age 12–14	76.2	11.0	4.3	8.5	100	2,894	87.2	19.6	
Female	78.0	7.9	7.7	6.4	100	3,716	85.9	14.3	
Male	76.4	9.3	6.8	7.5	100	3,978	85.7	16.8	
Relationship to head is biological child	76.7	8.7	7.5	7.0	100	5,981	85.5	15.7	
Mother lives in the household	76.3	9.0	7.5	7.2	100	5,976	85.3	16.2	
North	50.6	14.1	16.3	18.9	100	2,366	64.8	33.1	
South	89.0	6.2	3.2	1.6	100	5,264	95.2	7.8	
South Western	93.1	3.8	2.7	0.4	100	706	96.9	4.3	
Central	94.5	2.5	1.9	1.1	100	565	97.0	3.5	
Greater Accra	92.0	3.2	4.6	0.2	100	585	95.2	3.4	
Volta	80.4	7.1	6.8	5.7	100	674	87.5	12.8	
Eastern	78.1	19.1	1.9	0.9	100	790	97.2	20.0	
Ashanti	94.6	2.3	2.4	0.7	100	1,327	96.9	2.9	
Brong Ahafo	87.8	6.0	2.9	3.2	100	617	93.8	9.2	
North Northern	54.5	8.8	15.1	21.6	100	963	63.3	30.4	
Upper East	52.2	12.3	23.2	12.3	100	684	64.5	24.6	
Upper West	43.9	23.0	11.4	21.7	100	719	66.9	44.7	
Father's level of education: No schooling	66.6	13.1	10.1	10.2	100	994	79.7	23.3	
Primary	88.4	6.6	1.7	3.3	100	181	95.0	9.9	
Lower secondary	93.0	5.3	1.1	0.6	100	972	98.3	5.9	
Upper secondary	97.6	0.6	1.8	0.0	100	167	98.2	0.6	
Tertiary	98.2	1.8	0.0	0.0	100	55	100	1.8	
Household owns land	70.1	10.2	9.5	10.3	100	4,118	80.2	20.4	
Household owns no land	84.5	7.3	4.9	3.2	100	3,319	91.8	10.6	
Wealth quintile 1 (poorest)	58.1	12.2	15.2	14.6	100	2,287	70.2	26.8	
Wealth quintile 2	78.4	9.1	6.8	5.7	100	1,693	87.5	14.8	
Wealth quintile 3	84.3	8.9	3.3	3.6	100	1,480	93.1	12.4	
Wealth quintile 4	89.3	5.5	2.3	2.9	100	1,267	94.8	8.4	
Wealth quintile 5 (richest)	93.5	3.2	2.0	1.3	100	967	96.7	4.6	
School location									
Time to and from school, 0–59 min.	91.5	8.5	..	..	100	4,915	100	8.5	
Time to and from school, 60–119 min.	89.0	11.0	..	..	100	1,094	100	11.0	
Time to and from school, 120+ min.	84.6	15.4	..	..	100	391	100	15.4	
School participation rate by hours of class attended last week									
24 hours or less	86.9	13.1	..	..	100	1,180	100	13.1	
Between 25 and 34 hours	91.9	8.1	..	..	100	2,650	100	8.1	
35 hours or more	94.1	5.9	..	..	100	1,306	100	5.9	
Shares or figures are not necessarily to add up to 100%									
Avg. number of hours worked in week	..	19.9 h	..	34.1 h	..	1,199	..	26.3 h	
Share who received payment for work	..	3.8	..	3.9	..	1,199	..	3.8	
Child labour type									
Employment in agriculture, unpaid work	..	92.6	..	95.1	..	1,125	..	93.7	
Employment in non-agriculture	..	7.4	..	4.9	..	76	..	6.3	
Work place in village or town									
Yes	..	94.4	..	89.2	..	1,106	..	92.1	
No	..	5.6	..	10.8	..	95	..	7.9	

Source: Author's calculations based on GLSS data. *Note:* Data that refer to fathers with tertiary education should be read with caution given limited observations. *The last column reflects the total prevalence of child labourers whether also schooling or not, while the second-to-last column reflects the total share of school participants whether also working or not. The shares of the last two columns do not add up to 100%, as some children are doing both.

(33.1%). In the North, about half of the children of this age are only attending school (50.6%) and 18.9% are only working while 14.1% combine work with school and 16.3% are doing neither. The fact that only 1.6% of Southern children are working while not schooling compared to 18.9% of Northern children illustrates the extent of the latter group's strong marginalisation (Table 2). Children affected by harmful child labour (conflicting with their education) live therefore nearly entirely in the North.

Children's usefulness or value on the farm increases as they get older or (more accurately) physically bigger and stronger. Child labour rises incrementally from 9.9% for 7–8-year-olds to 15.4% for 9–11-year-olds followed by 19.6% for 12–14-year-olds. Such trends are also found internationally (Edmonds, 2008). In addition, there is an increasing demand for older children to only be working, as age-specific data in Figure A1 shows (see appendix).

There appears to be a strong intergenerational relationship between child labour and parental education as well as agricultural livelihoods (Table 2). The kinds of livelihoods that parents pursue seem closely related to whether children work or not, as nearly all child labourers are working in family farming, with only 6.3% engaged in non-agricultural work. This, together with the fact that only 3.8% of child labourers receive payment for their work (see Table 2), does not offer strong evidence for the argument that parents primarily employ their children as a source of additional revenue. Otherwise there would likely be a larger share of child labourers working outside of family farming for higher earnings in other sectors. In addition, children are three times more likely to be involved in harmful child labour (without schooling) who live in households owning land (10.3%) compared to those in landless households (3.2%).

An important aspect of child labour that is not commonly analysed in the literature is seasonality. Seasonal and temporary labour can follow seasonal and temporary school attendance patterns, with Figure A2 illustrating school–labour tradeoffs and a higher prevalence of child labour during the major planting and harvesting seasons (see appendix).[23] Simply engaging children seasonally on the farm is easier for many households than trying to search for and hire adult workers willing to work periodically during the peak seasons when especially adult labour shortages are more likely to arise.[24] A study by Fentiman *et al.* (1999) found that in rural Ghana some children who are enrolled miss school throughout seasons when families need additional assistance on the farm. Likewise, a study in Nigeria observed that lower school attendance is common throughout harvest seasons and on days of local markets (Francis *et al.* 1998).

4. Regression results

4.1 Regression model and basic results

Research that attempts to identify potential sources of child labour faces the challenge of trying to isolate those factors that influence child labour without simultaneously

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[23] Given the survey design of GLSS and that data on each child is only collected at one point in time, there is likely some degree of measurement error here as the survey does not include questions on children's main occupation (school or work) throughout the year or whether some may likely only work seasonally. Rather, children are classified as labourers if they worked during the last 7 days, as defined in Section 2. Furthermore, nationally representative panel data on child labour, which could help tackle this measurement issue, is not available in Ghana.

[24] Basu and Van (1998) include a substitution axiom in their model that suggests that, from a firm's point of view, child labour can substitute for adult labour, and vice versa.

influencing schooling. It is likely that child labour and schooling decisions are typically jointly determined, as these are interrelated choices about children's restricted time allocation. Given that working and schooling are interdependent decisions (and not mutually exclusive, as descriptive data show above), bivariate probit regressions are applied here which can permit interconnected relationships between these two binary dependent variables. A bivariate probit model allows for correlation in the error terms of the child labour regression and the schooling regression. This modelling approach—while acknowledging that every statistical model has important methodological limitations—may be better suited compared to the most common method of analysing child labour independently using for example a logit or probit model (see Edmonds 2008). Some researchers apply a sequential probit; see for example Grootaert and Patrinos (1998), who make a strong assumption that households first decide if a child attends school and then make decisions about a child's further time allocation.

The bivariate probit regressions conducted here control for the presence of a number of individual, parent, household, regional and cluster-level factors, and can help provide some insight into potential sources that can influence decisions about child labour—in part building on and expanding a model employed in Ghana using older data from the late 1980s and early 1990s (Canagarajah and Coulombe, 1997). The potential correlates of working and schooling are examined applying both supply- and demand-side variables. Independent variables explored range from sex, parental levels of education and household wealth,[25] to the number of household members, household occupation in agriculture/non-agriculture, region of residence and, among other factors, education supply indicators (for further information on variables and methodology applied, see Table 3).

It is important to note that a number of other factors can influence child labour that cannot all be easily measured or captured in household survey data and thus in regression models. These unobservables include factors such as social norms and attitudes about child labour, while their importance is highlighted above in the qualitative analysis. They include child decision-making processes such as whether some children may at times be working as their own choice to be with family members, because they want to work or even because they dislike school. Multiple children interviewed in 2010 indicated that they were beaten at times by their teacher in class for arriving late, not completing homework or the like.[26] They include differences in levels of laziness or intrinsic motivation while working which are likely to influence children's energy levels, for example in school or to complete homework. They also include differences in parental knowledge about anti–child labour legislation and the level of potential enforcement (if any) in their community, among many other factors. Such omitted variables can reduce the predictive power of existing coefficients as they can at times be correlated with independent variables, so that there would be a correlation between the

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[25] Household wealth is calculated based on annual household consumption expenditure, thereby reducing endogeneity in the child labour equation which can arise when using income from employment as a control variable as some children receive income for their work. Many child labour studies nonetheless use income as a control variable and suffer from greater endogeneity (see e.g. Deb and Rosati 2004; Edmonds 2008). Even using household consumption instead of income can lead to some biased results as nearly all child labourers work on the farm and thus household food consumption can be endogenous to household food production—this is another important methodological constraint in trying to identify potential sources of child labour that is not commonly recognised in the literature.

[26] The assumption in the literature, however, is that adults make the decisions related to their children's work.

error term and independent variables. The regression models here, while acknowledging the important methodological limitations of trying to model such complex human behaviour, focus on exploring those quantifiable factors that can help influence decisions about child labour found in GLSS survey data.[27] It is important to stress that the estimated results do not reflect causal effects, that they do not go beyond correlations.

The first model assesses potential effects of demand variables (at the household level) on influencing individual choices in favour of or against child labour and schooling, while the second model also takes into account supply variables (at the government level) such as distance to the nearest school facility and total school expenditure. The results of these two regression models are presented in Table 3, while only the last column reflects basic descriptive statistics of the explanatory variables applied (for the full sample). Results for models 1 and 2 are similar due to the rather limited reported effects of supply variables and the results for model 2 are described in the following for simplification purposes.

In terms of gender, the regression results show that overall the difference between 7–14-year-old boys and girls is not significant in their probability of being engaged in work. This result is consistent with previous research in Ghana (Canagarajah and Coulombe, 1997). In relation to fathers without any schooling (the reference group), those who have at least primary education are an estimated 4 to 5% less likely to have their children working while they are an estimated 3 to 6% more likely to send their children to school, with controls for individual, household, community and cluster factors (Table 3).[28] Similar trends are found internationally (Brown *et al.*, 2001). It has been argued that the age and presence of siblings can affect working patterns of other children in the household (Chernichovsky, 1985). This influence seems to exist in Ghana but is small, with the odds of children working increasing by about 1% with each additional household member aged 5 or below.

A child is estimated to be 7% less likely to work if he or she falls into the richest quintile compared to the poorest quintile (the reference group). This does not directly imply that poverty is influencing these potential effects but rather—as Bhalotra (2007) points out—that some more affluent households may simply place a greater importance on children's leisure or their schooling, for instance. Other factors are also linked to wealth that influence its correlation with child labour. Wealthier households and communities are for example more likely to use more sophisticated technology and thus be in localities with higher returns to education, with the inclusion of such a variable into the model (see Section 4.3) reducing the reported wealth effect.

Estimated effects of conditions associated with geographic location on labour participation appear strong: children who live in the Ashanti region are an estimated 7.5% less likely to be working compared to those in the Northern region (the reference group) while those in the Upper West region are an estimated 13.6% more likely to work, reflecting a cross-regional difference of 21.1% in the likelihood of working, with other factors such as household wealth levels held constant. Children in the Ashanti

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[27] However, further qualitative research with children, parents and teachers on these unobservables could provide additional insight into the non-quantifiable factors that can influence child labour.

[28] While levels of parental education often correlate with levels of household wealth, collinearity is not a direct issue in the models as wealth quintiles reflect household consumption expenditure (not income from employment) and as most Ghanaians are self-employed in agriculture, for which the completion of primary or lower secondary education yields no higher returns relative to no schooling (Table 1). On the other hand, existing studies often do not control for parental education and thus tend to overestimate the potential effect of wealth on child labour, as for example knowledge acquired through education can also influence social norms about child labour.

region are an estimated 4.4% more likely to attend school in comparison to those in the Northern region (Table 3). Overall, geographic location appears to influence child labour much more strongly than it does school participation, which is likely linked to the high concentration of child labourers in the North.

An important result is that household wealth in Ghana appears to have weaker effects on the prevalence of child labour and schooling than the conditions associated with geographic location particularly in the North.[29] This casts further doubt on the common perception that it is mainly just poverty pushing children prematurely into employment and it highlights the policy importance of geographic targeting to the North. Given these regression results (Table 3) together with the descriptive data on this relationship (Figure 1) and qualitative results, this paper breaks away from the conventional thinking that child labour is nearly entirely explained by monetary poverty. Since the models already control for the lower levels of parental education and household wealth of Northerners and, among other factors, their high levels of household engagement in agriculture, the strong reported effects of Northern residency largely capture the combination of remaining conditions (beyond the control variables available in the GLSS survey) associated with living in this part of the country. The estimated effects can reflect lower labour mobility into formal sector jobs and higher levels of social acceptance of child labour (than in the country as a whole) as the vast majority of households are active in agriculture here. The North also has a higher prevalence of drought, lower soil fertility and more unpredictable water and resource availability which typically generates lower agricultural productivity and output than in Southern areas (World Bank, 2010a) and can increase the demand for child labour.

Children living in households with one or both parents employed in agriculture (the reference group) are an estimated 2–3% more likely to be working themselves compared to children with parents employed in the manufacturing or service sector. This reported effect is low likely because the very large reported effects of geographic location in the North already partly capture these children's residency in rural areas.

Given that data on household expenditure for education and on distance to school are only provided for students (i.e. not for children who do not attend school), these two supply variables are calculated here creating the cluster median (the median for a given geographic enumeration area used for the national census). The assumption is thus made here that educational expenses for households and school distance would be similar within a given cluster, which the data confirms. These cluster-level variables also reduce potential endogeneity as household decisions to pay for schooling (and send children to school) can be endogenous to decisions about child labour. The school expenditure variable, which reflects potential household budget limitations in financing children's schooling, indicates that higher costs associated with education appears to have a non-significant effect on labour involvement and schooling, with controls for levels of household wealth and other factors in the model.[30] Even though school costs account for a large share of household expenditure especially among the poorest quintile (16% for public and 30%

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[29] Testing the model with an urban location dummy (1 or 0) instead of 10 regional dummies shows that the estimated effects of urban/rural location are also much stronger than those of all other factors, including household wealth.

[30] While measuring school quality is difficult with most household surveys, including GLSS, Brown *et al.* (2001) and Ray (2003) use school costs at the household level as a rough proxy for school quality, as schools with higher costs would on average tend to have higher quality school infrastructure and possibly higher learning outcomes.

Table 3. *Bivariate probit regression results: potential sources of child labour and school participation for 7–14-year-olds, 2005–2006*

Independent variables	Demand variables (Model 1) *Full sample*				Demand and supply variables (Model 2) *Full sample*				Demand and supply variables *Children in rural areas only*				Demand and supply variables *Children in agricultural households only*				descriptive data avg L 0.16 S 0.86
	Labour participation		School participation		Labour participation		School participation		Labour participation		School participation		Labour participation		School participation		
	marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio	
Child traits																	
Age	0.657	1.72	0.383	1.41	0.609	1.58	0.368	1.47	0.793	1.28	0.372	0.88	0.437	0.86	0.792	1.94	10.5
Age^2	-0.330	-1.23	-0.235	-1.22	-0.318	-1.18	-0.219	-1.22	-0.375	-0.86	-0.166	-0.55	-0.169	-0.47	-0.499	-1.72	--
Male (1 or 0) (reference group, female)	0.018	1.68	-0.015	-1.94	0.020	1.85	-0.012	-1.69	0.049	2.75	-0.031	-2.57	0.038	2.56	-0.024	-2.07	0.52
Own child (1 if relationship to head is biological child, 0 if not)	-0.031	-2.00	0.019	1.63	-0.025	-1.58	0.013	1.19	-0.048	-1.96	0.013	0.75	-0.062	-3.30	0.019	1.14	0.77
Parental traits																	
Mother lives in HH (1 or 0)	0.016	1.05	0.026	2.26	0.015	0.97	0.025	2.33	0.027	1.07	0.052	2.99	0.037	1.82	0.035	2.25	0.77
Father's education, primary (1 or 0) (ref. group, no edu.)	-0.035	-2.33	0.036	4.67	-0.042	-3.05	0.039	5.85	-0.083	-3.70	0.064	6.17	-0.046	-2.14	0.055	4.71	0.07
Father's education, lower sec.	-0.055	-4.12	0.066	6.41	-0.054	-3.86	0.056	5.92	-0.092	-4.17	0.076	5.21	-0.056	-3.17	0.066	5.01	0.41
Father's education, upper sec. or higher	-0.054	-3.65	0.042	5.10	-0.049	-3.32	0.034	4.15	-0.086	-3.47	0.056	4.46	-0.115	-10.63	0.077	8.25	0.11
Household conditions																	
Wealth quintile 2 (1 or 0) (ref. group, quintile1)	-0.018	-1.21	0.009	0.96	-0.013	-0.89	0.006	0.65	0.007	0.29	0.005	0.35	0.001	0.06	0.004	0.28	0.22
Wealth quintile 3	-0.021	-1.30	0.020	1.96	-0.032	-2.08	0.019	2.05	-0.005	-0.16	0.016	0.89	-0.008	-0.35	0.022	1.35	0.20
Wealth quintile 4	-0.031	-1.98	0.026	2.61	-0.042	-2.85	0.025	2.64	-0.028	-0.91	0.032	1.90	-0.033	-1.48	0.026	1.57	0.17
Wealth quintile 5	-0.074	-6.12	0.036	3.89	-0.069	-5.70	0.027	2.77	-0.107	-5.02	0.062	5.54	-0.088	-5.83	0.053	4.23	0.13
HH occupation in non-agriculture (ref. group, agriculture)	-0.027	-2.11	0.015	1.65	-0.024	-1.86	0.016	1.84	-0.027	-1.20	0.016	1.09					0.51
With each additional HH member aged 0-5	0.014	2.23	-0.007	-1.69	0.014	2.27	-0.007	-1.85	0.013	1.33	-0.009	-1.43	0.012	1.42	-0.009	-1.36	1.0
With each additional HH member aged 6-14	0.004	0.95	0.004	1.06	0.002	0.52	0.005	1.44	0.002	0.25	0.009	1.75	0.002	0.32	0.007	1.46	2.7
With each additional HH member aged 15-59	-0.003	-1.05	0.005	2.25	-0.003	-1.00	0.006	2.37	0.000	0.07	0.005	1.37	-0.003	-0.66	0.007	1.95	3.0
With each additional HH member aged 60 or older	-0.012	-1.30	0.008	1.36	-0.008	-0.90	0.006	1.01	-0.016	-1.16	0.010	1.07	-0.015	-1.36	0.009	1.02	0.3
Regional and cluster characteristics																	
Western region (1 or 0) (ref. group, Northern region)	-0.048	-3.03	0.037	4.49	-0.040	-2.30	0.028	3.03	-0.098	-4.65	0.052	3.77	-0.071	-4.14	0.055	4.69	0.09
Central region	-0.065	-4.92	0.042	5.36	-0.074	-6.60	0.040	5.50	-0.135	-9.33	0.062	5.07	-0.104	-9.57	0.060	5.41	0.08
Accra region	-0.044	-2.51	0.020	1.69	-0.043	-2.31	0.008	0.53	-0.079	-2.70	0.007	0.26	-0.056	-2.27	0.003	0.12	0.08
Volta region	-0.038	-2.18	0.033	3.79	-0.023	-1.11	0.032	4.14	-0.049	-1.53	0.052	3.97	-0.025	-0.89	0.043	3.17	0.10
Eastern region	0.063	1.95	0.046	5.83	0.062	1.79	0.042	6.00	0.027	0.60	0.070	6.37	0.038	0.94	0.063	6.34	0.11
Ashanti region	-0.082	-5.90	0.054	5.89	-0.075	-5.10	0.044	4.84	-0.132	-6.24	0.070	5.00	-0.085	-4.65	0.064	4.81	0.18
Brong Ahafo region	-0.042	-2.51	0.045	6.32	-0.040	-2.46	0.039	5.67	-0.062	-2.23	0.064	5.92	-0.056	-2.75	0.061	5.59	0.08
Upper East region	0.018	0.65	-0.033	-1.49	0.028	0.97	-0.027	-1.34	0.014	0.36	-0.034	-1.13	0.026	0.77	-0.042	-1.41	0.08
Upper West region	0.138	3.18	-0.010	-0.59	0.136	3.13	-0.001	-0.04	0.174	2.99	0.003	0.14	0.145	2.95	-0.008	-0.35	0.09
Total school expenditure, lowest tercile (ref. group, highest tercile)					-0.012	-0.74	-0.014	-0.99	-0.053	-2.06	-0.007	-0.33	-0.013	-0.58	-0.018	-0.89	0.33
Total school expenditure, middle tercile					-0.022	-1.66	0.001	0.12	-0.051	-2.24	0.023	1.33	-0.022	-1.13	0.005	0.28	0.33
Distance to school, 0-29 min. (ref. group, 30 or more min.)					-0.002	-0.17	0.033	2.63	0.012	0.57	0.034	1.97	-0.002	-0.10	0.049	2.68	0.76
Constant	-2.69	-2.92	-1.48	-1.46	-2.51	-2.59	-1.88	-1.72	-2.28	-2.07	-1.67	-1.35	-2.02	-1.82	-2.57	-2.14	
Sample of children			2,385				2,214				1,389				1,406		

Source: Author's regression results based on calculations of GLSS data. *Note:* T-ratio shows if a variable's significance level is over 95% if > 1.96 or < 1.96. HH stands for household. The last column reflects basic descriptive statistics of the explanatory variables applied for the full sample; additional tables of summary statistics including values on minimum, maximum and standard deviation are not included due to space limitations. Total school expenditure includes costs for school and registration fees; contributions to PTA; uniforms and sports clothes; books and school supplies; school transportation; food, board and lodging; expenses on extra classes; and in-kind expenses. Total school expenditure is divided into terciles, i.e. the lowest school expenditure tercile reflects clusters that spent on average GH¢0 – GH¢14.30 (new cedis), the middle school expenditure tercile spent GH¢14.31 – GH¢43.80 and the highest school expenditure tercile GH¢43.81 – GH¢700.00. Age^2 represents age squared and is included in order for the regression to allow for non-linearity in age. To capture a larger sample of children, mothers' level of education has been withdrawn from the initial regression design, for which reported effects are similar to fathers' level of education.

for private school students), they do not appear therefore to be a significant factor in pushing children prematurely into the labour force to be able to offset school fees or in pulling children out of school because of a lack of funding. Yet in other countries higher school costs do have potential effects on increased child labour, such as in Pakistan (Hazarika and Bedi, 2003) and Bangladesh (Shafiq, 2007). In terms of school distance, estimations illustrate that a distance of less than 30 minutes (compared to the reference group of over 30 minutes) appears to have a non-significant effect on working but a positive and significant effect on the prevalence of schooling by an estimated 3% (for similar results, see Deb and Rosati 2004). It was expected that potential effects of distance on working and schooling would be larger. The reported results could be because distances to school in 2005–2006 remain relatively long for most children largely irrespective of various background characteristics including North/South or rural/urban residency, with descriptive data indicating that 22.5% of primary students in the country take at least one hour to get to and come home from school.

4.2 Running split regressions

Most papers pool data on child labour in household farming with labour for outside employers and also pool data for rural and urban sectors within the economy, for children of different age groups, across wealth levels and over different seasons of the year. Because such aggregation can hide potential effects that influence some subgroups but not others, the following model specifications address and disaggregate these issues. Table 3 shows the regression results applying the variables in the second model (demand and supply model) but only for children in rural areas as well as only for children in agricultural households (in which either one or both parents are employed in agriculture). Relative to the results for the full sample in the second model, results only for rural children illustrate that the likelihood to be working increases (and schooling decreases) for rural boys in general and for all rural children living in the North compared to the South. These differences in reported effects for rural children are similar to the differences in reported effects for children in agricultural households. An important result is that the estimated effects of household wealth on child labour in agricultural households and in rural areas (where nearly all children work) become very small and non-significant across all wealth quintiles except for the richest 20% of households, providing further evidence against the 'luxury axiom' particularly for rural and agricultural areas.

Table A1 presents the estimated results of split regressions for children by household wealth levels, by season of the year and by age (see appendix). Results only for children in the poorest quintile illustrate that there is a bias against poor boys, as they are much more likely to be working and much less likely to be schooling. Limited research exists on the role of seasonal child labour. With GLSS 2005–2006 collecting monthly data from 4 September 2005 to 3 September 2006, Table A1 presents the results for the subgroup of children surveyed during the harvesting and planting seasons from November through April (i.e. during the months with greater levels of child labour; see Figure A2). Results show that children become even more likely to work in the Northern region relative to the regions across the South during this period. On the other hand, the estimated effects of geographic location on schooling become smaller. Among wealth quintiles, only households in the richest quintile appear to have a statistically significant effect on reducing child labour, while there is no significant wealth effect on children's schooling, which may both illustrate the stronger overall demand for children to assist on the farm during this period

of the year. Other estimates of sub-groups for the full model, for example by geographic location in the North and South, constrain the sample and are not possible.

4.3 Testing other variables, assessing potential sources over time and conducting further analyses

A range of other variables are individually included into the second model to test whether they may influence the decision for children to engage in work or go to school. In including variables to indirectly capture an aspect of social norms, results show that the potential effect of different religious affiliations or ethnicity on working is not significant. Yet results suggest that Muslims and Christians may possibly place a greater value on formal education, as children in these households are an estimated 4 to 9% more likely to attend school, respectively, relative to Animists, the reference group (for similar results, see Canagarajah and Coulombe 1997).[31] In terms of land ownership, children in households that own land are an estimated 5% more likely to work. Interaction terms between wealth quintiles and land ownership are also tested and illustrate that children living in land-owning households within poorer quintiles are more likely to work than those in land-owning households within richer quintiles.

To estimate the potential effects of returns to education on child labour and schooling, mean income from employment by paternal levels of education is calculated for the cluster average. Income from employment is aggregated at the cluster level for several reasons. One, this reduces endogeneity with any income gained by children in the same household. Two, many child labourers live in villages where reported income from employment is not always common, constraining thereby aggregation at low geographic levels. Three, aggregation at higher levels would not allow for sufficient variation in income from employment between districts or regions. At the same time, however, a limitation of any analysis estimating the potential effects of returns to education is that it is not possible to easily discern whether parents make decisions based on current returns or possibly on expected future returns. This analysis here, acknowledging such limitations, applies current returns that are averaged at the cluster level and then divided into terciles. In clusters with the highest returns to primary education (tercile 3), children are an estimated 5% less likely to be working and 2% more likely to be schooling relative to those living in clusters with the lowest returns to primary (tercile 1), while also controlling for mean income from employment at the cluster level and levels of fathers' education and household wealth. These results suggest that child labour may respond to higher returns to primary schooling and that raising returns may increase incentives to send children to school.

To try and test the 'luxury axiom' with a possible exogenous source of variation, a variable is included into the second model on whether children received a scholarship during the past 12 months. Results show that recipient children are an estimated 4% more likely to attend school while the estimated effect on reducing child labour is not significant. This may suggest that any potential effect of the scholarship on increasing school attendance is more likely to be a result of attracting idle ('inactive') children or child labourers who then combine work with school, rather than a corresponding reduction in child labour. Increasing school participation through such education subsidies will thus not inevitably reduce child labour, as school and work are (as mentioned)

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[31] The potential effects of religious affiliation or ethnicity nonetheless likely have little policy relevance relative to many of the other analysed variables, especially in terms of targeting government programmes due to issues associated with social stigma.

not the inverse of each other for the majority of child labourers. As another possible exogenous source of variation, including a variable for whether households received any domestic or foreign remittances in the past year (accounting for 35% of households) illustrates that children in recipient households are an estimated 2% more likely to attend school but the estimated effect on child labour is not significant. Thus, both of these exogenous variables, which raise households' disposable income and significantly increase the likelihood for children to attend school, have no significant reported effect on child labour and provide further evidence against the 'luxury axiom' in agrarian economies like Ghana.

While the entire paper analyses child labour defined as working for economic gain, a model is tested here using total hours spent on non-economic household chores as a dependent variable and using the same controls as in the second model. Results show that both girls and non-poor children are significantly more likely to do household chores. An interesting result is that children across Southern regions (where child labour is least pervasive) are more likely to be doing household chores than Northern children (see also Figure A3). That is, in the North, where agricultural livelihoods are most present, children's time is biased towards working for economic gain on the farm whereas in the South, where agricultural livelihoods are least present, children's time is biased towards assisting with household chores.

To assess factors across survey years for why children work for economic gain, Table 5 presents the regression results for the demand model and the demand and supply model using the GLSS survey from 1998–1999 and compares the results with those from the 2005–2006 survey. In describing the results for the demand and supply model, conditions associated with geographic location in the Northern region relative to different regions of the South appear to have the strongest and most consistent effects on increased child labour and reduced school participation in the country over both survey years. Compared to 2005–2006, the estimated effects of household wealth on child labour were smaller and non-significant across the bottom four quintiles in 1998–1999, with only children in the richest quintile being less likely to work.

An additional exercise with the 2005–2006 survey is conducted using a probit regression with labour participation as the dependent variable and including all control variables in the demand and supply model while also including school attendance. To reduce endogeneity associated with such a model (the interdependencies between schooling and working), a child's actual school attendance is not used but rather school attendance rates for the cluster mean are calculated and then divided into terciles. Results suggest that there are no large differences in the estimated effects of the remaining parameters. Relative to children living in clusters with the lowest school attendance rates (tercile 1), those in clusters with the middle or highest school attendance rates are an estimated 4 to 8% less likely to be working, respectively. The reported school attendance effect on reduced child labour appears thus larger than that of levels of household wealth and fathers' education. In addition, a probit regression with interaction terms is conducted for children involved in harmful child labour (i.e. children attending school are omitted from the sample), with boys living in an agricultural household in the North being most strongly and significantly affected by harmful child labour. The point at which child labour and schooling are thus more likely to become substitutes rather than complements is especially when children have these three traits. After discussing the regression results, the next section outlines policy and reform options.

5. Policy implications

This paper, first, tries to identify which potential constraints and enabling factors of child labour beyond monetary poverty may be critical and, second, which policy and reform approaches may then be best in reducing harmful child labour. Each step is incomplete without the other. Together they are crucial for planners and policymakers. Yet linking applied research to policy design is often lacking or rather rudimentary in child labour research, particularly context-specific policy design (cf. Bhalotra and Tzannatos, 2003; Edmonds, 2008).

Results suggest that demand-side variables and thus policies (that influence household demand) appear currently more important than school supply variables (school expenditure and distance) which often have a more limited or non-significant estimated effect on influencing labour and school participation in the country on a whole. Because access to basic education is often seen in the literature as the most effective way to reduce child labour (e.g. UNICEF, 2007; Overhoff, 2006), this paper provides alternative evidence, especially as most child labourers are already in school.

In terms of the country's strong agricultural dependency, school calendars could be matched to farming calendars in relevant rural communities as a shorter-term policy measure that synthesises working with schooling. Educational policies that do not consider local community needs can inadvertently have negative potential effects on rural livelihoods insofar as they may oblige some households to choose between either work or school. In raising the question during the interview about potentially modifying the school calendar to accommodate planting and harvest times, the Minister of Education responded that:

> This idea of making the school terms match the farming seasons of the country has been examined. ... the first NDC [National Democratic Congress] Government even asked that we look at the vacation periods; and even if we should have four terms, four academic terms within the year, so that the farming seasons—the minor season and the major season—will be set free for schools to release their students for work on the farms; [then] we should do so. ... And, at any rate, we have land preparation periods and all sorts of periods related to farming.

Given the strong seasonal labour demands for children in farming families (Figure A2) and given the general societal acceptance of safe forms of child labour, education authorities need to consider adopting a flexible school calendar. Such a calendar could adjust starting dates and holiday periods to better reflect farming seasons, although it should, if adopted, only affect relevant communities: those mainly in the rural North with school-age children who are out of the school system, or go in and out of school during agricultural periods.[32] Such a policy measure, while it could possibly even increase children's seasonal work on the farm, would help raise school participation.[33]

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[32] Also, a study of African countries by Eagle (2006) finds that some children would not mind attending school on weekends in exchange for being able to take off on the market day, questioning also the appropriateness of the conventional Western weekend for all school contexts.

[33] An example of such a scheme is the School For Life programme in the North. School hours are agreed upon with the community and its school year has a nine-month cycle and operates during the North's dry season, allowing children to assist their parents on the farm during its rainy seasons (Akyeampong, 2004). Field research illustrates that the programme's volunteer teachers who generally have some secondary schooling are hired locally and communities remunerate them with 'soap money', the equivalent of a few cedis per month or enough to purchase soap. Tens of thousands of children have been reached through the programme who otherwise would have likely remained excluded from school (Akyeampong, 2004). Scaling up this programme especially in the North can be a viable policy option in the shorter term, with very low operational costs needed to increase attendance among out-of-school child labourers.

Results here suggest that social programmes designed to offset the opportunity costs of schooling and thus reduce the time spent in child labour are likely to have limited success if they do not target rural households with farming livelihoods, especially in the North. Existing demand-side policies need to be therefore reformed. First, the capitation grant—which was a key policy in stimulating school enrolment growth between 2004–2005 and 2007–2008 by helping households offset 'private costs' for schooling—needs to improve its targeting mechanism by transferring funds to Northerners instead of nationwide allocations. Spatially targeting Northerners would have much lower administrative costs than its current targeting structure. Such a reform would increase efficiency in implementing public resources and help achieve the policy's objective of universalising basic attendance while it would require no additional funding as grant allocations would simply be redistributed (see Krauss 2012). Second, Livelihood Empowerment Against Poverty (LEAP) is a cash transfer programme adopted in 2008 conditional on no child labour involvement, health visits and school attendance, but there is room for improved targeting efficiency by better targeting the programme to Northerners as well (for an analysis of the programme, see World Bank 2010b).[34] Third, a reformed School Feeding Programme (a free school lunch scheme) that actually targets (i) poor, (ii) malnourished and (iii) out-of-school children especially in the North, none of which are currently targeting criteria, is also a necessary and viable policy approach to better incentivise school participation and mitigate harmful child labour. Overall, the social programmes in the country that currently have the largest potential at the micro level to reduce child labour either have a limited scope (LEAP), are spatially blind (capitation grant), are very poorly—if not inversely—targeted (school feeding programme) or suffer from a combination of these (for an in-depth analysis of these programmes, see Krauss 2012). Thus, better targeting existing programmes and safety nets to the North is needed so that child labour itself is not viewed as the safety net for some disadvantaged households. Yet such subsidies and safety nets are in general more likely to increase school participation than to reduce child labour.

In relation to the school-labour complementarities, universalising basic school attendance would nonetheless likely also help decrease child labour and reducing child labour would likely also help universalise basic school attendance in the longer term—even though (as shown) many children are able to combine the two. This apparently interlocking relationship is not a 'catch 22' given some of the policies outlined here and given that public intervention in other countries has been able to simultaneously link large reductions in child labour to large increases in schooling, particularly through demand-side schemes like conditional cash transfers to households such as Bolsa Família in Brazil. An improved LEAP policy also has such a potential in Ghana.

In analysing the country's economic structure it is almost logical that the demand for child labour—particularly in the North—is high as the majority of households have agricultural livelihoods that require much manual labour and children are a cheap and flexible source of labour within the household. Further reducing the agricultural dependency of the economy and the share of households active in family farming in the longer term would also support in mitigating child labour, as only about 6% of all child labourers in the country are engaged in non-agricultural work. A structural shift of the economy away from family farming in the long run would need to be coupled with policy interventions that widen access at the secondary and tertiary education levels in rural and Northern

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[34] LEAP is aimed at positively discriminating selected poor families within the lowest quintile with income substitution—while field research illustrates that conditionalities are not always monitored or enforced.

areas and that help expand the formal job market outside of agriculture for graduates. Over time this would help raise the social value of and economic returns to education in rural areas and decrease the need for child labourers on the farm.[35]

In terms of data collection, as household surveys can at times underestimate the prevalence of child labour (see Section 2), the Ghana Statistical Service should assess the feasibility of collecting a broader sample of data on street children by conducting an additional module for example in GLSS (or a separate, more specialised survey that only interviews child labourers) to gather data from non-household units.[36] This could help gain an even richer comprehension of the potential sources and consequences of the urban phenomenon and thereby help formulate more coherent and efficient policies for urban areas.[37] Finally, since nearly all child labourers are informally working in family farming, popular policies such as introducing a minimum wage or trade sanctions against products made by children will likely have a very limited, if any, potential effect in such agrarian countries like Ghana.

6. Conclusion

This paper explores structural, geographic, monetary, demographic, cultural, seasonal and school-supply factors that can influence household decisions about child labour. The main objective has been to try and identify a much broader range of potential sources beyond monetary poverty for why children in Ghana are working—i.e. empirically and interdisciplinarily test the 'luxury axiom' in this agrarian economy—and thereby help to inform decision-makers and actors who draft and implement public policy of possible ways to help mitigate harmful child labour.

The paper here highlights some of the limitations of the popular but simplistic theoretical idea in textbook economics of a 'luxury axiom' by Basu and Van (1998) when applied to empirical data in an agrarian economy. First, their focus on the 'economics of child labour' can provide insight into some of the economic aspects of why children work but there is a much broader, interdisciplinary story here that includes other important factors such as, among others, cultural, demographic and education influencers. Second, this disaggregated analysis highlights important differences across subgroups of children (e.g. in agricultural/non-agricultural households), across seasons of the year (harvesting/non-harvesting periods) and, among other factors, across geographic areas (e.g. rural/urban), which are not easily captured in their theoretical model. Third, in efforts to inform policy a focus on the 'luxury axiom' could help alleviate poverty-related forms of child labour but—as this study illustrates—it would not lead to the best designed and

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[35] In terms of the social value of education, Edmonds (2008) finds that, internationally, awareness and information campaigns are in general the most commonly adopted policy intervention aimed at reducing child labour. But sensitisation seminars for parents (despite the importance of parental education and social norms in the analysis) are likely only to influence those parents who do not view child labour as an optimal choice due to reasons such as low returns to schooling.

[36] Analysis on street children—and possibly child trafficking that is known to be practised on Lake Volta—is an area that warrants further research in Ghana, although some preliminarily research has been conducted (see Kwankye *et al.*, 2007).

[37] Another potential area for further research that also depends on better survey data collection on children is related to children's decision-making process regarding work (as discussed earlier), while much research already exists on parental and household choices. It is important to note that differences in methodologies—not only related to how survey questions are designed and whether only household heads (or rather also children themselves) respond to questions about child labour but also which research methods are used and, among other things, how results are interpreted—lead to unavoidable variations in how child labour is captured with data across different surveys and thus how it is understood. Combining data sources and methods is thus critical.

targeted policies to mitigate the different non-poverty-related forms of child labour. This paper has attempted to provide a more holistic, interdisciplinary approach using both quantitative and qualitative methods and thus to offer a broader understanding of why both poor and non-poor children work in agrarian economies like Ghana.

From a methodological perspective, it is important not to view the results here as definitive findings and as separate from the methods used to arrive at them—as any analysis examining complex human phenomena like child labour faces important measurement constraints. An example is that the standard approach in the literature of categorising whether children are working or not (as a binary variable) or whether they are in school or not (also as a binary variable) neglects the complexities of these dynamic phenomena with their many shades of grey. It forces variation among observations into black or white categories; it forces individual children into two artificial numerical categories of working or schooling. Such variables—which are defined by a researcher to try and precisely capture whether children participate in school or work and thus are made mathematically precise and amendable for statistical analysis—cannot always take into consideration if children enrol but never attend school, only attend school or work one day a month or only for an hour a day, if they currently do not attend school because their teacher is absent or their school is temporarily closed or, among many other things, if they currently do not work because it is not a planting or harvesting period for their family's particular crops—all of which can influence children's participation in school and work in countries like Ghana. How we precisely define our variables and how we make them measurable is however restricted by the specific data that can be made available, which predetermines the specific type and scope of possible correlational or 'causal' claims that can be made about child labour—or any phenomenon, for that matter. Generating correlational or 'causal' conclusions is thus limited to those aspects of human phenomena that we can force into simplified, quantifiable categories and thus make claims about their probability of occurrence (see also Krauss 2015).

Beyond the methodological constraints, we need to make the best of available data to inform policy, while acknowledging the important limitations of data and also being more modest about the possible scope of our results. This paper has tried showing that in economies like Ghana—in which most households and nearly all child labourers are working in family farming—agricultural livelihoods and land ownership appear to be important explanations for why children are working, including large shares of non-poor children in such households, as farm work generally requires intensive manual labour. Consequently, the demand for child labour seems to be maintained because of its established, often positive cultural value in society, on the one hand. On the other, returns to child labour in family farming appear often high because of a lack of returns to formal education up to the basic level in rural areas. Given this lack of returns, together with labour-intensive agricultural livelihoods and the social acceptance of child labour, many farming families may view child labour as an optimal decision, so that training children on the farm can be seen at times (not as some hazardous activity but rather) as a kind of 'informal' education for their children's future occupation. Child labour in Ghana appears to be thus largely about the country's agricultural dependency, social norms and no returns to rural basic education. By trying to disentangle the empirical data for specific subgroups most involved in child labour, this paper shows that two standard economic assumptions do not hold very strongly for many agricultural, land-owning households: that child labour is just the result of low levels of income and that basic education provides greater income returns. Results from the quantitative and qualitative analysis thus suggest that for the government to

simply focus on poverty reduction, economic growth or school participation will likely not be sufficient in tackling child labour, because many child labourers live in non-poor, land-owning households, because growth has been stronger in manufacturing and services than in agriculture and because most child labourers already combine work with school. This simplistic view is why theoretical and empirical papers (as cited in the introduction) are often left without viable answers when analysing why levels of child labour can stagnate in poverty-reducing economies or growing economies or countries with expanding levels of education like Ghana.

The analysis illustrates that children involved in harmful child labour (who are not able to get an education) are nearly entirely concentrated in the North. Specific policy responses outlined above to reduce the various potential sources of demand for child labour and to offset the opportunity costs of schooling need to place a particularly strong focus on the North, especially on agricultural households in the North (as the regression models with varying specifications suggest). Because reducing child engagement in labour activities, particularly in those interfering with schooling, would help increase the educational outcomes, later opportunities and personal freedoms of many children, the government needs to adopt stronger policies to mitigate harmful forms of child labour in the country.

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Appendix
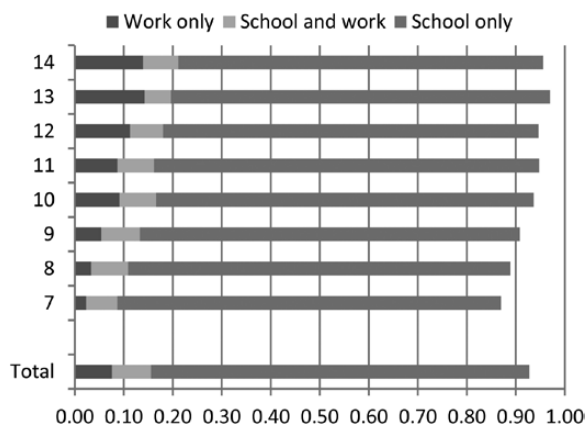
Figure A1. *Labour and school participation rates by individual age 7–14, 2005–2006 Source*: Author's illustration based on calculations of GLSS data. *Note:* The remaining share out of 100% reflects those who are neither working nor schooling.
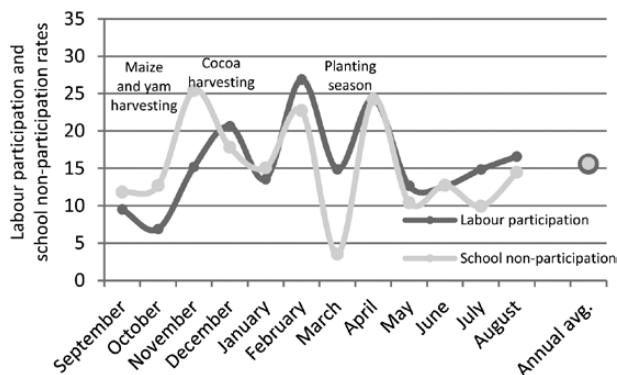
Figure A2. *Labour participation and school non-participation rates for 7–14-year-olds by month, 2005–2006 Source*: Author's illustration based on calculations of GLSS data. *Note:* Harvesting and planting periods reflect the major seasons.
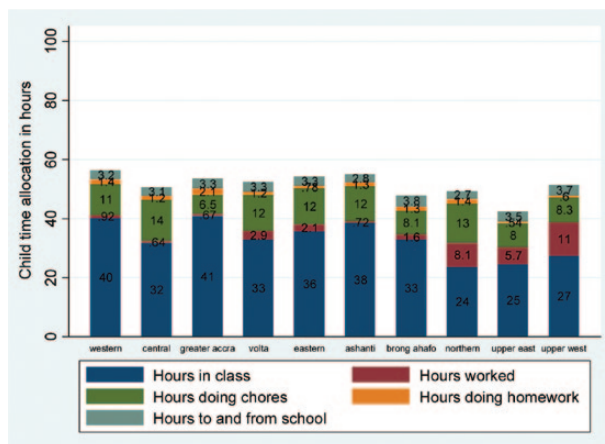
Figure A3. *National average child time allocation (in hours) over the past seven days for all 7–14-year-olds by region, 2005–2006*
Source: Author's illustration based on calculations of GLSS data.
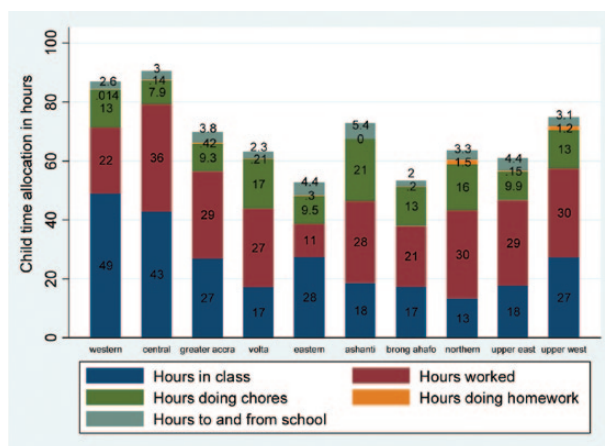
Figure A4. *Average child time allocation (in hours) over the past seven days for 7–14-year-old child labourers by region, 2005–2006*
Source: Author's illustration based on calculations of GLSS data.
Note: Compared to children not working, child labourers have an average of 13 hours of less time per week for other activities, such as leisure and play, and are thus more likely to suffer from fatigue.

Table A1. *Bivariate probit regression results: potential sources of child labour and school participation for 7–14-year-olds, 2005–2006*

All split regressions include demand and supply variables	Full sample				Children aged 10-14 only				Children in the poorest quintile only				Children in the 2nd to 5th quintiles only				Children during the months November–April only				descriptive data avg. L 0.16 S 0.86
	Labour participation		School participation		Labour participation		School participation		Labour participation		School participation		Labour participation		School participation		Labour participation		School participation		
Independent variables	marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio	
Age	0.609	1.58	0.368	1.47	-1.037	-0.68	0.636	1.45	1.541	1.32	0.303	0.40	0.376	1.11	0.365	1.74	0.128	0.24	-0.063	-0.30	10.5
Age^2	-0.318	-1.18	-0.219	-1.22	0.734	0.78	-0.390	-1.43	-0.805	-0.99	-0.125	-0.23	-0.203	-0.85	-0.230	-1.53	0.026	0.07	0.086	0.58	--
Male	0.020	1.85	-0.012	-1.69	0.023	1.54	-0.004	-0.93	0.094	2.82	-0.068	-3.20	0.005	0.52	0.003	0.57	0.050	3.24	-0.003	-0.56	0.52
Own child	-0.025	-1.58	0.013	1.19	-0.007	-0.32	0.003	0.52	-0.062	-1.36	0.024	0.78	-0.013	-0.86	0.004	0.39	0.012	0.55	-0.012	-1.20	0.77
Mother lives in HH	0.015	0.97	0.025	2.33	0.004	0.17	0.017	2.33	0.058	1.34	0.000	0.00	0.004	0.28	0.031	2.52	0.017	0.83	0.019	2.08	0.77
Father's education, primary (ref. group, no edu.)	-0.042	-3.05	0.039	5.85	-0.048	-2.53	0.016	4.29	0.077	0.80	0.125	6.24	-0.044	-5.01	0.024	4.35	-0.003	-0.10	0.020	3.83	0.07
Father's education, lower sec.	-0.054	-3.86	0.056	5.92	-0.053	-2.81	0.021	3.78	-0.089	-1.96	0.102	4.82	-0.040	-3.26	0.039	4.44	-0.052	-2.63	0.026	3.07	0.41
Father's education, upper sec. or higher	-0.049	-3.32	0.034	4.15	-0.067	-3.85	0.013	2.81	-0.093	-1.21	0.102	5.88	-0.039	-3.87	0.021	3.41	-0.072	-5.27	0.054	5.06	0.11
Wealth quintile 2 (ref. group, quintile1)	-0.013	-0.89	0.006	0.65	-0.015	-0.74	0.006	1.20									-0.021	-1.05	0.012	1.84	0.22
Wealth quintile 3	-0.032	-2.08	0.019	2.05	-0.047	-2.44	0.006	1.10									-0.029	-1.39	0.009	1.21	0.20
Wealth quintile 4	-0.042	-2.85	0.025	2.64	-0.042	-2.06	0.009	1.56									-0.031	-1.40	0.014	1.86	0.17
Wealth quintile 5	-0.069	-5.70	0.027	2.77	-0.077	-4.64	0.006	0.89									-0.059	-3.10	0.007	0.43	0.13
HH occupation in non-agriculture (ref. group, agriculture)	-0.024	-1.86	0.016	1.84	-0.017	-1.02	0.008	1.56	-0.060	-1.40	0.041	1.67	-0.021	-1.83	0.013	1.74	0.013	0.67	0.011	1.54	0.51
With each additional HH member aged 0-5	0.014	2.27	-0.007	-1.85	0.017	2.05	-0.002	-0.67	0.006	0.34	-0.012	-1.00	0.016	2.68	-0.007	-2.11	0.010	1.26	-0.001	-0.23	1.0
With each additional HH member aged 6-14	0.002	0.52	0.005	1.44	0.012	1.93	0.000	0.12	0.005	0.40	0.010	1.03	0.003	0.85	0.002	0.61	0.006	1.03	-0.002	-0.61	2.7
With each additional HH member aged 15-59	-0.003	-1.00	0.006	2.37	-0.003	-0.68	0.003	1.91	0.000	-0.01	0.009	1.27	-0.004	-1.25	0.004	1.77	-0.007	-1.54	0.002	1.04	3.0
With each additional HH member aged 60 or older	-0.008	-0.90	0.006	1.01	-0.007	-0.60	0.008	2.34	0.019	0.79	0.008	0.55	-0.013	-1.44	0.001	0.31	-0.008	-0.59	0.003	0.59	0.3
Western region (ref. group, Northern region)	-0.040	-2.30	0.028	3.03	-0.019	-0.61	0.011	2.47	-0.163	-5.15	0.082	4.13	-0.008	-0.44	0.013	1.49	-0.062	-3.90	0.020	3.01	0.09
Central region	-0.074	-6.60	0.040	5.50	-0.079	-4.47	0.039	5.49	-0.186	-9.86	0.093	5.71	-0.049	-5.03	0.024	3.97	-0.080	-6.48	0.015	1.76	0.08
Accra region	-0.043	-2.31	0.008	0.53	-0.025	-0.76	0.006	0.94	-0.233	-11.14	0.020	0.34	-0.010	-0.50	-0.001	-0.04	-0.068	-4.47	0.002	0.19	0.08
Volta region	-0.023	-1.11	0.032	4.14	-0.007	-0.22	0.015	4.22	-0.055	-0.79	0.069	2.58	-0.015	-0.84	0.018	2.86	-0.037	-1.71	0.017	2.60	0.10
Eastern region	0.062	1.79	0.042	6.00	0.079	1.66	0.017	4.50	0.155	1.17	0.060	1.40	0.051	1.58	0.026	4.26	-0.012	-0.42	0.020	3.12	0.11
Ashanti region	-0.075	-5.10	0.044	4.84	-0.074	-3.42	0.019	3.73	-0.153	-3.68	0.130	6.80	-0.050	-3.67	0.023	2.65	-0.120	-6.62	0.035	4.35	0.18
Brong Ahafo region	-0.040	-2.46	0.039	5.67	-0.034	-1.30	0.015	4.07	-0.084	-1.51	0.085	3.91	-0.026	-1.73	0.024	4.26	-0.057	-3.32	0.014	1.94	0.08
Upper East region	0.028	0.97	-0.027	-1.34	0.067	1.51	-0.016	-1.29	-0.005	-0.09	0.004	0.11	0.053	1.35	-0.035	-1.35	0.031	0.76	-0.016	-0.87	0.08
Upper West region	0.136	3.13	-0.001	-0.04	0.168	2.87	-0.002	-0.27	0.158	2.19	0.030	0.94	0.155	2.07	0.000	-0.02	0.093	1.53	0.002	0.17	0.09
Total school expenditure, lowest tercile (ref. group, highest tercile)	-0.012	-0.74	-0.014	-0.99	-0.002	-0.07	-0.011	-1.22	-0.071	-1.10	-0.043	-0.91	0.006	0.38	-0.015	-1.06	-0.014	-0.60	-0.020	-1.31	0.33
Total school expenditure, middle tercile	-0.022	-1.66	0.001	0.12	-0.025	-1.38	-0.003	-0.48	-0.096	-1.91	-0.023	-0.41	-0.002	-0.15	-0.001	-0.17	0.007	0.32	0.003	0.35	0.33
Distance to school, 0-29 min. (ref. group, 30 or more min.)	-0.002	-0.17	0.033	2.63	0.002	0.12	0.018	2.20	0.075	2.19	0.044	1.48	-0.031	-1.97	0.027	2.13	-0.041	-1.74	0.006	0.77	0.76
Constant	-2.51	-2.59	-1.88	-1.72	1.33	0.35	-7.05	-1.55	-3.43	-2.03	-0.80	-0.46	-2.39	-2.03	-2.46	-1.76	-1.33	-0.89	0.31	0.20	
Sample of children	2,214				1,471				517				1,697				1,012				

Source: Author's regression results based on calculations of GLSS data.

Note: The same note applies here as in Table 3.

Table A2. *Bivariate probit regression results: potential sources of child labour and school participation for 7–14-year-olds, 1998–99 and 2005–2006*

Independent variables	1998–99									2005–06								
	Demand variables Full sample				Demand and supply variables Full sample				descriptive data avg.	Demand variables Full sample				Demand and supply variables Full sample				descriptive data avg.
	Labour participation		School participation		Labour participation		School participation		L 0.16 S 0.89	Labour participation		School participation		Labour participation		School participation		L 0.16 S 0.86
	marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio		marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio	marginal effect	t-ratio	
Age	0.286	0.61	0.786	2.38	0.274	0.60	0.784	2.39	10.4	0.657	1.72	0.383	1.41	0.609	1.58	0.368	1.47	10.5
Age^2	0.037	0.11	-0.482	-2.02	0.039	0.12	-0.482	-2.04	--	-0.330	-1.23	-0.235	-1.22	-0.318	-1.18	-0.219	-1.22	--
Male	-0.017	-1.33	0.042	4.05	-0.017	-1.29	0.043	4.15	0.50	0.018	1.68	-0.015	-1.94	0.020	1.85	-0.012	-1.69	0.52
Own child	-0.053	-2.42	0.013	0.75	-0.048	-2.20	0.016	0.94	0.75	-0.031	-2.00	0.019	1.63	-0.025	-1.58	0.013	1.19	0.77
Mother lives in HH	0.031	1.45	0.016	0.96	0.028	1.28	0.011	0.70	0.73	0.016	1.05	0.026	2.26	0.015	0.97	0.025	2.33	0.77
Father's education, primary (ref. group, no edu.)	0.017	0.57	0.030	2.16	0.025	0.82	0.029	2.09	0.07	-0.035	-2.33	0.036	4.67	-0.042	-3.05	0.039	5.85	0.07
Father's education, lower sec.	-0.023	-1.41	0.067	5.58	-0.022	-1.33	0.066	5.49	0.46	-0.055	-4.12	0.066	6.41	-0.054	-3.86	0.056	5.92	0.41
Father's education, upper sec. or higher	0.002	0.11	0.078	9.11	0.009	0.39	0.077	8.93	0.17	-0.054	-3.65	0.042	5.10	-0.049	-3.32	0.034	4.15	0.11
Wealth quintile 2 (ref. group, quintile1)	0.016	0.74	-0.002	-0.13	0.007	0.34	0.003	0.19	0.22	-0.018	-1.21	0.009	0.96	-0.013	-0.89	0.006	0.65	0.22
Wealth quintile 3	0.004	0.17	0.035	2.83	-0.004	-0.22	0.037	3.07	0.21	-0.021	-1.30	0.020	1.96	-0.032	-2.08	0.019	2.05	0.20
Wealth quintile 4	0.009	0.40	0.013	0.86	0.007	0.30	0.023	1.59	0.19	-0.031	-1.98	0.026	2.61	-0.042	-2.85	0.025	2.64	0.17
Wealth quintile 5	-0.065	-3.57	0.009	0.51	-0.057	-2.88	0.023	1.39	0.15	-0.074	-6.12	0.036	3.89	-0.069	-5.70	0.027	2.77	0.13
HH occupation in non-agriculture (ref. group, agriculture)	-0.025	-1.58	0.025	2.04	-0.029	-1.85	0.026	2.06	0.52	-0.027	-2.11	0.015	1.65	-0.024	-1.86	0.016	1.84	0.51
With each additional HH member aged 0-5	0.004	0.60	-0.022	-4.14	0.004	0.52	-0.020	-3.67	0.9	0.014	2.23	-0.007	-1.69	0.014	2.27	-0.007	-1.85	1.0
With each additional HH member aged 6-14	0.000	-0.04	-0.002	-0.59	-0.002	-0.39	-0.003	-0.71	2.6	0.004	0.95	0.004	1.06	0.002	0.52	0.005	1.44	2.7
With each additional HH member aged 15-59	-0.011	-2.36	-0.004	-1.11	-0.011	-2.42	-0.002	-0.52	2.8	-0.003	-1.05	0.005	2.25	-0.003	-1.00	0.006	2.37	3.0
With each additional HH member aged 60 or older	-0.040	-3.34	0.012	1.29	-0.041	-3.39	0.012	1.32	0.3	-0.012	-1.30	0.008	1.36	-0.008	-0.90	0.006	1.01	0.3
Western region (ref. group, Northern region)	0.010	0.24	0.067	6.97	-0.010	-0.27	0.067	6.95	0.12	-0.048	-3.03	0.037	4.49	-0.040	-2.30	0.028	3.03	0.09
Central region	0.019	0.46	0.052	4.01	-0.023	-0.71	0.052	3.88	0.10	-0.065	-4.92	0.042	5.36	-0.074	-6.60	0.040	5.50	0.08
Accra region	-0.059	-2.11	0.039	2.28	-0.057	-2.05	0.041	2.48	0.09	-0.044	-2.51	0.020	1.69	-0.043	-2.31	0.008	0.53	0.08
Volta region	0.114	2.00	0.038	2.47	0.092	1.71	0.040	2.62	0.13	-0.038	-2.18	0.033	3.79	-0.023	-1.11	0.032	4.14	0.10
Eastern region	-0.062	-2.26	0.059	4.51	-0.074	-3.09	0.056	4.09	0.14	0.063	1.95	0.046	5.83	0.062	1.79	0.042	6.00	0.11
Ashanti region	-0.041	-1.25	0.054	3.34	-0.058	-1.97	0.053	3.15	0.19	-0.082	-5.90	0.054	5.89	-0.075	-5.10	0.044	4.84	0.18
Brong Ahafo region	-0.098	-5.85	0.063	6.17	-0.099	-6.56	0.061	5.88	0.08	-0.042	-2.51	0.045	6.32	-0.040	-2.46	0.039	5.67	0.08
Upper East region	0.096	1.31	-0.012	-0.33	0.111	1.47	-0.019	-0.50	0.05	0.018	0.65	-0.033	-1.49	0.028	0.97	-0.027	-1.34	0.08
Upper West region	0.052	0.66	-0.062	-1.02	0.021	0.28	-0.052	-0.84	0.03	0.138	3.18	-0.010	-0.59	0.136	3.13	-0.001	-0.04	0.09
Total school expenditure, lowest tercile (ref. group, highest tercile)					-0.015	-0.66	0.017	1.14	0.33					-0.012	-0.74	-0.014	-0.99	0.33
Total school expenditure, middle tercile					0.062	2.81	0.017	1.17	0.34					-0.022	-1.66	0.001	0.12	0.33
Distance to school, 0-29 min. (ref. group, 30 or more min.)					0.024	1.60	-0.010	-0.92	0.51					-0.002	-0.17	0.033	2.63	0.76
Constant	-1.86	-2.02	-2.16	-2.34	-1.89	-2.00	-2.33	-2.48		-2.69	-2.92	-1.48	-1.46	-2.51	-2.59	-1.88	-1.72	
Sample of children	2,250				2,214					2,385				2,214				

Source: Author's regression results based on calculations of GLSS data.

Note: The same note applies here as in Table 3.