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Social transfer programmes and school enrolment in Malawi

A micro-simulation

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Abstract

This paper investigates the impact of social transfer programmes on school enrolment and child labour in Malawi utilizing a micro-simulation evaluation method. Four hypothetical cash transfer programmes, differentiated in terms of their conditions on children's enrolment and gender, are considered. Results show that boys' enrolment increases in all four scenarios, whereas girls' enrolment increases only when the conditionality on enrolment is enforced.

Keywords: Malawi, social safety nets, social transfer programmes, micro-simulation, education
JEL classification: H53, I38, J22, I2

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1 Introduction

Over the last decade, social transfer programmes (STPs) have taken centre stage in the international policy arena. They have been utilized as instruments to address extreme economic hardships and vulnerabilities of society's most exposed members to reduce poverty in less developed countries. They operate as socioeconomic or social safety nets, and provide cash or in-kind goods to low-income households conditioned (unconditioned) upon human capital investment. Designed within the development theoretical framework, and particularly, with an understanding of factors hindering access to economic opportunities, while shoring up the persistence of poverty and vulnerability, STPs focus on human capital accumulation to break the intergenerational transmission of poverty (Barrientos and Hulme 2009). They have features of short-term social safety nets (providing income to poor households in time of crisis) and long-term development economic growth: And, unlike many traditional social programmes, STPs effectively address issues of targeting, high overheads, exclusion, paternalism, and cronyism (Rawlings and Rubio 2005).

STPs are a large set of programmes with different attributes, such as conditions, targeted sectors, and stated objectives. The most common STPs are the conditional cash transfer programmes (CCTs), which link their transfers to poor households on two types of conditions or co-responsibilities. First, the health and nutrition conditions require children to have periodic health check-ups as well as be vaccinated and pregnant and/or lactating women to have pre- and post-natal care or to attend regular health information meetings. Second, the education conditions require children to enrol and attend school regularly. Unconditioned cash transfer programmes (UCT) are non-contributory grants to households in extreme poverty or to people belonging to vulnerable groups—such as widows, orphans, and disabled—to meet their minimum consumption needs (Garcia et al. 2012). Various STPs' evaluations indicate that most programmes reach their stated goals (see e.g., Fiszbein et al. 2009). Nevertheless, their transferability to other regions of the world, particularly in sub-Saharan Africa (SSA), is an on-going debate in the development literature.

This paper contributes to this debate by addressing the question of whether the STPs impact school enrolment and child labour in Malawi. The scenario consists of transferring cash to households conditional on children aged between six and 18 being enrolled in school. We proceed with four scenarios in which a household receives: 1) MK1,040 (US$2.5) for each child enrolled in school regardless of the child's gender; 2) MK1,040 (US$2.5) regardless of the children's enrolment status and gender; 3) MK1,040 (US$2.5) and MK2,080 (US$5) for each boy or girl enrolled in school, respectively; and 4) MK1,040 (US$2.5) and MK2,080 (US$5) for each boy or girl, respectively, regardless of their enrolment status.[1] We adopt a mean test targeting method that sets a maximum household level of income beyond which the household is ineligible to receive the benefits.

[1] MK=Malawian Kwacha.

We adopt an ex ante evaluation method that consists of performing a micro-simulation evaluation of the four hypothetical scenarios. Performed prior to the intervention design and implementation of interventions, ex ante evaluations enhance knowledge of what works and what does not work, and enable the adoption of alternative design and implementation options for future interventions. They specifically simulate the impact of interventions on household behaviour. Our approach thus predicts how household's, namely children's, behaviours respond to changes in some parameters of the intervention. Contrary to ex ante evaluations, ex post evaluations cannot predict household behaviour. Instead, they link actual programmes' parameters to observed behaviours. Nevertheless, the validity of an ex ante evaluation depends on the assumptions on how the household will alter its behaviour when faced with the programme (Bourguignon et al. 2003).

The current paper adopts the behavioural model of child occupation developed by Bourguignon, Ferreira, and Leite (BFL). The BFL model is a standard reduced-form model of child behaviour based on four simplifying assumptions. It utilizes a representative household survey from the second Integrated Household Survey (IHS2) from Malawi conducted in 2004–05. The survey offers two main advantages: 1) the survey data was collected prior to the implementation of the two STPs currently underway in Malawi: Mchinji social cash transfer pilot scheme (MSCT) (2010) and Zomba cash transfer programme (ZCTP) (2008); and 2) it enables us to assess whether these two existing programmes can be scaled-up.

Malawi offers an interesting platform to investigate the effectiveness of STPs. With 96 per cent of the Malawian population under the age of 64, the population is relatively young. In 2011, the Malawi human development index (HDI) value was 0.415, which is lower than the SSA regional value of 0.464 (UNDP 2013). In 2009, its literacy rate among the youth aged between 15 and 24 was 86.4 per cent, with 86.03 and 86.88 per cent of females and males, respectively. The ratios of female-to-male primary and secondary enrolment were at 1.03 and 0.79 per cent in favour of male in 2010. According to a recent progress report of the Millennium Development Goals (MDGs), Malawi is unlikely to meet the second, third, and fifth goals of the MDGs (Government of Malawi, 2010). Therefore, Malawi can benefit from a well-planned and executed STP.

Our micro-simulation reveals that school enrolment increases in all four scenarios. Indeed, for conditioned scenarios where the household receives the same transfer for boys and girls, the school enrolment increases by 30.69 and 35.95 percentage points, respectively (scenario 1). This result changes when we drop the condition on school enrolment; girls' school enrolment lags behind boys. Specifically, girls' enrolment reaches 70.38 per cent, when boys' enrolment rate is 76.76 per cent. When programmes are differentiated both in terms of their conditionality and the cash transfer (CT), we obtain a strikingly different result. In the conditional scenario, we obtain similar school enrolment rates; i.e., 30.69 and 35.95 percentage points increase for boys and girls, respectively. Nevertheless, in the unconditional programme, girls' school enrolment is almost equal to the boys' school enrolment rate; i.e. 76.76 and 76.36 percentage points increase for boys and girls, respectively. Overall, our results suggest that households will prefer to send boys to school regardless of the programmes' nature while only the enforcement of conditionality will cause girls' enrolment to increase.

The paper is divided into six sections. The next section gives a brief description of Malawi. The third section describes the BFL theoretical model. The fourth section describes the data used in the analysis. The fifth section reports the results of the micro-simulation. The sixth section concludes and analyses the policy implications of our results.

2 Malawi: country profile

Over the last three decades (1980–2011), the Malawian economy grew by an average of 3.5 per cent per annum, with its peak in 1995 reaching the rate of 16.7 per cent (see Figure 1 in the Appendix).[2] Growth has slowed from 9 per cent in 2009 to 4.5 per cent in 2011. The slowing economic growth may be explained by four factors: foreign exchange imbalances, fuel and electricity supply shortages, high inflation rates, and low commodity prices, particularly for tobacco (World Bank 2013b). Imbalances in foreign exchange are caused mainly by high parallel market exchange rate premiums, suspension of budget support by development partners due to the deterioration of macroeconomic and democratic governance in 2011, and poor tobacco sales (World Bank 2013b). As illustrated in Figure 1 in the Appendix, inflation has always been a major macroeconomic problem in Malawi, which had an average inflation rate of 19.9 per cent over 1980–2011, with the lowest rate of 7.41 per cent in 2010.

Malawi's population is relatively young; 96 per cent of its population is under the age of 64 and only four per cent of its population is above 64 (see Figure 2 in the Appendix). This may be explained by the high incidence of HIV/AIDS and the low life expectancy rate, respectively at 11 per cent and 52 years in 2009. Most of the population (80.2 per cent) lives in rural areas. In 2004, 73.86 per cent of its population was living below the poverty line of US$38 a month (World Bank 2013a). Of those, 55.9 and 25.4 per cent are of the rural and urban areas population, respectively. Income inequality is prominent with a Gini index of 39.02 in 2004. The incidence of poverty, as measured by the poverty gap, was at 32.31 per cent in 2004.

Malawi can benefit from CTs in multiple ways. These programmes address persistent and deepened vulnerability and poverty. They are instruments for channelling resources to the most vulnerable, and can serve as a substitute to the traditional safety nets characterized by mutual support among family members, especially for the most vulnerable members, such as orphans, needy children, widows, and elders. The traditional safety nets have been weakened due to migration, urbanization, the evolution of the traditional family structures, and demand caused by the HIV/AIDs crisis (Garcia and Moore 2012). CTs in the education sector increase parents' investment in children's education. Where school is unaffordable, CTs make it affordable by giving parents means to pay for school fees and supplies. They can

[2] All data in this paragraph is from the World Bank (2013a).

increase parents' preference for educating girls, which in turn can reduce gender disparities in education. Increasing girls' education allows them to escape intergenerational poverty, delay marriage, reduce fertility rates, improves their chances to engage in income-generating activities or enter formal employment, and ultimately be empowered.

The potential impact of CTs can be undermined by the lack of sound macro- and micro-policies and the low quality of institutions. Indeed, their impacts depend on how markets, institutions, and societies evolve and interact. Market-driven economic growth is and remains the main driving force for reducing poverty and gender disparities. Institutions play a role in providing public goods, laying the foundations of economic growth, and correcting market failures.

Malawi has two STPs, the MSCT, and the ZCTP. The MSCT targets the 10 per cent of households living in extreme poverty as well as labour constrained households (households with incapacitated members) in the pilot area of Mchinji. It involves approximately 15,000 individuals in 3,000 households (Chipeta and Mwamlima 2007 in Garcia and Moore 2012). Among other things, the programme seeks to improve beneficiary children's enrolment and attendance. An evaluation of the MSCT found that children's school enrolment and attendance had increased. Beneficiaries increased and diversified their food consumption. Both children and adult health outcomes improved; and child labour decreased significantly in the treatment group (Garcia and Moore 2012).

The ZCTP targets young women from 13 to 22 years, and provides them with a direct CT conditional on school attendance. This programme differs from previous CTs in two ways. First, it provides a fraction of the CT to the household head in which the young woman lives. The monthly average transfer is US$10, or 15 per cent of the total monthly consumption of the household. Second, it allows girls to decide on how to spend their CT. An evaluation of the ZCTP reveals that the intervention increased school enrolment and attendance as well as delayed childbearing and marriage. Female school drop-outs benefitting from the programme, reported a willingness to postpone their first pregnancy for eight months but the intervention had no impact on overall desired fertility. The intervention reduced marriage rates by 11 per cent. Girls who married reported choosing their marital partners based on their educational background rather than wealth, indicating thus greater agency. The programme improved the girls' position within their households. Female school drop-outs reported that heads of households encouraged them not to get married or pregnant, to spend more time attending school than doing household chores to increase their chance of participating in the programme and receiving cash benefits (Baird et al. 2010).

3 The Bourguignon, Ferreira, and Leite model

Our theoretical model consists of an ex ante micro-simulation of the four hypothetical scenarios. The model is the behavioural model reduced-form of child occupation. The BFL model predicts the effect of the Bolsa Escola-type transfer programmes. The model does not depart from the standard reduced-form models of child occupation. The model ignores how decisions of child labour supply are made within a household. Instead, it focuses solely on examining the outcomes of decisions taken within the household. Also, the decision on sending children to school or to work is made independently of the adults' labour supply decisions. Further, the model is applied to school-age children ignoring the issue of siblings and the simultaneity of corresponding decisions. Finally, the composition of the household is exogenous.

Let a child in household, i , take on a qualitative variable S_i representing its occupational choice. S_i takes on a value of 0 if the child does not go to school but works full time within or outside the household. It takes on a value of 1 if the child goes to school and works outside the household. S_i takes on a value of 2 if the child goes to school. Here, the child is assumed to do household chores or domestic activities:

(1) $S_i = k \; iff \; (A_i, X_i, H_i; Y_{-i} + y_{ik}) + v_{ik} > S_j\big(A_i, X_i, H_i; Y_{-i} + y_{ij}\big) + v_{ij})$ for $j \neq k$

where S_k is a latent function representing the net utility of choosing alternative occupations (k= 0,1,2) for a child in household i, and A being the age of a child. The child's characteristics are captured by the vector X. H is the vector of the child's household's characteristics, such as the size, the age of the parents, the parents' education, the number of siblings, and the distance from school. Y represents the household's income excluding that of the child's i. The child's i's income is represented by y_{ik} depending on the occupational choice. V_{ik} is a random variable representing individual preference. Linearizing equation (1) and collapsing non-income variables into a vector Z, equation (1) becomes:

(2) $U_i\,(j) = S_j\big(A_i, X_i, H_i; Y_{-i} + y_{ij}\big) + v_{ij} = Z_i \,.\, \gamma_i + \big(Y_{-i} + y_{ij}\big).\, \alpha_i + v_{ij})$

α_i and γ_i represent respectively the coefficients for non-income and income variables. Allowing these two coefficients to differ across occupational choices has two advantages. First, it enables the model to consider trade-offs between schooling today and child's income in future on the one hand and household's current income on the other hand. Second, the number of hours worked by the child is considered as a discrete choice in the model. Also, the child's occupational choice is a discrete choice, capturing the number of hours worked by the children; the numbers are larger for occupational choices 0 and 1 than for occupational choice 2. Occupational choice 0 is for children working only, 1 for children both working and studying, and 2 for children studying only.

Child's i's earnings w_i can be determined based on the Becker-Mincer Human capital model as follows:

$$(3) \quad Log\, w_i = X_i \,.\, \delta + m\, Ind\, (S_i = 1) + \mu_i$$

where, X_i is a vector of individual characteristics defined in A_i and X_i and according to the standard Mincerian variables. μ_i is a random term that stands for unobserved earning determinants. *Ind (•)* is a function that takes on a value of 1 when children attend school as well as work outside the household, and whose number of hours worked is less than the children's who work full time. This term accounts for the difference in the number of hours worked by children choosing occupational choice 0 and 1. From equation (3), children's income is derived for each alternative *j*:

$$(4) \quad y_{i0} = Kw_i;\ y_{i1} = My_{i0} = MKw_{i;}\, y_{i2} = Dy_{i0} = DKw_i \text{ with } M = Exp\,(m)$$

where, y_{ij} measures the output of the market and domestic child labour. Domestic income is proportional to the actual or potential market earnings with a proportion *K* for children not attending school, (*1-M*) proportion for children both attending school and working outside of the household, and (*1-D*) for children only going to school. Proportion *M* is observed based on the actual earnings from equation (3), while *D* and *K* are unobserved. *M* is the same for both domestic and market activities.

Rewriting equation (2), we obtain:

$$(5) \quad U_i\,(j) = S_j\big(A_i, X_i, H_i; Y_{-i} + y_{ij}\big) + v_{ij} = Z_i \,.\, \gamma_i + Y_{-i} \,.\, \alpha_i + \beta_j . y_{ij} + v_{ij}$$

with $\beta_0 = \alpha_0\, K$; $\beta_1 = \alpha_1\, MK$; and $\beta_2 = \alpha_2\, DK$

Equation (5) is the household utility under the occupational choice *j*. Children's occupational choices can be derived from equation (5) when all the coefficients are known as well as the actual or potential market earnings and the random error, then the child's occupational choice selected by household *i* is obtained using equation (6). Equation (6) represents household *i* utility under occupational choice *j*.

$$(6) \quad K^* = Arg\, \max[\, U_i(j)]$$

Household receives a transfer of amount *T* for all children attending school. The transfer is included in equation (5) by adding T to the household income excluding child's *i*'s income:

$$(7) \quad U_i\,(j) = Z_i \,.\, \gamma_i + (Y_{-i} + BE_{ij}) \,.\, \alpha_i + \beta_j . w_i + v_{ij} \text{ with } BE_{i0} = 0 \text{ and } BE_{i1} = BE_{i2} = T$$

Equation (7) is the full reduced-form of the occupational choice of children. The programme's conditionality enters equation (7) independently of the children's occupational choices but the children must attend school. That is an occupational choice (*j=0*) where children work full time, where the Bolsa Escola transfer is equal to 0. For occupational choice (*j=1* and *j=2*), the household receives a transfer (*T*).

The programme aims at moving children from occupational choice $j=0$ to occupational choices $j=1$ and 2. Therefore, it is important to compute the probability of household i to select occupational choice *K*, which is obtained using multilogit model. Assuming that the random term is independently and identically distributed across the sample with a double exponential distribution, we obtain:

$$(8)\ p_{ij} = \frac{Exp\left[Z_i\left(\gamma_j - \gamma_0\right) + Y_{-i}\left(\alpha_j - \alpha_0\right) + w_i(\beta_j - \beta_0)\right]}{1 + \sum_{j=1}^{2} Exp\left[Z_i\left(\gamma_j - \gamma_0\right) + Y_{-i}\left(\alpha_j - \alpha_0\right) + w_i(\beta_j - \beta_0)\right]} \text{ for } j = 1{,}2 \text{ and } p_{i0} = 1 - p_{i1} - p_{i2}$$

Taking $j=0$, the multinomial logit estimation permits to obtain the differences $(\gamma_j - \gamma_0)$, $(\alpha_j - \alpha_0), and\ (\beta_j - \beta_0)$. This does not identify the utility maximizing alternative k^* because the programme's transfer is state contingent and $\alpha_0, \alpha_{1,}\ and\ \alpha_2$ are unknown. Using equation (5), the proportion *M* for domestic and market work estimated, observed in equation (3), and arbitrarily setting values for proportions *D* and *K*, we obtain $\alpha_0, \alpha_{1,}\ and\ \alpha_2$ as described below:

$$(9)\ \alpha_1 = \frac{\hat{a}_1 - \hat{b}_1}{1-M},\ \alpha_0 = \alpha_1 - \hat{a}_1,\ \alpha_2 = \alpha_1 + \hat{a}_2 - \hat{a}_1, \text{ and } D = \frac{\hat{a}_0 + \hat{b}_2}{\alpha_2}$$

The difference $(v_j - v_0)$ is derived from each observation within relevant intervals determined by the decision made by household i in choosing between occupational choices $j=1$ and $j=2$. Inspection of equation (7) reveals that the vector of potential earnings values, w_i, is missing. BFL estimate equation (3) using ordinary least squares from which they generate random terms, μ_i, for nonworking children drawing form its distribution.

Bolsa Escola programme is based on the means test, which requires that household i qualifies to receive the transfer only if its income is below some income threshold Y^0. Introducing the means test in the utility function leads to obtaining three alternatives cases:

$$(10)\ \begin{array}{ll} U_i\,(0) = Z_i\,.\gamma_0 + \alpha_0\,.Y_{-i} + \beta_0\,.w_i + v_{i0} & \\ U_i\,(1) = Z_i\,.\gamma_1 + \alpha_1\,.(Y_{-i} + T) + \beta_1\,.w_i + v_{i1} & \text{if } Y_{-i} + Mw_i \le Y^0 \\ U_i\,(1) = Z_i\,.\gamma_1 + \alpha_1\,.Y_{-i} + \beta_1\,.w_i + v_{i1} & \text{if } Y_{-i} + Mw_i > Y^0 \\ U_i\,(2) = Z_i\,.\gamma_2 + \alpha_2\,.(Y_{-i} + T) + \beta_2\,.w_i + v_{i2} & \text{if } Y_{-i} \le Y^0 \\ U_i\,(2) = Z_i\,.\gamma_2 + \alpha_2\,.Y_{-i} + \beta_2\,.w_i + v_{i2} & \text{if } Y_{-i} > Y^0 \end{array}$$

In the last two cases, $j=2$, the contributions of children in domestic activities are not taken into account because the programme's conditions are defined in terms of monetary income.

Introducing Bolsa Escola allows one to see how household *i* can move from *j=0* to *j=1* and 2 or from *j=1* to *j=2*.

We simulate four alternative programmes where all of the above assumptions and equations hold, but the transfer and utility functions change in the subsequent equations. Equation (7) is modified as:

$$(11)\ U_i\,(j) = Z_i\,.\,\gamma_i + (Y_{-i} + BE_{ij})\,.\,\alpha_i + \beta_j.\,w_i + v_{ij} \text{ with } BE_{i0} = 0 \text{ and } BE_{i1} = BE_{i2} = \sigma$$

With:

$$\begin{array}{ll} \sigma_{1,2} = T = nC_i & \text{in scenarios 1 and 2} \\ \sigma_{3,4} = T = t_{mC} + t_{mF} = n\,MC_i + n\,FC_i & \text{in scenarios 3 and 4} \end{array}$$

where σ is the transfer received by a household when children (C_i) are enrolled in school. In scenarios 1 and 2, $\sigma_{1,2}$ is equal to nC_i where n is the number of children enrolled in school. In scenarios 3 and 4, we differentiate the transfer by the child's gender. $t_{mC} = n\,MC_i$ is the transfer for enrolling male children, whereas $t_{mF} = n\,FC_i$ is the transfer for female children. The utility functions for these scenarios are as follows.

For the CCT, the utility functions are:

$$(12)\quad \begin{array}{ll} U_i\,(0) = Z_i\,.\,\gamma_0 + \alpha_0\,.\,Y_{-i} + \beta_0\,.\,w_i + v_{i0} & \\ U_i\,(1) = Z_i\,.\,\gamma_1 + \alpha_1\,.\,(Y_{-i} + \sigma_{1,3}) + \beta_1\,.\,w_i + v_{i1} & \text{if } Y_{-i} + Mw_i \leq Y^0 \\ U_i\,(1) = Z_i\,.\,\gamma_1 + \alpha_1\,.\,(Y_{-i} + \sigma_{1,3}) + \beta_1\,.\,w_i + v_{i1} & \text{if } Y_{-i} + Mw_i \leq Y^0 \\ U_i\,(1) = Z_i\,.\,\gamma_1 + \alpha_1\,.\,Y_{-i} + \beta_1\,.\,w_i + v_{i1} & \text{if } Y_{-i} + Mw_i > Y^0 \\ U_i\,(2) = Z_i\,.\,\gamma_2 + \alpha_2\,.\,(Y_{-i} + \sigma_{1,3}) + \beta_2\,.\,w_i + v_{i2} & \text{if } Y_{-i} \leq Y^0 \\ U_i\,(2) = Z_i\,.\,\gamma_2 + \alpha_2\,.\,(Y_{-i} + \sigma_{1,3}) + \beta_2\,.\,w_i + v_{i2} & \text{if } Y_{-i} \leq Y^0 \\ U_i\,(2) = Z_i\,.\,\gamma_2 + \alpha_2\,.\,Y_{-i} + \beta_2\,.\,w_i + v_{i2} & \text{if } Y_{-i} > Y^0 \end{array}$$

For the UCT, the utility functions are:

$$(13)\quad \begin{array}{ll} U_i\,(0) = Z_i\,.\,\gamma_0 + \alpha_0\,.\,(Y_{-i} + \sigma_{2,4}) + \beta_0\,.\,w_i + v_{i0} & \text{if } Y_{-i} + w_i \leq Y^0 \\ U_i\,(0) = Z_i\,.\,\gamma_0 + \alpha_0\,.\,Y_{-i} + \beta_0\,.\,w_i + v_{i0} & \text{if } Y_{-i} + w_i > Y^0 \\ U_i\,(1) = Z_i\,.\,\gamma_1 + \alpha_1\,.\,(Y_{-i} + \sigma_{2,4}) + \beta_1\,.\,w_i + v_{i1} & \text{if } Y_{-i} + Mw_i \leq Y^0 \\ U_i\,(1) = Z_i\,.\,\gamma_1 + \alpha_1\,.\,Y_{-i} + \beta_1\,.\,w_i + v_{i1} & \text{if } Y_{-i} + Mw_i > Y^0 \\ U_i\,(2) = Z_i\,.\,\gamma_2 + \alpha_2\,.\,(Y_{-i} + \sigma_{2,4}) + \beta_2\,.\,w_i + v_{i2} & \text{if } Y_{-i} \leq Y^0 \\ U_i\,(2) = Z_i\,.\,\gamma_2 + \alpha_2\,.\,Y_{-i} + \beta_2\,.\,w_i + v_{i2} & \text{if } Y_{-i} > Y^0 \end{array}$$

4 Descriptive statistics

Our main source of data is the IHS2 conducted over 2004–05. The survey is a nationally representative survey aimed at providing information on the socio-economic status of households in Malawi. The survey covers 11,280 households and the survey response rate was 96 per cent. The total population covered by the survey was 2.7 million. 27 districts of Malawi were considered as a rural stratum (except for Likoma district). The urban stratum includes the four major urban areas: Lilongwe, Blantyre, Mzuzu, and the Municipality of Zomba.[3]

The questionnaire encompasses six modular questionnaires (education, health, demographic, agriculture, labourforce, and anthropometric information) covering the socio-economic aspects of the household. 13 other questionnaires were added to collect information on the household's agricultural situation, social safety nets, security and safety, credit, subjective assessment of well-being, and recent shocks to the household. Here, we mainly focus on the education, demographic, and labourforce questionnaires.

From the 11,280 households questioned, we pooled 7,724 households with children. This represents 14.07 per cent of the IHS2 coverage. The units of our analysis, children, are defined as respondents aged between six and 18, living in a household regardless of their relationship with the head of the household. The total population of this analysis is 17,367 children. Table 1 reports the sample mean of selected variables capturing children's, households, and heads of households' characteristics.

More than half of the children are female who mostly live in the rural areas. The national primary and secondary school enrolment is 65.01 and 28.38 per cent, respectively. The data reveals a clear gender bias of school enrolment toward male versus female children and urban versus rural areas. Overall, 39.28 per cent of children are involved in some economic activities (Ecoact) and 14.84 per cent are involved in Ganyu (casual labour). Female children spend more hours doing household chores than male children. The sample mean wage of children is MK149,16 (US$0.35) per month. Children living in the urban areas earn more than those living in the rural areas. There are 28.50 per cent female headed households that mostly live in the rural areas. The average household income is MK2,214 (US$5.32) per month.

[3] Overall, the survey covers 30 districts.

Table 1: Characteristics of children and households (sample mean)

Variable	Total	Urban	Rural	Male	Female
Age (years)	11.45	11.91	11.40	11.37	11.53
Sex (1:male) (%)	48.34	46.41	48.59	48.34	51.66
Primary education (%)	65.01	68.09	64.61	66.91	63.22
Secondary education (%)	28.38	28.85	25.31	28.80	27.95
Household chores*	56.08	63.33	55.15	37.45	73.52
Wage (MK)	149.19	799.97	132.35	181.55	106.67
Ganyu (%)	14.84	3.27	16.32	17.39	12.45
Ecoact (%)*	39.28	11.43	42.84	41.14	37.53
Children enrolled (%)	66.5	78.02	65.02	69.16	64.01
Schooling years	3.30	4.85	3.10	3.25	3.34
n_infants*	84.30	69.56	86.18	85.44	83.22
Head primary educ. (%)	20.06	12.23	2.10	21.25	18.94
Head secondary educ. (%)	10.02	11.52	9.83	9.71	10.31
Head tertiary educ. (%)	11.14	15.60	10.57	10.43	11.81
Head_engl (%)	0.19	1.57	0.01	0.21	0.17
Head_ganyu (%)	34.16	19.73	36.01	33.62	34.66
Head_age (years)	44.98	40.29	45.58	46.01	44.02
Head_agriculture (%)	16.19	2.35	18.28	22.17	10.39
Head income (MK)	2214.07	10585.06	1142.14	2034.20	2382.42
Hh_literate (%)	62.90	86.82	59.83	61.69	64.02
Hh_uned (%)	30.32	10.40	32.87	31.68	29.04

Sources: Author’s calculation’s using the IHS2.

Notes: Household chores represent the per cent of hours per week that children spend doing chores. The maximum number of infants in a household is five, with an average of 1.02. Ecoact: dummy variable takes a value of 1 if a child is involved in any types of economic activities.

Table 2.A describes the percentage of children by their occupational choice. Overall, 33.50 per cent are working while 40.68 per cent both work and study, exhibiting a non-linear relationship between children’s age and their occupational choice; also shown in Table 2.A. The two sub-samples of children aged six through eight and 16 through 18 show a U-shaped curve, with more children working only. Children aged between nine and 15 have an inverted U-shaped curve. A further disaggregation of children’s occupational choice by age and gender (Table 2.B) reveals that female children make up the majority of children working in the two sub-samples of chidren aged six through eight and 16 through 18.

Table 2.A: Children's occupational choice by age (sample mean, %)

Age	j=0	j=1	j=2
6 – 8	42.81	9.26	29.19
9 – 11	11.66	25.92	32.77
12 – 15	14.76	45.12	27.68
16 – 18	30.76	19.68	10.35
Total children	33.50	25.82	40.68

Sources: Author's calculations using the IHS2.

Table 2.B: Children's occupational choice by age and sex (sample mean, %)

Age	j=0		j=1		j=2	
	Female	Male	Female	Male	Female	Male
6 – 8	38.08	48.70	10.44	8.31	29.35	29.01
9 – 11	9.54	14.29	28.17	24.11	34.59	30.73
12 – 15	14.21	15.44	45.88	44.50	27.14	28.28
16 – 18	38.14	21.55	15.49	23.07	8.91	11.96
Total children	36.00	30.84	22.36	29.52	41.64	39.64

Sources: Author's calculations using the IHS2.

5 Estimation results

5.1 Multinomial logit estimation of children's occupational choices

The first step in estimating the results of transfer programmes is to estimate the earnings function for children who have reported earning wages in the sample. We utilize equation (3), while controlling for children's characteristics (*age* and *sex*), geographical locations (*urban*), and their education proxied by schooling years (*schooling*). We introduce the square of age to capture the nonlinearity effect of age. The variable (*Log_wage*) is the logarithm of median earnings by districts. *Log_wage* captures the difference in the demand of child labour by districts. Work status is a dummy variable that takes on a value of 1 for working children and 0 otherwise.

Table 3: Log earnings regression for reported earnings of children

Variables	Coefficients	Robust Std. Err.	P>t
Work Status	-0.327**	(0.141)	0.028
Child's Age	0.532***	(0.116)	0.000
Child's Sex	0.191**	(0.0740)	0.015
Age square	-0.0113**	(0.00421)	0.012
Schooling	-0.00370	(0.0200)	0.855
Urban	0.455***	(0.134)	0.002
Log_wage	0.580***	(0.0955)	0.000
Constant	-3.653***	(0.896)	0.000343
Observations: 2,336			
R-squared: 0.239			

Sources: Author's calculations using the IHS2.

Notes: working and studying (1: Yes); Log_wage: logarithm of median earnings by districts; dependent variable: logarithm of reported children's wages; *** p<0.01, ** p<0.05, * p<0.1.

The results of this estimation are reported in Table 3. As expected, children's age and sex are positive and significant at the one and five per cent levels, respectively; whereas, schooling year is not significant. Older male children receive higher earnings than younger female children. The logarithm of the median earnings is positive and significant suggesting that the demand of child labour based on their geographical area affects children's occupational decisions through their potential earnings. The positive sign and the significance level of the urban dummy support the previous result. The coefficient of the work status variable is negative and significant. This reveals that children who work and study contribute less to the household income than those who only work. Indeed, an older working child in a district classified as urban will contribute more to the household income than a younger working child living in a district classified as rural.

Next, we estimate the multinomial logit for children's occupational choice using equation (9). The results of this estimation are reported in Table 4. Note that we report the marginal effects rather than the coefficients. These marginal effects are interpreted as probabilities. The base group is children not studying when j=0.

Table 4: Occupational structure multinomial logit model: marginal effects

Variables	Working and attending school		Attending school	
	Marginal effects	P>|z|	Marginal effects	P>|z|
Hh_income	0.0000	0.0370	0.0000	0.0090
Children's wage	-0.0000	0.0030	-0.0000	0.0054
Hh_size	0.0146	0.0000	-0.0007	0.8610
Ranking	0.0508	0.0000	-0.0317	0.0000
Gender	0.0404	0.0000	-0.0212	0.0110
Prii	0.0615	0.0000	0.2703	0.0000
Pric	0.0186	0.3100	0.2064	0.0000
n_infants	0.0232	0.0000	-0.0015	0.8010
Urban	-0.1487	0.0020	0.2242	0.0000
Head_female	0.0416	0.0000	-0.0069	0.5250
Head_age	0.0009	0.0000	-0.0006	0.1380
Head_agriculture	0.0196	0.2740	-0.0508	0.0070
Head_ganyu	0.0434	0.0000	-0.0765	0.0000
Head_literate	0.0071	0.4100	0.0394	0.0010
Head_English	-0.9615	0.0000	0.8687	0.0000

Notes: Observations: 13627; Pseudo R^2: 0.53158. Hh_income: household income minus children's wage.

Sources: Author's calculations using the IHS2.

We control for children's own characteristics along with households' and heads of households' characteristics, and children's estimated wage (*Children's_wage*), as well as household income (*hh_income*). Household size (*hh_size*) and the number of infants in the household (*n_infants*) capture the households' characteristics. Head of household characteristics are *head_female* (dummy variable that takes on value 1 if the head of household is a woman), *head_age* (age of the head of household), *head_agriculture* (dummy that takes on value of 1 if the head of household works in the agriculture sector), *head_ganyu* (dummy variable that takes on value 1 if the head of household does casual work), *head_literate* (dummy variable that takes on value 1 if the head of household reads and writes), and *head_English* (dummy variable that takes the value of 1 if the spoken language in the household is english). We capture children's own characteristics using four variables: 1) *ranking* (ranks the children in the household from the eldest to the youngest); 2) *gender* (child's gender); 3) *prii* (dummy variable that takes on value 1 if the child has not completed primary school); and 4) *pric* (dummy variable that takes on value 1 if the child has completed primary school).

The household's size and children's ranking have opposite signs for j=1 and j=2. This result was expected since older children from a household with a large number of members are more likely to work and study than only study. Comparing this result to the base group, it implies that older children from large households are more likely to work. The significance level and sign of the number of infants' coefficient (*n_infants*) confirm this result. Children of female headed households ($head\_female$) are more likely to work than study, once we control for the household source of income (*head_ganyu* or *head_agriculture*) and language spoken at home. The head of household's literacy (*head_literate*) influences the children in choosing j=2 more than j=1. Overall, the results presented in Tables 3 and 4 confirm our expectations in the Malawian context. Lastly, household's income appears to be the most important factor in influencing children's occupational choice.

5.2 Impact of programmes on occupational choice

Table 5 presents the results of our four simulated scenarios on children's occupational choices. In all scenarios, households are selected based on a mean test targeting method. We utilize the poverty line determined in the survey to capture the Malawian context in 2005. Therefore, the poverty line is set at MK16,165.[4]

Table 5: Transfer programme's impact on children's occupational choice (%)

Status	2003	Simulated Impacts			
		scenario 1	scenario 2	scenario 3	scenario 4
Overall					
Working (j=0)	33.50	0.10	26.53	0.10	23.44
Working and studying (j=1)	25.82	15.78	6.11	14.29	5.77
Studying (j=2)	40.68	84.04	67.36	85.61	70.79
Boys					
Working (j=0)	30.84	0.15	23.24	0.15	23.24
Working and studying (j=1)	29.52	16.41	7.84	16.41	7.84
Studying (j=2)	39.64	83.44	68.92	83.44	68.93
Girls					
Working (j=0)	36.00	0.05	29.62	0.05	23.64
Working and studying (j=1)	22.36	15.34	4.49	12.31	3.84
Studying (j=2)	41.64	84.61	65.89	87.64	72.52

Sources: Author's calculations using the IHS2.

Notes: scenario 1: CCT MK1,040/per child; scenario 2: UCT MK1,040/per child; scenario 3: CCT MK1,040/per boy and MK2,080/per girl; scenario 4: UCT MK1,040/per boy and MK2,080/per girl.

The first column of Table 5 reports the situation of children working (j=0), working and studying (j=1), or studying (j=2) in 2003. We consider the 2003 status as the baseline because the 2003 data were collected prior to the implementation of any STPs in Malawi. The four remaining columns report the percentage of children in each occupational choice as a result of their participation in each programme. Note that these percentages are the simulated effects of each scenario.

Table 5 shows that each scenario results in a significant reduction in the percentage of children working only. Scenarios 1 and 3 result in a reduction of 32.40 per cent of children working, whereas scenarios 2 and 4 result in a reduction of 6.97 and 10.16 per cent, respectively. Nevertheless, at this stage, we cannot infer from these results whether all these

[4] It is equivalent to US$45.15

children are now enrolled in school or not participating in any type of economic activities. The same pattern is also observed in the share of children working and studying. In all of the four scenarios, there have been significant reductions with the highest reduction recorded in scenario 4 (20.5 per cent) and the lowest in scenario 1 (10.04 per cent). The number of children choosing studying only increases in all four scenarios. Thus, in the Malawian case, the results translate into an increase in share of children studying only (j=2) and a decrease in the number of children working only (j=0) as wel as working and studying (j=1). Table 5 reports a large increase in the share of children studying only. This increase varies from 26.68 per cent (the lowest) to 44.93 (the highest) depending upon the scenario.

The two lower panels of Table 5 report the results for boys and girls, respectively. We observed the highest reduction on the percentage of boys working only in the conditional scenarios (1 and 3), i.e., there is a difference of 30.69 per cent in the percentage of boys working. The same result holds for girls' occupational choice (35.95 per cent decrease in the percentage of children working only). Table 5 reveals a surprising result on the impact of programmes that are differentiated by gender (scenarios 1 and 2 versus scenarios 3 and 4). Differentiating the CT by children's gender influences their decision to opt into studying only. Indeed, the percentage of girls' studying only increases from 41.64 to 87.03 and 72.52 per cent in scenarios 3 and 4. The difference between these percentage increases is 14.51 per cent in favour of the conditional scenario (3).

5.3 Impact of programmes on school enrolment

The second column of Table 6 indicates that 66.50 against 33.50 per cent of children were enrolled in school. From the children who were not enrolled in school, 30.84 per cent were boys and 36 per cent were girls. All four scenarios improve children's school enrolment. The highest increase of children's enrolment is recorded in the conditional programme scenarios 1 and 3. Indeed, the enrolment rate increases from 66.50 to 99.90 per cent, which represents a 33.40 per cent increase from the 2003 rate. This percentage increase is equal to the share of children choosing studying, i.e. moving from j=0 to j=1 or 2.

Table 6: Transfer programme's impact on children's school enrolment

Status	2003	Simulated Impacts			
		scenario 1	scenario 2	scenario 3	scenario 4
Overall					
Enrolled	66.50	99.90	73.47	99.90	76.56
Not enrolled	33.50	0.10	26.53	0.10	23.44
Boys					
Enrolled	69.16	99.85	76.76	99.85	76.76
Not enrolled	30.84	0.15	23.24	0.15	23.24
Girls					
Enrolled	64.00	99.95	70.38	99.95	76.36
Not enrolled	36.00	0.05	29.62	0.05	23.64

Sources: Author's calculations using the IHS2.

Notes: scenario 1: CCT MK1,040/per child; scenario 2: UCT MK1,040/per child; scenario 3: CCT MK1,040/per boy and MK2,080/per girl; scenario 4: UCT MK1,040/per boy and MK2,080/per girl.

The conditional programmes scenarios seem to have a greater impact on school enrolment than the unconditional scenarios. Indeed, the difference in the percentage of enrolled children between the two types of programmes is 26.43 for scenarios 1 and 2 and 23.34 per cent for scenarios 3 and 4. These differences are explained by the fact that these two sets of programmes are further differentiated by the benefits received for boys and girls.

This is also observable in the two lower panels of Table 6. In scenarios 1 and 2, the change in school enrolment rate is the same, whereas the change is different in scenarios 3 and 4. Girls experience the largest increase compared to boys. This is further confirmed in scenarios 3 and 4. This implies that the CT is primordial for increasing girls' enrolment. Comparing scenario 3 to scenario 4, we see that the conditionality still matters for girls. Under the conditional scenario, girls' enrolment is almost equal to 100 per cent (scenarios 1 and 3) whereas in the unconditional scenario it is 76.36 per cent (scenario 4). Overall, we observe large increase in the percentage of children being enrolled in school in all of the four scenarios.

5.4 Impact of programmes on child labour

In Table 7, we observe a negative trend in the share of working children. The lowest decrease of working children is 10.88 per cent in scenario 3. This implies an increase of 28.4 per cent difference in the children not working between the 2003 rate and the imputed effect of scenario 3. It is worth noting here that scenario 3 is a conditional programme with gender differentiated CT.

Table 7: Transfer programme's impact on child labour

Status	2003	Simulated Impacts			
		scenario 1	scenario 2	scenario 3	scenario 4
Overall					
Working	39.28	11.96	17.23	10.88	15.87
Not Working	60.72	88.04	82.77	89.12	84.13
Boys					
Working	41.14	12.62	16.91	12.62	16.91
Not Working	58.86	87.38	83.09	87.38	83.09
Girls					
Working	37.54	11.34	17.53	9.26	14.89
Not Working	62.46	88.66	82.47	90.74	85.11

Notes: scenario 1: CCT MK1,040/per child; scenario 2: UCT MK1,040/per child; scenario 3: CCT MK1,040/per boy and MK2,080/ per girl; scenario 4: UCT MK1,040/per boy and MK2,080/ per girl.

Sources: Author's calculations using the IHS2.

Contrary to the results obtained on school enrolment, which tend to be more favourable to girls than boys, here we observe the opposite effect. The effect of the four scenarios show that more boys move out of the labour market than girls. Considering programmes with same transfer, the difference in percentage of children working is 1.28 per cent in favour of boys (scenario 1), whereas the unconditional programme favours girls (0.62 per cent in scenario 2). The highest decrease is recorded in scenario 3, where percentage of girls working decreases to 9.26 per cent from 37.54 per cent (second column of table 7).

6 Conclusion

This paper investigates the impact of CCT and UCT programmes on school enrolment and child labour in Malawi. We perform a micro-simulation of four different scenarios. Households are selected based on a mean test targeting method, which defines a maximum threshold household income, above which households are not eligible to receive the benefit. Our micro-simulation reveals that school enrolment increases in all of the four scenarios. Indeed, for conditioned scenarios where the household receives the same transfer for boys and girls, school enrolment increases by 30.69 and 35.95 percentage points, respectively (scenario 1). This result changes when we drop the condition on school enrolment, girls' school enrolment lags behind boys' school enrolment. Specifically, girl's enrolment reaches 70.38 per cent when boys' enrolment rate is 76.76 per cent. When programmes are differentiated both in terms of their conditionality and the CT, we obtain a strikingly different result. In the conditional scenario, we obtain similar school enrolment rates, i.e., 30.69 and 35.95 percentage points increase for boys and girls, respectively. Nevertheless, in the unconditional programme, girls' school enrolment is almost equal to the boys' school enrolment rate, i.e., 76.76 and 76.36 percentage points increase for boys and girls. Our results suggest that households will prefer to send boys to school regardless of the nature of the programmes, while only the enforcement of conditionality will cause girls' enrolment.

Overall, our results are similar to those obtained from a randomised control trial of the Malawi Social Cash-transfer Scheme (SCTS) conducted by Miller and Tsoka (2012).[5] The SCTS is operational in 7 districts and by 2010, more than 11,000 households have received CTs on a monthly basis (Miller and Tsoka 2012). The programme is an UCT with no supply-side using a community based targeting strategy.[6] The CT depends on the size of the household and the number of school-aged children.[7] They find that on average, school enrolment for children aged six to 18 is 91 per cent in the intervention households versus 83 per cent in comparison households. These results are significant when the child's age and gender as well as additional household level factors are modelled.

The conditional and unconditional programmes are effective for increasing children's school enrolment and decreasing child labour. The results of this analysis reveal the importance of enforcing conditions to maximize programmes' effectiveness. The difference in the imputed effects of all of the four scenarios is pronounced when we further differentiate along the engendered CT. This suggests that households will prefer to send boys to school regardless of the nature of the programmes while enforcement of conditionality enhances girls' enrolment.

The main policy implication of this paper is that the Malawian government should scale-up its existing CT programmes. It is essential to maintain the conditional nature of these programmes to assure that both male and female children would benefit from these programmes. Moreover, the cash value of the transfer should be increased for discouraging child labour. Although a gender differentiated cash value creates girls' school enrolment, it is, nevertheless, not necessary since the government can still reach its targeted enrolment rate with same transfer for both male and female children. The gender differentiated is likely to be more costly to implement than the same transfer programme. It is important to keep the cost of the programme within a reasonable percentage of the government budget for facilitating government's ownership and programme continuity.

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[5] The Malawian government implements the programme but is is mainly donors funded.

[6] However, families are told that children should attend school. There is no monitoring or penalties regarding children's school attendance.

[7] The cash value is MK 2,000 (US$14) on average per month. A single person household receives MK600 (US$4.30), whereas a household with four or more members receives MK1,800 (US$12.85). Each additional primary school-aged child is paid MK200 (US$1.42), while a secondary school-aged youth receives MK400 (US$2.86).

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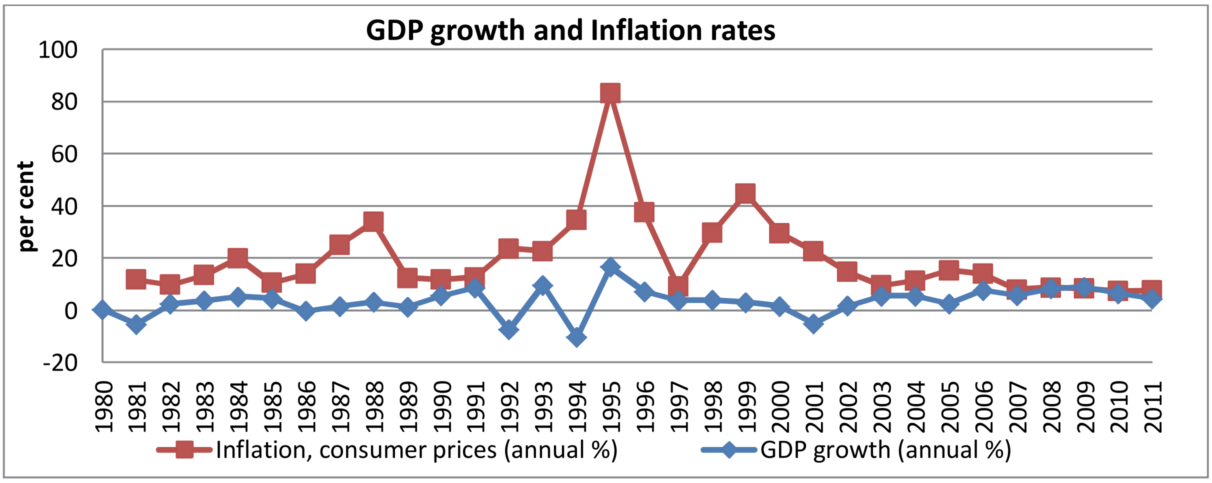
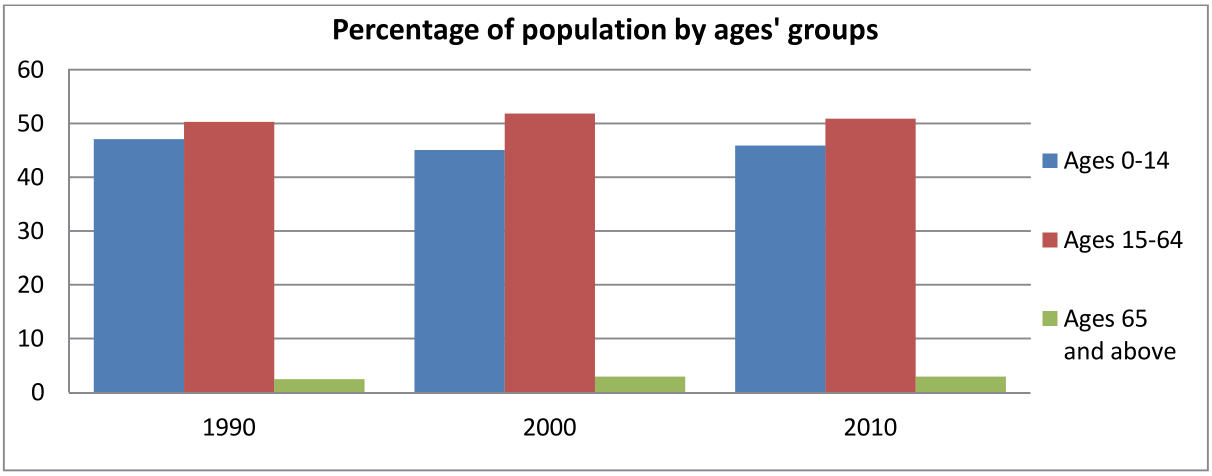
Appendix

Figure 1: Economic growth and inflation rates in Malawi from 1980 to 2011



Source: World Bank (2013a).

Figure 2: Growth rates of population by age groups (decade averages 1980–2010)



Sources: World Bank (2013a).