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ORIGINAL ARTICLE

Fiscal Policy, Multidimensional Poverty, and Equity in Uganda: A Child-Lens Analysis

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Abstract

Fiscal incidence analysis is the most widely used methodology to assess the distributional effects of fiscal policies. However, despite 40 years of use and refinement, it still lacks. A focus on the redistributive capacity of fiscal policy among children is increasingly important as policymakers pay growing attention to the disproportionate incidence of poverty among children globally. This paper brings a child-dedicated focus to fiscal incidence analysis by tracking child-relevant benefits, making child wellbeing the unit of analysis, and using multidimensional child poverty metrics. The analysis—Commitment to Equity for Children, or CEQ4C—integrates three analytical frameworks: public finance, fiscal incidence, and multidimensional child poverty. The paper develops a proof of concept for Uganda that includes measurement, diagnostics, and a policy simulation package replicable across diverse contexts. The proof of concept confirms that CEQ4C provides a higher-resolution fiscal incidence analysis for children than the traditional fiscal incidence analysis.

Keywords Childhood · Multidimensional poverty · Equity · Fiscal policy · Uganda

Résumé

L'analyse d'incidence fiscale est la méthodologie la plus utilisée pour évaluer les effets redistributifs des politiques budgétaires. Cependant, en dépit de 40 années d'utilisation et de perfectionnement, cette méthodologie comporte toujours des lacunes. Il est de plus en plus important de se concentrer sur la capacité de redistribution de la politique budgétaire chez les enfants, car les décideurs sont de plus en plus attentifs à l'incidence disproportionnée de la pauvreté chez les enfants dans le monde. Cet article centre l'analyse de l'incidence fiscale sur l'enfant en suivant les presta-

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tions adaptées aux enfants, en faisant du bien-être de l'enfant l'unité d'analyse et en utilisant des mesures multidimensionnelles de la pauvreté des enfants. L'analyse, qui s'intitule "S'engager pour plus d'équité pour les enfants" ou CEQ4C, intègre trois cadres analytiques: les finances publiques, l'incidence fiscale et la pauvreté multidimensionnelle des enfants. L'article développe une preuve de concept pour l'Ouganda qui comprend des outils de mesures, des outils diagnostiques et un ensemble de simulation de politiques publiques reproductibles dans divers contextes. La preuve de concept confirme que CEQ4C fournit une analyse d'incidence fiscale plus élevée pour les enfants que l'analyse d'incidence fiscale traditionnelle.

JEL Codes H23 · I32

Introduction

The body of evidence on interventions that successfully address deprivations and inequalities in child well-being is growing. Investments in early childhood development, improving education, universal health care, cash transfers, and the protection of children against violence are some of the many interventions shown to reduce poverty, inequality and inequity (Berlinksi and Schady 2015; Davis et al. 2016; World Bank 2016a). But the composition and scale of such government programs determine their success in addressing child deprivations. Whether governments finance such expenditures through often-progressive income taxes, often-regressive value added taxes (VAT), or introducing property or inheritance taxes rather than user fees also has distinctive distributional effects (World Bank 2016b).

Analysis of the impacts of public spending and revenue collection on poverty and inequality dates to the 1970s (Chenery et al. 1974; Wulf 1975; Meerman 1979; Selowsky 1979).[1] But fiscal incidence analyses over the last 40 years have lacked a specific focus on child well-being. This omission is important for two reasons. First, the traditional focus on income, consumption, or wealth often misses the true dimensions of child well-being (Gordon et al. 2003; Alkire and Santos 2013). As reported below, the incidence of monetary poverty among children in Uganda (22%) starkly contrasts with the incidence of multidimensional child poverty (83%). Second, spending that can be easily associated with children, for instance, education, is often mixed with spending that is not specific to children, for instance, universal health care programs. This does not allow a precise assessment of the incidence of spending on children.

This article provides a child-specific lens on the equity analysis of public finance by broadening one of the most thorough applications of the traditional fiscal incidence analysis, the Commitment to Equity (CEQ) Assessment (Lustig et al.

[1] Key analytical developments emerge also from work by Derviş et al. (1982), van de Walle and Nead (1995), Shah (2003), Bourguignon et al. (2003), Löfgren (2004), Martinez-Vazquez (2008), Moreno-Dodson and Wodon (2008), Cuesta and Ponce (2007), Bastagli et al. (2012), Lustig et al. (2012), IMF (2014), Cuesta (2014), Avram et al. (2014), among others.

2012; Lustig 2018). The resulting framework, Commitment to Equity for Children (CEQ4C), contributes to the fiscal incidence literature in three distinctive ways. First, it identifies child-relevant benefits from interventions not impacting children; ensures children are the unit of analysis; and uses multidimensional child poverty metrics. Second, it integrates three separate analytical frameworks: public finance, child poverty measurement, and fiscal incidence analysis. Third, it builds a protocol that includes measurement, diagnostics, and a policy simulation package that can be replicated across diverse contexts and the child's life cycle. The numerous building blocks of CEQ4C—budgets relevant for children, child poverty measures, fiscal incidence analysis, simulation techniques—need to be coherently articulated. Because of the intricacy of that exercise, this article walks the reader step-by-step through the sequential integration of the CEQ4C building blocks. It guides the reader through the choices made in terms of measuring child budgets and child poverty. It details the assumptions behind the fiscal incidence used and the merits and limitations of the proposed child-centric fiscal incidence analysis. Finally, the article provides insights into the construction of simulation scenarios and resulting estimates. Each step is presented on its own subsection for easy reference. Section "Fiscal Incidence Analysis with a Child Lens Introduces" CEQ assessments and their child-focused extension, CEQ4C. Section "CEQ4C in Practice: Uganda Case Study" applies CEQ4C to a country, Uganda, reporting the main findings of what constitutes a proof of concept of the expanded fiscal incidence analysis. Section "Conclusion" concludes and identifies next steps for this enhanced analytical framework.

Fiscal Incidence Analysis with a Child Lens

The Current State of Fiscal Incidence Analysis

Fiscal incidence analysis estimates how much and through which channels public expenditure is received, and the burden from public revenue collections across societal groups. Incidence analyses also capture how the share of benefits and burdens decreases or increases with welfare levels. Furthermore, fiscal incidence analyses address the capacity of taxes and expenditures to affect income distribution and, ultimately, poverty and inequality. Methodologically, this analysis follows three basic steps (van de Walle 1996): first, it approximates the value to consumers of a public service or the net costs with which a taxpayer is burdened; second, it ranks beneficiaries and taxpayers according to an agreed measure of welfare, typically income; and third, it assigns the provision of the public service across a welfare distribution to compute the shares of the monetized services that are allocated to various segments of the population and the statutory burden of taxes. Typically, the unit of analysis is the representative household by quintile or decile of income (on a per capita basis).

A main advantage of fiscal incidence analysis is that it provides a powerful tool for diagnostic and policy analysis relevant across multiple contexts. For example, European Union taxes and transfers reduce the Gini index of market income inequalities of the 27 member states by 20 points on average (De Agostini et al. 2015).

In developing countries, results vary (IMF 2014; Inchauste and Lustig 2017). Social expenditures in Tanzania have done relatively little to redistribute income and reduce poverty, while taxes have narrowed inequality but have not affected poverty (Younger et al. 2016). The World Bank (2016b) concludes that anti-poverty fiscal reforms in Chile and Mexico had different distributional impacts because one was designed to affect the ultra-rich and the other the upper-middle class.

However, fiscal incidence says little about the mechanism generating the distribution of incomes, benefits, or burdens. For example, many fiscal incidence analyses do not survey how a certain program or policy influences the behavior of beneficiaries.[2] Incidence analysis rests on strong operational assumptions: that benefits received by individuals are usually presumed to be equivalent to the public costs of public provision; that individuals value transfers received and taxes taken identically, and only value the current spending element of programs (that is, do not include the investment nature of public transfers in education and health); and that there is frequently total pass-through of taxes remitted by producers to consumer prices. These assumptions may create several biases. It is likely, for example, that the poor attend lower-quality schools and health care facilities and therefore receive lower effective benefits from such services. Poor households might be less willing to pay for these services or may have to incur higher transaction costs, such as transport costs, to access these services.

Various techniques have been developed to operationalize the analysis of fiscal incidence. They include tax-benefit microsimulation models, such as Euromod (Atkinson et al. 2002; Lelkes 2007) or LATAX, a multicountry tax microsimulation model housed at the Institute of Fiscal Studies (Abramovsky and Phillips 2015); dedicated general equilibrium models, such as Maquettes for Millennium Development Goal (MDG) simulations (MAMs); and efficiency analysis of budgets along geographical lines, such as BOOST (Löfgren 2009; Wilkinson 2009; Kheyfets et al. 2011).

The Commitment to Equity (CEQ) Assessment (Lustig et al. 2012; Inchauste and Lustig 2017; Lustig 2018) is one of the most comprehensive applications of fiscal incidence analysis. CEQ's core is the definition and construction of actual and counterfactual income concepts, from market (or prefiscal) income to various measures of postfiscal income (after taxes and transfers originating in the public sector). For example, after constructing a value for the market income of a household, disposable income is obtained by subtracting direct personal income taxes and adding cash transfers. Consumable income adds indirect subsidies and subtracts indirect taxes to disposable incomes, while final income adds in-kind transfers and subtracts copayments and user fees to consumable income.

To understand policy effects, a CEQ Assessment generates marginal contributions to determine the effect of taxes and spending on poverty and inequality. For instance, the marginal contribution of direct taxes to inequality at final incomes

[2] Fiscal incidences studies sometimes analyze labor or consumption behavior: Aran et al. (2016); Attanasio et al. (2014); Bourguignon and Ferreira (2003); Cogneau et al. (2003); Cuesta and Ponce (2007); Leite et al. (2011).

is the difference between the Gini of final incomes with all taxes and transfers included, and that without direct taxes included.

Transfers usually included in CEQ assessments are cash transfers, in-kind benefits like free education and health care, and consumption subsidies for food, electricity, and fuel. Social insurance contributory pensions are partly deferred income, and should therefore be partially added to market income (and contributions subtracted from labor income), and partly government transfers, so a portion should be included with the rest of government transfers (and contributions treated as a direct tax). In practice, however, analyses consider them either as market income (as in the CEQ) or government transfers.

CEQ assessments are among the most comprehensive and comparable fiscal incidence analyses available on middle-income and low-income countries, currently conducted in nearly 100 countries and covering 80% of the world's poor. While net fiscal incidence is widely acknowledged to be the relevant equity measure needed to judge policies, simultaneous analysis of the incidence of government revenue and spending, including net indirect taxes and spending on in-kind services, was uncommon until the launch of the CEQ project in 2008 (see Lustig 2018).

Adding a Child Lens to Fiscal Incidence Analysis

However, even the most comprehensive CEQ assessments lack a child lens. Providing this requires establishing child-specific links to fiscal incidence analysis. Our proposed approach, Commitment to Equity for Children, CEQ4C, does this by expanding the standard CEQ in three directions: at a macrolevel, describing public spending particularly relevant to child well-being; at a mesolevel, performing policy simulations involving child-relevant spending and revenues; and at a microlevel, introducing a measure of multidimensional child poverty (MDCP). Specifically, the CEQ4C application adds three components to the CEQ:

An Explicit Focus on Child-Relevant Budgets

A "child-relevant" budget identifies public spending or tax revenues specific to those aged 0–17 (or any other definition of childhood used). CEQ4C defines a child-relevant budget as one possessing components that explicitly and directly target child well-being. This implies spending that is earmarked to benefit children through eligibility mechanisms or an allocation formula (such as preschool, primary, and secondary education, early childhood development, or child grants); spending accruing to children as one of multiple beneficiaries (for example, youth training programs that may include adolescents and young adults); and spending not linked directly to children, but benefiting them indirectly, such as household or community subsidies for basic groceries, electricity, or heating.

The CEQ4C protocol follows the basic conceptual principles of direct and indirect relevance for children that provide a child lens to public finance, as laid out in Cummins (2016), United Nations Children's Fund (UNICEF 2016) and Garcimartin et al. (2018). Pragmatically, however, the specific context and circumstances

of each program need to be taken into consideration in classifying each budgetary item country by country. This practical solution reflects the lack of consensus around a simple definition of child-relevant budgets (UNICEF 2016). Recent analysis in Uganda (Republic of Uganda and UNICEF 2016), included only three items of social spending (education, health, and water) as child relevant. In contrast, an analysis in Spain reviewed some 14,000 budgetary lines and around 100 tax expenses to determine child-relevance (Garcimartin et al. 2018). Thus, countries with detailed financial monitoring and tracking information systems should be expected to conduct more detailed PF4C analyses than countries with weaker technical capacity.

A Built-in MDCP Metric in the Fiscal Incidence Analysis

CEQ4C assessments index and examine multidimensional child poverty. The choice of the several MDCP measures currently used (see de Neubourg et al. 2012; Hjelm et al. 2016; Karpati and de Neubourg 2017) is based on the needs of the exercise and the availability of data. Regardless of the measure chosen, individuals are categorized under CEQ4C as poor or non-poor based on an MDCP metric, alongside monetary poverty metrics. The incidence of (child-relevant) public spending and tax burdens can also be defined across individuals based on their estimated MDCP status. Furthermore, CEQ4C reflects age-relevant considerations in analyzing spending categories, such as biological factors (for example, different cognitive development stages), institutional factors (school admission age), or policy reasons (interventions targeting teenagers).

Child-Relevant Policy Simulations

While policy analyses need to consider specific contexts, CEQ4C builds a series of comparable policy simulations relevant to child well-being policy questions common across diverse contexts, types of countries, and the child's life cycle. These simulations revolve around the following generic scenarios, policy settings, or reforms:

a. The fiscal cost of filling investment gap. This policy simulation estimates the additional cost of providing essential services to those children currently not benefiting from public spending (because of legislation, policy aims, or international standards). Examples include providing universal access to primary education, vaccination, or reducing urban–rural gaps.
b. MDCP as targeting mechanism. This type of analysis uses MDCP status or intensity to target or allocate public spending (or tax revenue considerations) across individuals.
c. Distributive effects of pro-child spending shifts. Under this simulation, the composition or aggregate levels of public spending are shifted from observed to alternative uses, based on equity considerations. A typical example would shift resources from a regressive, low-impact energy subsidy to pro-poor and pro-child public spending on primary education. The simulation identifies those population groups that benefit or lose out from the change.

d. Fiscal reform impacts on children. As governments design fiscal reforms to increase revenues or improve equity, simulations can estimate the specific impacts of each intervention, including on children, based on MDCP status. An example of this simulation includes a shift of resources from subsidies to a child grant accompanied by selective increases in VAT rates.

Bringing the Building Blocks Together

A CEQ4C assessment performs three distinct functions: measurement, diagnostics, and policy analysis. Both quantifying the part of the budget that serves a child-relevant objective and estimating the incidence of multidimensional child poverty have a measurement objective. The focus on children of the expanded fiscal incidence analysis provides a more granular diagnostic of the distributive capacity of fiscal policy. The set of policy simulations built into the CEQ4C framework allows an analyst to quantify the potential effects of alternative policy interventions across age groups.

CEQ4C is designed to be relevant across multiple contexts. The building blocks, the choice of well-being metrics, and policy questions are common across developed and developing economies, fragility contexts, countries with good or poor micro data and financial information systems, and different levels of installed capacity to collect and analyze evidence on distributional impacts. A country with a tradition of multidimensional poverty measurement, analytical and planning capacity, used to basing the design of its policies on evidence, and sensitive to child well-being is likely to produce a rich CEQ4C assessment, and vice versa. In both cases, however, CEQ4C has limitations. By not incorporating behavioral responses, CEQ4C results typically provide an upper (lower) bound of poverty and distributional effects to the extent that, for example, labor supply is reduced (increased) following fiscal reforms. When focusing on the short term and not providing the investment value of some spending categories, CEQ4C results provide a lower-bound estimate of welfare effects. CEQ4C analyses will also be imprecise to the extent that they fail to use realistic assumptions on pass-through effects of taxes or excessively simplify aspects like increasing administrative costs.

CEQ4C in Practice: Uganda Case Study

We pilot the CEQ4C proof of concept in Uganda, a low-income country with high levels of MDCP and low fiscal expenditures and revenues (as shares of GDP). Successive governments have made economic growth and fiscal policy more inclusive (EPRC, BMAU, and UNICEF 2016). In fact, Uganda is one of the few countries in Sub-Saharan Africa with pro-poor spending and taxation (Jellema et al. 2016). The CEQ4C is built from microdata in the Uganda National Household Survey 2012/2013 (UNHS), while estimates and measurements are validated using additional health and demographic surveys.

Table 1 Uganda government expenditures, 2012/2013

	UGSh, (billions)	% of GDP	CEQ included?	Child budget?
Total expenditure	7454	12.1	4.8%	
Defense spending	749	1.2	No	No
Social spending	2817	4.6	Yes	
Social protection	344	0.6		Yes (indirect)
Social assistance	84	0.14	Yes	Yes (indirect)
Cash transfers	84	0.14	Yes	
Noncontributory pensions	–			
Near cash transfers	–			
Other	–			
Social insurance	260	0.4	Yes	Yes (indirect)
Education of which	1,504	2.4		
Preschool	–			Yes (direct)
Primary	750	1.2	Yes	Yes (direct)
Secondary	528	0.9	Yes	Yes (direct)
Postsecondary nontertiary				Yes (direct)
Tertiary	202	0.3	Yes	No
Health	969	1.6	Yes	
Contributory				Yes (indirect)
Noncontributory				Yes (indirect)
Housing and urban	24	0.04	No	No
Subsidies	129	0.21	Yes	
Energy				
Electricity				
Fuel				
Food				
Inputs for agriculture	18		Yes	No
Water	91		Yes	No
Rural electrification	9		Yes	No
Infrastructure	2595	4.21	No	No

Source Authors' calculations based on data in MoFPED (2013)

Next, each step of the CEQ4C assessment is developed for Uganda.

CEQ4C Measurements

Identifying a Child-Relevant Budget

Table 1 provides a snapshot of expenditures in fiscal year 2012/13, the latest year in which budgetary data can be linked to available household survey microdata. Social

expenditures account for nearly two fifths of total expenditures; infrastructure, one third; defense, one tenth; and other sectors, 17%.[3]

In Uganda, child-relevant budgets include all education spending that benefits children aged 0–17, that is, primary and secondary school expenses. Public preschool spending is negligible, while tertiary education benefits an older age group, so neither are included in the Ugandan proof of concept. All public health spending is considered part of the child-relevant budget, following common practice (Cummins 2016). It combines benefits aimed directly at children and benefits reaching children indirectly. Social insurance and social assistance are considered to indirectly benefit children (see Jellema et al 2016). Social insurance, even if not targeting children directly, helps protect all members of beneficiary households. In practice, because the Ugandan household survey does not ask about contributions towards social insurance nor are these reported in the budget, we cannot include them in our proof of concept. However, this omission should have a very limited impact given the small budgetary incidence of social insurance (0.4% of GDP). Social assistance in Uganda is not directly linked to children either but to household size. The only in-kind social spending not covered by this CEQ4C assessment is urban housing expenditure, of which there is little and virtually none outside the capital, Kampala. Neither defense and infrastructure spending nor subsidies are considered child-relevant budget items.[4] As a result, the child-relevant budget in Uganda amounts to 4.2% of GDP, under the 4.5% to 8.5% of GDP range reported in Cummins (2016) for other countries at a similar developmental stage like El Salvador and Honduras.

Table 2 provides a snapshot of public revenue sources in Uganda in fiscal year 2012/13. Uganda's revenues come largely from indirect taxes like VAT, excise taxes (including on petroleum products), and trade taxes. This structure is similar to comparable neighboring countries like Ethiopia and Tanzania (Jellema et al. 2016). Direct taxes—personal income tax, corporate income taxes (including on capital gains), and a withholding tax—contribute to public revenues by half as much as indirect taxes. Consumption taxes include the VAT (18%), excise duties (including fuels), and customs duties. There are various VAT exemptions and zero-rated products, namely on consumption goods among the poor, unprocessed foodstuffs, agricultural products (except for wheat grain), and several agricultural inputs. Overall, Uganda's tax to GDP ratio, at 11.6% of GDP in 2012/13, is one of the lowest in sub-Saharan Africa. The tax compliance gap is large, and contributors few.

The Uganda CEQ4C assessment covers most indirect taxes and the personal income tax. There is not sufficient information to allocate corporate income tax burdens to households surveyed in UNHS, nor to allocate social insurance contributions, so we do not include those taxes in the proof of concept.

[3] Other sectors not shown in Table 1 include energy and mineral development, information and communication technology, tourism, trade, and industry.

[4] Direct subsidies of water and electricity consumption had been phased out in urban areas by the time the UNHS was run, while, in rural areas, relatively small subsidies cover only some infrastructure investments and maintenance costs.

Table 2 Uganda Government Revenues, 2012/2013

	UGSh, (billions)	% of GDP	CEQ Included?	CEQ4C included?
Total revenue and grants	9213	14.9	8.2%	
Revenue	8277	13.4		
Tax revenue	7150	11.6		
Direct taxes	2407	3.9		
Personal income tax	1197	1.9	Yes	Yes
Corporate income tax	598	1.0	No	No
Corporate withholding tax	389	0.06	No	No
Taxes on property	–	–		
Contributions to social insurance	–	–		
Indirect taxes	4,712	7.6		
VAT	2,353	3.8	Yes	Yes
Sales tax	–	–		
Excise taxes	1,466	2.4	Yes	Yes
Customs duties	753	1.2	No	
Taxes on exports	0	0.0	No	
Nontax revenue	191	0.3	No	
Grants	936	1.5	Yes	Yes

Source Authors' calculations based on data in MoFPED (2013)

From Budget Spending to Individual Benefits

Figure 1 links public spending (defined as child-relevant spending and the revenue items included in the CEQ4C analysis) with the individual and household income earning generation process. The CEQ4C assessment in Uganda includes personal income, payroll taxes, and the VAT. Spending covers direct cash transfers, direct near-cash transfers, and benefits from public spending on education and health care. Spending on defense and housing, corporate taxes, and subsidies are not considered child-relevant (see above). Corporate taxes and contributions to social security are not in the current analysis because the household survey does not identify them. Although not considered child-relevant, subsidies are included in the assessment as part of policy simulations, that is, a budget component to be redistributed to children based on their MDP status.

Measuring Multidimensional Child Poverty

The proposed MDCP estimate for this proof of concept is a generic measure that identifies critical dimensions of child well-being based on children's rights; reflects current SDG-based priorities; picks representative indicators for those dimensions (a decision driven by data availability); and identifies whether children are deprived along those dimensions when they do not reach predetermined minimum thresholds

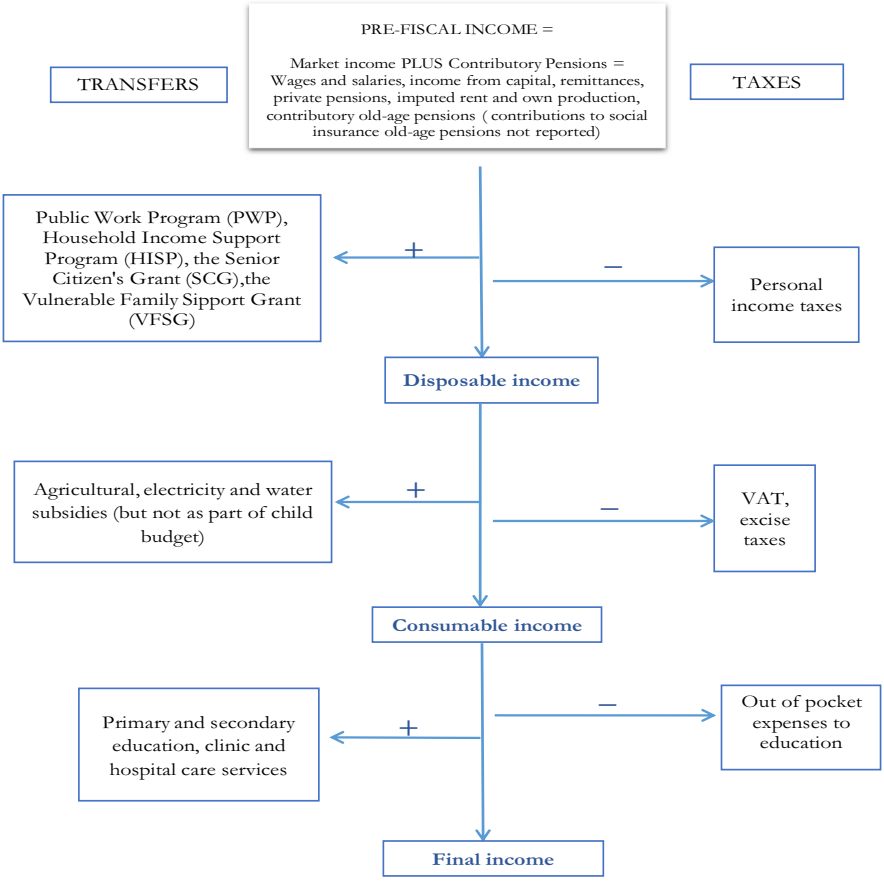

Fig. 1 From Budget to Household and Individual Income in Uganda. *Source*: Authors' adaptation, based on Lustig (2018)

for selected indicators.[5] Most dimensions are relevant for each child regardless of age, except education, which applies only to children age 6 or older.

The MDCP measure as defined in Uganda is no more accurate than alternative applications such as multiple overlapping deprivation analysis (MODA) or the multidimensional poverty index (MPI). Karpati and de Neubourg (2017) examine several MDCP measures in detail, including MODA, MPI, Mexico's multidimensional poverty measure, and the European Union's material deprivation index,

[5] The micro-level dataset providing the individual- and household-level information is the Uganda National Household Survey (UNHS) 2012/13. UNHS is a nationally representative survey that covers consumption and income behavior, with 6887 households surveyed for that round. The UNHS is conducted approximately every three years using a two-stage stratified sample design that allows for reliable estimation of key indicators at the national, rural–urban, regional and (separately) the sub-regional level (Jellema et al. 2016).

concluding that none is systematically superior. Measures differ in terms of conceptual underpinning, the unit of analysis (household versus child), the number and type of dimensions and indicators of wellbeing considered, aggregation practices, cut-offs and thresholds, and so on. The ultimate objective of the analysis—targeting the children who are the most deprived, international comparisons and monitoring, or understanding the links between monetary and multidimensional poverty—determines which MDCP measure option is best in each country. Empirically, Hjelm et al. (2016) suggest that MODA captures individual deprivations (including gender-based ones) more aptly than the MPI, a household-based index. Hjelm et al. (2016)'s analysis focuses only on Cambodia, Ghana, Mali and Mongolia (Table 3).

Our generic measure shows that it is possible to generate a simple MDCP indicator that can be used for fiscal incidence purposes without such difficult conceptual deliberations. It also demonstrates that an MDCP measure can be obtained from a standard household income-expenditure survey, even one not designed to provide a precise picture of child well-being. In other words, rather than choosing arbitrarily between MODA or MPI for this proof of concept, we estimate a generic measure that requires the least number of decisions about weights and thresholds.

There are also some caveats as far as the definition of child poverty is concerned. The indicator capturing deprivations in the health dimension—access, ownership, coverage, or use of mosquito nets—is selected over more frequently used indicators capturing assisted delivery or vaccinations. This is because the UNHS does not contain standard information on vaccinations, maternal health care, or postnatal care. However, the indicator is relevant as vector-transmitted diseases like malaria, which killed more than 7000 Ugandans in 2013, are an increasing concern (WHO 2018).

Likewise, the proposed nutrition indicator does not refer to child anthropometrics (unavailable in UNHS), caloric intake or other nutritional variables. Dietary diversity, a nutritional input, is used instead. Underlying this choice is the assumption that children are properly fed if the household guarantees sufficient dietary diversity. In the present application, the dietary diversity indicator refers to all children, providing information on school-aged children and adolescents, which is usually missing in the Multiple Indicator Cluster Surveys or the Demographic and Health Surveys.

The nationally estimated MDCP in Uganda is 83%, defined as the share of children reporting two or more deprivations (Table 4). MDCP is higher in rural areas (87.5%) than in urban areas (63.8%) across all age groups (0–6, 7–12, and 13–17). Furthermore, while six deprivations are observed among less than 1% of Ugandan children, four and five deprivations affect up to 48% of rural children aged 13–17. Sanitation is the most frequently observed deprivation among children aged 0–17, at a national average incidence of deprivation of 73%, followed by health deprivations (57%), nutrition (53%), housing and education (37% and 35%), and water (27%).

Our measurement choices have substantial implications. Using demographic and health surveys and a MODA methodology, de Milliano and Plavgo (2014) estimate MDCP incidence for children aged 0–17 at 74%, 9% points lower than the estimate in this proof of concept. However, it confirms that the widest divergence in poverty measurement is between monetary and multidimensional child poverty, not between multidimensional child poverty measures. The World Bank's estimate (2016c) of

Table 3 Measuring Multidimensional Child Poverty in Uganda, 2014

Child well-being dimension	Child well-being indicator	Definition of indicator	Reference age group
Health care	Insecticide-treated mosquito net	Did not sleep under an insecticide-treated mosquito net the night before the survey	0–17
Nutrition	Lack of dietary diversity	Deprived if child lives in a household in which food consumption comprises less than 4 food groups, of which one omitted group is meat/fish/pulses, or egg/milk	0–17
Education	School enrolment	Not in school	6–12; 13–17
	Grade/age	More than two grades behind	13–17
Housing	Overcrowding	Four or more people per room in the household	0–17
Water	Unimproved water	The main source of drinking water is unprotected well or spring, river, tanker truck, or bottled water or an unspecified source	0–17
Sanitation	Unimproved sanitation facility	The main toilet facility is a latrine without a slab, no facility (bush), or unspecified	0–17

Source Authors' analysis based on UBS 2014

Table 4 Multidimensional child poverty in Uganda: a generic estimate (2014)

Number of deprivations	MDCP nonpoor		MDCP poor				
	0	1	2	3	4	5	6
All children							
Nationwide	3.8	13.4	25.9	29.3	19.9	7.0	0.9
Urban	12.0	24.2	28.3	22.6	10.3	2.4	0.3
Rural	1.8	10.7	25.3	30.9	22.3	8.1	1.0
0–6							
Nationwide	5.1	17.2	29.4	29.1	15.1	4.1	
Urban	15.0	29.8	29.1	18.7	6.1	1.3	
Rural	2.4	13.9	29.5	31.9	17.5	4.9	
7–12							
Nationwide	3.4	13.0	27.6	30.5	19.4	5.3	0.8
Urban	10.6	23.4	29.9	24.0	10.4	1.5	0.2
Rural	1.8	10.6	27.0	32.0	21.5	6.2	0.9
13–17							
Nationwide	2.4	7.6	17.0	27.4	28.7	14.4	2.5
Urban	9.2	15.9	24.2	27.1	17.2	5.7	0.8
Rural	0.7	5.5	15.2	27.5	31.5	16.6	2.9

Source Authors' analysis based on UBS 2014

monetary child poverty based on UNHS data is 22% in 2012/13.[6] But this monetary metric is clearly unable to capture the wider distribution of deprivations of the multidimensional poverty metric. Instead, MODA and the generic measure used in CEQ4C include the same dimensions and similar indicators on education, housing, and water and sanitation. Whether this conclusion can be extrapolated to other contexts will be examined below.

CEQ4C Diagnostics

Fiscal incidence Analysis with a Child Lens

Table 5 reports the benefits and burdens that child-relevant public spending and taxes represent across Ugandan children. The benefits and burdens are constructed following the steps in Sect. 2: first, computing the value of a public service or the liability with which a taxpayer is burdened as the cost of providing the service and the net payment incurred by the taxpayer; second, ranking beneficiaries and tax bearers according to the number of well-being deprivations they suffer; and, third,

[6] The official national poverty line ranges from USD 0.88 to 1.04 in 2005 international purchasing power parity dollars per capita depending on the region and defined according to a basic needs approach. See World Bank (2016c).

Table 5 Gross fiscal incidence analysis across the MDCP and monetary poverty metrics, 2014

Income, tax or benefits	Child multidimensional poverty						Monetary poverty					
	Poor											
	0 deprivations	1	2	3	4 + deprivations	All MDCP Poor	Poor	Q1	Q2	Q3	Q4	Q5 (richest)
Market	3,776,099	2,037,894	1,472,171	1,253,235	1,082,009	1,320,965	556,748	543,303	877,763	1,192,284	1,656,417	3,733,735
MI + Pensions	3,777,068	2,043,355	1,476,210	1,254,331	1,082,492	1,323,288	556,773	543,330	879,285	1,193,794	1,657,450	3,744,106
Net market	3,479,312	1,977,209	1,459,760	1,249,972	1,078,982	1,313,576	556,701	543,253	878,527	1,189,682	1,646,968	3,575,191
Disposable	3,479,778	1,977,997	1,461,119	1,251,954	1,081,062	1,315,292	560,109	546,582	880,030	1,190,689	1,647,957	3,575,659
Consumable	3,409,033	1,942,244	1,439,248	1,233,907	1,065,588	1,295,984	555,204	541,734	870,182	1,175,413	1,622,878	3,503,403
Final	3,514,879	2,043,754	1,539,954	1,326,933	1,150,169	1,390,929	644,117	629,463	965,308	1,268,680	1,715,612	3,618,943
Child budget: total	**66,875**	**71,983**	**79,175**	**80,910**	**78,192**	**79,610**	**81,576**	**81,080**	**82,014**	**78,119**	**74,279**	**71,292**
Transfer 1	**23**	**7**	**4**	**22**	**25**	**14**	**62**	**56**	**11**	**0**	**0**	**0**
Transfer 2	**0**	**241**	**411**	**525**	**667**	**500**	**1960**	**1884**	**215**	**0**	**0**	**0**
Transfer 3	**444**	**465**	**836**	**965**	**963**	**906**	**1159**	**1145**	**959**	**805**	**681**	**363**
Transfer 4	**0**	**77**	**108**	**472**	**429**	**298**	**229**	**245**	**323**	**199**	**309**	**106**
Hospital	**6952**	**6462**	**5996**	**5646**	**5587**	**5795**	**5462**	**5489**	**5304**	**5723**	**6204**	**7250**
Clinic	**16,052**	**18,373**	**18,980**	**19,093**	**19,353**	**19,090**	**21,170**	**21,255**	**19,242**	**18,698**	**18,344**	**16,356**
Primary	**22,022**	**27,125**	**37,684**	**42,272**	**40,929**	**39,929**	**45,401**	**45,028**	**44,833**	**36,039**	**33,504**	**22,270**
Primary fees	***−11,286***	***−10,247***	***−12,244***	***−14,298***	***−14,623***	***−13,422***	***−11,283***	***−11,067***	***−13,397***	***−11,930***	***−14,558***	***−12,325***
Primary (NET)	**10,736**	**16,878**	**25,440**	**27,974**	**26,307**	**26,506**	**34,118**	**33,961**	**31,436**	**24,110**	**18,946**	**9945**
Secondary	**21,382**	**19,233**	**15,155**	**11,915**	**10,239**	**13,078**	**6133**	**5977**	**11,128**	**16,654**	**15,236**	**24,946**
Secondary fees	***−19,109***	***−8114***	***−6315***	***−3914***	***−3098***	***−4855***	***−1215***	***−1151***	***−2800***	***−5734***	***−5832***	***−15,955***

Table 5 (continued)

Income, tax or benefits	Child multidimensional poverty						Monetary poverty					
	Poor											
	0 deprivations	1	2	3	4 + deprivations	All MDCP Poor	Poor	Q1	Q2	Q3	Q4	Q5 (richest)
Secondary (NET)	**2273**	**11,120**	**8841**	**8001**	**7141**	**8223**	**4918**	**4825**	**8329**	**10,920**	**9404**	**8992**
Tertiary	19,209	8563	6549	4659	1723	4970	553	0	2237	5020	5877	19,249
Tertiary fees	− 10,149	− 5549	− 4111	− 2563	− 674	− 2915	− 139	0	− 485	− 1435	− 3534	− 13,775
VAT	− 36,405	− 20,463	− 13,183	− 10,738	− 9100	− 11,546	− 4074	− 4020	− 6215	− 9261	− 15,229	− 38,866
Excise	− 35,865	− 19,615	− 12,124	− 9903	− 7884	− 10,537	− 3789	− 3774	− 6656	− 9599	− 13,653	− 35,158
Petroleum	− 4867	− 1340	− 659	− 264	− 223	− 437	− 9	− 10	− 16	− 124	− 311	− 3847
PIT	297,757	66,146	16,450	4359	3510	9713	72	77	757	4112	10,481	168,914
Water Subsidy	5114	4462	3107	2002	1006	2319	2401	2388	2279	2561	2945	4377
Elec. Subsidy	700	533	212	142	147	175	62	62	107	177	339	699
Agri. Subsidy	580	670	775	714	581	717	505	504	653	971	831	538

Source Authors' analysis based on UBS 2014. Transfer 1 refers to the Public Work Program; Transfer 2 to the Household Income Support Program; Transfer 3 to the Senior Citizen's Grant; and Transfer 4 to the Vulnerable Family Support Grant

allocating the computed benefits and tax burdens to the respective individuals based on their consumption of services and tax commitments.

Child-relevant benefits (the bold italics in Table 5) within the MDCP metric amount on average to between UGSh 70,000 and UGSh 80,000 per child.[7] These benefits are progressive: they increase with the number of deprivations reported by the average child. However, this progressivity is not marked nor steady: children with three deprivations obtain the largest average benefits, more than those with four or more deprivations. Among children with three deprivations, the benefits represent 7% of per capita household market income (that is, UGSh 80,910 over UGSh 1,253,235; see column "3" in Table 5). The monetary metric corroborates these findings. This limited progressivity is explained by the distinctive distributional effects of cash transfers, education, and health care.

The magnitude of cash transfers represents a meager 2 to 3% of total child transfers across deprivation categories (and income quintiles).[8] Some of the transfers are clearly more progressive than others, but the average amount of the benefit is negligible: less than 0.2% of per capita household market incomes.[9] Healthcare benefits are much larger. Benefits to children in the form of clinic services are slightly progressive: they increase along with the number of deprivations. Yet, these benefits appear to have a larger distributive effect than transfers from hospital services. These are about three times smaller than clinic transfers per child and are clearly regressive, decreasing with the number of deprivations reported by the child (that is, UGSh 5795 vs UGSh 19,090, respectively, in Table 5 column "All MDCP poor"). This reflects the fact that deprived children use these services less frequently than less deprived peers.

Primary and secondary education benefits also differ. Primary education benefits are the largest in magnitude across all child-relevant benefits considered and are progressive: they increase with the number of deprivations reported by the child. On average, a child with four or more deprivations receives about 85% more transfers through public education than a child without deprivations (UGSh 40,929 vs UGSh 22,022, Table 5, columns "0 deprivations" and "4 + deprivations"). This is significant because primary education transfers represent more than half of all the benefits that a highly deprived child receives in Uganda. Among children with no deprivations, primary education benefits represent only a third of total transfers received (UGSh 22,022 out of UGSh 66,875, column "0 deprivations," Table 5). In contrast, benefits supplied through public secondary education are regressive because they decrease with the number of deprivations children report. For the most deprived children, secondary education transfers represent only a quarter of

[7] These are category means, that is, they include beneficiaries and nonbeneficiaries.

[8] That is, the sum of all four transfers among households with children having 4 or more deprivations, (UGSh 2084) represent about 3% of all per capita household child budgets (UGSh 78,192). See Column "4 + deprivations in Table 5). When looking at the average for all multidimensionally poor children, the share is about 2% (UGSh 1718 over UGSh 79,610, see Column "All MDCP poor").

[9] That is, the sum of all four transfers among households with children displaying 4 or more deprivations (UGSh 2084) represents about 0.2% of per capita household incomes (UGSh 1,080,009). See Column "4 + deprivations" in Table 5).

the benefit transferred from primary education (UGSh 10,239 over UGSh 40,929, column "4 + deprivations", Table 5). Yet, the regressivity of public secondary education is less marked than that observed in tertiary education.

Public primary school fees paid out of pocket (registration, tuition, supplies, uniforms) rise among more deprived children, describing a regressive pattern. Thus, primary education benefits net of household contributions are progressive (which is confirmed when the analysis looks at child socioeconomic status by level of income). This is the result of marginal increases in in-kind service benefits being greater than the marginal increase in in-kind service fees paid across deprivation groups. Public secondary fees paid fall on average with the number of deprivations, but so do net benefits from the public secondary education system. Because of this pattern of increasing out-of-pocket fees, the highly regressive nature of public spending in secondary education is somewhat mitigated. Taken together, these findings demonstrate that public primary education is solely responsible for the progressivity of public education spending.

The results underscore that all taxes considered in this analysis are progressive in Uganda. The more deprived the child, the smaller the payments of personal income tax, excises, petroleum tax, and VAT her household bears. Subsidies are regressive. This is consistent with the notion that the least deprived households consume more water and electricity than more deprived households. Agricultural subsidies are less regressive, however, because they tend to increase with deprivation levels, as more deprived children belong to rural, agriculture-dependent households. But this increase is not steady, and households with no deprived children benefit more from agricultural subsidies on average than most deprived households, indicating targeting issues.

These results are in line with "the conventional wisdom" (Lustig et al. 2012). First, the higher use of direct taxes is progressive in that it tends to make the final distribution of income more equal. The reverse is true for indirect taxes. Direct cash transfers, in-kind transfers, and expenditure programs in social sectors are more progressive if adequately targeted and implemented, as found in Uganda using the CEQ approach (see Jellema et al. 2016).

Comparing monetary and MDCP measures highlights that some *monetarily* nonpoor children are found to be multidimensionally deprived (Table 6). As indicated above, some 22% of children in Uganda are monetarily poor according to the official definition (World Bank 2016c). However, some 11% of children that are not multidimensionally poor are monetarily poor. In contrast, only 26% of multidimensionally poor children are monetarily poor. And, among those children who are most deprived (four or more deprivations), 59% are not monetarily poor. In other words, poor children and deprived children are by and large not the same children in Uganda. This has important policy implications for policy, targeting, and mechanisms to ensure inclusive wellbeing among children.

Poverty and Inequality Impacts

The second diagnostic area of CEQ4C examines the fiscal system's impact on poverty headcounts, inequality, and other welfare measures. For example, in fiscal year

Table 6 Monetary and deprivations overlapping distributions among Ugandan children, 2014

Categories of children	Poverty headcount (in%) As share of respective population group identified as monetarily poor[a]	Inequality (as coefficient 0–1) Gini coefficient of the household per capita market and pension incomes of each category of children
All children	22	0.38
By multidimensional status		
Children multidimensionally not poor	11	0.42
Children multidimensionally poor	26	0.32
By number of deprivations		
Children living with 0 deprivations	5	0.45
Children living with 1 deprivation	12	0.37
Children living with 2 deprivations	19	0.32
Children living with 3 deprivations	27	0.30
Children living with 4 or more deprivations	41	0.36

Source Author analysis based on UBS 2014

[a]Monetary poverty defined over the household per capita market and pension incomes

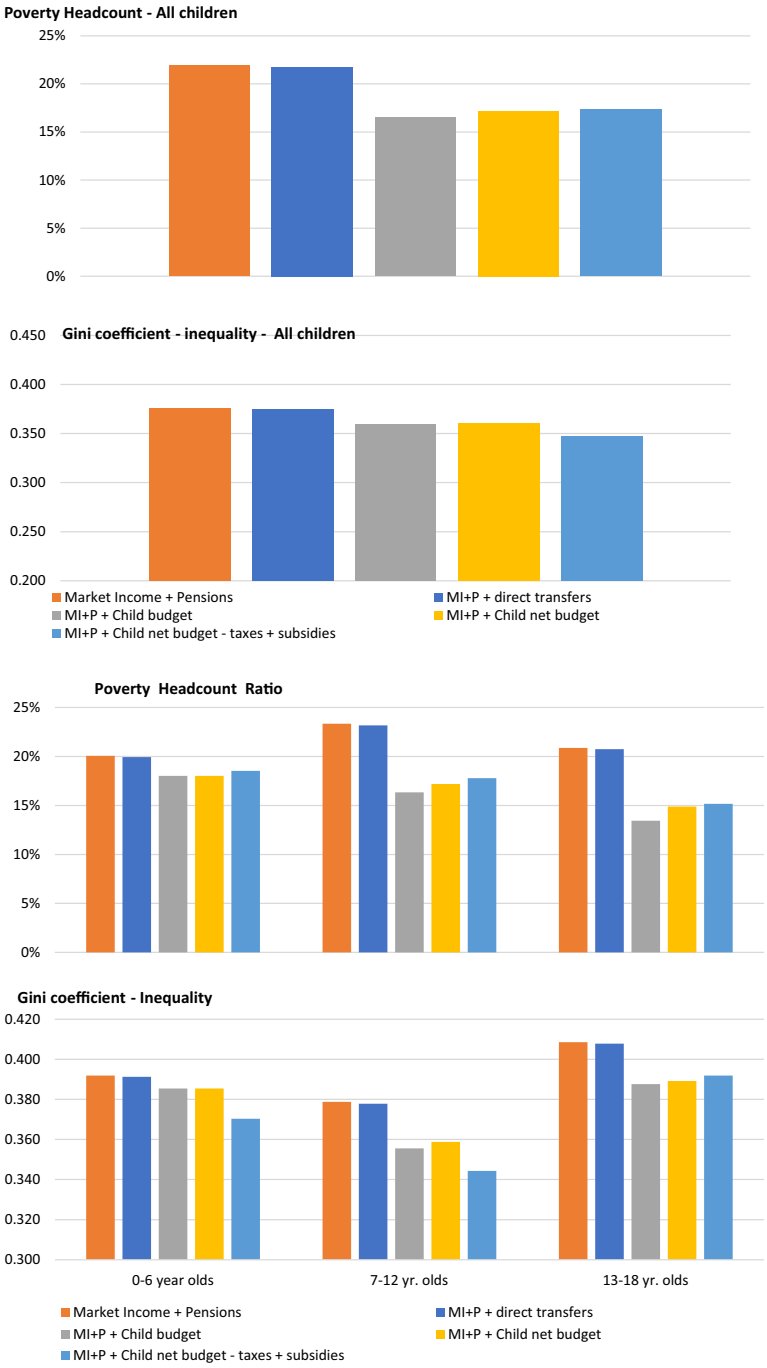

Fig. 2 The Income Poverty and Inequality Effects of Child Budgets, 2014. *Source* Authors' analysis based on UBS (2014)

2014, social spending, subsidies, and taxes reduced the poverty headcount among all Ugandan children by approximately 5% points from market (or prefiscal) income to final (or postfiscal) income (Fig. 2, first panel). The largest contribution was due to in-kind benefits from public services in health and education. The effect of cash transfers on monetary poverty is negligible, a reduction of about 0.14% points to 21.76%, reflecting low average benefits per individual (as reported in Table 5). Only when much-larger in-kind transfers are considered, the estimated reduction in poverty rises to more than 5% points (Fig. 2, first panel). Because of the huge benefits associated with education, school-age children (aged 7–17) enjoy the largest average reduction in poverty. Poverty reduction appears to be more significant among children aged 7–12 and 13–17 (reduced by 7% points) than among the youngest children (2% points; Fig. 2, third panel).

The initial inequality of market and pension income, Gini 0.375, narrows to 0.361 after the inclusion of the child budget (Fig. 2, second panel). School-age children benefit the most in terms of inequality reduction, with the same equalizing effect from spending in favor of children of primary and secondary school age (a reduction of 0.020 Gini points in each relative to a reduction of only 0.006 points among the youngest age group; Fig. 2, fourth panel).

Adding out-of-pocket contributions to education increases poverty—by about 0.6% points—and leaves inequality virtually unchanged. Adding taxes and consumption subsidies also increases poverty, by an additional 0.15% points, while reducing inequality does so by just 0.013 points. The increase in the poverty headcount associated with net subsidies in the youngest age group is more significant than the increase associated with the older age groups. This result derives again from children in the first age group not being eligible for public education.

CEQ4C Policy Simulation Analysis

Policy Scenarios

This section reports five fiscal policy simulations relevant in Uganda (Table 7). The selection of these simulations strikes a balance between three broad elements. First, policy relevance, which in turn consists of *political* relevance (for example, achieving universal education). Second, being periodically discussed (VAT reform; improved targeting). Third, analytical relevance (that is, covering multiple simulated scenarios to show the tool's versatility).

Thus, *Simulation 1* estimates the fiscal impact of closing the educational deprivation gap in Uganda, or enrolling (at public educational institutions) all school-aged children currently out of school.[10] *Simulation 2* estimates the effect on (monetary) poverty and inequality of shifting the current composition of the budget towards a more child-relevant composition: it eliminates all spending on non-child-relevant

[10] In other words, the fiscal impact of closing this gap is the estimated cost of providing public education services to those school-aged children who report not being currently enrolled.

Table 7 Child-relevant fiscal policy simulations in Uganda, 2014

Simulation	Initial poverty (Po) and inequality (Go) by age group	Number of children affected by the reform	Average benefit	Impact on poverty and inequality (Δ change in P and G),% points	Fiscal costs	Assumptions
Sim 1: Children deprived of education (not enrolled in school) become enrolled and benefit from the implicit transfer from public provision in education	Po = 21.91% Po [0–6] = 18.18% Po [7–12] = 17.48% Po [13–17] = 15.01% Go = 0.370 Go [0–6] = 0.370 Go [7–12] = 0.344 Go [13–17] = 0.374 MDCP = 83%	0.95 million and 3.0 million children aged 7–12 and 13–17, respectively	Unitary cost for student at age group 7–12: UGSh 110,428 Unitary cost for student at age group 13–17: UGSh 703,398	ΔP = − 1.33 ΔP [0–6] = 0 ΔP [7–12] = − 0.82 ΔP [13–17] = − 14 ΔG: − 0.013 ΔG [0–6] = 0 ΔG [7–12] = − 0.003 ΔG [13–17] = − 0.074 Δ MDCP = − 2.5	UGSh 449 billion or 6% of total public spending	No behavioral changes. No additional administrative costs of reaching out to currently unenrolled students. No need to build additional infrastructure to accommodate new students
Sim 2: Public spending on subsidies is removed and transferred to children found to be multidimensionally poor through a child grant that is equal for all beneficiaries		14.29 million multidimensionally poor children	Uniform cash transfer of UGSh 8,500 to each beneficiary	ΔP = − 0.30 ΔP [0–6] = − 0.23 ΔP [7–12] = − 0.29 ΔP [13–17] = − 0.46 ΔG: − 0.001 ΔG [0–6]: − 0.001 ΔG [7–12]: − 0.001 ΔG [13–17]: 0	0 fiscal cost: the UGSh 118 billion saved from ending subsidies are fully redistributed to multidimensionally poor children	No behavioral changes and no administrative costs of providing the cash transfer

Table 7 (continued)

Simulation	Initial poverty (Po) and inequality (Go) by age group	Number of children affected by the reform	Average benefit	Impact on poverty and inequality (Δ change in P and G),% points	Fiscal costs	Assumptions
Sim 3: Same as simulation 2 with an additional VAT reform, that eliminates all exemptions and introduces a new two-tier schedule of 2 and 14% VAT rates		14.29 million multidimensionally poor children (from the spending reform) and 18.27 million affected by the VAT reform	Uniform cash transfer of UGSh 9,027 to each beneficiary	ΔP = −0.02 ΔP [0–6] = 0 ΔP [7–12] = +0.06 ΔP [13–17] = −0.18 ΔG: − 0.001 ΔG [0–6]: − 0.001 ΔG [7–12]: − 0.001 ΔG [13–17]: − 0.001	Revenue-neutral scenario. The UGSh 118 million saved from ending subsidies are fully redistributed to multidimensionally poor children. The VAT reform is designed to be fiscally neutral	No behavioral changes and no administrative costs of providing the cash transfer or closing VAT exemptions
Sim 4: Public spending on subsidies is removed and transferred to children found to be monetarily poor through a child grant that is equal for all beneficiaries		4.02 million poor children	Uniform cash transfer of UGSh 32,107 to each beneficiary	ΔP = −1.71 ΔP [0–6] = − 1.75 ΔP [7–12] = − 1.68 ΔP [13–17] = − 1.73 ΔG: − 0.004 ΔG [0–6]: − 0.003 ΔG [7–12]: − 0.004 ΔG [13–17]: − 0.003	0 fiscal cost: the UGSh 118 billion saved from ending subsidies are fully redistributed to poor children	No behavioral changes and no administrative costs of providing the cash transfer

Table 7 (continued)

Simulation	Initial poverty (Po) and inequality (Go) by age group	Number of children affected by the reform	Average benefit	Impact on poverty and inequality (Δ change in P and G),% points	Fiscal costs	Assumptions
Sim 5: Same as simulation 4 with an additional VAT reform eliminating all exemptions and introducing a two-tier schedule of 2 and 14% VAT rates		4.02 million poor children (from the spending reform) and 18.27 million affected by the VAT reform	Uniform cash transfer of UGSh 32,107 to each beneficiary	ΔP = − 1.51 ΔP [0–6] = − 1.54 ΔP [7–12] = − 1.40 ΔP [13–17] = − 1.65 ΔG: − 0.004 ΔG [0–6]: − 0.005 ΔG [7–12]: − 0.004 ΔG [13–17]: = − 0.004	Revenue neutral scenario. The UGSh 118 million saved from ending subsidies are fully redistributed to multidimensionally poor children. The VAT reform is designed to be fiscally neutral	No behavioral changes and no administrative costs of providing the cash transfer or closing VAT exemptions

Source Authors' estimates

and regressive subsidies, and uses those savings to fund a new cash transfer program (perfectly) targeted at multidimensionally poor children.[11]

Simulation 3 describes a fiscal reform that eliminates all VAT exemptions (in the fiscal-year-2014 VAT schedule), instead placing those goods under a preferential VAT rate. Meanwhile, standard-rated goods see their VAT rate increase.[12] In addition, public spending is shifted as discussed in simulation 2. *Simulation 4* and *Simulation 5* repeat simulations 2 and 3, respectively, but target transfers based on monetary poverty, not MDCP.

None of these simulations include behavioral changes or additional administrative costs, meaning the methodology's estimates are less precise, but key messages are unlikely to be affected. Possible behavior-induced changes such as reduced labor supply from increased benefits or consumption substitution from VAT changes are unlikely in Uganda, given the size of transfers and the lack of multiple consumption options. Other possible behavioral effects such as changes to the labor supply from income taxes do not apply to our simulations.

In addition, *Simulation 1* includes the expected private contributions necessary for accessing the public education service delivery system and therefore uses the net benefit from extending public education access to those currently excluded. Only in Simulation 1 is it possible to compute the impact on both monetary and multidimensional poverty, because educational deprivation is a dimension of MDCP. For the other simulations, the focus is on the effect of fiscal policy changes on monetary child poverty.

Simulation Results

The expected poverty and distributional changes and the expected fiscal costs resulting from the simulated policy alternatives are diverse. The effect of closing the educational gap in Simulation 1 by extending access to the public education service delivery system—with no additional administrative costs—reduces MDCP by approximately 2.5% age points. That is, the share of children experiencing two or more deprivations declines by that magnitude after ensuring universal education in Uganda.

The overall effect of closing the education gap is a drop of 1.3% points in the monetary poverty headcount ratio.[13] The poverty reduction is moderate only among the primary school age group (7–12), 80% of whom are already enrolled. In contrast, the reduction in monetary poverty among the 13–17 age group is striking, some 14%

[11] *Simulation 2* combines the second and third generic scenarios discussed in section "Fiscal Incidence Analysis with a Child Lens Introduces". It is theoretically fiscally neutral because there are no additional fiscal costs; transaction costs are ignored.

[12] The preferential rate is approximately 2% while the higher standard VAT rate is 14 percent. These new VAT rates ensure that the reform is revenue neutral.

[13] There might be, however, some trade-off between the implicit transfer received after schooling and reduced labor supply from children or adolescents now enrolled in school, but this is not accounted for here.

age points.[14] This is the result of a very large in-kind transfer associated with secondary education, almost two thirds of the equivalent poverty line per person per year.

In terms of inequality reduction, the total effect is a modest narrowing of 1.3 Gini points; the effects among children aged 7–12 are approximately half those on children aged 13–17. This again reflects the fact that benefiting children are not necessarily monetarily poor. In conclusion, while MDCP is reduced substantially, monetary child poverty is not, and the distribution of incomes does not change substantially.

Simulation 2 brings scant reduction in poverty or inequality: the poverty headcount falls by approximately 0.3% points while the Gini coefficient falls by approximately 0.01 points. This reflects the mismatch between multidimensionally poor children and monetarily poor children, and the meagre fiscal shift from subsidies of only UGSh 118 billion (almost four times more resources are required to close the educational gap). If the VAT reform (designed to be revenue neutral) is added (*Simulation 3*), the additional effect of raising the VAT rate (by 2%) on previously exempted goods (most of the consumption of poor households) is an increase in poverty from *Simulation 2* and virtually no change in inequality.

Simulations 4 and *5* show a more sizeable reduction in monetary poverty of between 1.5 and 2% points, resulting from targeting benefits to monetarily poor children and from a much larger benefit to each child. These simulations also confirm a minimal impact on inequality. VAT reform (added in *Simulation* 5) increases poverty (relative to *Simulation 4*) by about 0.3% points, partly reflecting the fact that neither changes in consumption behavior nor substantial increases in VAT rates are introduced.

Finally, while the resources redistributed in *Simulations* 2 to 5 (UGSh 118 billion) are more limited than in *Simulation* 1 (closing the education gap, UGSh 448 billion), the capacity to reduce poverty in each scenario varies considerably (see Table 8). The cost of reducing one percentage point of monetary child poverty requires UGSh 69 to 79 billion in simulations where resources are targeted around monetary child poverty. This cost increases substantially, to around UGSh 400 billion per percentage-point reduction in poverty, when MDCP is used as targeting mechanism; when the VAT reform is included (as in *Simulations 3* and *5*), the cost per percentage point of poverty reduction skyrockets (to about UGSh 5900 billion in Simulation 3). This is the case because fewer people are helped out of poverty via VAT reform.

Conclusion

Incidence analysis is a powerful analytical tool when it comes to understanding poverty and the distributional effects of fiscal policies. So far, it has not focused on children. CEQ4C remedies this gap in CEQ and other incidence techniques by

[14] No changes should be observed for the 0–6 age group as they are too young to attend primary school.

Table 8 Cost–benefit of simulated policies, 2014

Simulation	Cost of reducing 1 pp of child poverty (UGSh billion)	Requires additional funding?	Expected administrative costs	How to maximize poverty impact?
1. (end educational gap)	337	Yes	Moderate to high costs required to accommodate almost 4 million new students	Ensure economies of scale when expanding the provision of education to almost four million new students
2. (spending shift and MDCP targeting)	393	No	Low cost of eliminating subsidies, moderate cost of targeting beneficiaries based on MDCP	Increase unitary benefits to the extent possible
3. (spending shift, MDCP targeting and VAT reform)	5900	No	Low cost of eliminating subsidies and replacing old VAT rates, moderate cost of targeting beneficiaries based on MDCP	Explore alternative revenue-raising strategies that do not increase poverty, such as increasing PIT rates or extending tax base to nonpoor currently exempted households
4. (spending shift and monetary poverty targeting)	69	No	Low cost of eliminating subsidies, moderate to high cost of targeting monetary poverty (almost four times lower incidence than MDCP)	Success of this policy comes from targeting a smaller group of beneficiaries (poor children). The more resources shifted from regressive spending to these schemes, the better
5. (spending shift, monetary poverty targeting and VAT reform)	78	No	Low cost of eliminating subsidies and replacing old VAT rates, moderate to high cost of targeting monetary poverty	Same as simulation 4

Source Authors based on results reported in this Table

singling out public spending that is child-relevant and building a multidimensional child poverty metric and policy simulation scenarios for analysis. However, building a CEQ4C framework is an intricate process. It needs to articulate numerous methodological building blocks in order to deliver several functions to shape more efficient policies on child welfare. This article explains step by step–how to ensemble the numerous pieces of the CEQ4C and applies it to a country case, Uganda.

The Ugandan child budget estimated in this exercise represents a low 4.2% of GDP. Child-relevant spending transfers about 6% of per capita household market income to multidimensionally poor children (and less than 2% to non-deprived children). Small child-relevant budgets reduce poverty and inequality in Uganda to a modest degree. Primary education spending is clearly progressive (it increases with the number of child deprivations); secondary education is clearly regressive (it decreases with the number of deprivations), while health services are partially progressive (clinic visits) and regressive (hospital services). These findings corroborate other fiscal incidence analyses in Uganda and elsewhere, suggest that CEQ4C provides a higher-resolution child-specific analysis, and support previous evidence on the distributional effects of fiscal policies.

Policy simulations show that the fiscal cost of ending educational enrolment deprivation in Uganda is relatively modest, in part because additional administrative costs of reaching children left behind are not considered. Alternative progressive policy scenarios that eliminate child-irrelevant and regressive subsidies and redistribute fiscal savings in favor of multidimensionally poor children report almost imperceptible poverty reduction. This is so for two main reasons: the fiscal resources mobilized are small, and targeting MDP will not reach the many children who are monetarily but not multidimensionally poor. A larger reduction in poverty of about 2% points is found when shifts in spending and VAT reform target monetarily poor children instead of multidimensionally poor children.

Simulations highlight that different programs need to increase their total funding, improve unitary benefits and improve targeting to be more efficient. Those interventions that target MDCP require a higher unitary benefit to be transferred in order to be effective. Lower-bound estimates (assuming away administrative costs and second round effects) show that the cost of reducing one percentage point of poverty may range from UGSh 69 billion to UGSh 5900 billion depending on the policy. More generally, monetary and multidimensional child poverty have very little crossover in Uganda.

There are several areas that require further refinement before CEQ4C can provide the expected high-resolution analysis across multiple countries, policy contexts, and data conditions. First, more information on the aim, function, nature, and implementation of public spending is needed to categorize child budgets with confidence. Second, there is an intrinsic trade-off with current data sources. It is possible to estimate a MDCP from an income-expenditure survey that is reasonably comparable with DHS or MICS estimates. But this comes with a cost in terms of precision: an estimated 9% points in the MDCP incidence in the case of Uganda. Third, sweeping assumptions about lack of behavioral change following changes in taxes or benefits received need to be evaluated by context-relevant evidence. Finally, not every fiscal policy change can be traced back to a MDCP measure. A CEQ4C assessment—or

CEQ more generally—is currently not able to incorporate sectoral changes, such as a new educational curriculum or improvements in the quality of water service delivery, if these have not been previously monetized. In the case of Uganda, additional simulations of the impact of policies on multidimensional metrics include the provision of bed-nets to children; the effect of decreasing class sizes; or investments in water and sanitation. Notwithstanding these current limitations and recommendations, the proposed CEQ4C protocol remains relevant and useful across multiple contexts.

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Compliance with Ethical Standards

Conflict of interest The authors certify that there is no conflict of interest in the production of this piece of research.

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