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Abstract

In recent years, the need for a better access to health services has become a social objective in many sub-Saharan African countries that seek to achieve the Millennium Goals for Development. Yet such pursuits raise questions about the appropriate balance between the social goals and economic objectives of poverty reduction policies, such that measures promoting agricultural growth might appear as a more effective strategies. This article explores how an improvement of health subsidies policy in Uganda experiment might meet both these social and economic goals. Focusing on the relationship between farmers' health and agricultural productivity, we use a computable general equilibrium model and a non-parametric micro-simulation model to predict the effect of this policy. The results show that it is likely to increase both households' access to health care and growth processes. They also show that in a context marked by scarce budgetary resources, it is possible to maximise the impact of this policy by reallocating subsidies toward the categories of health care with the greatest impacts on workers' productivity or toward rural households.

Keywords: Health policy, Poverty, Computable general equilibrium model, Micro-simulation

Classification JEL: I18, I32, C68, C81

I. INTRODUCTION

During the 2000s, poverty reduction became the primary focus of development policies in African countries, after two decades of policies nearly exclusively dedicated to macroeconomic and financial issues. Encouraged by international initiatives, such as the Heavily Indebted Poor Countries initiative or Millennium Goals for Development (MDG), African governments started promoting social services classified as 'pro-poor', such as education and health care. However, recently, a broader consensus has suggested that economic growth may be a necessary condition for sustainable poverty reduction, and that exclusive funding of short-term social programs rather than long-term productive investments, is not the most efficient way to maximise the impacts of scarce budgetary resources (Badiane and Ulimwengu, 2009; Benin et al., 2008; Killick, 2004; Kydd and Dorward, 2001; Paternostro et al., 2007; World Bank, 2003). From this perspective, the agricultural sector is an appealing potential target for maximising poverty reduction outcomes, considering its critical contribution to overall growth and its importance for ensuring the livelihood of poor people (Christiansen et al., 2011; Diao et al., 2010; Fan and Rosegrant, 2008; World Bank, 2008).

Uganda offers a good illustration of this trade-off between economic and social goals in poverty reduction efforts (Paternostro et al., 2007; Williamson and Canagarajah, 2003; World Bank, 2002). Successive Ugandan agricultural programs have called for more substantial investment policies while also facing scarce public funding, most of which was allocated to costly social policies with direct poverty benefits, including health care policies. For example, on 1 March 2001, in direct contrast with the spirit of the Bamako Initiative[1], Uganda abolished user fees for government health facilities[2] to reduce financial barriers to receiving health services. This policy substantially increased the use of public health facilities among the poor and confirmed that it could achieve MDG by 2015. Yet it also revealed some limitations, including arguments that better targeted subsidies specifically dedicated to the rural users or extended to providers who serve rural areas might have offered greater effectiveness (Pariyo et al., 2009; Ridde et al., 2012; Uganda Ministry of Health, 2010).

In this context, we seek to determine whether improvements in Ugandan health subsidies might offer a doubly effective poverty reduction strategy, meeting both short-term social needs and long-run economic objectives. Specifically, such a policy might not only improve the well-being of the poorest members of society but also enhance agricultural productivity (Badiane and Ulimwengu,

[1] The Bamako Initiative, sponsored by UNICEF and the World Health Organization and adopted by African ministers of health in 1987, aimed to increase access to primary health care by increasing the effectiveness, efficiency, financial viability, and equity of health services. Of the various elements of this initiative, a key component was the introduction of user fees to improve the sustainability of primary health care in Africa (Gibson, 1995)

[2] This abolition of user fees occurred at the same time as several other changes in the health sector, such as the decentralisation of responsibility for the delivery of health services to local authorities, restructuring the Ministry of Health (MOH), the introduction of the Uganda National Minimum Health Care Package (UNMHCP), autonomy for the National Medical Stores (NMS), community health insurance schemes, contracting with health workers, and hospital autonomy (see Pariyo et al., 2009).

2009; Malney and Sachs, 2002; World Bank, 2008). We use a computable general equilibrium model extended by a micro-simulation model, to perform numerical simulations of the impact of such health subsidies on poverty through their effects on production, employment, and income. The first section provides some insights from existing literature. The second section explains our main methodological choices. The final section presents the results of the numerical simulations in an attempt to identify which public health subsidy strategies might be most effective in terms of reducing poverty in Uganda.

II. BACKGROUND

Our analysis reflects the underlying hypothesis that a public health policy designed to improve access to health care for farmers can effectively increase agricultural efficiency and generate pro-poor growth processes. Each of these links has been explored previously in economics literature.

The potential benefits of agriculture in developing countries has been debated for years (for reviews, see Christiansen et al., 2011; Dethier and Effenberger, 2011; Diao et al., 2010). According to dualist development theories, some works still consider agriculture as an unproductive subsistence sector that cannot generate growth because of its poor productivity level, among other features. However, recently, increasing numbers of studies emphasise the critical contributions of agriculture to overall growth, due to its large size, dominant influence on the incomes of the poorest populations and high labour intensity (Tiffin and Irz, 2006; World Bank, 2008). From the MDG perspective, the focus even has shifted to whether promoting agriculture growth might generate sustainable poverty reduction (e.g., Christiansen et al., 2011; Diao et al., 2010; Loayza and Raddatz, 2010), whether indirectly from forward and backward demand or supply linkages of agriculture with other nonfarm sectors or directly through an increase in agricultural labour productivity.

Among the determinants of agricultural labour productivity, the health conditions of farmers represent a particular case that can be included in the more general issue of the link between health and economic efficiency. The existence of such link seems widely accepted in economic literature, though it remains difficult to identify and measure (e.g., Jack and Lewis, 2009; Sachs, 2001; Strauss and Thomas, 1998). Beyond the challenge of defining health status precisely, the difficulties stem from the complex bi-directional causalities of health and economic efficiency both at macroeconomic and microeconomic level**.** For instance economic growth has an evident positive impact on health, whether directly through income and demand effects or indirectly through general improvement in living conditions, such as better access to food or better sanitation facilities. But, on the other side, health has also a supply effect that various empirical studies attempt to capture by considering health expenditures as an investment in human capital (for overview see e.g., Mwabu, 2007 or McNamara et al., 2010) mostly by addressing the productivity of agricultural households (e.g., Ajani and Ugwu, 2008; Asenso-Okyere et al., 2011; Audibert and Etard, 2003; Ersado et al., 2004; Hawkes and Ruel, 2006; Ulimwengu, 2009)[3].

Finally, the question of what kind of public health policy might be designed to promote households 'health became a critical issue last years (e.g., Cleason and Wagstaff, 2004; Gupta et al., 2003; Nixon and Ulmann, 2006; O'Donnell et al., 2008) and the particular question of user fees has even raised recently, as African countries, breaking from the Bamako Initiative, have experimented with partial or universal abolition. However, this abolition seems still debated today (e.g., Hanson et al., 2006; Ridde et al., 2012). On the one hand, focusing on an efficiency perspective, some works doubt of the relevancy of such policy. They argue for instance that demand for health care is relatively inelastic with respect to price because factors such as proximity to health care providers, perceived quality of care or perceived illness severity, offer stronger determinants of health services uses than fees charged. These arguments also tend to emphasise the disruptive effects of free access, including declining quality or inappropriate management (e.g., lack of information about free services, unpredictable and insufficient funding, reimbursement delays, multiplicity of actors, existence of informal fees). On the other hand, focusing on an equity perspective, others works indicates that credit constraints limit households' ability to access fee-based services, even when they clearly would be willing to pay, such that the aggregate benefits of abolishing user fees exceed their estimated damages.

III. METHODOLOGY

3.1. Methodological choices

In order to deal with the complex relationships among public health policy, agricultural efficiency and poverty reduction, our first methodological choice is to adopt a computable general equilibrium model (CGE). Indeed, CGE modeling seems to be a significant complementary tool of empirical approaches[4]. Its Walrasian logic can account for bi-directional links of health, growth, and income through the effects of supply, prices, and demand. Moreover, its disaggregated nature enables us to focus on the agricultural sector or farmers. Finally, the normative character of CGE approaches can help clarify transmission channels between public spending and poverty and provide a method for evaluating their effectiveness. However, because the results of the CGE model are relevant only at the aggregate level of each household group, in line with the representative agent hypothesis, we extend our analysis with a micro-simulation model (MS) that uses a sequential top-down approach (Bourguignon et al., 2005). Within this framework, the CGE model simulates the impact of a public

[3] According to the theoretical model of Pitt and Rosenzweig (1986), health is then often considered as a determinant of the level of production of farmers, by determining their quantity and quality of work or their ability to incorporate new technologies

[4] Some CGE models even cite health issues in developing countries, such as in studies of the impact of HIV/AIDS on economic performances (e.g., Arndt, 2003; Arndt and Lewis, 2000, 2001; Arndt and Wobst, 2002) or externalities related to improved health conditions (Kouwenaar, 1986; Savard and Adjovi, 1997). No prior studies apply these models to Uganda's health care system.

health subsidy policy in Uganda, and the macroeconomic results are extended to the MS model, without any feedback effects, to estimate the impact at the individual level, particularly in terms of poverty.

Our second methodological choice pertains to the health public policy we consider in these simulations. The abolition of user fees experimented in Uganda since 2001 resulted in an substantial increase in uses of public facilities among the poor but it also revealed some room for improvements (Burnham et al., 2004; Deininger and Mpuga, 2004; Kajula et al., 2004; Nabyonga et al., 2005, 2008; Pariyo et al., 2009; Ridde et al., 2012; Rutebemberwa et al., 2009; Uganda Ministry of Health, 2010; Xu et al., 2006; Yates et al., 2006). The high cost of this universal policy has prompted financial losses for public facilities, as well as wide variance in the quantity and quality of services offered raising the question of better management and effectiveness of public expenditure. Nor has it completely eliminated barriers to access that challenge the poorest and most rural populations such as financial costs or long distances to health facilities. Fee abolition refers exclusively to first-level public health facilities[5] and public hospitals still offer services for pay for those who can afford them and a survey by the Ministry of Health also revealed the presence of informal fees in public health centres (Uganda Ministry of Health, 2010). Ugandan National Household Survey (UNHS) data[6] show then that spending in public centres still represents 21% of households' total health expenditures while spending in private not-for-profit (PNFP) facilities accounts for 43% and spending in private for-profit (PFP) facilities for 36%. In this context, given that Ugandan government has extended its support to PNFP facilities, which now receive funds amounting to 20% of the service they provide (Uganda Ministry of Health, 2010), and that such PNFP facilities are widespread, representing 41% of hospitals and 22% of small health centres, which complement the first-level public centres, mainly in rural areas, we envisage an extended real fee reduction for both public and PNFP facilities. Thus we consider two types of health sub-sectors: a profit sector, essentially formed by PFP (private health practitioners) and a non-profit sector formed by all public and PNFP facilities.

Finally, we note one last methodological choice: Previous literature has revealed that the effectiveness of public health expenditures depends on both allocation (i.e., how the recipients are distributed across the population) and efficiency (i.e., productivity or quality of health facilities). We do not address the latter but instead treat it as given. Our focus instead is on the allocation efficiency of public subsidies, which may vary in the CGE model by categories of households or health products, according to the impact on agricultural productivity and thus on poverty.

[5] The Ugandan healthcare delivery system is highly decentralised into zones at the national, regional, district and sub-districts levels (Deininger and Mpuga, 2004). The health system is based on referrals; health centres, categorised into levels I–IV, cover geographic areas ranging from villages to counties and serve different functions (e.g., level I focuses on prevention and health education; level IV covers prevention, cure, rehabilitation and emergency surgeries). Curative services are provided by a mix of public and private facilities; the latter include not-for-profit, for-profit (private health practitioners) and traditional medicine providers.

[6] This national survey included 7400 households, in which all members were surveyed.

3.2. CGE model

The CGE model encompasses an agricultural sector (15 activities), a non-agricultural sector (21 activities), a health sector (3 non-profit activities, 3 profit activities), five groups of households (3 urban, 2 rural) and a government agent. We present the relevant equations and variables in Appendix 1. On the supply side, each activity combines fixed capital with a composite (skilled and unskilled) labour factor. Incomes are distributed to different agents on the basis of their factor endowments. The government receives taxes too. On the demand side, households' consumption reflects a linear expenditure system function, and demand from the government is assumed to be exogenous. The prices, wage rate, and exchange rate provide the closure mechanisms for, respectively, product markets, the skilled labour market, and the external accounts market. Nominal investment is savings driven on the capital market. At this point, the logic of our CGE model is fairly standard. Its main originalities rely on the ways the agricultural sector is specified and the health topics are introduced.

Various specificities of the agricultural sector in the model reflect its forward and backward linkages with the rest of the economy and the ways it drives economic growth and poverty reduction. From the demand side, it exports goods to foreign markets with an exogenous price, but data show that it is less tradable than other activities. On domestic markets, agricultural goods are used for intermediate consumption by activities and final consumption by households. The latter should exhibit lower income elasticity for agricultural goods than for non-agricultural goods. When incomes rise, final demand for agricultural goods should increase at a slower rate than demand for other products (Engel's law). On the supply side, agricultural activities consume intermediate goods from all activities and only use unskilled workers, most of whom live in rural areas (*rural farmers*) or urban peripheries (*urban farmers*). We introduce a migration hypothesis to allow for labour movements to the non-agricultural sector, where the wages are fixed higher at initial equilibrium (+20%). This Harris-Todaro mechanism implies comparisons of average earnings in the agricultural sector and likely gains in the non-agricultural sector. Unemployment ensures the closure of the overall unskilled labour market in the economy.

A main innovation of our model is that we leave the total factor productivity of agricultural activities endogenous, linked to farmers' health. As suggested in economic literature, this element effectively determines farmers' ability to work, innovate, and experiment with new agricultural technologies (Fulginiti and Perrin, 1993, 1998). We do not model household health *per se* though; instead, we introduce it using the health-capital concept proposed by Grossman (1972, 2000). In this framework, each household produces its own health-capital, in accordance with a Cobb-Douglas function of the three types of health products it consumes (medical consultation, hospitalisation and drugs), and each category of consumption has a specific impact on productivity levels in agricultural activities. Because these products are produced through both non-profit and profit activities, households consume composites of medical care, according to an Armington specification. The share of profit and non-profit products in each household's health consumption depends on the elasticity of substitution[7] and relative prices. At this stage of the model, we introduce the public health policy, using the possibility of subsidising the price of non-profit products. These subsidies, funded by the Ugandan government, then can be assigned to each categories of health care for each household (rural or urban)[8].

Most of model parameters can be calibrated directly from Uganda's 2007 Social Accounting Matrix (SAM-2007) built by Thurlow (2008). If such a calibration is not possible, we obtain the remaining parameters from extant literature, including other CGE models already established for Uganda[9]. However, because it is a central point of our analysis, the elasticity parameters between households' medical care consumption and productivity in agricultural activities are estimated using data from the Uganda National Households Survey conducted in 2005/2006 (UNHS-2005/2006). The econometric approach and results of the estimations are in Appendix 2.

3.3. MS model

The MS model is connected to the CGE model through the labour market. The underlying idea is that a macroeconomic shock may change the status of each household member on this market and therefore the nature and amount of their incomes. However, because of a lack of consistency between microeconomic data (UNHS-2005/2006) and macroeconomic data (SAM-2007), changes observed after running the CGE model cannot advance directly into the MS model, such that we must proxy for the new individual status. This estimated procedure is based on the non-parametric approach used by Ganuza et al. (2002). According to microeconomic data, individual earnings should be function of individual attributes (i.e., skills) and position on the labour market. The latter factor depends on overall market conditions, expressed in terms of the participation and unemployment rates of skilled and unskilled workers; employment structure by sector of activity and occupational category; overall and sectoral wage rates; and the average skill level of the workers. The distribution of individual income is a function of these labour market conditions and personal attribute distributions within households. Each change in these parameters thus should alter the distribution of per capita income. At this point, we note that the non-parametric approach does not explicitly include labour market individual behaviours, as would be common with parametric approaches[10]. Instead, it assumes that the impact of changes in labour market conditions on employment status and incomes of individual

[7] Because we lack data, we assume all households substitute private health consumption for public consumption with the same elasticity. This assumption limits our analysis by preventing us from accounting for different behaviors across households. However, income elasticity for health products appears lower for rural households than for urban households.

[8] The public supply of health products is well distributed geographically between Ugandan districts and sub-districts, so we assume it is possible to find different subsidies between rural and urban areas.

[9] E.g. Blake et al. (2002), Dorosh et al. (2003), Dorosh and Thurlow (2009), Senoga and Matovu (2010).

[10] Parametric approaches rely on labour market theories such as human capital, assignment, or labour market segmentation theory and include labour-supply or labour-demand behaviours (e.g., Bourguignon et al., 2005).

workers can be estimated with a random selection procedure. Macroeconomic changes simulated by the CGE model then enter the MS model, with random numbers assigned to individuals (classified on the basis of their individual attributes and labour market segments) to determine who undergoes a status change and what new types of income they perceive. On average, the predicted effects of these random changes should correctly reflect the final impact of global changes observed on the labour market at the macro level. Repeated several times with a Monte Carlo approach[11], these micro-simulations lead to average results with confidence intervals of 95% of the impact of the initial macroeconomic shock on individuals, such as inequality indices and poverty rates.

IV. THE IMPACT OF PUBLIC SPENDING ON HEALTH IN UGANDA

4.1 Simulations of increased public subsidies for all health products and types of households

The first group of simulations reveal the impact of an increase in government subsidies for all health products for different categories of households. The latter are distinguished by their residence area and different modes of integration in the Ugandan economy (see Table 1).

TABLE 1

Table 2 shows the results of these simulations at the macro level (Panel a) and micro level (Panel b). The first policy provides the baseline scenario: a comprehensive 25% increase in subsidies dedicated to all households and non-profit health products. The second and third policies instead target rural or urban households.

TABLE 2

Increasing subsidies for all households has a significantly positive impact on the Ugandan economy. At the macro level, it changes the relative prices between non-profit and for-profit health products and generates a substitution effect. The market adjustments lead to a decrease in the relative prices, to the benefit of non-profit products (-24.16%); an increase in the share of consumption of non-profit health products as a percentage of total household health care expenditures (+2.98%); and, overall, an increase in the volume of health consumption (3.09%). This last outcome has a dual effect on the rest of the economy: First, it stimulates the production of health activities, boosting the skilled jobs they demand and the income they distribute. Second, it increases the productive efficiency of households (+0.9%) and stimulates agricultural production (1.57%). Third, this health policy increases domestic production volume (0.32%) and household income (0.26%) while decreasing the price index (-0.70%). Unskilled employment declines (-0.21%), especially in rural areas (-0.40%). This change reflects the combined effects of increases in agricultural productivity and production, together with wage differentials between sectors that determine incentives for rural-urban migration.

[11] Vos and Sanchez (2010) recommend 30 simulations.

In this new macroeconomic context, the micro-simulations indicate an increase in average household income (4.42%) and a reduction in the overall incidence of poverty (-1.56%), in both rural areas (-1.54%) and urban areas (-2.83%). They also show that inequality grew significantly at the national level (5.16%) but more intensely in urban areas (6.20%) than in rural areas (3.88%). The policies targeted toward rural or urban households have comparable but logically reduced effects. Subsidising only rural households increased their consumption of health care (2.01%) and productivity, as well as overall production (0.31%), total income (0.22) and purchasing power due to the lower price index (-0.63%). The incidence of poverty thus decreased in rural areas (-1.29%), but it also fell in urban areas (-2.69%). When the subsidy was allocated exclusively to urban households, the macroeconomic impacts were equivalent but lower in extent, due to their minority weight in the economy. However, the reduction of poverty (-0.21%) was logically higher in urban areas (-1.10%) than in rural areas (-0.23%). Yet our simulation also shows that, paradoxically, urban households benefit less from this policy than from the indirect effects of a policy dedicated to rural households.

4.2. Simulations of increased public subsidies for specific health products for all households

By determining the impacts of public subsidises assigned to each of the three categories of medical care, for all households, we attempt to show that targeting a particular type of product does not have the same impact on the economy, because of the weighted differences in household consumption, level of subsidy or potential impacts on agricultural productivity. Table 3 shows that drug sales represented the main consumption category; consultation had potentially the greatest impact in terms of agricultural efficiency.

TABLE 3

For this analysis, we assigned the 25% increase in the government subsidy alternately to drugs, hospitalisation services or medical consultation services. Table 4 show the simulation macro (Panel a) and micro (Panel b) results. They confirm that these policies have distinct impacts on the economy.

TABLE 4

In terms of health, each intervention reduces relative prices, in favour of the public sector, and also prompts an overall reduction in the average price of health care, which increases medical consumption and agricultural productive efficiency. This effect is particularly important in the case of subsidy policies toward drugs, which have the greatest impacts on domestic production (0.15% versus 0.07% for hospitalisation and 0.10% for consultation). A similar effect arose for skilled employment (1.16% versus 0.67% and 0.27% respectively), unskilled employment (-0.11% versus -0.06% and -0.06%, respectively), household income (0.12% versus 0.07% and 0.05%, respectively) or prices (-0.31% versus -0.21% and -0.21%, respectively). The microeconomic analysis also reflects the positive impact of these policies on household welfare. At the national level, per capita income varies positively at levels of 2.64%, 1.58%, and 0.75% for subsidies of drug, hospitalisation, and consultations, respectively. As in the previous simulations, these shifts again are accompanied by increased inequality though (3.09%, +1.58%, and +0.81%).

4.3 Maximising public spending effectiveness

The previous simulations revealed the impacts of different policies in absolute terms on poverty and households' health-capital. A comprehensive policy of public subsidies dedicated to all households and all products obviously would have the greatest impact. Similarly, policies targeted at rural households or drugs appear potentially successful. However, these results are not directly comparable in terms of the efficiency of public spending, because their extra budgetary costs remain endogenous in the model, as dependant variables pertaining to the demand of each household group for medical care. With this framework, we cannot address the critical question of how much $1 worth of public health expenditures actually maximise growth and reduce poverty. Thus we introduce two indicators of public spending effectiveness, in terms of poverty reduction and health-capital accumulation. Each indicator compares the relative change in the poverty rate or health-capital level against the relative variation of the health policy cost. Table 5, Panel a, shows the values of these indicators for all previous simulations. In terms of household group choice, subsidising rural households appears to be a 'good governance policy' that maximises the efficiency of public spending. At the national level, the additional budgetary costs are 43.5% (nearly 137 billion shillings), and it leads to a reduction of 1.29% of the poverty rate and an increase of 0.87% of household health-capital. The other policies do not achieve equal effectiveness, even the comprehensive version. In terms of product choice, Table 5, Panel a, also shows that subsidising consultation services for all types of households is the most effective national strategy: It increases health government expenditures by only 5.99% (nearly 19 billion shillings) but leads to a significant reduction of 0.72% in the poverty rate and an increase of 0.47% in household health-capital. Finally, we consider the potential benefits of a mixed health policy that targets rural households and offers access to consultation services. The last group of simulations thus considers all combinations of household types and product categories. The main results in Table 5, Panel b, confirm the superior efficiency of a rural consultation approach for both poverty reduction and the accumulation of health-capital.

TABLE 5

V. CONCLUSION

Focusing on the relationship between households' medical spending and agricultural productivity, this study has explored the impact that a broader public policy of health subsidies may produce on agricultural performances and poverty in Uganda. The numerical simulations, performed with a CGE model extended by a MS model, confirm that increased public health subsidies may be doubly effective, by improving households' access to care and generating pro-poor growth. Our findings further reveal that it is possible to maximise the impacts of such public spending by allocating subsidies to the products (i.e., consultation services) and households (rural) that induce maximum poverty-reduction outcomes.

These results also confirm the possibility that the Ugandan government can effectively deal with its current policy trade-off, between economic and social goals, even considering its strong budget constraints. In this context, we find room for a *growth–poverty convergence agenda* for public policies in Uganda (Badiane and Ulimwengu, 2009) that relies on optimised management of the budget allocations across different ministries to exploit potential synergies between social policies and direct productivity-enhancing investments. We also confirm that subsidising PNFP facilities to address the special health care needs of the poor can improve public spending. The Ugandan government and health development partners thus should pursue and encourage innovative solutions (e.g., public–private partnerships).

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APPENDIX 1. CGE MODEL

A. Institutional desegregation

Non-agricultural activities	Agriculture	Public services (except Health)
Mining	Maize	Government administration
Food processing	Rice	Education
Beverages and tobacco	Other cereals	Other services
Textiles and clothing	Cassava	
Wood and furniture	Roots	**Health services**
Petroleum products	Pulses and oilseeds	Private drug sale
Chemical products	Horticulture	Private medical consultation
Machinery	Matoke	Private hospitalisation service
Other manufacturing	Tobacco	Non-profit drug sale
Construction	Cotton	Non-profit medical consultation
Electricity and water	Coffee	Non-profit hospitalisation service
Trade services	Other crops	
Hotels and catering	Livestock	**Households**
Transport services	Forestry	Rural farmers
Communications	Fishing	Rural Non farmers
Financial services		Kampala metropolitans
Business services		Urban farmers
Real estate		Urban non farmers

B. model sets

C *All Activities or products*

$HP \subset C$ Private health services or activities
$HG \subset C$ Non − profit health services or activities
$NH \subset C$ Non − profit products or activities

$AGR \subset C$ Agricultural products or activities
$NAGR \subset C$ Non Agricultural products or activities

$CEX \subset C$ Exported or imported products
$CEXN \subset C$ Non Exported or imported products

$SNM \subset C$ Non marketed products (except health products)

H *Composite health products*

M Households

C. Model equations

Production Block

Production process

1. $QX_c = A_c^p.LD_c^{\alpha_c^p}.\overline{K_c}^{1-\alpha_c^p} \quad \forall c \in C$

2. $LD_c = \dfrac{\alpha_c^p.PVA_c.QX_c}{W_c} \quad \forall c \in C$

3. $PVA_c = PX_c - \sum_{c'} PQ_{c'}.ica_{c',c} \quad \forall c \; et \; c' \in C$

Agricultural total productivity

4. $A_c^p = \overline{A0_c^p}.\left(1 + \dfrac{HK - \overline{HK_0}}{\overline{HK_0}}\right) \quad \forall c \in AGR$

5.

$$HK = \left(\sum_m \gamma_{Agr}^m.CQH_{Hmed}^m\right)^{\psi m}.\left(\sum_m \gamma_{Agr}^m.CQH_{Hhos}^m\right)^{\psi h}.\left(\sum_m \gamma_{Agr}^m.CQH_{Hcons}^m\right)^{\psi c}$$

Composite labour

6. $LD_c = A_c^l.\left[\alpha_c^l.LDS_c^{-\mu_c^l} + \left(1-\alpha_c^l\right).LDNS_c^{-\mu_c^l}\right]^{-\frac{1}{\mu_c^l}} \quad \forall c \in NAGR$

7. $\dfrac{LDS_c}{LDNS_c} = \left[\dfrac{\alpha_c^l}{\left(1-\alpha_c^l\right)}\right]^{\sigma_a^l}.\left[\dfrac{\overline{WNS_{nagr}}}{\overline{WS_{nagr}}}\right]^{\sigma_c^l} \quad \forall c \in NAGR$

8. $W_c = \dfrac{\overline{WNS_{nagr}}.LDNS_c + \overline{WS_{nagr}}.LDS_c}{LD_c} \quad \forall c \in NAGR$

9. $LD_c = LDNS_c \quad \forall c \in AGR$

10. $W_c = WNS_{agr} \quad \forall c \in AGR$

Composite health products

11. $CQH_h^m = A_h^m.\left[\alpha_h^m.QHG_c^{m^{-\mu_h^m}} + \left(1-\alpha_h^m\right).QHP_{c'}^{m^{-\mu_h^m}}\right]^{-\frac{1}{\mu h}}$
$\forall h \in H, c \in HG, c' \in HP \; et \; m \in M$

12.

$$\frac{QHG_c^m}{QHP_{c'}^m} = \left[\frac{\alpha_h^m}{\left(1-\alpha_h^m\right)}\right]^{\sigma_h^m}.\left[\frac{PHP_{c'}^m}{PHG_c^m}\right]^{\sigma_h^m} \quad \forall h \in H, c \in HG, c' \in HP \; et \; m \in M$$

13. $PHQ_h^m = \dfrac{PHG_c^m.QHG_c^m + PHP_{c'}^m.QHP_{c'}^m}{CQH_h^h}$
$\forall h \in H, c \in HG, c' \in HP \; et \; m \in M$

14. $PHP_{c'}^m = PQ_{c'} \quad \forall c' \in HP \; et \; m \in M$

15. $PHG_c^m = PX_c - \overline{subv_c^m} \quad \forall c \in HG \; et \; m \in M$

Output transformation

16. $QX_c = A_c^t.\left[\alpha_c^t.QE_c^{-\mu_c^t} + \left(1-\alpha_c^t\right).QD_c^{-\mu_c^t}\right]^{-\frac{1}{\mu_c^t}} \quad \forall c \in CEX$

17. $\dfrac{QD_c}{QE_c} = \left[\dfrac{\alpha_c^t}{\left(1-\alpha_c^t\right)}\right]^{\sigma_c^t}.\left[\dfrac{PDS_c}{PE_c}\right]^{\sigma_c^l} \quad \forall c \in CEX$

18. $PX_c = \dfrac{PDS_c.QD_c + PE_c.QE_c}{QX_c} \quad \forall c \in CEX$

19. $PE_c = EXR.\overline{PWE_c} \quad \forall c \in CEX$

20. $QX_c = QD_c \quad \forall c \in CEXN$

21. $PX_c = PDS_c \quad \forall c \in CEXN$

Imports and domestic sales

22. $QQ_c = A_c^m.\left[\alpha_c^m.QD_c^{-\mu_c^m} + \left(1-\alpha_c^m\right).QM_c^{-\mu_c^m}\right]^{-\frac{1}{\mu_c^m}} \quad \forall c \in CEX$

23. $\dfrac{QM_c}{QD_c} = \left[\dfrac{\alpha_c^m}{\left(1-\alpha_c^m\right)}\right]^{\sigma_c^m}.\left[\dfrac{PDD_c}{PM_c}\right]^{\sigma_c^m} \quad \forall c \in CEX$

24. $PQ_c = \dfrac{PDD_c.QD_c + PM_c.QM_c}{(1-tva_c).QQ_c} \quad \forall c \in CEX$

25. $PM_c = EXR.\overline{PWM_c}.(tm_c + 1) \quad \forall c \in CEX$

26. $QQ_c = QD_c \quad \forall c \in CEXN$

27. $(1-tva_c).PQ_c = PDD_c \quad \forall c \in CEXN$

28. $PDD_c = PDS_c + icd_{com}^c.PQ_{com} \quad \forall c \in C$

Demand Block

Household consumption demand

29. $PQ_c.CQNH_c^m = cnh_c^m.PQ_c + pmc_c^m.\left[CFM^m - \sum_c cnh_c^m.PQ_c - \sum_h ch_h^m.PHQ_h^m\right]$
$\forall c \in NH, h \in H \; et \; m \in M$

30.

$$PHQ_h^m.CQH_h^m = ch_c^m.PHQ_c^m + pmc_c^m.\left[CFM^m - \sum_c cnh_c^m.PQ_c - \sum_h ch_h^m.PHQ_h^m\right]$$
$\forall h \in H, c \in NH \; et \; m \in M$

Intermediate demand

31. $DIQ_c = \sum_{c'} ica_{c,c'}.QX_{c'} \quad \forall c \in NH \; et \; c' \in C$

Investment demand

32. $INVQ_c = \varphi_c.\dfrac{IT}{PQ_c} \quad \forall c \in NH$

Trade demand

33. $MC_{Com}^c = icd_{Com}^c.QD_c \quad \forall c \in NH$

Incomes and Savings block

Factors

34. $RLNS^{NAGR} = \sum_{c \in NAGR} \overline{WNS_{nagr}}.LDNS_c$

35. $RLNS^{AGR} = \sum_{c \in AGR} WNS_{agr}.LDNS_c$

36. $RLS^{NAGR} = \sum_{c \in NAGR} \overline{WS_{nagr}}.LDS_c$

37. $RK^{NAGR} = \sum_{c \in NAGR} \left(PVA_c.QX_c - W_c.LD_c\right)$

38. $RK^{AGR} = \sum_{c \in AGR} \left(PVA_c.QX_c - W_c.LD_c\right)$

Households

39.
$$YH^m = \lambda ns^m_{agr}.RLNS^{AGR} + \lambda ns^m_{nagr}.RLNS^{NAGR} + \lambda s^m_{nagr}.RLS^{NAGR} + \lambda k^m_{agr}.RK^{AGR} + \lambda k^m_{nagr}.RK^{NAGR} + DIV^m$$

40. $YDH^m = (1 - ty^m).YH^m$

41. $SH^m = mps^m.YDH^m$

42. $CFM^m = YDH^m - SH^m$

Firms

43. $YF = \lambda k^F (RK^{AGR} + RK^{NAGR})$

44. $SF = (1 - ty^F)YF - DIV^G - \sum_m DIV^m$

45. $DIV^G = divid^G.YF$

46. $DIV^m = divid^m.YF$

Government

47. $YG = TAXY + TAXM + TAXS + \lambda k^G.(RK^{AGR} + RK^{NAGR}) + \overline{TRANS^{Row}} + DIV^G$

48. $TAXY = \sum_m ty^m.YH^m + ty^F.YF$

49. $TAXM = \sum_{c \in CEX} tm_c.EXR.PWM_c.QM_c$

50. $TAXS = \sum_c tva_c.PQ_c.QQ_c$

51. $SG = YG - CFG$

52. $CFG = CFGNM + \sum_{c \in HG} \sum_m \overline{subv^m_c}.QHG^m_c$

53. $CFGNM = PX_{snm}.\overline{CQNMG_{snm}}$

CLOSURE RULES BLOCK

Unskilled labour market

54. $WNS_{agr'} = \dfrac{\overline{WNS_{nagr}}.\sum_{c \in NAGR} LDNS_c}{LNS^U + \sum_{c \in NAGR} LDNS_c}$

55. $LNS^U + \sum_c LDNS_c = \overline{LDNS^S}$

Skilled labour market

56. $LS^U + \sum_{c \in NAGR} LDS_c = \overline{LDS^S}$

Commodities markets

57. $QQ_c = \sum_m CQNH^m_c + \sum_c ica_{c,c'}.QX_{c'} + INVQ_c + \overline{\Delta St_c}$ $\quad \forall c \in NH$ et $c \neq com$ et $c \notin SNM$

58. $QQ_{com} = \sum_c MC^c_{com}$

59. $QQ_c = \sum_m QHP^m_c \quad \forall c \in HP$

Non-profit services

60. $QX_c = \sum_m QHG^m_c \quad \forall c \in HG$

61. $QX_{snm} = \overline{CQNMG_{snm}}$

Current account balance

62. $\sum_{c \in CEX} EXR.\overline{PWM_c}.QM_c = \sum_{c \in CEX} EXR.\overline{PWE_c}.QE_c + \overline{Srow} + \overline{TRANS^{Row}}$

Savings–investment balance

63. $IT + \sum_{c \in NH} PQ_c.\overline{\Delta St_c} = \sum_m SH^m + SF + SG + \overline{Srow}$

Price index and numerator

64. $Pindex = \sum_c \pi_c.PQ_c$

65. $EXR = 1$

Total equations: 1042

D. List of variables and parameters

Endogenous variables (1041)

PVA_c Value-added activity price
PX_c Aggregate producer commodities price
PDS_c Offer price for domestic commoditie
PDD_c Demand price for domestic commodities
PE_c Export commodities price
PM_c Import commodities price
PQ_c Composite commodities price
PHQ^m_h Composite health commodity price for household m
PHP^m_h Private health commodities price for household m
PHG^m_h Public health commodities price for household m
$Pindex$ Consumer price index
EXR Exchange rate
QX_c Quantity of aggregate commodity c output
QD_c Quantity of domestic supply of commodity c
QE_c Quantity of commodity c exports
QM_c Quantity of commodity c imports
QQ_c Quantity of composite commodity c

QHG_h^m Quantity of consumption of public health commodity h by household m

QHP_h^m Quantity of consumption of private health commodity h by household m

$CQNH_c^m$ Quantity of consumption of non health commodity c by household m

CQH_h^m Quantity of consumption of composite health commodity h by household m

DIQ_c Quantity of intermediate demand for composite commodity c

$INVQ_c$ Quantity of investment demand for composite commodity c

MC_{Com}^c Quantity of trade for composite commodity c

$RLNS^{NAGR}$ Non-skilled labour incomes in non-agricultural activities

$RLNS^{AGR}$ Non-skilled labour incomes in agricultural activities

RLS^{NAGR} Skilled labour incomes in non-agricultural activities

RK^{NAGR} Capital incomes in non-agricultural activities

RK^{AGR} Capital incomes in agricultural activities

DIV^m Dividend perceived by household m

DIV^G Dividend perceived by government

YH^m Household m income

YDH^m Household m disposable income

SH^m Household m savings

CFM^m Household m consumption expenditures

YF Firm income

SF Firm savings

YG Government income

$TAXY$ Income tax

$TAXM$ Import tax

$TAXS$ Sale tax

SG Government savings

CFG Government consumption expenditures

$CFGNM$ Government non-marketed consumption expenditures

IT Nominal investment

LD_c Quantity of composite labour in activity c

$LDNS_c$ Quantity of unskilled labour in activity c

LDS_c Quantity of skilled labour in activity c

LNS^U Unemployment of unskilled labour

LS^U Unemployment of skilled labour

W_c Labour wage rate in activity c

WNS_{Agr} Unskilled labour wage rate in agricultural activities

$HealthK$ Farmer household health

A_{agr}^p Efficiency parameter rate in agricultural activities

Exogenous variables

$\overline{Srow}$ Foreign savings

$\overline{TRANS_{Row}}$ Transfers from government to row

$\overline{PWE_c}$ Foreign export commodities price

$\overline{PWM_c}$ Foreign import price

$\overline{\Delta St_c}$ Stock change

$\overline{K_c}$ Quantity of capital factor in activity c

$\overline{WNS_{nagr}}$ Unskilled labour wage rate in non-agricultural activities

$\overline{WS_{nagr}}$ Skilled labour wage rate in non-agricultural activities

$\overline{LDNS^S}$ Quantity supplied of unskilled labour factor

$\overline{LDS^S}$ Quantity supplied of skilled labour factor

$\overline{CQNMG_c}$ Quantity of government consumption of non marketed commodities

$\overline{Subv_{Healthg}^h}$ Price subvention of public health commodities

Parameters

A_c^p Production function efficiency parameter

α_c^p Production function share parameter

$ica_{c',c}$ Quantity of intermediate input c' per unit of product c

$A0_c^p$ Initial production function efficiency parameter in agricultural activity

HK_0 Initial farmer household health capital

ψh Health production function exponent

A_c^l Composite labour function shift parameter

α_c^l Composite labour function share parameter

μ_c^l Composite labour function exponent

σ_a^l Composite labour function substitution parameter

A_h^m Composite function shift parameter for commodity h

α_h^m Composite function share parameter for commodity h

μ_h^m Composite function exponent for commodity h

σ_h^m	Composite function substitution parameter for commodity h	ch_h^m	Subsistence consumption of health commodity h for household m
A_c^t	CET domestic-export function shift parameter	φ_c	Share of commodity c in total investment
α_c^t	CET domestic-export function share parameter	λns_{nagr}^m	Share of household m in income of unskilled labour factor in non-agricultural sector
μ_c^t	CET domestic-export function exponent	λs_{nagr}^m	Share of household m in income of skilled labour factor in non-agricultural sector
σ_c^t	CET domestic-export function substitution parameter	λk_{agr}^m	Share of household m in income of capital factor in agricultural sector
A_c^m	Armington domestic-import function shift parameter	λk_{nagr}^m	Share of household m in income of capital factor in non-agricultural sector
α_c^m	Armington domestic-import function share parameter	ty^m	Direct tax rate on household m
μ_c^m	Armington domestic-import function exponent	mps^m	Marginal propensity to save for household m
σ_c^m	Armington domestic-import function substitution parameter	λk^F	Share of household m in income of capital factor
tva_c	Sales tax rate	ty^F	Direct tax rate on firms
tm_c	Import tariff rate	$divid^G$	Share of government in total dividend
icd_{com}^c	Quantity of trade input per unit of product c	$divid^m$	Share of household m in total dividend
cnh_c^m	Subsistence consumption of non health commodity c for household m	λk^G	Share of government in income of capital factor
pmc_c^m	Marginal share of consumption spending on commodity c for household m	π_c	Weight of commodity c in the consumer price index

APPENDIX 2. ESTIMATION OF HEALTH-CAPITAL FUNCTION PARAMETERS

The agricultural production function is assumed to be a Cobb-Douglas function, whose parameters depend on the health-capital of farmers (Fulginiti and Perrin, 1993, 1998), which itself is derived from a Cobb-Douglas function of their medical care consumptions (Grossman, 1972)

$$y = A \prod_{i=1}^{n} x_i^{\beta_i} \quad (1a)$$
$$\log A = \alpha_0 + \alpha logHK + \mu_0 \quad (1b)$$
$$\beta_i = \gamma_{i0} + \gamma_i logHK \quad (1c)$$
$$\text{HK} = BC^{s_C} D^{s_D} H^{s_H} \quad (1d)$$

where y is the production volume; x_i indicate the inputs; β_i refers to the output–input elasticity; A is the productivity scale parameter; HK indicates the farmers' health-capital; C, D and H indicate medical spending in consultation, drugs and hospitalisation, respectively; $s_{C,} s_D, s_H$ the are health consumption elasticities; and B refers to the efficiency parameter of the health-capital function. Therefore,

$$\log y = \alpha_0 + \alpha_1 logC + \alpha_2 logD + \alpha_3 logH + \sum_{i=1}^{n} \gamma_{i0} logx_i + \sum_{i=1}^{n} \gamma_{i1} logClogx_i + \sum_{i=1}^{n} \gamma_{i3} logD.logx_i + \sum_{i=1}^{n} \gamma_{i3} logH.logx_i + \sum_{i=1}^{n} \mu_i \, logx_i + \mu_0 \quad (2)$$

where α_j and γ_{ij} are fixed coefficients, and μ_i is an Independent and identically distributed random variable of input x_i .

The direct ordinary least square estimation of this model leads to biased estimates because of the censoring and endogeneity of the health care spending data. Thus, we apply Vella's (1993) proposed dual approach, which predicts endogenous variables from a Tobit model and generalised residual. We also conducted a booststrap analysis for non-biased standard deviations. As suggested by Terza et al. (2008), we used Heckman and Robb's (1985) control function, which includes the residuals of the regression of each endogenous variable on the instruments and on other exogenous variables. Both approaches lead to similar results. Elasticities of agricultural productivity with respect to consultation, drugs and hospitalisation for each household are derived from the following formulas:

$$\psi_C = \sum_{i=1}^{n} \gamma_{i1} \, logx_i + \alpha_1 \quad (3a)$$
$$\psi_D = \sum_{i=1}^{n} \gamma_{i2} \, logx_i + \alpha_2 \quad (3b)$$
$$\psi_H = \sum_{i=1}^{n} \gamma_{i3} \, logx_i + \alpha_3 \quad (3c)$$

Elasticities of agricultural productivity with respect to input

Variables (in Log)	CF (Robust)	2S (Bootstrap)
Consultation	0,29(0,0007)***	0,29(0,0007)***
Drugs	0,22(0,0007)***	0,21(0,0007)***
Hospitalisation	0,14(0,0004)***	0,13(0,0004)***
Wage labour	0,03(0,0001)***	0,03(0,0001)***
Land	0,42(0,0006)***	0,42(0,0006)***
Family labour	0,24(0,0004)***	0,24(0,0004)***
Seed	-0,01(0,0001)***	-0,01(0,0001)***
Machine	0,01(0,0002)***	0,01(0,0002)***
Fertiliser	0,07(0,0003)***	0,07(0,0003)***
Constant	10,74(0,0080)***	10,87(0,0075)***

*** $p < 0.01$. ** $p < 0.05$. * $p < 0.1$.

Source: own calculations from UNHS 2005/2006.

TABLES

Table 1. Shares of households by type of income (%)

Type of income / *Type of household*	**Global**	**Unskilled labour**	**Skilled labour**	**Capital**
Rural households	63,0	66,4	41,5	58,7
Rural farmers	*48,5*	*52,9*	*23,1*	*42,2*
Rural non farmers	*14,5*	*13,5*	*18,4*	*16,5*
Urban households	37,0	33,6	58,4	41,3
Urban farmers	*8.3*	*6,5*	*19,9*	*8,8*
Urban non farmers	*10,1*	*9,3*	*14,6*	*11,4*
Kampala metropolitans	*18,6*	*17,8*	*23,9*	*21,1*
Total	100,0	100,0	100,0	100,0

Source: own calculations from Ugandan SAM -2007.

Table2. 25% increase of public subsidies of all health care products for different types of households,
a. macro-simulation results: variation rate from initial equilibrium (%)

		All households	Rural	Urban
Production (volume)	*National*	+0,32	+0,31	+0,01
	Agricultural	+1,57	+1,51	+0,11
	Non agricultural	+0,01	+0,02	-0,01
Index price	*National*	-0,70	-0,63	-0,06
	Agricultural	-1,65	-1,57	-0,16
	Non agricultural	-0,19	-0,12	-0,01
Agricultural unskilled wage rate		-0,49	-0,42	-0,12
Unskilled employment	*National*	-0,21	-0,19	-0,04
	Agricultural	-0,40	-0,40	-0,01
	Non agricultural	-0,03	+0,02	-0,07
Skilled employment	*National*	+2,09	+1,78	+0,72
Households' income	*National*	+0,26	+0,22	+0,08
	Rural	+0,16	+0,14	+0,04
	Urban	+0,43	+0,37	+0,14
Households' health consumption (volume)	*National*	+3,09	+2,01	+1,40
	Rural	+2,61	+2,99	-0,40
	Urban	+4,67	-1,26	+7,36
Average price of medical care	*National*	-14,87	-11,60	-3,14
	Rural area	-14,73	-16,77	+3,30
	Urban area	-15,32	+6,57	-23,19
Relative price of non-profit products/private care	*National*	-24,16	-20,33	-8,34
	Rural area	-23,94	-29,09	+8,76
	Urban area	-24,84	+22,88	-42,84
Households' non-profit health spending/health spending	*National*	+2,98	+2,16	+0,40
	Rural	+2,94	+3,70	-0,90
	Urban	+3,08	-2,22	+6,06
Households' productive heath-capital		+0,90	+0,87	+0,06

Source: Own calculations with GAMS.

b. micro-simulation results: variation rate from initial equilibrium (%)

	Initial value	All households	Rural	Urban
National level				
Poverty rate	**32,88%**	-1,56	-1,29	-0,21
Gini index	**0,39**	+5,16	+4,11	+1,92
Per capita income (thousands of Ugandan shillings)	**35,74**	+4,42	+3,50	+1,55
Rural area				
Poverty rate	**35,43%**	-1,54	-1,29	-0,23
Gini index	**0,35**	+3,88	+2,97	+1,21
Per capita income (thousands of Ugandan shillings)	**31,90**	+3,09	+2,44	+0,99
Urban area				
Poverty rate	**19,42%**	-2,83	-2,69	-1,10
Gini index	**0,43**	+6,20	+5,03	+2,20
Per capita income (thousands of Ugandan shillings)	**56,35**	+8,02	+6,44	+2,83

Source: Own calculations from UNHS 2005/2006.

Table 3. Respective weights of different types of health products

	Consultation	Drugs	Hospitalisation	Total
Share in households' health consumption at initial equilibrium	12,6%	54,6%	32,9%	100,0%
Share in the total public subsidies at initial equilibrium	10,1%	56,2%	33,7%	100,0%
Elasticity impact on agricultural productivity	0,29	0,22	0,14	0,35

Sources: own calculations from Ugandan SAM-2007and UNHS 2005/2006.

Table 4. 25% increase of public subsidy, for different type of health care product for all households,

a. macro-simulation results: variation rate from initial equilibrium(%)

		Drugs.	Hosp.	Cons.
Production (volume)	*National*	+0,15	+0,07	+0,10
	Agricultural	+0,76	+0,37	+0,42
	Non-agricultural	+0,19	+0,11	+0,06
Index price	*National*	-0,31	-0,21	-0,21
	Agricultural	-0,82	-0,39	-0,48
	Non-agricultural	-0,03	-0,11	-0,06
Agricultural unskilled wage rate		-0,27	-0,14	-0,10
Unskilled employment	*National*	-0,11	-0,06	-0,06
	Agricultural	-0,18	-0,07	-0,17
	Non-agricultural	-0,04	-0,04	+0,05
Skilled employment	*National*	+1,16	+0,67	+0,27
Households' income	*National*	+0,12	+0,07	+0,05
	Rural	+0,07	+0,03	+0,04
	Urban	+0,22	+0,12	+0,07
Households' health consumption (volume)	*National*	+1,74	+1,00	+0,33
	Rural	+1,45	+0,86	+0,28
	Urban	+2,70	+1,48	+0,48
Average price of medical care	*National*	-8,51	-5,13	-1,48
	Rural area	-8,36	-5,13	-1,44
	Urban area	-9,00	-5,12	-1,61
Relative price of non-profit products/private care	*National*	-15,00	-9,32	-2,98
	Rural area	-14,70	-9,37	-2,90
	Urban area	-15,94	-9,13	-3,24
Households' non-profit health spending/health spending	*National*	+1,41	+0,75	+0,58
	Rural	+1,34	+0,73	+0,62
	Urban	+1,61	+0,79	+0,47
Households' productive heath-capital		+0,83	+0,40	+0,47

Source: Own calculations with GAMS.

b. micro-simulation results: variation rate from initial equilibrium (%)

	Initial value	Drugs	Hosp.	Cons.
National level				
Poverty rate	**32,88%**	-1,13	-0,87	-0,72
Gini index	**0,39**	+3,09	+1,81	+0,83
Per capita income (thousands of Ugandan shillings)	**35,74**	+2,64	+1,58	+0,75
Rural area				
Poverty rate	**35,43%**	-1,17	-0,82	-0,70
Gini index	**0,35**	+2,22	+1,14	+0,31
Per capita income (thousands of Ugandan shillings)	**31,90**	+1,87	+1,08	+0,48
Urban zones				
Poverty rate	**19,42%**	-2,47	-2,29	-1,97
Gini index	**0,43**	+3,65	+2,04	+0,88
Per capita income (thousands of Ugandan shillings)	**56,35**	+4,73	+2,74	+1,23

Source: Own calculations from UNHS 2005/2006.

Table 5. Public spending effectiveness indicators

a. Different targeted policies

	Global policy	Targeted policy on households		Targeted policy on health products		
		Rural	*Urban*	*Drugs*	*Hosp.*	*Cons.*
Additional cost	+54,39%	+43,50%	+17,22%	+30,56%	+17,93%	+5,99%
Poverty variation	-1,56%	-1,29%	-0,21%	-1,13%	-0,87%	-0,72%
Health-capital accumulation	+0,90%	+0,87%	+0,06%	+0,83%	+0,40%	+0,47%
Policy effectiveness on poverty*	2,87	2,96	1,22	3,70	4,85	12,02
Policy effectiveness on health*	1,65	2,00	0 ,35	2,72	2,23	7,85

*The values are multiplied by 100 for ease of comprehension.
Source: Own calculations

b. Different mixed policies

	Targeted to rural households			Targeted to urban households		
	Drugs	***Hosp.***	***Cons.***	***Drugs***	***Hosp.***	***Cons.***
Additional cost	+24,25%	+14,51%	+4,78%	+9,97%	+5,36%	+1,90%
Poverty variation	-0,52%	-1,08%	-0,69%	-0,04%	-0,02%	-0,05%
Health-capital accumulation	+0,80%	+0,39%	+0,43%	+0,05%	+0,02%	+0,05%*
Policy effectiveness on poverty*	2,14	7,44	14,43	0,40	0,37	2,64
Policy effectiveness on health*	3,31	2,69	9,04	0,51	0,30	2,66

*The values are multiplied by 100 for ease of comprehension.
Source: Own calculations.