

# SOUTHMOD

Country report

# Zambia

MicroZAMOD v2.4

2010, 2015–19

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## About the project

### **SOUTHMOD – simulating tax and benefit policies for development**

SOUTHMOD is a joint project between the United Nations University World Institute for Development Economics Research (**UNU-WIDER**), the European Union Tax–Benefit Microsimulation Model (**EUROMOD**) team at the Institute for Social and Economic Research (**ISER**) at the **University of Essex**, and Southern African Social Policy Research Insights (**SASPRI**) in which tax–benefit microsimulation models for selected developing countries are being built. These models enable researchers and policy analysts to calculate, in a comparable manner, the effects of taxes and benefits on household incomes and work incentives for the population of each country.

SOUTHMOD models are currently available for Ecuador (ECUAMOD), Ethiopia (ETMOD), Ghana (GHAMOD), Mozambique (MOZMOD), Namibia (NAMOD), Vietnam (VNMOD), South Africa (SAMOD), Tanzania (TAZMOD), Uganda (UGAMOD), and Zambia (MicroZAMOD). SOUTHMOD models are updated to recent policy systems using national household survey data. This report documents MicroZAMOD, the SOUTHMOD model developed for Zambia. This work was carried out by Zambia Institute for Policy Analysis & Research (**ZIPAR**) in collaboration with the project partners.

The results presented in this report are derived using MicroZAMOD version 2.4 running on EUROMOD software. The report describes the different tax–benefit policies in place, how the microsimulation model picks up these different provisions, and the database on which the model runs. It concludes with a validation of MicroZAMOD results against external data sources. For further information on access to MicroZAMOD and other SOUTHMOD models see the [SOUTHMOD page](#).

The MicroZAMOD model and its documentation in this country report has been prepared within the UNU-WIDER project on ‘SOUTHMOD—simulating tax and benefit policies for development’, which is part of a larger research project on ‘The economics and politics of taxation and social protection’. For more information, see the [SOUTHMOD project page](#).

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## Acronyms

CSO	(Zambia) Central Statistical Office
FISP	Farmer Input Support Programme
E-FISP	Electronic-Farmer Input Support Programme
HGSFP	Home Grown School Feeding Programme
LASF	Local Authority Superannuation Fund
LCMS	Living Conditions Monitoring Survey
LFS	Labour Force Survey
NAPSA	National Pension Scheme Authority
PAYE	Pay as you earn
PSPF	Public Service Pension Fund
PWAS	Public Welfare Assistance Scheme
SCT	Social cash transfer
SEA	Standard enumeration area
VAT	Value-added tax
ZAPD	Zambia Agency for Person with Disabilities
ZMW	Zambian Kwacha

# 1 Basic Information

This report documents the development of a tax–benefit microsimulation model for Zambia, MicroZAMOD. The report provides a brief description of the tax–benefit system in Zambia in Section 1. The selected taxes and benefits that are simulated in MicroZAMOD are described in detail in Section 2. The report also describes the data that underpin the model, including any adjustments, imputations, and assumptions made (Section 3). Section 4 concludes the report by providing a validation of the model findings based on external information.

## 1.1 Basic information about the tax–benefit system

Although Zambia’s tax system is reasonably well developed and comparable with those found in most developing countries, the range of social benefits remains narrow and is in the process of development. As noted by the World Bank (2013), the social benefit programmes are too fragmented, incoherent, and transitory to provide a solid enough safety net. This has also been widely acknowledged by the Government of Zambia (MCDMCH 2014). Thus, Zambia is in the process of expanding its social protection programmes, such as the social cash transfer (SCT) scheme, and streamlining its other social protection policies.

The benefit system is largely contributory and consists of pension schemes governed by various laws.<sup>1</sup> The state pension age used to be 55 years. In November 2014, under the Public Service (Retirement Age) Regulations 2014 (Statutory Instrument No. 63 of 2014), this was raised to 65 years, but in May 2015 this was lowered to 60 years with options of 55 years and 65 years for early retirement and late retirement, respectively, under the Public Service (Retirement Age) (Amendment) Regulations 2015 (Statutory Instrument No. 24 of 2015).

The tax system consists of direct and indirect taxes. The most important source of revenue is income tax, followed by value-added tax (VAT) (IMF 2015; ZRA 2015). Direct taxes are generally individual-based whereas some social protection programmes also have household-specific eligibility conditions.

The fiscal year in Zambia follows the calendar year, and tax changes outlined in government budgets in the fourth quarter of the previous year usually take place at the beginning of the calendar year.

Primary school in Zambia starts at the age of 7 years, and free basic education includes seven grades of primary school followed by 5 years of secondary school. Dropout rates, however, are non-negligible at each grade throughout primary school (Ministry of Education, Science, Vocational Training and Early Education 2014).

There is no uniform definition of working age. Prior to 2017, the SCT had a demographic test that consisted of an economic ‘fit-for-work’ criteria. For the purposes of the SCT scheme, working age or fit-for-work individuals were defined as being 19–64 years of age. In the Living Conditions Monitoring Survey (LCMS), socio-economic status is assigned to everyone 12 years of age or over. In the estimates derived from the Labour Force Survey (LFS), employment status is defined for individuals 15 years of age and above. The statutory minimum age for light work defined in the Employment of Young Persons and Children Act is 13 years, and the minimum contractual age is 16 years.

## 1.2 Social benefits

**Benefit 1** (*Social Cash Transfer*, SCT): The SCT programme was initiated as a pilot scheme by Zambia’s Ministry of Community Development and Social Services (2017) as an intervention to reduce extreme poverty and intergenerational transfer of poverty among beneficiary households and the community. The SCT pilots were designed to protect and promote the livelihoods and welfare of households suffering from critical levels of poverty and deprivation. At the end of 2015, the SCT was being implemented in 50 districts. In 2016, the programme was rolled out to an additional 28 districts using the harmonized inclusive model (Ministry of Community Development and Social Welfare 2015). Beneficiary households are currently entitled to Zambian

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1 National Pension Scheme Authority Act, Public Services Pension Fund Act, Local Authorities Superannuation Fund Act, and Pension Scheme Regulation Act.

Kwacha (ZMW) 90 per month, which they receive on a bi-monthly basis as a sum of ZMW 180 every 2 months. Different eligibility criteria exist for urban and rural areas. Beneficiary households containing one or more disabled members are eligible for double the standard amount (ZMW 360 every 2 months).

**Benefit 2** (*Home-Grown School Feeding Programme, HGSFP*): This is a district-based programme administered by Zambia's Ministry of General Education. The programme initially covered 22 districts selected on the basis of a food security measure and education test scores of a particular district. The coverage has now increased to 38 districts. All public schools in the eligible district provide free school meals daily to learners, prepared from maize meal, pulses, and oil. The HGSFP came into being in 2013 after the signing of a memorandum of understanding between the Ministry of Education and Early Education in Zambia and the United Nations World Food Programme. The main objective of this programme is to improve attendance and consequently the quality of education in schools, especially for learners from vulnerable and food insecure households (GRZ 2013). The HGSFP took over from an earlier supported feeding programme in which food commodities for the school feeding were procured from outside the country. The HGSFP is required to use only locally produced food; hence, the name of the programme.

**Benefit 3** (*Farmer Input Support Programme, FISP; and Electronic voucher Farmer Input Support Programme, E-FISP*): This programme is administered by the Ministry of Agriculture (2017) and is intended to benefit smallholder farmers in order to promote household and national food security by providing access to agricultural inputs. The original FISP package consisted of two 50-kg bags of basal-dressing fertilizer, two 50-kg bags of top-dressing fertilizer, and one 10-kg bag of maize seed. To benefit from this pack, farmers needed to be actively engaged in farming and have the capacity to cultivate between 0.5 and 5 ha. Eligible farmers also had to belong to a farmers' cooperative and be able to pay a 50 per cent share of the fertilizer price and a 40 per cent share of the seed price. During the 2015–16 farming season, the Ministry of Agriculture implemented the E-FISP scheme. A total of 241,000 farmers across the 13 pilot districts in Southern, Lusaka, Central, and Copperbelt Provinces received the E-FISP subsidy through pre-paid VISA bank cards rather than receiving physical inputs centrally procured by the government. During the 2016–17 farming season, the government extended the programme to 39 additional districts covering 602,521 farmers. The introduction of the E-voucher system is intended to improve beneficiary targeting, promote agricultural diversification, and ensure timely access to inputs by smallholder farmers.

**Benefit 4** (*Food Security Pack*): This consists of a package of inputs sufficient to cultivate 0.5 ha of maize, 0.25 ha of legumes, and in some cases chicken and goats. Eligibility of beneficiaries is based on having access to less than 1 ha of land and having the ability to work but having no gainful employment. Furthermore, eligible households must either be headed by a female or have orphans or children, or a child- or disabled-head of the family. There is an obligation to make a partial repayment of the benefit in terms of the share of the yield from the pack.

**Benefit 5** (*Public Welfare Assistance Scheme, PWAS*): This is the Government of Zambia's social assistance programme aimed at mitigating social economic shocks and other negative effects such as poverty and the HIV/AIDS pandemic. Specifically, PWAS is aimed at assisting the most vulnerable in the society to fulfil their basic needs—particularly health, education, food, and shelter—in order to overcome problems of extreme poverty and vulnerability. Social support rendered under this scheme includes supply of food, shelter, clothing, and repatriation to stranded persons. There is also education support in that children from households registered under PWAS are provided with necessary school requirements for primary and secondary school. In addition, health care support assists in identifying destitute persons with orthopaedic medicines and appliances such as artificial limbs, shoes, crutches, and spectacles. PWAS targets extremely poor older persons, orphans or neglected children, chronically ill or disabled persons, and households headed by a single female.

**Benefit 6** (*Orphans and Vulnerable Children Bursary*): The bursary is administered by Zambia's Ministry of General Education and is targeted at orphans and vulnerable children by providing them with secondary school fees and boarding fees.

### 1.3 Social contributions

The pension industry in Zambia is based on a compulsory and a voluntary system. Employees in the formal sector are required to contribute to one of the following three public schemes:

the Public Service Pension Fund (PSPF), the National Pension Scheme managed by the National Pension Scheme Authority (NAPSA), and the Local Authority Superannuation Fund (LASF). The LASF and PSPF are gradually being phased out with no new members. Therefore, these are not included in the description below.<sup>2</sup>

**Social contribution 1** (*National Pension Scheme*): All new private and public formal sector employees are required to register with a pension scheme administered by NAPSA. Presently, the monthly contribution rate is pegged at 10 per cent of a worker's gross monthly earnings (5 per cent is paid by the employee and 5 per cent by the employer). The contributions are subject to a ceiling. The contribution ceiling is revised annually, and the revision takes effect from January of each year. The ceiling for 2019 was ZMW 1,074 per month. The following constitute gross earnings for NAPSA purposes: basic salary plus leave pay, commuted days, overtime, bonus, and all allowances such as housing and transport.

**Social contribution 2** (*Workers' Compensation Fund*): In addition to the pension schemes, employers must register and pay contributions to the Workers' Compensation Fund Control Board. The contribution rates vary by economic activities and their associated risks. The Workers' Compensation Fund Control Board provides pensions to people who have been disabled or killed by a work-related accident or as a result of a work-related disease. Compensation is payable for temporary or permanent disablement and depends on the degree thereof. Temporary disablement is defined as not exceeding 18 months. When a worker's injuries are static, the degree of permanent disability will be determined. If the worker has suffered permanent disablement of 10 per cent, they will be eligible for a lump sum compensation. If the degree of disablement is 11 per cent and above, the worker is entitled to a pension for life.

## 1.4 Taxes

This section describes direct and indirect taxes. However, taxes that are not amenable to microsimulation, such as company income tax and property transfer tax, are not discussed.

**Tax 1** (*Income tax*): This is a tax on profits earned by companies and emoluments earned by employees. Self-employed individuals are also liable to pay income tax. Thus, income tax consists of company income tax<sup>3</sup> and personal income tax. Personal income tax is levied on all income with a few exceptions, such as Labour Day awards, ex-gratia payments, medical expenses, funeral expenses, and sitting allowances for councillors. Personal income tax in Zambia is largely collected via the 'pay as you earn' (PAYE) scheme.<sup>4</sup> It has four income bands that are adjusted on an ad hoc basis during national budgets to provide relief in times of high inflation.

**Tax 2** (*Turnover tax*): This is a tax on gross sales/turnover, such as income, earnings, revenue, yield, and proceeds of small individual traders or companies with an annual turnover of ZMW 800,000 or less unless they are voluntarily registered to pay VAT. This tax regime includes informal workers such as street traders. Prior to 2017, turnover tax was calculated at 3 per cent of turnover for individuals with turnover of less than ZMW 800,000. In 2017, the rules changed to consist of six turnover bands (with associated turnover tax liabilities). However, in 2019, the turnover tax schedule returned to a flat rate, this time calculated at 4 per cent of turnover, applied to all turnover of less than ZMW 800,000.

**Tax 3** (*VAT*): VAT on goods and services is levied at the standard rate of 16 per cent, and a 0 per cent rate for exports and selected non-export goods. There are also several VAT-exempted items/services.

**Tax 4** (*Excise taxes*): Excise taxes are levied on selected commodities that include tobacco products, alcoholic beverages, petroleum products, motor vehicles, pollutants, cosmetics, and mobile telecommunication airtime. The taxes are levied at different rates and are either ad valorem or specific rates.

**Tax 5** (*Medical levy*): This levy existed prior to 2013. It was charged at the rate of 1 per cent on gross interest earned on savings with banks and other financial institutions. In 2013, the medical levy was abolished together with all taxes on interest earned on savings in order to promote a culture of savings and investment.

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<sup>2</sup> Sources in this section include NAPSA (n.d).

<sup>3</sup> See ZRA (2017) for a description of company income tax rates.

<sup>4</sup> See ZRA (2016) for a description of PAYE.

## 2 Simulation of taxes and benefits in MicroZAMOD

### 2.1 Scope of simulation

Table 2.1 shows the benefit policies that are simulated in MicroZAMOD v2.4.

The original FISP is not simulated as it was replaced by the E-FISP in the 2015–16 farming season.

**Table 2.1: Simulation of benefits in MicroZAMOD**

	Variable name(s)	Treatment in MicroZAMOD						Why not fully simulated?
		2010	2015	2016	2017	2018	2019	
Social assistance								
SCT	<i>bsa_zm</i>	—	PS	PS	PS	PS	PS	2010 is not simulated because SCT was still not widely scaled up. It is not possible to simulate the community verification process of eligible households.
Agriculture benefits								
E-FISP	<i>bag_zm</i>		PS	PS	PS	PS	PS	The eligibility criteria related to ownership of livestock could not be modelled due to lack of data.
Education benefits								
HGSFP	<i>bedot_zm</i>		PS	PS	PS	PS	PS	The correct monetary amounts for the value of the school meals in 2015, 2016, 2018, and 2019 were unknown; so, they were estimated by adjusting the 2017 value by the food component of the CPI.

Notes: : SCT, social cash transfer; E-FISP, Electronic-Voucher Farmer Input Support Programme; HGSFP, Home-Grown School Feeding Programme; CPI, consumer price index. '—' policy did not exist in that year; 'PS' policy is *partially simulated* as some of its relevant rules are not simulated. '|' policy not simulated as no data obtainable.

Source: Authors' compilation.

### 2.2 Order of simulation and interdependencies

In Table 2.2, the treatment of taxes and social contributions in MicroZAMOD are presented. Complete simulation for personal income tax, turnover tax, and VAT is possible. Selected excise duties with a significant impact on individuals are also simulated. Employee contributions to a pension scheme are also possible. Simulation of medical levy is only possible in the year 2010 because it was abolished in 2013.

Table 2.3 shows the order in which the main elements of MicroZAMOD are simulated, for time points 2010 and 2015–19. There were no changes in the order of simulation between the six periods. Medical levy is only simulated in 2010 because it was abolished in 2013. Employee and employer social contributions are simulated first. Next, turnover tax is simulated for individuals with annual turnovers below ZMW 800,000. Personal income tax is then simulated for those individuals with turnover above the turnover tax threshold and all those eligible to pay personal income tax. The SCT policy is simulated next, taking into account differences in rural/urban eligibility conditions by simulating separately for each area type. Two further benefit policies are then simulated: HGSFP and E-FISP. Finally, simulations are undertaken for VAT and excise duties.

**Table 2.2: Simulation of taxes and social contributions in MicroZAMOD**

	Variable name(s)	Treatment in MicroZAMOD						Why not fully simulated?
		2010	2015	2016	2017	2018	2019	
Taxes								
Personal income tax	<i>tin_zm</i>	S	S	S	S	S	S	
Presumptive turnover tax	<i>ttn_zm</i>	S	S	S	S	S	S	
Medical levy	<i>thl_zm</i>	S	—	—	—	—	—	Abolished in 2013
VAT	<i>tva_zm</i>	S	S	S	S	S	S	
Excise duty	<i>tex_zm</i>	PS	PS	PS	PS	PS	PS	Simulated for alcohol, tobacco, and petrol/diesel
Social contributions								
Employee pension contribution	<i>tsceepi_zm</i>	S	S	S	S	S	S	
Employer pension contribution	<i>tscerpi_zm</i>	S	S	S	S	S	S	

Notes: VAT, value-added tax. ‘S’ policy is *simulated* although some minor or very specific rules may not be simulated; ‘—’ policy did not exist in that year; ‘PS’ policy is *partially simulated* as some of its relevant rules are not simulated.

Source: Authors’ compilation.

**Table 2.3: MicroZAMOD spine: Order of simulation**

Policy	2010	2015	2016	2017	2018	2019	Description of the instrument and main output
<i>uprate_zm</i>	On	On	On	On	On	On	DEF: Up-rating factors
<i>neg_zm</i>	On	On	On	On	On	On	DEF: Recode negative income to zero
<i>ildef_std_zm</i>	On	On	On	On	On	On	DEF: Standard income list
<i>ildef_non_std_zm</i>	On	On	On	On	On	On	DEF: Model specific income list
<i>ildef_stats_zm</i>	On	On	On	On	On	On	DEF: Stats presenter income list
<i>ildef_exp_zm</i>	On	On	On	On	On	On	DEF: Expenditure income list (COICOP)
<i>tundef_zm</i>	On	On	On	On	On	On	DEF: Assessment units
<i>constdef_zm</i>	On	On	On	On	On	On	DEF: Constants
<i>spl_zm</i>	On	On	On	On	On	On	INC: Poverty lines
<i>ses_zm</i>	On	On	On	On	On	On	INC: Equivalence scales
<i>tsceepi_zm</i>	On	On	On	On	On	On	SIC: Employee pension contributions
<i>tscerpi_zm</i>	On	On	On	On	On	On	SIC: Employer pension contributions
<i>ttn_zm</i>	On	On	On	On	On	On	TAX: Turnover tax
<i>tin_zm</i>	On	On	On	On	On	On	TAX: Personal income tax
<i>thl_zm</i>	On	Off	Off	Off	Off	Off	SIC: Medical levy
<i>bsa_rural_zm</i>	n/a	On	On	On	On	On	BEN: SCT—rural areas
<i>bsa_urban_zm</i>	n/a	On	On	On	On	On	BEN: SCT—urban areas
<i>bedot_zm</i>	n/a	On	On	On	On	On	BEN: HGSFP
<i>bag_zm</i>	n/a	n/a	On	On	On	On	BEN: E-FISP
<i>tva_zm</i>	On	On	On	On	On	On	TAX: VAT
<i>tex_zm</i>	On	On	On	On	On	On	TAX: Excise duty
<i>output_std_zm</i>	On	On	On	On	On	On	DEF: Standard output individual level
<i>output_std_hh_zm</i>	Off	Off	Off	Off	Off	Off	DEF: Standard output household level

Notes: DEF, definitional policy; INC, poverty policy; SIC, social insurance contribution policy; BEN, benefit policy.

Source: Authors’ compilation.

## 2.3 Social benefits and contributions

### 2.3.1 Social Cash Transfer (SCT) (*bsa\_s*)

The SCT is provided to needy households in rural and urban areas. In 2017, the eligibility criteria for the SCT were amended by the removal of one category of eligibility and the simultaneous introduction of several new categories of eligibility.

#### Definitions

- Child-headed household: the head of the household is 19 years or younger and is not married, and the household is verified by members of the community to be a child-headed household.
- Elderly person: persons aged 65 years and above.
- Household with members with severe disability: for this programme, severe disability is assessed by medical professionals and reflected in a Disability Medical Assessment Slip or a ZAPID that indicates the level of disability.
- Households with members who are chronically ill and on palliative care: a household member is regarded as chronically ill and on palliative care if their Medical Assessment Slip states this.
- Female-headed household: the head of the household is a female who is between the ages of 19 and 65 years, has at least three children under the age of 19 years, is not married, and who is verified by members of the community to be the head of the household.

Prior to 2017, the SCT contained a demographic fit-for-work test: to be eligible under this category households needed to have a ratio of unfit to fit members of three or more. The definition of fit-for-work included all those household members capable of working, who are not chronically ill or disabled, aged between 19 and 64 years and not attending school. Anyone not meeting these fit-for-work criteria were classed as 'unfit for work'.

#### Eligibility conditions

In order to be eligible for SCT in rural areas from 2017 onwards, the household should satisfy the following conditions (GRZ 2015):

- Residency test: only households residing in the same catchment area for at least 6 months; and
- Household contains an elderly person aged 65 years or above, or
- Household contains one or more members with severe disability, or
- Household contains one or more members who are chronically ill and on palliative care, or
- Female-headed household, or
- Child-headed household, and
- Living conditions test: households must have a 'living conditions index' score (see below) below the specified threshold to indicate they are poor.

These criteria are similar to those used in urban areas, although eligible urban households have to fulfil an additional requirement that the household must contain at least one disabled member of any age. Furthermore, the living conditions test, consisting of the living conditions index, was designed using different characteristics or variables for urban and rural areas. Each of these characteristics is associated with a specific contribution score that is summed up to give a total household score. The living conditions test is, in effect, a 'proxy means test': the higher the total score the greater the chances that the household is relatively well off; the lower the total score the greater the chances that the household is relatively poor.

The ten variables used for rural areas in the living conditions index are: highest education level achieved by household members 15 years and above, type of toilet used, type of roof in the house, source of lighting, most used cooking fuel, ownership of mattress, ownership of sofa, ownership of television, ownership of clock, and ownership of electric iron.

The ten variables for urban areas are the following: highest education level achieved by household members 15 years and above, type of dwelling, type of toilet used, type of floor in the house, source of lighting, ownership of bed, ownership of sofa, ownership of computer, ownership of dining table, and ownership of electric iron.

#### **Income test**

There is no income test for this benefit (although the living conditions index is, in effect, a proxy means test).

#### **Benefit amount**

From 2017 onwards, the benefit amount has been ZMW 90 per month and has been paid bi-monthly (so ZMW 180 is paid once every 2 months). Households containing one or more disabled persons receive double the amount (i.e. ZMW 360 is paid every 2 months).

Prior to 2016, the benefit amount was ZMW 70 per month and paid bi-monthly (so ZMW 140 was paid once every 2 months). Households containing one or more disabled persons received double the amount (i.e. ZMW 280 was paid every 2 months).

#### **MicroZAMOD notes**

The residence test requires that households should have resided in the same catchment area for at least 6 months to be eligible for the cash transfer. However, the LCMS dataset only contains a question about where the person resided 12 months previously and so this criterion was applied instead.

It is not possible to confirm the certification of those who are severely disabled or those who are chronically ill and on palliative care. We therefore assume these individuals are captured by our demographic variable for disability, *ddi*.

The SCT also includes a community validation process in all Community Welfare Assistance Committees and the community validation of potential beneficiaries after the living conditions test. It is not possible to simulate this.

### **2.3.2 Home Grown School Feeding Programme: HGSFP (*bedot\_s*)**

#### **Eligibility conditions**

All public and community school children from grades 1 to 7 who are currently attending schools in the eligible districts.

#### **Income test**

There is no income test for this benefit.

#### **Benefit amount and duration**

Eligible school children receive free school meals daily. The meals are prepared from maize meal, pulses, and oil. The value of the school meals was the equivalent of ZMW 198 per child per year in 2017.

#### **MicroZAMOD notes**

The correct monetary amounts for the value of the school meals in 2015, 2016, 2018, and 2019 were unknown; so, these were estimated by adjusting the 2017 value by the food component of the consumer price index (CPI).

### **2.3.3 Electronic-Farmer Input Support Programme: E-FISP (*bag\_zm*)**

#### **Eligibility conditions**

In order to be eligible for E-FISP from the 2015–16 farming season onwards, an individual beneficiary should satisfy the following conditions (GRZ 2015):

- Be a member of a registered farmer organization or be captured in the farmer register;
- Be a small-scale farmer or traditional leader;
- Cultivate between 0.5 ha and 5.0 ha of land; or be raising 2–10 cattle, 5–30 pigs, 5–30 goats, 20–100 chickens, or 1–2 fish ponds;
- Have the capacity to pay the farmer contribution of ZMW 400, and
- Be approved by the Camp Agricultural Committee.

### **Income test**

There is no income test for this benefit.

### **Benefit amount**

The total amount loaded onto the E-FISP in the 2015–16 farming season was ZMW 1,800. However, beneficiary farmers were expected to make a farmer contribution of ZMW 400 before their cards were activated for use. It was therefore necessary to subtract the farmer contribution of ZMW 400 from the voucher value of 1,800, resulting in the actual benefit amount received being ZMW 1,400. In the 2016–17 farming season, the voucher amount was increased to ZMW 2,100, but again farmers had to pay an initial ZMW 400 contribution, resulting in a net benefit amount of ZMW 1,700 per eligible farmer.

### **MicroZAMOD notes**

It was not possible to model the eligibility criteria related to paying the farmer contribution. All farmers that met the other eligibility criteria were therefore assumed to be able and willing to pay the ZMW 400 contribution to activate the voucher payment.

It was not possible to model the eligibility criteria relating to the ownership of livestock due to unavailability of data. These data are, in fact, collected within the 2015 LCMS, but it has not yet been possible to obtain them from the Zambian Central Statistical Office (CSO).

It was also not possible to identify traditional leaders.

#### **2.3.4 Employee social contributions**

All employees in wage employment are liable to pay a pension contribution calculated at 5 per cent of gross salary plus leave pay, overtime, bonus, and all allowances. The other 5 per cent is paid by the employer. The contributions are also subject to a ceiling, and in 2019 the contribution ceiling was ZMW 1,074 per month. This was an increase from the 2018 ceiling amount of ZMW 995.

#### **2.3.5 Employer social contributions**

All employers are liable to contribute 5 per cent of the employee's gross earnings towards their pension.

## **2.4 Personal income tax**

### **2.4.1 Tax unit**

Personal income tax is levied on an individual basis. There is no joint taxation.

### **2.4.2 Exemptions**

Following Verbist (2004), we define exemptions as 'income components (that) are part of pre-tax income, but do not have to be declared to the tax authorities, and thus are not included in the concept of taxable income (e.g. child benefits in most countries)'. In Zambia, these include Labour Day awards, ex-gratia payments, medical expenses, funeral expenses, sitting allowances for councillors, and benefits that cannot be converted into cash.

### **2.4.3 Tax allowances**

Here, we define tax allowances as any amount subtracted from pre-tax income (including social insurance contributions). Differently from Verbist (2004), there is no distinction between

those that are fixed amounts (tax allowances) and those whose level is a function of pre-tax income (deductions). In addition to contribution to pension calculated at 5 per cent (or ZMW 255, whichever is lower) of the wage income, there is a tax allowance for disabled persons of ZMW 600 per month. To be eligible for the disability allowance, one has to be certified by the Zambia Agency for Persons with Disabilities (ZAPD). As the 2015 LCMS data do not indicate which individuals have been certified as disabled by ZAPD, we have not simulated this disability allowance.

#### 2.4.4 Tax base

The tax base is defined as taxable income minus contributions to pension and tax allowances.

Taxable income includes income from employment, self-employment, property, and capital. The following is the personal income tax schedule for 2017–19:

- ZMW 0–39,600 per year at 0 per cent
- ZMW 39,601–49,200 per year at 25 per cent
- ZMW 49,200–74,400 per year at 30 per cent
- Above ZMW 74,401 per year at 37.5 per cent.

The income tax bands changed slightly between 2016 and 2017 and between 2010 and 2015.

#### MicroZAMOD notes

The ZMW 600 per month allowance for disabled people for personal income tax purposes is not implemented in the model because of the requirement that the eligible person be certified by ZAPD and this information is not captured in the data. Awarding the allowance to all disabled people would greatly inflate the numbers eligible for the allowance.

Furthermore, the LCMS dataset does not contain information on expenses from the incomes of self-employed individuals. The 2014 LFS does, however, ask about the cost of business expenses incurred in running the respondent's main business activity. Using this information, it was determined that expenses for the self-employed (with turnovers greater than ZMW 800,000—the turnover tax threshold; see below) equate to 35 per cent of the total turnover. Therefore, net income (i.e. profit) for tax purposes for those self-employed who do not fall within the scope of turnover tax was imputed as 65 per cent of their total turnover.

## 2.5 Indirect taxes

Indirect taxation in Zambia includes VAT as well as excise duty on certain goods. The standard rate of VAT is 16 per cent and there are a number of exempted and zero-rated goods and services. VAT-exempted goods and services include, for example, water supply, health and education, books and newspapers, as well as a number of agricultural and food products. Zero-rated goods include exports and, for example, building supplies, medical supplies, agricultural equipment, and energy-saving appliances equipment and machinery (ZRA 2014).

A new methodology for modelling VAT and excise duties was introduced in the model in 2017. This involves removing VAT and excise duty (where applicable) from expenditure items at the point of preparation of the data so that expenditure is brought into the model ex-VAT and Excise. This simplifies the modelling of indirect taxes on the model. The VAT and excise duty removed are carried into the model as the variables for imputed VAT (*tvai<sub>i</sub>*) and imputed excise duty (*tex<sub>i</sub>*).

For the correct functioning of estimates of Consumption Poverty using the Statistics Presenter application within the model, an imputed income tax variable was also imputed and a number of other variables were constructed (see Data Requirement Document <sup>5</sup>).

Excise duty is applicable to various goods. The excise duty rates are presented in Table 2.4.

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<sup>5</sup> Available upon request from the authors.

**Table 2.4: Selected excise duty rates (2018)**

<b>Commodity</b>	<b>Rate</b>
Clear beer	40%
Opaque beer	ZMW 0.15/litre
All types of wines	60%
Spirits, liqueurs, and other spirits beverages <sup>a</sup>	60%
Cigars, cheroots, cigarillos, and cigarettes of tobacco substitutes	ZMW 240/1,000 pieces
Petrol	ZMW 1.142/litre

Note: <sup>a</sup>Undenatured ethyl alcohol of an alcoholic strength by volume of less than 80 per cent

Source: ZRA 2017.

### **MicroZAMOD notes**

Excise duty has been simulated for alcohol, tobacco, and petrol/diesel.

## **2.6 Other taxes—Turnover tax**

This tax is applied on the annual turnover of self-employed people whose turnover falls below the threshold of ZMW 800,000. Prior to 2017, this tax was applied at a flat rate of 3 per cent on the annual turnover of self-employed people whose turnover falls below the threshold of ZMW 800,000. In 2017 and 2018, the tax schedule for turnover tax was changed so that people were placed into bands according to their reported turnover (below ZMW 800,000 per year) and the amount of turnover tax payable was related to the band to which the person was allocated. However, in 2019, the turnover tax schedule returned to being a flat rate, this time at 4 per cent of the annual turnover for people whose turnover falls below the threshold of ZMW 800,000 .

## **3 Data**

### **3.1 General description**

MicroZAMOD is underpinned by the 2010 and 2015 Living Conditions Monitoring Survey (LCMS). The description of the data provided here relates to the 2015 LCMS (CSO 2016) (Table 3.1). The 2015 LCMS was conducted in April/May 2015 and covered 12,251 households in 664 randomly selected enumeration areas across the ten provinces of Zambia. The survey estimated a total population of 15.5 million, with 58.2 per cent of the population residing in rural areas. It estimated a total of 3,014,965 households, with an average household size of 5.1 persons. The survey was designed to produce reliable estimates at national, provincial, and residence (rural/urban) levels.

**Table 3.1: MicroZAMOD database description**

<b>Original name</b>	Living Conditions Monitoring Survey
<b>Provider</b>	Central Statistical Office
<b>Year of collection</b>	2015
<b>Period of collection</b>	April/May 2015
<b>Income reference period</b>	2015
<b>Sample size (households)</b>	12,251
<b>Response rate</b>	98%

Source: Authors' compilation.

The response rate, as measured by the proportion of successful interviews from the originally selected households, was 98 per cent. Non-responding households were systematically replaced. In total 12,251 households, with 62,880 individuals, were successfully interviewed.

The household response rate was calculated as the ratio of selected households with completed interviews over the total number of households originally selected. The household selection technique allows for a systematic method of replacing non-responding households.

Households are defined as a group of persons who normally eat and live together. They may or may not be related by blood, but make common provision for food and other essentials. The household head is identified by the household as the person who normally makes day-to-day decisions concerning the running of the household. Households with a child head are also captured in the data: examination of the data reveals that just 4 of the 12,251 household heads (<0.1 per cent) are aged below 18 years.

The 2015 LCMS data are not publicly available but can be obtained from the CSO, subject to providing a letter outlining the purpose of study and gaining approval from the director. The survey was undertaken in English and there is a 'Survey Report' in English. The data were not supplied with metadata; however, data dictionaries are available from the CSO and International Household Survey Network websites (see CSO 2017; IHSN 2017). CSO staff can also be contacted for further information on the data. In general, the variables are labelled, and the variable names refer to the section/question number.

The data files contain weights. The sampling weights were defined as the inverse of the product of the two selection probabilities employed at each stage of selection. The weights were adjusted using population projections at district level for 2015.

## 3.2 Data adjustment

### 3.2.1 Household unique identifier

The original identifier for households, *ParentId*, was found to be unique. This identifier consisted of a combination of 33 characters and numbers. To aid interpretation during the data preparation process, a new numeric unique household identifier was created ranging from 1 to 12,251.

### 3.2.2 Demographic variables

The variable 'age' in the LCMS was recorded either as years or months, as specified using the age code. Therefore, where appropriate, ages recorded in months were converted to years. However, the data preparation work revealed a number of instances of probable miscoding of the age code variable, where respondents' age values had been coded as 'months' yet other variables suggested that the correct age code should have been 'years', and vice versa. These probable errors were manually adjusted.

There is a variable in the LCMS denoting the respondent's stated relationship to the nominated head of household. The relationship information is needed primarily to inform decisions concerning the *idpartner*, *idfather*, and *idmother* variables. Checks confirm that every household contains one (and only one) head of household. As part of the data preparation process, a new category of 'relationship to head' was created for households with plausible polygamous marriage structures whereby the principal spouse is identified as 'spouse' and other spouses are classified as 'second, third, etc. wives'.

The *idpartner*, *idfather*, and *idmother* variables were derived using the *relationship\_-to-head* variable. These variables could only be derived for respondents who had one of these direct associations with the head of household. No other intra-household relationship information is contained within the LCMS. In light of the lack of more detailed relationship information, any 'loose children' present within a household were assigned to the head of household (and their spouse, if present).

Anyone below 16 years is a minor; marrying someone below 16 years is an offence and sex with a minor is a serious crime punishable by imprisonment of up to 25 years. Marriage between people below 16 years was considered void and all missing marital statuses for children aged 0–15 years were recoded as 'never married'.

### 3.2.3 Labour market variables

Occupation: Following the one-digit classification as per EUROMOD convention, the variable *loc* was created on the basis of the first digit of the four-digit ISCO code in the 2015 LCMS. Labour market variables are defined as follows:

- 1 = Legislators, senior officials, and managers
- 2 = Professionals
- 3 = Technical and associate professionals
- 4 = Clerical support workers
- 5 = Service and sales workers
- 6 = Skilled agricultural, forestry, and fishery workers
- 7 = Craft and related trade workers
- 8 = Plant and machine operators and assemblers
- 9 = Elementary occupations
- 0 = Armed forces occupation
- 1 = Not applicable

### 3.2.4 Households/individuals dropped from original

One household was identified with no information other than household identification characteristics and was dropped. As the household did not have a weight either, there was no need to make adjustments to the weights after it was dropped.

### 3.2.5 Income amounts

Each income variable was assessed in terms of its distribution and the effects of any outliers. Where relevant, incomes were capped to minimize the effect of outliers. Two income categories were capped at the 99th percentile value (*ypr, yiyit*); one was capped at the 90th percentile value (*ypp*); four were capped at particular numeric values (*yse, yiy, yot, yag*); and three were not capped at all as the distributions looked plausible (*yem, ytn, ypt*).

### 3.2.6 Expenditure/Quantity values

As noted above, the excise duty policy consists of a combination of ad valorem calculations and quantity-based calculations. For those items on which excise duty is calculated based upon quantity purchased, it was necessary to refer to the variables in the 2015 LCMS that related to 'quantity' and 'unit'. By using the quantity and unit variables in conjunction it was possible to derive a 'standardized quantity' value per item per household. By then using the standardized quantity variable in conjunction with the 'monthly expenditure' variable it was possible to derive a 'price per unit purchased', per item, and per household. Analysis of the price per unit revealed vast differences between households. This suggests that one or more component of the calculations (monthly expenditure, quantity, unit) captured in the 2015 LCMS is unreliable. It is not possible to ascertain with any confidence which of the components is unreliable, so the decision was taken to treat monthly expenditure as reliable and to impute an 'adjusted standardized quantity' based upon a combination of the reported monthly expenditure and 'average prices' for the relevant expenditure items for 2015, sourced from external statistics. This is the same approach that was adopted with the 2010 LCMS data preparation.

## 3.3 Imputations and assumptions

### 3.3.1 Time period

The reference period for all the variables in the input dataset is 2015.

### 3.3.2 Gross incomes

Income data in the original sample was reported as gross.

## 3.4 Updating

To account for any time inconsistencies between the input dataset and the policy year, updating factors are used. Each monetary variable (i.e. each income component) is updated so as to

account for changes in the non-simulated variables that have taken place between the year of the data and the year of the simulated tax–benefit system. Uprating factors are generally based on changes in the average value of an income component between the year of the data and the policy year.

The list of uprating factors as well as the sources used to derive them are shown in Table 3.2.

**Table 3.2: Raw indices for deriving MicroZAMOD uprating factors**

	Uprating factors					
	2010	2015	2016	2017	2018	2019
<i>\$f_CPI_overall</i>	107.93	151.46	183.31	195.82	210.35	223.29
<i>\$f_CPI_food</i>	106.26	146.04	183.03	193.61	208.21	221.74
<i>\$f_CPI_non_food</i>	109.85	157.86	183.63	198.37	212.81	225.06
<i>\$f_CPI_alc_tob</i>	103.04	155.05	173.16	179.39	189.23	197.49
<i>\$f_CPI_transport</i>	113.77	169.12	187.33	187.33	226.33	253.65
<i>\$f_Earnings_inflator<sup>a</sup></i>	100.00	234.86	285.18	285.18	448.75	476.4

Note: <sup>a</sup> Derived through interpolation between and extrapolation of LFS 2008, 2012, 2014, and 2017 data.

Source: Authors' compilation and Zambian Central Statistical Office (for CPI data).

## 4 Validation

### 4.1 Aggregate validation

MicroZAMOD results have been validated against external benchmarks wherever possible. The main discrepancies between MicroZAMOD results and external benchmarks are discussed in the following subsections. Factors that may explain the observed differences are also discussed.

#### 4.1.1 Validation of incomes inputted into the simulation

The actual macro-validation tables are included in the Annex. Comments are made here on the main results with reference to the tables in the Annex.

##### *Number of people employed and unemployed in the input dataset*

Table A1 in the Annex presents the number of paid employees, self-employed, and unemployed persons as calculated using the 'main economic activity' question in the 2015 LCMS. No alternative external validation statistics are currently available.

##### *Number of people receiving different kinds of market income in the input dataset*

Table A2 in the Annex presents the number of individuals reporting receipt of each of the listed income sources in the 2015 LCMS. No alternative external validation statistics are currently available.

##### *Aggregate amounts of different kinds of market income reported in the input dataset*

Table A3 in the Annex presents the aggregate annual amounts of various types of market income in the input dataset. No alternative external validation statistics are currently available.

##### *Number of people receiving different types of non-simulated benefits and number of payers of non-simulated taxes in the input dataset*

It was not possible to obtain these statistics from the input dataset or to obtain any suitable external statistics. As such, Table A4 in the Annex is left blank.

##### *Aggregate amounts of different types of non-simulated benefits and non-simulated taxes in the input dataset*

It was not possible to obtain these statistics from the input dataset or to obtain any suitable external statistics. As such, Table A5 in the Annex is left blank.

#### 4.1.2 Validation of outputted (simulated) instruments

Table A6 in the Annex presents the number of recipients of various types of simulated benefits/number of payers of simulated taxes in MicroZAMOD. No external statistics are available to validate the contents of Table A6.

Table A7 in the Annex presents the aggregate yearly amounts of various types of simulated benefits/simulated taxes in MicroZAMOD and, where available, compares these against external statistics.

In 2015, MicroZAMOD simulated 150 per cent of VAT compared with the Ministry of Finance (MoF) preliminary outturn figure. The picture for 2016 and 2017, however, is more complicated. According to the MoF 2016 Annual Economic Report (see MoF 2017), the budgeted VAT take for 2016 was ZMW 1,503 million; however, the preliminary outturn reported by MoF for that year was just ZMW 97 million, equating to a budget variance of -93.6 per cent. This could equally be expressed as the budgeted figure being 1,558 per cent of the preliminary outturn for 2016. MicroZAMOD simulates 3,031 per cent of preliminary outturn VAT for 2016. In 2017, MicroZAMOD simulated just 56 per cent of the MoF preliminary outturn, but this is in the context of the preliminary outturn of 2017 being 647.7 per cent of the MoF-budgeted VAT figure for that year. These findings indicate that there were some issues with the MoF budget and/or preliminary outturn figures for VAT in 2016 and 2017, as there appears to be an element of budgetary/fiscal correction occurring. On the other hand, the simulated outputs from MicroZAMOD follow a relatively consistent trend over the period. No external data are currently available for 2018 or 2019.

Table A7 in the Annex shows that 31 per cent of personal income tax is simulated by MicroZAMOD in 2015, compared with the MoF preliminary outturn for that year. The percentage of personal income tax simulated increases to 43 per cent in 2016, and further to 55 per cent in 2017. No external data are yet available for 2018.

However, there are a number of caveats that should be kept in mind in relation to the personal income tax comparisons:

- **Published data:** Data published on income tax are not sufficiently broken down into the required categories. The MoF publishes income tax totals for company tax (not relevant here), PAYE, and 'Other income tax—withholding tax' (which includes turnover tax and other income taxes). This means that turnover tax is combined with all other categories of withholding tax in the published data and so it is not possible to compare the simulated outputs with directly comparable categories of published figures for income tax. This was identified by the MoF as being relevant in 2015 due to a particularly high amount of property transfer tax received that year, which is included within the withholding tax reported figure but was not simulated in MicroZAMOD: 'Withholding tax was also higher by 32.9 percent mainly boosted by higher than anticipated property transfer tax collections' (MoF 2016: 29). It is possible that similar issues apply to 2016 and 2017 too, as these external statistics also contain 'Other income tax—withholding tax'. As noted above, no external statistics are currently available for 2018 or 2019.
- **Missing income data:** The income data contain many missing values and zero values where one might expect there to be positive income values. For example, 21 per cent of individuals reporting themselves as having a labour market status of 'employee' do not report a positive *yem* income. The imputation of missing and implausible income values is being explored as part of an associated piece of SOUTHMOD research, but the results from that imputation process are not included within MicroZAMOD v2.4.

In relation to the SCT, MicroZAMOD simulations yield 396,811 eligible households in 2015. This is over twice as many households than were actually recorded as being in payment in December 2015. This discrepancy is to be expected, given that MicroZAMOD simulates the SCT policy on the basis of a full national roll-out, whereas in reality SCT had only achieved a partial geographical roll-out as of December 2015. It has not been possible to obtain any external validation statistics for numbers of recipient households of SCT for 2016–19.

The simulated SCT amount for 2015, presented in Table A7 in the Annex, is over three times larger than the actual amount for 2015 provided by MoF. This is again likely to be due in large

part to the assumption of a full national roll-out in MicroZAMOD. However, this may also be due in part to the assumption in MicroZAMOD that all households with a disabled person received double SCT (as per the official eligibility guidance) when, in reality, this may not have been fully achieved (and/or the disability categorization applied in reality may be more stringent than that applied in MicroZAMOD). In 2016, MicroZAMOD simulates a national aggregate payment for SCT that is 481 per cent of the external statistics. The increase in the ratio of simulated to reported SCT amounts is partly due to an increase in the total simulated SCT amount between 2015 and 2016 (due to the benefit amount increasing in value from ZMW 70 per month to ZMW 90 per month) and at the same time a decrease in the reported external amount for SCT (with the MoF reporting that the total expenditure for SCT fell from ZMW 123 million to ZMW 119 million), despite this period being intended to produce a fuller national roll-out. In 2017, MicroZAMOD simulates 211 per cent of the external statistics, which is considerably less than in 2016 (and indeed 2015), and which may be partly due to the realization of an increased national roll-out, but may also be due to the changes to SCT eligibility that were introduced in 2017. No external statistics are currently available for 2018 or 2019.

In relation to pensions, MicroZAMOD simulates 144 per cent of the reported number of contributing employees to NAPSA's scheme in 2015. One possible explanation for an over-estimation of NAPSA contributors is that, in 2015, there were still some active contributors to the LASF and PSPF schemes. It has not been possible to obtain any external validation statistics for pension contributions for 2016–19.

## 4.2 Income distribution

In the 2015 LCMS report (CSO 2016), poverty levels are assessed using two poverty lines: a lower-bound poverty line (or 'extreme' poverty as defined by CSO) and an upper-bound poverty line (or 'total' poverty as defined by CSO, which includes those in 'moderate' poverty as well as those in 'extreme' poverty). CSO bases its poverty measurements on consumption expenditure rather than income, stating that 'household consumption expenditure serves as a useful proxy for household income, which in many cases tends to be under-reported by most households' (CSO 2016: 86). CSO states that '[h]ousehold expenditure for the 2015 LCMS was obtained by adding the various goods and services purchased, consumed from own production and received as gifts. Consumption expenditure of all these goods and services was converted into Zambian Kwacha values, converted into monthly values, and then added together to obtain a measure of monthly household expenditure' (CSO 2016: 88). CSO adopts an 'adult equivalent' approach to equalizing household consumption expenditures for the purpose of poverty measurement. The lower-bound poverty line in 2015 was ZMW 152 per adult equivalent per month, whereas the upper-bound poverty line in 2015 was ZMW 214 per adult equivalent per month. CSO has not published poverty lines for 2016–19 time points so, for the purpose of these analyses, the 2015 poverty lines have been updated in line with the overall CPI.

With regard to inequality measurement, the 2015 LCMS report (CSO 2016) presents Gini coefficients based on both consumption expenditure and income. Whereas for poverty rate calculations CSO uses the adult equivalent approach to equalization, for inequality calculations CSO adopts a per-capita equalization approach.

The poverty and inequality measures constructed using the simulated outputs from MicroZAMOD and presented in this country report are all based on consumption expenditure. This means that it is possible to compare the poverty and inequality measures on a like-for-like basis. In terms of equalization scales, MicroZAMOD poverty measures are constructed using CSO's adult equivalent scales whereas MicroZAMOD Gini coefficients are constructed using the per-capita approach adopted by CSO.

### 4.2.1 Income inequality

Table A8 in the Annex compares the Gini coefficient calculated from the MicroZAMOD-simulated output for 2015, with the relevant Gini coefficient presented in CSO's report on the 2015 LCMS data (CSO 2016). Both Gini coefficients are based on per-capita consumption expenditure. It is evident from Table A8 that the Gini coefficient calculated from MicroZAMOD for the year 2015 (Gini = 0.57) is exactly the same as the Gini coefficient presented in the CSO (2017) report for the year 2015. No external statistics are currently available with which to validate the simulated Gini coefficients for 2016–19.

#### 4.2.2 Poverty rates

Table A9 in the Annex presents lower- and upper-bound poverty rates for 2015–19 derived from the simulated MicroZAMOD output data. External validation statistics are available for 2015 only (CSO 2016). As noted earlier, the poverty rates presented here are all based on a consumption expenditure basis. In terms of the lower-bound poverty line (i.e. extreme poverty as defined by CSO), the poverty rate for 2015 derived from MicroZAMOD stands at 41.5 per cent compared with 40.8 per cent presented in the CSO (2016) report. As such, the poverty rate from MicroZAMOD is 0.7 percentage points higher than the poverty rate from the CSO (2016) report. In terms of the upper-bound poverty line (i.e. total poverty as defined by CSO), the poverty rate for 2015 derived from MicroZAMOD stands at 54.5 per cent compared with 54.4 per cent presented in the CSO (2016) report. As such, the poverty rate from MicroZAMOD is just 0.1 percentage points higher than the poverty rate figure from the CSO (2016) report. No external statistics are currently available with which to validate the simulated poverty rates for 2016–19.

#### 4.3 Summary of ‘health warnings’

The LCMS data required a degree of cleaning in order to produce the compulsory variables required by the EUROMOD software for MicroZAMOD. Nevertheless, there may be further steps that could be taken in this regard, particularly in relation to the income data.

Every effort has been made to collate the precise tax and benefit rules for each system year, but this was difficult to achieve and has been an iterative process.

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## Annex

**Table A1: Number of employed and unemployed in Zambia, 2015**

Employment status	Input dataset (2015 LCMS) (A)	External statistics 2015 (B)	Per cent captured (A/B)
Paid employees	1,030,714	Not available	Not available
Self-employed	905,451	Not available	Not available
Unemployed	699,153	Not available	Not available

Note: The figures reported in column A are for non-overlapping categories; that is, a person cannot report being both a 'paid employee' and 'self-employed' as the LCMS question asks for 'main economic activity'.

Source: Column A: 2010 LCMS prepared as the input dataset for MicroZAMOD (figures derived from 'main current economic activity' question).

**Table A2: Number of recipients of various types of market income, 2015**

Income type	Input dataset (2010 LCMS) (A)	External statistics 2010 (B)	Per cent captured (A/B)
Paid employment	1,008,995	Not available	Not available
Self-employment	1,931,016	Not available	Not available
Agricultural	1,115,009		
Property	127,183	Not available	Not available
Pension	26,635	Not available	Not available
Investment (excluding interest)	14,254	Not available	Not available
Interest on savings	41,558	Not available	Not available
Private transfers	553,589	Not available	Not available
Other non-agricultural sources	394,455	Not available	Not available

Notes: Unlike in Table A1, the figures reported in column A are *not* for non-overlapping categories; that is, it is possible for a respondent to report multiple different income sources.

Source: Column A: 2015 LCMS prepared as the input dataset for MicroZAMOD (figures derived from income source questions).

**Table A3: Aggregate annual amounts of various types of market income, 2015**

Income type	Input dataset (2015 LCMS) (ZMW million) (A)	External statistics 2015 (ZMW million) (B)	Per cent captured (A/B)
Paid employment	29,200.5	Not available	Not available
Self-employment (non-agricultural)	11,572.7	Not available	Not available
Agriculture	2,026.8	Not available	Not available
Property	1,103.2	Not available	Not available
Pension	107.0	Not available	Not available
Investment (excluding interest)	25.5	Not available	Not available
Interest on savings	106.8	Not available	Not available
Private transfers	2,025.2	Not available	Not available
Other non-agricultural sources	1,289.4	Not available	Not available

Notes: The figure for self-employed income is derived from self-employed turnover as reported in the LCMS. Net self-employed income for those with turnovers over ZMW 800,000 per year is assumed to be 0.650 of self-employed turnover (with ratio derived from LFS), whereas net self-employed income for those with self-employment turnover of less than ZMW 800,000 per year is assumed to be 0.581 of self-employed turnover (with ratio again derived from LFS).

Source: Column A: 2015 LCMS prepared as the input dataset for MicroZAMOD.

**Table A4: Number of recipients of various types of non-simulated benefits/number of payers of non-simulated taxes (external data not available)**

**Table A5: Aggregate yearly amounts of various types of non-simulated benefits/ non-simulated taxes in the input dataset and external statistics (external data not available)**

**Table A6: Tax and benefit instruments simulated in MicroZAMOD—Number of recipients/payers, 2015-19**

<b>Tax–benefit policy</b>	<b>MicroZAMOD 2015 (A)</b>	<b>External 2015 (B)</b>	<b>Per cent captured (A/B)</b>	<b>MicroZAMOD 2016 (D)</b>	<b>External 2016 (E)</b>	<b>MicroZAMOD 2017 (G)</b>	<b>External 2017 (H)</b>	<b>MicroZAMOD 2018 (J)</b>	<b>External 2018 (K)</b>	<b>MicroZAMOD 2019 (L)</b>	<b>External 2019 (M)</b>
Turnover tax	2,814,019	Not available	Not available	2,814,019	Not available	180,602	Not available	190,202	Not available	2,813,979	Not available
Personal income tax	317,503	Not available	Not available	373,924	Not available	456,132	Not available	512,130	Not available	468,842	Not available
VAT (hh)	2,975,820	Not available	Not available	2,975,820	Not available	2,975,820	Not available	2,975,820	Not available	2,975,820	Not available
Excise duty (hh)	433,359	Not available	Not available	433,359	Not available	433,359	Not available	433,359	Not available	433,359	Not available
SCT (h/h)	396,811	180,261	220.1%	396,811	Not available	567,296	Not available	567,296	Not available	567,296	Not available
Home Grown	617,594	Not applicable	Not applicable	617,594	Not available						
E-FISP	Not applicable	Not applicable	Not applicable	35,970	Not available	145,425	Not available	145,425	Not available	145,425	Not available
Employee pension contribution	1,008,999	701,374	143.9%	1,008,999	Not available						
Employer pension contribution	1,008,999	701,374	143.9%	1,008,999	Not available						

Source: Columns A, D, G, J, and L: MicroZAMOD v2.4. Column B: For SCT, Department of Social Welfare (2016: 1); for pension contributions, data provided by NAPSA for 2015 on request.

**Table A7: Tax and benefit instruments simulated in MicroZAMOD—Annual amounts (millions ZMW), 2015-19**

Tax–benefit policy	MicroZAMOD 2015 (A)	External 2015 (B)	Per cent captured (A/B)	MicroZAMOD 2016 (D)	External 2016 (E)	Per cent captured (D/E)	MicroZAMOD 2017 (G)	External 2017 (H)	Per cent captured (G/H)	MicroZAMOD 2018 (J)	External 2018 (K)	MicroZAMOD 2019 (L)	External 2018 (M)
Turnover tax	698	10,005 <sup>a</sup>	31%	845	10,883 <sup>b</sup>	43%	367	11,956 <sup>c</sup>	55%	408	Not available	1,372	Not available
Personal income tax	2,431			3,836			6,183			9,484		9,761	
VAT	2,490	1,661	150%	2,940	97 <sup>d</sup>	3031% <sup>d</sup>	3,156	5,631 <sup>e</sup>	56% <sup>e</sup>	3,388	Not available	3,598	Not available
Excise duty	308	3,254	9%	347	3,140	11%	354	3,179	11%	362	Not available	369	Not available
SCT	445	123	362%	572	119	481%	880	417	211%	880	Not available	880	Not available
Home Grown	92	Not available	Not available	115	Not available	Not available	122	Not available	Not available	132	Not available	140	Not available
E-FISP	Not applicable	Not applicable	Not applicable	50	Not available <sup>f</sup>	Not available	247	Not available <sup>f</sup>	Not available	247	Not available	247	Not available
Employee pension contribution	1,460	1,269	115%	1,773	Not available	Not available	2,219	Not available	Not available	2,771	Not available	2,944	Not available
Employer pension contribution	1,460	1,269	115%	1,773	Not available	Not available	2,219	Not available	Not available	2,771	Not available	2,944	Not available

Notes: <sup>a</sup>This figure comprises ZMW 2,561 million for ‘Other income tax—withholding tax’ plus ZMW 7,444 million for ‘PAYE’. <sup>b</sup>This figure comprises ZMW 2,737 million for ‘Other income tax—withholding tax’ plus ZMW 8,147 million for ‘PAYE’. <sup>c</sup>This figure comprises ZMW 3,270 million for ‘Other income tax—withholding tax’ plus ZMW 8,686 million for ‘PAYE’. <sup>d</sup>The budgeted VAT take for 2016 was ZMW 1,503 million, but the preliminary outturn reported by MoF was ZMW 97 million, equating to a budget variance of –93.6 per cent. Although the MicroZAMOD 2016 simulated VAT figure is 1,761 per cent the MoF preliminary outturn for 2016, the MicroZAMOD-simulated figure is just 114 per cent of the MoF-budgeted amount. <sup>e</sup>The budgeted VAT take for 2017 was ZMW 753 million, but the preliminary outturn reported by MoF was ZMW 5,631 million, equating to a budget variance of 647.7 per cent. Although the MicroZAMOD 2017 simulated VAT figure is just 32 per cent of the MoF preliminary outturn for 2017, the MicroZAMOD-simulated figure is 243 per cent of the MoF-budgeted amount. <sup>f</sup>No external validation statistics are available for the E-FISP component of the overall FISP policy.

Source: Columns A, D, G, J, and L: MicroZAMOD v2.4. Column B: MoF (2016: 28, 30); for pension contributions, data provided by NAPSA for 2015 on request. Column E: MoF (2017: 24, 27); Column H: MoF (2018: 27, 29).

**Table A8: Inequality in Zambia (consumption-based), 2015-2018**

	MicroZAMOD 2015 (A)	External statistics 2015 (B)	MicroZAMOD 2016 (C)	External statistics 2016 (D)	MicroZAMOD 2017 (E)	External statistics 2017 (F)	MicroZAMOD 2018 (G)	External statistics 2018 (H)	MicroZAMOD 2019 (I)	External statistics 2019 (J)
Gini coefficient	0.57	0.57	0.56	Not available	0.55	Not available	0.55	Not available	0.55	Not available

Source: Columns A, C, E, G, and I: Gini coefficients calculated using simulated outputs from MicroZAMOD v2.4 for 2015, 2016, 2017 2018, and 2019, respectively. Column B: CSO (2016: 82).

**Table A9: Poverty rates in Zambia (consumption-based), 2015-2018**

	MicroZAMOD 2015 (A)	External statistics 2015 (B)	Ratio (A/B)	MicroZAMOD 2016 (D)	External statistics 2016 (E)	Ratio (D/E)	MicroZAMOD 2017 (G)	External statistics 2017 (H)	Ratio (G/H)	MicroZAMOD 2018 (J)	External statistics 2018 (K)	Ratio (J/K)	MicroZAMOD 2019 (L)	External statistics 2018 (M)	Ratio (L/M)
Lower-bound poverty line	41.5	40.8	1.02	41.4	Not available	Not available	40.3	Not available	Not available	41.2	Not available	Not available	41.9	Not available	Not available
Upper-bound poverty line	54.5	54.4	1.00	54.5	Not available	Not available	54.0	Not available	Not available	55.0	Not available	Not available	55.4	Not available	Not available

Notes: Lower-bound (extreme only) poverty line (adult equivalent): ZMW 152 per month in 2015; Upper-bound (moderate+extreme) poverty line (adult equivalent): ZMW 214 per month in 2015 (CSO 2016: 103). All figures are based on consumption expenditure. Both sets of figures use an adult equivalent method of equalization, as per the guidance from CSO. The poverty lines for 2016–18 have been derived by inflating the 2015 poverty lines by the CPI.

Source: Columns A, D, G, J, and L: Simulated output from MicroZAMOD v2.4. Column B: CSO (2016: 105).