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Tax-benefit microsimulation modelling in Zambia

A feasibility study

Mari Kangasniemi,[1] Helen Barnes,[2] Gemma Wright,[2] and Michell Mpike[3]

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Abstract: This study presents the findings from a feasibility study on the potential for developing a static tax-benefit microsimulation model for Zambia. The paper focuses on the details of the tax-benefit system and possible data sources, building on information collected in the initial scoping study of all countries in the Southern African Development Community and East African Community. The paper concludes with an assessment of the feasibility of producing a tax-benefit microsimulation model and its potential sustainability into the future.

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[1]Labour Institute For Economic Research, Helsinki, Finland; [2]Southern African Social Policy Research Insights, Hove, UK; corresponding author: gemma.wright@saspri.org; [3]Southern African Social Policy Research Institute, Cape Town, South Africa.

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Acronyms

CPO	Consumer Price Index
CSO	(Zambia) Central Statistical Office
FSP	Food Security Pack
FISP	Farmer Input Support Programme
HH	Household
IHSN	International Household Survey Network
IMF	International Monetary Fund
K	Zambian Kwacha
LCMS	Living Conditions Monitoring Survey
MCDMCH	Ministry of Community Development, Mother and Child Health (now MCD)
NAPSA	National Pensions Scheme Authority
OVC	Orphans and Vulnerable Children
PAYE	Pay-As-You-Earn
PIA	Pensions Insurance Authority
PWAS	Public Welfare Assistance Scheme
SCT	Social Cash Transfer
VAT	Value-Added Tax
WEF	Women's Empowerment Fund
ZRA	Zambia Revenue Authority

1 Introduction

This paper presents the findings from a feasibility study on the potential for developing a static tax-benefit microsimulation model for Zambia. The paper focuses first on the details of the tax-benefit system (Sections 2 and 3) and possible data sources (Section 4), building on information collected in the initial scoping study of all countries in the Southern African Development Community and East African Community (Wright et al. 2015). The paper concludes with an assessment of the feasibility of producing a tax-benefit microsimulation model and its potential sustainability into the future (Section 5).

Poverty in Zambia stands at 60.5 per cent when measured by the share of population whose expenditure falls below the poverty line (the level where food expenditure corresponds to the basic food basket and the Engels ratio at typical level) according to the most recent Living Conditions Monitoring Survey (LCMS) in 2010 (CSO 2012). There was a minimal decline from the previous survey in 2006 when the poverty rate was estimated to be 62.8 per cent; and poverty is significantly higher in rural areas at 77.9 per cent (CSO 2012). The Gini coefficient calculated from the same data is 0.55 (CSO 2012).

According to the most recent Labour Force Survey (LFS) in 2012, the unemployment rate in Zambia stands at 7.8 per cent of the labour force (CSO 2013a). The unemployment rate in urban areas is 14.2 per cent and in rural areas 3.3 per cent. Out of employed people, 15.4 per cent were working in the formal sector, which in the LFS report was defined as employees of registered business units and central and local government and parastatals, irrespective of whether they were formally engaged. The LCMS has also been used to estimate the degree of formality amongst employed people. A different definition is used, fulfilment of at least one of the criteria of formal employment (entitled to paid leave, entitled to pension, gratuity and social security, and working in an establishment employing more than five persons). According to the results approximately 83 per cent of employed persons were engaged in the informal sector in 2010, and the rate had changed little from the previous round of the survey (CSO 2012).

Furthermore, Zambia is in the process of expanding some of its social protection programmes and streamlining its social protection policies. In their 2013 report, the World Bank stated that programmes are too fragmented, incoherent, and transitory to provide a solid enough safety net (World Bank 2013). This has been widely acknowledged and the National Social Protection Policy (MCDMCH 2014b) outlines that, for example, the Social Cash Transfer (SCT) scheme will be rolled out to cover all districts by 2017, an universal old age social grant scheme will be developed, and the school feeding programme will be expanded to cover over one million pupils by 2018 (MCDMCH 2014b). The already existing social protection policies also include the extensive Farmer Input Support Programme (FISP) which provides subsidies for purchasing seed and fertilizer to farmers who have access to at least 0.5 hectare land. There are also several ad hoc poverty relief and income generation assistance programmes such as the Food Security Pack (FSP), the Women's Empowerment Fund (WEF), and the Public Welfare Assistance Scheme (PWAS).

Social protection policies are not currently enshrined in law, though the aim of the social protection policy is to rectify this. The social protection schemes are administered by different ministries depending on the focus of the scheme, and financial as well as technical support is received from donor countries.

Taxation in Zambia involves both direct and indirect taxes (see for example Aguzzoni 2011, pp. 33-42). The most important source of revenue is income tax, followed by value-added tax (VAT)

(IMF 2015; ZRA 2015a). Direct taxes are generally individual-based whereas some social protection programmes, especially the SCT, also have household-specific eligibility conditions.

The fiscal year in Zambia follows the calendar year and tax changes outlined in government budgets usually take place at the beginning of the year. Primary school starts in Zambia at the age of seven, and free basic education includes seven grades followed by two upper grades and three years of secondary school. Dropout rates, however, are non-negligible at each grade throughout the primary school (Ministry of Education 2014).

There is no uniform definition of working age. Working age or fit-for-work individuals in targeting the SCT scheme are defined as being 19-64 years old. In the LCMS, socio-economic status is assigned to everyone 12 years of age or over. In the estimates derived from the LFS, employment status is defined for individuals 15 years of age and over. The statutory minimum age for light work defined in the Employment of Young Persons and Children Act is 13, and the minimum contractual age is 16. The compulsory pension scheme for formal sector workers allows retiring at the age of 50, though the standard pension age is set at 55.

In Sections 2 and 3 the tax and benefit systems are described with the aim of providing as detailed as possible an overview of the different tax and benefit instruments in the country.

2 The tax system

Zambia has a system of direct and indirect taxation. The most important source of tax revenue is personal income tax, followed by VAT. Table 1 presents tax revenue by type in 2014.

Table 1: Tax revenue by type, 2014

Type of tax	Revenue (estimate 2014), million kwacha
Personal income tax	6,427
Corporate Income tax, non-mining	2,014
Corporate Income tax, mining	1,473
VAT (both domestic and imports)	9,512
Excise taxes (excise duties, rural electrification levy, fuel levy and carbon tax)	2,854
Customs duties	1,972

Source: ZRA (2015a).

2.1 Direct taxation

Persons in employment as well as limited companies are liable to pay income tax. The tax rate is based on individual annual income, and for second jobs the highest marginal rate (35 per cent) is applied. Day workers are also subject to income tax. Deductions for employees include pension contributions to approved funds such as the National Pensions Scheme Authority (NAPSA).

Income tax brackets are adjusted in the annual government budgets to prevent increase in tax burden along with wage inflation. However, there is no automatic indexation, but they are changed on ad hoc basis as a high-inflation environment indexation is not practical.[1]

[1] Based on discussions with the director of planning and research at ZRA.

The tax year runs from 1 January to 31 December. Advance payments of tax, called 'Provisional Tax', are made on the basis of estimated liability. Excess payment of pay-as-you-earn (PAYE) tax due to, for example, unemployment can be reclaimed from the ZRA offices. The taxpayers are required to submit an Income Tax Return and pay the outstanding balance by 30 June the following year.

Small companies (turnover K800,000[2] or less) are liable to pay a turnover tax instead of income tax. In the transport sector presumptive tax is applied to encourage small companies missing accounting expertise or administrative resources to pay taxes.

In the mining sector, in addition to corporate income taxes, mining royalties are applied. Specific rates of corporate income tax also apply for mining companies. The system of royalties and corporate tax for mining has undergone changes during 2015 as the government tried to change the tax regime by introducing significantly higher royalty rates and a zero corporate income tax for mining companies. At the moment the earlier corporate income tax rate of 30 per cent has been reinstated. There is also additional 15 per cent variable profit tax on income when taxable earnings exceed 8 per cent of gross sales. The royalty rate is 6 per cent for underground operations and 9 per cent for open cast mines.

[2] K for Zambian Kwacha.

Table 2: Direct taxation in Zambia

Type of tax	Rate	Notes
Income tax is tax on profits and emoluments earned by employees. In addition to employees limited companies, partnerships and self-employed individuals are liable to pay income tax.	Personal income tax rates 2015: Income bands Rates for employees. First K36,000 @ 0% K36,001-K45,600 @ 25% K45,601-K70,800 @ 30% Above K70,800 @ 35% Company tax rates (see ZRA 2015).	Employees' taxes are deducted from their salary by the employer who subsequently remits to ZRA: PAYE. Taxable income includes all allowances. The exceptions listed by ZRA are 'Labour Day awards, Ex-gratia payments, Medical expenses, Funeral expenses, Sitting allowances for councillors and benefits that cannot be converted into cash.'
Turnover tax is a tax on gross sales/turnover, such as earnings, income, revenue, takings, yield, and proceeds of companies with an annual turnover of K800,000 or less unless they are voluntarily registered to pay VAT	3%	
Withholding tax applies to dividends, interest, royalties, payments to non-resident contractors on construction, and haulage operations and rental income	20, 15, or 10% depending on the type of income	Interest on deposits paid to natural persons is exempted. In most cases the withholding tax is not the final tax. At the end of the charge year, the taxpayer will be required to submit an Income Tax Return. This would detail all sources of income, including income from interest. The final tax will be based on assessment of these. The withholding tax already paid is taken into account in the assessment of the final tax, although the withholding tax is treated as the final tax in the case of charitable organizations.
Property transfer tax applies to transfer of land, shares, or mining rights	15% for the transfer of land or shares, 10% for mining rights	The value applied is open market value, or if between immediate family member, the actual price paid, if any
Medical levy: The medical levy is deducted from gross interest by banks and other financial institutions. This applies to the savings, deposit accounts, Treasury bills or government bonds of any person or partnership	1%	
Presumptive tax applies to bus, taxi, and mini-bus operators	Based on the type of vehicle, defined as fixed fee rather than rate	Payable in small instalments instead of a single annual payment
Advance income tax is paid at the port of entry for goods imported for commercial purposes	6%	Companies registered for VAT which submit a tax return or VAT remittance card can claim a refund

Sources: ZRA 2015a, 2015b, 2015c; and Republic of Zambia (n.d.a).

2.2 Indirect taxation

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. VAT exempted goods 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. Excise duty is applicable to various goods. The rates are presented in Table 3.

Table 3: Excise duties in Zambia

Commodity	Rate
Clear beer	60%
Opaque beer	K0.15/lt
All type of wines	60%
Undenaturated ethyl alcohol of an alcoholic strength by volume of less than 80%, spirits, liqueurs, and other spiritious beverage	60%
Cigars, cheroots, cigarillos, and cigarettes of tobacco substitutes	K90,000/ thousand pcs
Other manufactured tobacco substitutes ‘homogenized’ or reconstituted tobacco extracts and essences	K90,000/ thousand pcs
Hydrocarbon oils:	
Petroleum spirit	K1.142/lt
White spirit	15%
Other light oils	15%
Kerosene (domestic)	0%
Kerosene (industrial)	0%
Low sulphur gas oil	30%
Automotive gas-oils (diesel)	K0.87/lt
Other fuel oils	30%
Petroleum gases and other gaseous hydro-carbons	K0.45/lt
Electrical energy	3%
Air time	15%
Beauty make-up kits, body and hair creams, and perfumes	20%
Undenatured ethyl alcohol of an alcoholic strength by volume of 80% or higher, when imported by a non-licensed importer	20%

Source: ZRA (n.d.).

3 The benefit system

Zambia has both contributory and non-contributory benefit systems (see for example ILO 2008). Contributory systems have a long history but non-contributory social protection is more recent and currently in the process of development.

Contributory schemes are based on law (NAPSA Act, Public Services Pension Fund Act, Local Authorities Superannuation Fund Act, the Pension Scheme Regulation Act) whereas non-contributory social benefit schemes currently are not.

3.1 Contributory benefits

The pension industry in Zambia is based on a compulsory and a voluntary pillar.[3] Employees in the formal sector are required to contribute to one of three public schemes: the Public Service Pension Fund (PSPF), the National Pension Scheme (NPS) managed by NAPSA, and the Local Authority Superannuation Fund (LASF). The LASF and PSPF are gradually being phased out with no new members.[4] The estimated assets of the compulsory schemes were K6 billion at the end of 2012, with just over 770,000 members (PIA n.d.).

[3] References for this section include PIA (n.d), NAPSA (n.d), Government of Zambia (n.d.), PSPF (2014).

[4] Public sector employees have two schemes, PSPF and LASF. Upon setting up NAPSA they were closed for new entrants (with some minor exceptions) but continue to exist as separate schemes. The contribution rates for LASF are 10 per cent for employee and 23 per cent for the employer, and for PSPF 7.25 per cent for each (Chisupa 2015; Koyi 2012).

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 2015 is K15,841. The following constitute gross earnings for NAPSA purposes: basic salary plus leave pay, commuted days, overtime, bonus and all allowances.

Thus, NAPSA remains the single largest contributory scheme. The requirements for NAPSA benefits vary by the type of benefit (Table 4).

Table 4: A summary of benefits provided by NAPSA

Type of benefit	Eligibility	Rate	Notes
Pension - standard retirement	Members are eligible for standard retirement either if they were aged less than 39 on 1st February 2000 and and now 55 years or over, and had made at least 180 monthly contributions OR if they were over 39 on 1st February 2000 and had made the required number of contributions under a sliding scale.	Average earnings over contribution period adjusted to National Average Earnings (NAE) so that monthly pension is approximately the same relative to current NAE as earnings were to the contemporaneous NAE when they were earned. Minimum pension is equivalent to 20% of NAE applicable in that year as obtained from the Central Statistical Office.	The sliding scale enables members who had limited amount of working age left when the scheme was introduced to qualify for a pension.
Pension - early retirement	Early retirement is possible if a member is within five years of reaching 55 years and has made the minimum 180 monthly contributions. The level of the pension has to be above the minimum pension set at 20% of NAE.		
Invalidity pension	To qualify the member must have a minimum of 60 months of contribution and be unable to work. They must have paid at least 12 monthly contributions within the last 36 months prior to the claim.	The pension is the sum of a general pension for the months contributed supplemented with a pension for the years presumed lost from work due to invalidity, which is 0.5% of the member's indexed monthly earnings per year presumed lost.	
Lump sum payment	Members who have attained the age of 55 years, less than 180 months of contributions and do not qualify under a sliding scale.	Retirement / Survivors / Invalidity lump sums are calculated based on Contributions from the employee and employer, the interest amount and index amount (compensation for loss of value)	
Funeral grant	At least 12 monthly contributions made during the last 36 months prior to member's death.	10 x the minimum pension in the year of the member's death	
Survivor's pension	Member must have been receiving either an Invalidity Pension or Retirement Pension at the time of their death, and must have been currently or fully insured. The pension is paid to a spouse, child under age 18 years, child under age 25 in full time education, unborn child (child in utero at the death of member), child of any age disabled by age 18 and at the time of the death of the member.		
Survivor's pension, lump sum	In the absence of children or spouse(s), the next of kin will be eligible to receive a survivors' lump sum.		

Source: NAPSA (n.d.), Government of Zambia (n.d.).

The voluntary pension pillar is comprised of Trusts that are established by employers and are supervised by the Pensions Insurance Authority (PIA). At the end of June 2014, the PIA had a total of 238 schemes on its register and a membership of 110,503 (PIA n.d.). The contribution rates for these schemes vary by scheme, but typically the schemes are defined contribution schemes.

3.2 Workers Compensation Fund benefits

In addition to the pension schemes, employers must register and to pay contributions to the Workers' Compensation Fund Control Board. The contribution rates vary by economic activities and their associated risks.

The Workers Compensation Board provides pensions to people who have been disabled or killed by a work-related accident, or as a result of work related diseases.[5] 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, he or she will be eligible for a lump sum compensation. If the degree of disablement is 11 per cent or above the worker is entitled to a pension for life.

The spouse and up to eight children are entitled to pensions upon the death of the pensioner. The widow is paid four-fifths (4/5) of the pensioner's monthly pension. Similarly, children under the age of 18 are paid allowances. The size of these allowances is dependent on the birth order: the youngest child receives 15 per cent of the monthly pension of the worker, compared to just 5 per cent for each additional child (up to a total of 8 children). The allowances paid to children are capped at 50 per cent of the worker's pension.

WCFCB pensions can also be commuted to a lump sum payment for the purpose of purchasing a dwelling house.

3.3 Non-contributory benefits

As pointed out by the World Bank report on social protection in Zambia (2013) there are a number of existing schemes, but they are not adequately coordinated and suffer from unpredictability. The existing and projected schemes are described in the National Social Protection Policy document produced by the Ministry of Community Development (MCDMCH 2014b) which outlines the intended future developments of the schemes. Currently existing schemes are summarized in Table 5.

[5] Source for this sub-section: Workers Compensation Fund Control Board (n.d.)

Table 5: A summary of non-contributory benefits

Scheme	No. of recipients 2014/ most recent available figure	Administrative body	Targeting	Value of the benefit
Farmers Input Support Pack	800,000 farmers[1]	Ministry of Agriculture	Small scale, actively engaged in farming, capacity 0.5-5 ha maize, the benefit pay share of subsidized package, the beneficiaries should not receive FSP simultaneously, have to be members of farmers' organization	10 kg seed and 2*50kg bags of each urea and DAP, government pays 75%
Home Grown	850,000[1], 22 districts out of 104	Ministry of Education	District-based, all schools and students in selected districts receive meals	Free school meal for primary school pupils, see http://documents.wfp.org/stellent/groups/public/documents/newsroom/wfp260972.pdf
SCT	136,330[2]	Ministry of Community Development Mother and Child Health	Targeting system, (MCDMCH 2014a).	70 kwacha per month
FSP	76,300[3]	Ministry of Community Development Mother and Child Health	Done by CWACs, criteria 1) access to land but less than 1 ha, adequate labour, no gainful employment; 2) female headed HH OR HH contain orphans or children OR child headed HH OR terminally ill HH head OR disabled HH head OR unemployed youth OR aged	Package of inputs sufficient to cultivate 0,5 ha maize, 0,25ha legumes and in some cases chickens and goats, repayment of a small share of the value expected, the programme implements strict graduation after 2 years
PWAS	59,000[3]	Ministry of Community Development Mother and Child Health	PWAS targets extremely poor older persons, orphans or neglected children, chronically ill or disabled persons, female single headed households	Educational support for primary and secondary levels, health support to meet the cost of prescribed drugs and orthopedic appliances, food, bedding and clothing
Tertiary Bursary	51,000[3]	Ministry of Education	There are four loan options: 100% funding level 75% funding level 50% funding level 25% funding level. The 100% loan is intended for vulnerable Zambians	According to the World Bank (2013) repayment is nonexistent. The bursary committee is going to be converted into a student loan board, suggesting a move towards a more genuine loan.
OVC Bursary	96,356[4]	Ministry of Education	Orphans and vulnerable children, school based committees decide, funds allocated to districts based on school census	Secondary school fees and boarding
Old age pension pilot	5,900[3] Probably less now as is being phased out	Ministry of Community Development Mother and Child Health	Katete district, individuals of 60 years or over. In the process of being phased out, no new beneficiaries.	
WEF	TBC	Ministry of Community Development	Provides assistance to women's clubs to support income generating projects, small scale businesses or direct material or support or equipment.	
Social Protection Fund	TBC	Ministry of Community Development	Provides one off grants to vulnerable but viable households to develop income generating activities	

Note: Household (HH).

Sources: [1]MCDMCH (2014b); [2]MCDMCH, most recent figures provided in June 2015; [3]World Bank (2013); [4]Ministry of Education (2014).

The programme currently in the process of being scaled up, the SCT scheme, is funded by both the Government and its co-operating partners. In 2015, the total budget allocated to the programme is K180 million, out of which K150 million is from the Government and K30 million is from its co-operating partners. About 20 per cent of this sum is intended for the costs of administering the scheme (MCDMCH 2015). The scheme has achieved many positive impacts including alleviation of extreme poverty as well enhanced food security (MCMDC 2013).

The funds available, however, limit the number of beneficiaries even in the currently covered districts. It is estimated that a significant share, though not all intended beneficiaries, actually receive the cash transfer (MCDMCH, a discussion).

Other schemes intended for vulnerable households such as PWAS, SPF, and FSP are of significantly smaller in terms of the number of beneficiaries. They also use less rigorous targeting mechanisms, relying on assessment carried out by local welfare assistance committees or social workers (Beazley and Carraro 2013).

The budgeted total spending on fertilizer support in 2015 is K1,338 million, and on the Food Reserve Agency that buys maize from smallholder farmers K993 million (IMF 2015). The Indaba Agricultural Policy Research Institute has carried out research on the subsidy programmes and their publications have detailed information on the schemes and their impacts (see for example Mason and Tembo 2015; Mofya-Mkuka et al. 2013).

4 Data sources

Microsimulation of the tax and benefit system in a particular country requires detailed data on individuals in terms of their demographic profile, incomes, expenditures, and household relationships. A potentially suitable data source was identified in the scoping study (Wright et al. 2015): the Living Conditions Monitoring Survey (LCMS). The latest data from the LCMS were collected in 2015, though at the time of writing this paper, these data were not yet available. The survey prior to this was in 2010, and prior that surveys were conducted in 1996, 1998, 2002/03, 2004, and 2006. Throughout the rest of this section, reference is made to the Survey Report (CSO 2012).

4.1 Living Conditions Monitoring Survey 2010

The LCMS 2010 is a cross-sectional[6] survey which was administered to a representative sample of households drawn up using the 2,000 Census of Population and Housing as the sampling frame. Standard enumeration areas (SEAs) were the primary sampling units. Although adjustments were made to take into account small district sizes, the CSO (2012) does urge caution when undertaking analysis at district level. A two-stage stratified cluster sample design was used: as part of the first stage 1,000 SEAs were selected using probability proportional to estimated size; and as part of the second stage, 15 households were selected for rural SEAs, and 25 for urban SEAs.[7]

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 19,398 households were successfully interviewed, comprising 102,883 individuals. The

[6] Note that the 2002/03, LCMS was, exceptionally, a longitudinal survey.

[7] See http://www.zamstats.gov.zm/nada/index.php/catalog/59 and pages 6-7 of CSO (2012).

survey is representative below national level to provincial and district level (there are 72 districts in nine provinces in Zambia), as well as for urban and rural areas.[8]

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.[9] Child-headed households are also captured in the data: examination of the data reveals that 12 of the 19,398 household heads (<0.1 per cent) are aged under 18 and the youngest is five.[10]

The LCMS 2010 data are not publicly available but can be obtained from the Zambia Central Statistical Office (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 was not supplied with metadata, however, data dictionaries are available on the CSO and International Household Survey Network (IHSN) websites.[11] 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 2010.[12]

Missing values have not been imputed (see the sub-Section on Weaknesses of the data for a discussion of this in relation to the income variables where there is the greatest proportion of missing values).

Section 1 of the questionnaire is called Household Roster but appears to just capture information about relationship to household head. Information on whether the mother and father are still alive is also obtained but this does not include the mother's and father's ID numbers to help determine parent-child relationships. It will therefore only be possible to determine a limited set of relationships within the household.[13] Others will need to be determined using a series of rules aimed at identifying the most likely relationships.

It seems that no distinction is made between civil and customary marriages as the possible responses to the question on marital status are: never married, married, separated, divorced, widowed, co-habiting.

There are 17 data files in total, including a household file and an individual file. Some[14] of the other files contain information on income and expenditure. The files can be merged together

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[8] See pages 5-6 of the Survey Report.

[9] See pages 11-12 of the Survey Report.

[10] This is using variable hage in the data file PERS RECORD.

[11] See CSO (n.d.) http://www.zamstats.gov.zm/nada/index.php/catalog/59/data_dictionary and IHSN (n.d.) http://catalog.ihsn.org/index.php/catalog/2597/data_dictionary.

[12] See pages 7-10 of the Survey Report and http://www.zamstats.gov.zm/nada/index.php/catalog/59.

[13] Adopted children can be identified but only if adopted by the head of the household.

[14] There are also files on (community) developmental issues (development_issues_rec_clean), child health and nutrition (child_health_rec_clean), self-assessed poverty, shocks and coping strategies (coping_strategies_rec_clean), household access to facilities/services (hh_access_rec_clean - the file appears to have zero observations), and livestock (hh_livestock_rec_clean).

using the appropriate ID variables.[15] The information contained in the relevant files is described in Appendix 1.[16]

4.1.1 Previous analysis of the data

The LCMS 2010 has been analysed by the CSO (2011) with sections on demographics, migration, education, health (including child health and nutrition), economic activities, household food production, household income and assets, household expenditure, poverty, housing characteristics, household amenities and access to facilities, and community developmental issues. Cuesta et al. (2012) use the LCMS 2010 to examine incidence of public spending, outlining how consumption of different public services is allocated across income quintiles. De la Fuente et al. (2015) use the LCMS 2010 and 2010 Census of Population and Housing to map poverty to sub-national level. Other publications which have made use of the LCMS 2010 data are listed on the IHSN website.[17]

4.1.2 Weaknesses of the data

The main weakness of the data is the large number of missing observations in the income variables. The missing values have not been imputed. The general view, from discussions with researchers at the Zambia Institute for Policy Analysis and Research (ZIPAR), seems to be that the missing values occur across the board and there are no obvious groups with more missing values. In practice, the issue has been dealt with by using expenditure data for poverty estimates (for example CSO 2011; de la Fuente et al. 2015). Care therefore needs to be taken when using the income data.

Cuesta et al. (2012) identify some limitations of the data pertinent to their own research, stating that the LCMS 2010 'also identifies beneficiaries of public spending programs, though not always precisely. The survey identifies individual and household beneficiaries of public health and education services and identifies whether a household received fertilizer and seeds from a public program, but not which one, FISP or FSP. In addition, the LCMS does not include information on beneficiaries of the PWAS, either those receiving food subsidies or other cash transfers, not does it record beneficiaries of school feeding programs providing support to orphans and vulnerable children.' (p. 17). They report some inconsistencies and missing data in relation to education, health care and crop production. They also provide methods for overcoming some of the limitations they note, for example a method for identifying recipients of FISP and FSP subsidies.

4.1.3 Sources of data for uprating and up-weighting

Datasets of the type required for tax-benefit simulations are rarely produced on an annual basis, and in any case, there is usually a time-lag between data collection and release. In order to be able to model current tax and benefit rules (or any year between the year of data collection and the current year), it is usually necessary to uprate the income and expenditure data collected in

[15] The key variables are HHID (household ID) and PID_02 (person ID).

[16] In addition, in each file, there is usually information about the interview and location including household and/or person id numbers, and weights. These variables are not mentioned each time.

[17] See IHSN (n.d.).

surveys. The Consumer Price Index (CPI) or similar from the respective country is used to do this. CPI for Zambia is available on a monthly basis from the CSO.[18]

When analysing output from the microsimulation model, it is usually necessary to take into account demographic changes since the date the survey data were collected. The last Census of population was carried out in 2010, and annual population estimates are produced based on projections from 2010.[19]

5 Assessment of tax-benefit microsimulation feasibility

5.1 Feasibility of building a microsimulation model

At this stage, the LCMS 2010 has been identified as the best available dataset to underpin a tax-benefit microsimulation model in Zambia. A new LCMS 2015 is underway but the release date has not been made public yet.

In order for the LCMS 2010 to relate to a 2015 timepoint optimally (whilst awaiting the LCMS 2015), it is necessary to recast the survey weights using population estimates for 2015. These are available from the CSO by district, sex, and 5-year age band for 2015, and each year up to and including 2020, then 2025, 2030, and 2035.

The LCMS 2010 income and expenditure data could be uprated from 2010 to 2015 using the CPI, which is available on a monthly basis from the CSO.

Table 6 summarizes the feasibility of simulating each tax (Section 2) and benefit (Section 3) in Zambia.

[18] See CSO (2015).

[19] See CSO (2013b).

Table 6: Simulation feasibility of taxes and benefits in Zambia

Tax-benefit policy	Simulation feasibility
Taxation	
Personal income tax	Yes Note: Gross income is captured in the LCMS, for first and second jobs. Employees' taxes (and contributions to approved pension funds) are deducted from the salary by the employer who subsequently remits to ZRA: PAYE. Income from second job is taxed at 35%. Taxable income includes all allowances except Labour Day awards, ex-gratia payments, medical expenses (presumably those paid by employer), funeral expenses (presumably those paid by employer), sitting allowances for councillors and benefits that cannot be converted into cash. There do not appear to be any tax rebates.
Medical Levy (1% of gross interest)	Yes Note: The medical levy is deducted from gross interest by banks and other financial institutions, and applies to savings, deposit accounts, Treasury bills or government bonds of any person or partnership. Interest income is captured in the LCMS and the wording of the question implies the levy has already been deducted, so it can be calculated from the net amount.
VAT	Yes, to a certain extent Note: The LCMS will not capture all VAT income sources. The standard rate of VAT is 16% and there are a number of exempted and zero rated goods. VAT exempted goods include water supply, health and education, books and newspapers (though LCMS captures expenditure on text books only), and a number of agricultural and food products. Zero rated goods include exports and building supplies but these would not be captured in the LCMS. See Republic of Zambia (n.d.b)
Excise Duty	Yes, to a certain extent Note: The LCMS will not capture all Excise Duty income sources. In addition, the LCMS does not capture expenditure on all excise duty items (e.g. perfume, white spirit).
Custom Duties; Corporate Income Tax (mining, non-mining); mining royalties; carbon tax; turnover tax for small companies; Property transfer tax; presumptive tax; advance income tax; withholding tax	No – not possible using the LCMS
Rural electrification levy, fuel levy	Yes in so far as this can be captured via a household survey.
Social transfers **Contributory benefits**	
Workers Compensation Scheme	No- not possible to identify disabled /sick people who were formally employed
Compulsory pension pillar: Retirement pension, early retirement pension, invalidity pension, survivor's pension, funeral grant, lump sum payments for retirement/ invalidity/survivors	No – Lack of data about the contribution history of the beneficiary There does not appear to be any unemployment or maternity insurance cover.
Voluntary Pension pillar -	No – not possible to identify prior contributions
Non-contributory benefits	
SCT	Yes, to a certain extent. Eligibility criteria: Living in same catchment area for at least 6m (LCMS captures location 12m ago; catchment area would need to be defined) No fit-to-work household members, or high dependency ratio of 3 or more dependents per fit-to-work member, where dependent = under 19, older than 64, or 19-64 AND chronically ill or disabled (POSSIBLE) 'Welfare test' (definition is unspecified, so currently NOT POSSIBLE BUT MUST BE RESOLVED) Disability in the h/h (urban areas) (POSSIBLE) Identification as potentially eligible by Community Welfare Assistance Committees (NOT POSSIBLE) Community Validation (NOT POSSIBLE) Note: Due to be rolled out to all districts by 2017 (MCDMCHb 2014).
Farmers Input Support Pack	Yes, to a certain extent – entitlement only (not value). LCMS does not reveal membership of farmers association.
Home Grown	Yes – entitlement only (not value) and if told which districts this applies to
FSP	Yes – entitlement only (not value)
PWAS	Yes – entitlement only (not value)
OVC Bursary	Yes – entitlement only (not value)
WEF	No – it is not possible to determine eligibility within the survey
Tertiary Bursary	No – this is a loan
Old Age Pension Pilot	No - being phased out

Note: The proposed universal old age social grant scheme could however be simulated (MCDMCHb 2014).
Source: Authors.

There are a number of additional caveats that should be signalled here. As mentioned in the Section 4, there are missing observations in the income data and so the income variables will need to be imputed. There are a few other outstanding queries about the data, including the need to obtain clarification about which weights to use. The extent to which the dataset yields plausible results has not been assessed by the team, though it is very encouraging that it has already been extensively worked on within and outside of Government. Lastly, additional issues may only become apparent when the model is being constructed.

5.2 Long-term future of a microsimulation model

The long-term future of a microsimulation model in Zambia depends upon the following things being in place:

- commitment to develop the model with in-country partners;
- a first draft of the model which demonstrably enables social security options to be explored by government and academia;
- a transparent user guide;
- an organization which issues user licences for the model, and liaises with users;
- regular training events for new users;
- an organization to co-ordinate updates of the policies, reweight the survey weights, inflate the income data etc. each year, and add new datasets as they become available;
- users having licences for STATA or another software package with which to analyse the output data.

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Appendix 1

Information on households

Non-expenditure/consumption information on households is mainly contained in the file *hh_rec_clean*. There is also a file relating to household assets (*hh_assets_rec_clean*). The file *hh_rec_clean* contains information on type of dwelling; number of rooms occupied; basis of occupation; rent; ground and property rates; mortgage; material for roof/walls/floor; main water source; distance of water source; main source of drinking water; energy source for lighting/cooking; electricity; main type of toilet; main method garbage disposal; crops grown (yes/no); fishing (yes/no, quantity, income received); provision and improvement of social and economic facilities in community; deaths (number, age and sex of deceased, cause of death); household level of poverty (self-assessed) and main reasons; poverty comparison last 12 months and reasons; money needed by household in a month; meals per day and consumption of meat and vegetables in last month/week; weights[1].[2]

Information on individuals

Non-income information on individuals can be found in a single file called *PERS RECORD*. This file contains information on sex; age; albino; any disability; relationship to head; migration; marital status; biological mother and father alive; illness or injury; visits to health or other institution/personnel; cost of and payment for visits and medication; continuous illness for at least 3 months in last 12 months; ability to carry out normal activities, school attendance (current/ever); current level grade; grade last year; type of school; highest grade attained; reasons for leaving and for never attending; main current economic activity; type of job/business; employer business/service; employment status; entitlement to pension, gratuity, social security; entitlement to paid leave; changed employment/ business in last 12 months; main reason for leaving job/business; engagement in income generating activity; weights[3].[4]

Information on income

Information on income is mainly collected at the individual level. Data collection was carried out in December 2010 and January 2011. The income questions generally relate to the last month, though the question on interest or dividends is for the last 12 months.

The file *PERS RECORD* additionally contains the information about individual income (asked of all persons aged 5 years and above). The file contains information on main and other non-farm business income in last month; gross monthly salary/wage including regular allowances from main job; non regular allowance last month from main job; gross monthly salary/wage

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[1] There are four weights in this file (final_we - final weight, v96_a - final weight cso, weight - weight, wgt - wgt). ZIPAR advises that CSO have recommended using final_weight_cso.

[2] There are additionally a number of derived variables (total_nu - total number of persons, v105_a - total number of persons sum, v108_a, electric).

[3] There are three weights in this file (final_weight - final weight, final_weight_cso - final weight CSO, weights - ?). ZIPAR advises that CSO have recommended using final_weight_cso.

[4] There are additionally a number of derived variables (type 1; type2; type3; Rural_Urban_2010; Migration_Status; Direction; Years; hsex; hdisa; hage; hhsize), including some that look to be for poverty analysis (perequi; A__TYPE; A__FREQ; hhequi; totfood; total household food expenditure; p_impver2; expeqim; pline_s; pline_m; poor_s; poor_m; hc; pline; gap_s; depth_s; gap_m; depth_m).

including regular allowances from second job; non regular allowance last month from second job; income in kind per month; rent per month from house, other buildings and non-agricultural equipment; remittances in last month; pension payment last month; income in form of grants per month (both in cash and in kind); income from borrowing in last month; interest on savings in last month; interest or dividends on shares etc. in last 12 months; income from any other sources in last month.

Although there is information on a range of income sources, some income variables have been aggregated such that they may only allow crude simulations to be produced, for example the questions on pension payments and grants do not give any detail about the source (see the sub-section on Weaknesses of the data for further discussion of this point). The extent of this will only become clear when starting to build any microsimulation model.

Information on expenditure/consumption

Information on expenditure is collected at the household level. Data collection was carried out in December 2010 and January 2011. Expenditure/consumption/receipt of goods is recorded for the last two weeks, last four weeks or last year depending on the type of expenditure. For questions relating to the last year, the time period is specified as 2009.

Information on expenditure can be found in four files: *hh_expenditure1_rec_clean*, *hh_expenditure2_rec_clean*, *hh_expenditure3_rec_clean* and *hh_expenditure4_rec_clean*. These files contain the following information:

File *hh_expenditure1_rec_clean*: in the last two weeks (for frequent expenditure, e.g., food, drink, cigarettes/tobacco) did the household purchase or consume the item?; total spent on item; quantity purchased; quantity of own produced item consumed; market value of item consumed; quantity of item received without payment; market value of item received.

File *hh_expenditure2_rec_clean*: in the last four weeks (for less frequent expenditure, e.g., food, utilities, home repairs, household goods, personal care, transport, communications, leisure, other) did the household purchase or consume the item?; total spent on item; quantity purchased; quantity of own produced item consumed; market value; quantity of item received without payment; market value.

File *hh_expenditure3_rec_clean*: in the last year (2009) did the household purchase or receive the item? (education, health, clothing, financial services, remittances[5]); total spent on item; market value of item received.

File *hh_expenditure4_rec_clean*: in the last year did the household send remittances in cash or in kind?; total spent in cash remittances; value of remittances in kind.

The expenditure/consumption data is therefore very detailed, however, some assistance will be required in interpreting and using these files in the construction of any microsimulation model. It will also be necessary to ascertain whether incomes and expenditures have been inflated/deflated to reflect a specific time point.

[5] Section 11 questions 18, 19, and 20 ask about expenditure on remittances (in cash or in kind) in the last year.

Additional information: Agricultural production

In addition to the individual level income information, there are two files (hh_crop_income_rec_clean and hh_livestock_income_rec_clean) containing information on crop and livestock income at household level (sales or consumption in last 12 months). There are also three files relating to agricultural production (hh_ag_prod1_rec_clean, hh_ag_prod2_rec_clean, hh_ag_prod3_rec_clean). These contain limited information on sales (for last agriculture season, October 2008 to September 2009). Consideration needs to be given to the inclusion of such information in any microsimulation model.