



UNITED NATIONS
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WIDER Working Paper 2016/143

Updating NAMOD

A Namibian tax-benefit microsimulation model

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November 2016

Abstract: This paper provides an account of a Namibian tax-benefit microsimulation model—NAMOD—which has been developed for use by government. Following a section on the importance of social security in Namibia and recent related studies, the paper outlines the tax-benefit policies that are included within NAMOD and describes the data challenges and assumptions that had to be made in order to simulate these policies. Results for 2015 are compared with reported administrative data. In spite of current data challenges, NAMOD can be used to help inform social security policy design.

Keywords: tax-benefit, microsimulation, South Africa

JEL classification: C63, H24, I38

Acknowledgements: UNU-WIDER is thanked for supporting the update of NAMOD as part of the SOUTHMOD programme of work. UNICEF Namibia is thanked for funding the initial work on NAMOD, and for their support of this update. The Namibia Statistics Agency is thanked for supplying the data that underpins the NAMOD model. The University of Essex is thanked for granting a licence to SASPRI to use EUROMOD, for their support of the NAMOD work, and for granting the authors permission to update EUROMOD Working Paper EM7/14. The European Commission is acknowledged for funding the development of EUROMOD.

Note: Users of NAMOD are required to obtain a user licence. For enquiries about how to access NAMOD, please contact the corresponding author Gemma Wright.

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This study 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’.

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ISSN 1798-7237 ISBN 978-92-9256-187-1

Typescript prepared by Lesley Ellen.

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The Institute is funded through income from an endowment fund with additional contributions to its work programme from Denmark, Finland, Sweden, and the United Kingdom.

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The views expressed in this paper are those of the author(s), and do not necessarily reflect the views of the Institute or the United Nations University, nor the programme/project donors.

Acronyms

AU	African Union
BIG	Basic Income Grant
CMG	Child Maintenance Grant
CPI	Consumer price index
DF	Development Fund
DG	Disability Grant
ECF	Employees' Compensation Fund
FCG	Foster Care Grant
ILO	International Labour Office
MGECW	Ministry of Gender Equality and Child Welfare
MoF	Ministry of Finance
MSDF	Maternity leave, Sick leave and Death benefit Fund
NAMOD	Namibian Tax-Benefit Microsimulation Model
NHIES	Namibia Household Income and Expenditure Survey
NPC	National Planning Commission
OAG	Old Age Grant
SADC	Southern African Development Community
SASPRI	Southern African Social Policy Research Insights
SDG	Sustainable Development Goals
SMG	Special Maintenance Grant
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
VCG	Vulnerable Children Grant
WVS	War Veterans Subvention

1 Introduction

NAMOD (a Namibian Microsimulation Model) is a tax and benefit microsimulation model that was first developed for the Namibian government with support from UNICEF Namibia (Wright et al. 2014). This working paper is an updated version of the original working paper and includes results on simulations for a 2015 time point.¹

Microsimulation is a technique that involves taking household survey data and applying a set of policy rules to the data to calculate individual entitlement to benefits and/or liability for taxation. The resulting output at individual and household level can then be aggregated to provide national data on, for example, expenditure on social grants or revenue from taxation (see for example Mitton et al. 2000; Zaidi et al. 2009).

NAMOD was first developed using the EUROMOD platform (version F6.0), which was built by Professor Sutherland (University of Essex) and colleagues to simulate policies for the European Union countries (Sutherland and Figari 2013).² EUROMOD has been built and developed over a period of two decades and now comprises 28 countries (Leventi and Vujacko 2016). The updated version of NAMOD uses the new, stand-alone version of EUROMOD.³

The main features of EUROMOD which make it a particularly suitable basis for the Namibian model are that all the calculations are transparent and can be easily modified by the user. The model is very flexible and allows policies to be modified and almost any type of new policy to be created. There is an international network of EUROMOD users, and the EUROMOD executable is regularly updated by the EUROMOD team at the University of Essex.

The following section highlights the importance of social security in the Namibian, Southern African Development Community (SADC), and African policy contexts, and provides an overview of recent research on poverty, inequality, and the impact of social security in Namibia. Sections 3 and 4 then provide information about the social security system in Namibia (Section 3), and the numerous decisions and, in some instances, compromises that had to be made in relation to NAMOD's underpinning dataset (Section 4). Results for 2015 are presented in Section 5, and Section 6 concludes. An updated version of the NAMOD user manual has also been produced which explains how to use the model and so this is not repeated here.

2 Background

2.1 The importance of social security provision

The importance of social security⁴ in developing countries for poverty alleviation and investment in human capital is widely acknowledged (e.g. Kabeer 2009; Barrientos 2010; European Commission 2010; Handa et al. 2010; Hanlon et al. 2010; ILO 2010; ISSA 2010; Barrientos and

¹ For 2013 results please see Wright et al. (2014).

² See also EUROMOD (N.D.)

³ EUROMOD executable version 1.12.9.

⁴ Following the Code on Social Security in the SADC, social security is defined here as 'public and private, or [...] mixed public and private measures, designed to protect individuals and families against income insecurity caused by contingencies such as unemployment, employment injury, maternity, sickness, invalidity, old age, and death. The main objectives of social security are: (a) to maintain income, (b) to provide health care, and (c) to provide benefits to families. [...] social security includes social insurance, social assistance and social allowances.' (SADC 2007: 2).

Niño-Zarazúa 2011; DFID 2011). This is reflected in Article 22 of the Universal Declaration of Human Rights which states that, ‘Everyone, as a member of society, has the right to social security’. This has been reaffirmed in the United Nations’ Sustainable Development Goals (SDGs), Goal 1 of which is to ‘End poverty in all its forms everywhere’. Target 1.3 of the SDGs is to ‘implement nationally appropriate social protection systems and measures for all, including [social protection] floors, and by 2030 achieve substantial coverage of the poor and the vulnerable’.⁵

Within Africa, the African Union (AU) has over many years emphasized the importance of social protection⁶ for poverty alleviation in key social policy documents (for example AU 2005; AU 2008a, 2008b, 2008c; Wright and Noble 2010), declarations (for example AU 2004; AU 2006; HelpAge International 2006; AU 2010), and expert meetings and consultations (for example HelpAge International 2008). The International Labour Office (ILO) also promoted the extension of social security at its African Regional Meeting (ILO 2007). The first Regional Social Security Forum for Africa took place in Kigali in 2008, and 2008 was also the year of the launch of the Africa Civil Society Platform for Social Protection. More recently, there have been a number of initiatives to collate and review the progress that is being made across Africa and sub-regions in Africa (for example ISSA 2013; Dorfman 2015; UNICEF-ESARO 2015; IPC-UNDP 2016).

A SADC-specific Social Policy Framework has been developed (SADC 2006), which highlighted *inter alia* the importance of social security for both vulnerable and non-vulnerable groups as it has defensive and enabling dimensions. The 2003 Charter of Fundamental Social Rights in SADC states that both workers and people outside the labour market should have adequate social security benefits or should receive sufficient resources and social assistance (SADC 2003). The Code on Social Security in the SADC further states that everyone in SADC has the right to social security and that member states should, as far as is realistically possible, increase their social security provision to ensure that everyone is meaningfully covered under the system (SADC 2007).

In addition to these commitments, Namibia’s own constitution makes provision for the promotion and maintenance of the welfare of its people through policies aimed at ensuring that ‘senior citizens are entitled to and do receive a regular pension adequate for the maintenance of a decent standard of living and the enjoyment of social and cultural opportunities’ and that ‘the unemployed, the incapacitated, the indigent and the disadvantaged are accorded such social benefits and amenities as are determined by Parliament to be just and affordable with due regard to the resources of the State’ (Republic of Namibia 1990: Article 95).

The reduction of poverty and inequality has been and remains a central focus for the Namibian government. The national development framework, Vision 2030, states that currently ‘Inequality and poverty endangers social harmony, peace and democracy’, and has as a sub-vision the objective that ‘Poverty is reduced to the minimum, the existing pattern of income-distribution is equitable and disparity is at the minimum’ (Republic of Namibia 2004: 104). In addition to the 1998 Poverty Reduction Strategy and subsequent National Poverty Reduction Action Programme (Republic of Namibia 1998, 2002), in successive National Development Plans the

⁵ See United Nations (N.D.).

⁶ In accordance with the Code on Social Security in the SADC (SADC 2007), social protection is regarded as broader than social security, encompassing all forms of social security, as well as social services and developmental social welfare.

reduction of poverty and inequality has been a key objective (Republic of Namibia 1995, 2001, 2008, 2012).

Social grants are regarded as an effective way to help combat poverty in Namibia: 'Financial assistance, in the form of grant transfers, is a [sic] important component to a national safety net that prevents the most needy from falling further into poverty and deprivation' (Republic of Namibia 2002: 57). The most recent National Development Plan (NDP4) highlights a number of issues with the current grants system and makes the following commitments with regard to improving the system: (i) expansion to include more of the households severely affected by poverty; (ii) review and simplification of bureaucratic procedures (e.g. means testing and introduction of a Kinship Grant); (iii) improvement of civil registration to reduce access barriers; and (iv) adequate and regular increases to the grant amounts. It also includes a specific proposal to expand social protection to cover children in all poor households (Republic of Namibia 2012: 68).

Social security in Namibia takes the form of non-contributory social grants and contributory schemes. The Namibian social grant system is not yet comprehensive and existing grants do not always reach the target poor populations. The following subsection comprises a review of recent research on poverty, inequality, and the social grants system in Namibia.

2.2 Previous research on poverty, inequality, and the social grants system in Namibia

Various studies of poverty and inequality in Namibia have been undertaken, often by government agencies using Namibia Household Income and Expenditure Survey (NHIES) data (for example, NPC 1996; Strauss 2006; Van Rooy et al. 2006; Levine 2007; CBS 2008; NSA 2012a, 2012b) or Census data (for example Noble et al. 2011; NPC 2015b). Some studies use only money metric approaches to measure poverty, while others use multidimensional measures or a combination of the two. Detailed child-focused situation analyses have been undertaken (e.g. NPC 2010; including analysis of NHIES data NSA 2012c; UNICEF 2013).

Over the last 20 years there have been a number of assessments of social security provision and recommendations for improvements (for example, Morgan 1991; Subbarao 1998; Devereux 2001; Schleberger 2002; Clausen 2006; Strauss 2006). These studies mainly focus on the Old Age Grant (OAG). Haarmann et al. (2009) have assessed the impact of a Basic Income Grant (BIG) pilot project that was carried out from January 2008 until December 2009 in the Otjivero-Omitara area of Namibia. Options for financing a BIG nationally are also examined, showing that the costs of a BIG could be financed through tax revenue.

There have been relatively few detailed studies into the impact on poverty and inequality of Namibia's existing social grants and potential policy options. The first study, by Levine et al. (2009, 2011), examines the impact of cash transfers on household welfare in Namibia using the NHIES 2003/04. They find that cash transfers, particularly the OAG, play an important role in alleviating poverty, especially for the very poor, but that the impact on inequality is limited. They provide evidence that an expanded system of social transfers (growth in the number of beneficiaries and grant amounts increasing in line with inflation) is sustainable. They highlight the ineffectiveness of the Child Maintenance Grant (CMG) means test (errors of inclusion), show the impact on poverty of better targeting of the grant, and also question whether appropriate eligibility criteria are used to capture the poorest and most vulnerable children (errors of exclusion). They also find that some poorer age-eligible individuals do not receive the OAG (while higher-income individuals are less likely to apply).

The study about child poverty in Namibia (NSA 2012c) includes a section in which the impact of social grants is examined and simulations are carried out to assess the impact of child welfare grant expansion and variation. The NHIES 2009/10 was used for this analysis. The research shows that the grant system as a whole has a notable impact on child poverty (the rate would increase from 34 per cent to 41 per cent without the grants or from 39 per cent to 62 per cent when only households in receipt of the grants are taken into account), and that the OAG has the greatest impact. Various scenarios for expanding child welfare grants are simulated, including all children under 18 in households with consumption below a means test of 40 per cent of equivalent expenditure per year (N\$5,673), and universal grants for children under 5 and all children. This exercise reveals that the costs of expanding the child grant system are substantial, but that child poverty could be dramatically reduced with such policy changes (for example, a universal grant for all children under 18 would decrease poverty from 34 per cent to 13 per cent).

This analysis was complemented by a qualitative study on the effectiveness of the social protection system in reducing child poverty in order to understand why high levels of child poverty persist and why the social protection system is not reaching the most vulnerable groups of children (MGECW and NPC 2013). In addition to findings on poor people's experiences of poverty and informal community support structures and coping strategies, the study examines uptake and impact of grants on vulnerable children and their families, finding that despite the small value of child welfare grants, they play a critical role in reducing the burden of poverty by providing for children's basic needs and by supporting household economic activities and other productive activities (e.g. job-seeking). However, a range of issues are identified and are reflected in the recommendations (selected points only): (i) expand the grants to all poor and vulnerable children; (ii) increase the grant amounts every year in line with inflation; (iii) remove barriers to grant access (e.g. documentation and distance travelled) and raise awareness about grants; and (iv) improve data collection on the number of children who require and receive grants and services, and introduce regular monitoring of the implementation of the grant system and child outcomes.

Finally, in an issues paper produced for the Ministry of Gender Equality and Child Welfare (MGECW), Bradshaw and Huby (2013) analyse the impact of different options for extending the child welfare grants system, again using the NHIES 2009/10. A range of scenarios are simulated, building on the analysis in the NSA (2012c) report. These include full take-up of the existing child grants without the means test being applied to CMG, replacing the CMG (but not the Foster Care Grant (FCG) or Special Maintenance Grant (SMG)) with a new grant paid to all children under certain ages (under 6 and then extending progressively to under 18) and with different amounts (N\$200, N\$250, and N\$400 per month per child), and then repeating the analysis with different means tests. Poverty rates and gaps, inequality, and cost are all examined. The different scenarios have varying impacts on poverty and inequality, at best reducing the child poverty rate to under 3 per cent (for a universal grant of N\$400 per month paid to all children under 18). However, this has to be balanced against the increased cost of expanding the system.

In the above studies, the impact of the current social grants system is simulated on the basis of reported receipt of grants in the NHIES. Simulations of modifications to the current system are carried out in relation to the specific grant only, rather than by modelling the entire tax and benefit system using the rules contained in policy documents. This, however, has been undertaken through NAMOD and the impact of existing (or hypothetical) tax and benefit arrangements can be calculated in terms of the extent to which they reduce poverty and inequality, their cost, and their impact on different sub-groups of the population such as children. The following section provides an account of the tax and benefit rules that could—or could not—be incorporated within NAMOD.

3 Tax and benefit policies in Namibia and their inclusion in NAMOD

This section provides details about social security in Namibia which takes the form of non-contributory social grants and contributory schemes, as well as the country's tax arrangements. Section 3.3 summarizes which of the policies are simulated in NAMOD, with further details provided in Section 4, which focuses on issues relating to the underpinning dataset.

3.1 Non-contributory social security: the social grants

The main social grants in Namibia are the War Veterans Subvention (WVS), the so-called Basic State Grants (for older persons and disabled adults), and child welfare grants (for children who are either disabled, in foster care, or poor/vulnerable in specified ways). In addition, a Place of Safety Allowance is paid to an institution or person who is taking care of a child who has been located in a place of safety by a Commissioner of Child Welfare. Each of these is described in turn below.

War Veterans Subvention

The War Veterans Trust Fund was first established by the War Veterans Subvention Act 1999 (Republic of Namibia 1999) which was then repealed and replaced by the Veterans Act 2008 (Republic of Namibia 2008). Veterans are defined as people who were either members of the liberation forces, i.e. they 'underwent military training and participated consistently and persistently in the war in order to bring about the independence of Namibia'; or 'consistently and persistently participated or engaged in any political, diplomatic or under-ground activity in furtherance of the liberation struggle'; or 'owing to his or her participation in the liberation struggle was convicted, whether in Namibia or elsewhere, of any offence closely connected to the struggle and sentenced to imprisonment' (Republic of Namibia 2008: 4–5).

In order to apply for the grant, an application has to be made to the Veteran Board for registration as a veteran. It can also be paid to registered dependants (the widow/widower or children under 18) of deceased veterans under certain conditions (section 30 of the Veterans Act 2008). The grant is means tested⁷ and is the largest grant (in value), paid at N\$2,500 in 2015 (New Era 2015)⁸. This grant is payable to Namibian citizens, or permanent residents if not born in Namibia, and recipients must reside in Namibia.

Old Age Grant

The OAG is a universal grant (i.e. there is no means test) and as such can be classified as a social allowance rather than social assistance. It is payable to men and women aged 60 and over. Applicants must be Namibian citizens or permanent residents if not born in Namibia, and must reside in Namibia. The payment was N\$1,000 per month in 2015 (Lela 2015)⁹. The National Pensions Act (Republic of Namibia 1992) refers to it as a 'basic state pension'. It cannot be claimed concurrently with the Disability Grant (DG).

⁷ See Ministry of Veteran Affairs (N.D.).

⁸ Approximately US\$204 in June 2015 (www.xe.com).

⁹ Approximately US\$82 in June 2015 (www.xe.com).

Disability Grant

The DG is also a universal grant, and comprises a social allowance for certain people aged 16 or above. The National Pensions Act (Republic of Namibia 1992) makes a distinction between a 'disability pension' and a 'blind person's pension' (for people who have been registered as blind) but they have been conceptually combined and referred to as the 'Disability Grant' (and in any event they cannot both be paid to one person). A disabled person is defined as: 'any person who is, owing to any physical or any mental disability, incapable to obtain from any employment or the practising of any profession or trade, or from the rendering of any service, the means needed to enable him or her to adequately provide for his or her own maintenance, and has attained the age of 16 years' (Republic of Namibia 1992: 3). As part of the application process, the applicant has to be examined by a district surgeon who then has to prepare a medical report. Applicants are also eligible if they have been certified by a medical doctor as having AIDS. Applicants must be Namibian citizens or permanent residents if not born in Namibia, and must reside in Namibia. The payment was N\$1,000 per month in 2015, and it cannot be claimed concurrently with the OAG.

Child Maintenance Grant

The CMG was enacted in the Children's Act (No. 33 of 1960) and is administered by the MGECW as part of its child welfare programme. The CMG is payable to a biological parent with a child under the age of 18 (may be extended up to age 21 if child remains in education) under certain circumstances. The applicant's income is means tested¹⁰ (< N\$1,000 per month) and they must also fulfil one of the following conditions: the applicant is receiving an old age or disability pension or their spouse (the other biological parent of the child): (i) is receiving an old age or disability pension; or (ii) has died; or (iii) is serving a prison sentence of six months or longer. For children older than 7 years, he/she is required to attend school (school report has to be presented every year). Applicants must be Namibian citizens or permanent residents if not born in Namibia, and must reside in Namibia. The payment was N\$250 per month in 2015.¹¹

According to the website of the MGECW the follow items are required as part of the application process:

- Certified copies of the applicant's birth certificate and identity document
- Certified copies of the child or children's full birth certificates/confirmation of birth or baptism card
- A certified copy of the applicant's marriage certificate where applicable
- The latest school report of each school-going child
- A certified copy of the spouse's death certificate in case of death
- If the spouse is in prison, a letter from the prison and a declaration from him/her confirming this

¹⁰ The means test is in fact not applied if the applicant (or the other biological parent of the child, if living with the applicant) is in receipt of OAG or DG (MGECW).

¹¹ Just over US\$20 in June 2015 (www.xe.com).

- Proof of the spouse receiving a disability grant or an old age pension
- If the applicant is employed, a pay slip with the name, phone number, and address of the employer, if not employed a police declaration.¹²

The new Childcare and Protection Act 2015 extends the eligibility of the grant to include children in kinship care (Republic of Namibia 2015: para 240 (3)(b)). Kinship care is defined as follows: ‘A child is in kinship care if the child has been placed, with the express or implied consent of the child’s parent or guardian or by order of court in terms of section 145(3)(f)(i), in the care of a member of the child’s family or extended family, other than the parent or guardian of the child or a person who has parental responsibilities and rights in respect of the child’. (Republic of Namibia 2015: para 123 (1)).

Special Maintenance Grant

The SMG has been put into force by the Children’s Act (No. 33 of 1960), and is administered by the MGECW as part of its child welfare programme. It was designed to assist Namibian children under the age of 16 with disabilities. Children cannot receive SMG concurrently with CMG or FCG. Applicants must be Namibian citizens or permanent residents if not born in Namibia, and must reside in Namibia. The payment was N\$250 per month in 2015. According to the website of the MGECW, the following items are required as part of the application process:

- A certified copy of the child’s birth certificate
- Certified copies of parent/caregiver’s identity document and birth certificates
- A medical certificate from a state medical officer or doctor confirming disability
- A social background report from a social worker.¹³

The new Child Care and Protection Act renames the grant the ‘Child Disability Grant’ rather than SMG (Republic of Namibia 2015: para 241).

Foster Care Grant

The FCG has been put into force by the Children’s Act (No. 33 of 1960), and is administered by the MGECW as part of its child welfare programme. It is payable to someone who undertakes the temporary care of any child, who has been placed in their custody in terms of section 31(1)b or section 50(1) of the Children’s Act No. 33 of 1960. Applicants must be Namibian citizens or permanent residents if not born in Namibia, and must reside in Namibia. The payment was N\$250 per month per foster child in 2015. A child can only receive one grant type (CMG, SMG, or FCG). According to the website of the MGECW, the following items are required as part of the application process.

- A certified copy of the Court Order, or if the child was transferred, (i.e. from one foster parent to another) a section 50 Transfer Order

¹² See MGECW (N.D.a).

¹³ See MGECW (N.D.b).

- A certified copy of the child's birth certificate
- A certified copy of the foster parent's identity document
- A certified copy of the marriage certificate of the foster parents if applicable
- The latest school report of each school-going child
- A certified copy of the death certificate(s) of the biological parent(s) if applicable.¹⁴

The new Child Care and Protection Act calls the grant the 'Foster Parent Grant' rather than FCG (Republic of Namibia 2015: para 242).

Vulnerable Children Grant

The Vulnerable Children Grant (VCG) has recently been introduced by the MGECW to support children living in poor households who are not eligible for either the SMG or the CMG. In order for a child to be eligible to receive the VCG, the child's parent(s) must have no source of income (MGECW N.D.: 8). A child can only receive one of the child grants, and so children who are in receipt of FCG, SMG, or CMG cannot also receive VCG. The VCG is still regarded as being within the trial period (personal correspondence with UNICEF Namibia). A one-month registration window was opened in 2014 to enable applications to be made for VCG receipt, followed by another one-month registration window in 2015 and an extended registration window in 2016 (personal correspondence with UNICEF Namibia). The VCG is paid at a rate of N\$250 per child per month (MGECW N.D.: 8).

Place of Safety Allowance

The Place of Safety Allowance is payable to a person or institution who is taking care of a child who is under the age of 21 years and has been placed in a place of safety by a Commissioner of Child Welfare in terms of the Children's Act No. 33 of 1960 or the Criminal Procedure Act No. 51 of 1977. The payment is N\$10 per child per day.¹⁵

3.2 Contributory schemes

The contributory schemes in Namibia, administered by the Social Security Commission, include the Maternity Leave, Sick Leave and Death Benefit Fund (MSDF), and the Employees' Compensation Fund (ECF). The Social Security Act (Republic of Namibia 1994) also makes provision for a National Medical Benefit Fund and National Pension Fund, and while such provisions are currently being developed by the Social Security Commission they have not yet been implemented at present. There is also a contributory pension scheme for civil servants: the Government Institutions Pension Fund.

With regard to the MSDF, both the employer and the employee are required to make social security contributions at a rate of 0.9 per cent (1.8 per cent in total) of the employee's basic wages from a lower limit of N\$300 per month to a ceiling of N\$9,000.¹⁶ The scheme is also open

¹⁴ See MGECW (N.D.c).

¹⁵ See MGECW (N.D.d)

¹⁶ See Social Security Commission (N.D.a).

to self-employed workers who have to pay both the employer and employee share, and workers in the informal sector. The minimum monthly contribution by members in 2015 was N\$2.70 and the maximum was N\$81 (PWC Namibia 2015: 3).

Maternity leave benefits for female members of the MSDF is payable at 100 per cent of their salary (from N\$300 per month to a maximum of N\$13,000) for a maximum period of 12 weeks.¹⁷

The sick leave benefit is payable when an employee has used up their paid sick leave days under the Labour Act or their contract of employment, and has been signed-off by a doctor for 30 or more consecutive days. Sick leave benefits are paid at 75 per cent of the maximum basic salary of N\$13,000 for the first 12 months (minimum N\$225 per month and maximum N\$9,750 per month) and 65 per cent for a further 12 months, at N\$195 per month (minimum) and N\$8,450 per month (maximum).¹⁸ Lastly, a once-off amount of N\$8,475 is paid upon the death of a fully paid up member of the MSDF or upon retirement or permanent disability.¹⁹

Employers are also required to register all employees (subject to certain exclusions) and pay annual assessments to the Accident Fund (Employees' Compensation Act No. 30 of 1941 as amended). An employee who is injured by an accident at work is paid compensation from the Accident Fund in respect of temporary disablement, permanent disablement, and death. Medical expenses are payable for a period of two years, or longer if further medical or surgical treatment may reduce the extent of the disablement.²⁰

Additionally the Social Security Commission administers the Development Fund (DF). This was set up to assist unemployed Namibians from socio-economically disadvantaged backgrounds through training and employment schemes and by providing bursaries, loans, and other financial aid to students enrolled at technical or academic institutions of higher education.²¹

3.3 Personal income tax and value added tax in Namibia

Personal income tax is payable by resident and non-resident individuals in Namibia (Republic of Namibia 1981). Individuals may deduct contributions to approved pension, provident, and retirement annuity funds, and premiums with respect to educational policies. The income tax threshold is N\$50,000 and rates are progressive up to 37 per cent (PWC Namibia 2015). The current tax bands are as shown in Table 1.

¹⁷ See Social Security Commission (N.D.a).

¹⁸ See Social Security Commission (N.D.a).

¹⁹ See Social Security Commission (N.D.a).

²⁰ See Social Security Commission (N.D.b).

²¹ See Social Security Commission (N.D.c).

Table 1: Current tax bands

Taxable income (N\$)	Tax rate
Up to 50,000	0%
50,001 to 100,000	18% on amount exceeding 50,000
100,001 to 300,000	9,000 plus 25% on amount exceeding 100,000
300,001 to 500,000	59,000 plus 28% on amount exceeding 300,000
500,001 to 799,999	115,000 plus 30% on amount exceeding 500,000
800,000 to 1,500,001	205,000 plus 32% on amount exceeding 799,999
Over 1,500,001	429,000 plus 37% on amount exceeding 1,500,000

Source: Derived from PWC 2015.

VAT is levied on the supply and import of most goods and the provision of services at a standard rate of 15 per cent (Republic of Namibia 2000). Certain goods and services are exempted while others are zero rated. Zero-rated goods include certain basic food staples e.g. mahango and mahango meal, maize meal, fresh and dried beans, certain cooking oils and fats, bread, sugar, and milk. Postage, telephone and internet charges, domestic fuel, and funeral services are also zero rated. Other services such as electricity, refuse collection, and health care are exempted.

3.4 Policies simulated in NAMOD

For the purposes of this project the following policies were simulated for 2015:

- Child Maintenance Grant
- Foster Care Grant
- Vulnerable Children Grant
- Old Age Grant
- Disability Grant
- Personal income tax
- VAT (only a proportion of VAT will be captured using a household survey).

The two grants that could not be simulated were the SMG for disabled children, and the War WVS. It was not possible to simulate the SMG because there is not a disability question about children in the NHIES (see next section) and so potentially eligible children could not be identified, except by their receipt of the SMG which fails to capture eligible non-recipients. Similarly, as it is not possible to identify war veterans in the NHIES (except by their receipt of the WVS), it was not possible to simulate the WVS either. For the purposes of analysis, the NHIES data on reported receipt of SMG and WVS was retained so that it could be added to the simulations for the other grants in order to analyse the impact of grants on poverty and

inequality. That is, analysis on the impact of grants takes into account *simulated* CMG, FCG, OAG, and DG, and *reported* receipt of SMG and WVS (see section 5). However, in order to facilitate implementation of these policies should appropriate data become available, policies in respect of both SMG and WVS have been prepared but switched off in the model.

There are no variables in the NHIES that enable the Place of Safety Allowance to be modelled. However, this is only a short-term emergency measure and beneficiary numbers are small.

The contributory Employee Compensation Fund and MSDF are not simulated. While it would be possible to calculate contributions made (a percentage of salary paid by the employer/employee in both cases),²² it is not possible to ascertain whether people are eligible to receive the fund as employment history and past contributions are not measured. In any event, such schemes would more typically be simulated using a dynamic (rather than static) microsimulation model.

NAMOD does not include a policy for excise duties as this was not part of the original brief, but there is potential to add this in due course.

The following section provides an account of the dataset that underpins NAMOD, and the various decisions (and in some instances compromises) that had to be made to enable the policies listed here to be simulated.

4 Underpinning microdata for NAMOD

4.1 Strengths and weaknesses of the NHIES as the source for the microdata

When NAMOD was first developed, a review was undertaken of the availability of suitable microdata in Namibia, and the NHIES 2009/10 was identified as the most suitable microdata source as the data was collected quite recently and contains detailed information on household and individual income and expenditure. The 2011 Namibian Population and Housing Census does not include questions about income or expenditure and so could not be used as the underpinning dataset. The 2008 and 2012 Labour Force Surveys could not be used as there is insufficient detail in these surveys about income and expenditure (NSA 2013a).

The next round of the NHIES took place between April 2015 and March 2016 and so is not yet available.²³

The NHIES is a survey targeted at private households in Namibia. Surveys have been conducted by the Namibia Statistics Agency (and its predecessors) in 1993/94, 2003/04, and 2009/10. The main objective of the NHIES 2009/10 was to provide information on patterns of consumption and income and other socio-economic characteristics. The final sample size was 10,660 households, which equates to 2.8 per cent of the households in Namibia (NSA 2012a).

The NHIES income data is usually only released at household level. However, individual-level income data was necessary for our purposes for the following reasons:

²² Employee contributions will be added to NAMOD in due course.

²³ See The Namibian (2015).

- 1) The incomes of individuals within a household will of course vary and in order to undertake microsimulation it is necessary to know to which person the income should be assigned. For example, personal income tax is calculated at individual level.
- 2) The means tests for social grants currently applied in Namibia (for WVS and CMG) are calculated on the applicant's income only (the biological parent in the case of the CMG). This calculation can only be carried out accurately where an individual's own income is known, rather than an income that is some fraction of the household-level income.
- 3) If grant income is only provided at household level it is not possible to determine which individuals within the household are receiving the grants.

It is important to stress that by using the individual-level income data we will obtain very different results from other studies which use aggregate household income data. This is because the published household-level income data was inflated prior to its release to equal household expenditure totals.²⁴ So for example, our approach results in higher levels of poverty than other studies which use the adjusted aggregate household income data.

As no metadata were supplied we used the NHIES questionnaire and data to scope the breadth of policies that could be simulated with the NHIES, assessing the data against the policy rules and EUROMOD requirements. It should be signalled that the NHIES data does have several challenges which can be grouped into three categories: transparency, survey design, and gaps.

Transparency

Multiple extracts of the dataset were supplied to the research team, each time with no metadata, making the assessment of the data more time-consuming and laborious than would usually be the case (nine datasets were supplied successively over an elapsed time of almost a year). This was particularly problematic in relation to the income data. Some datasets could not at first be linked due to missing linkage variables.

Survey design

As will become evident in the next section, there are clearly some fundamental challenges associated with capturing income data at an individual level. Easiest to address, however, are questions relating to receipt of social grants. Grant receipt is assigned to individuals within a household inconsistently. For example, the SMG is sometimes assigned to a child, sometimes assigned to an adult (presumably the child's caregiver), and in some instances is assigned to the child and an adult (again presumably the child's caregiver). For example, only 35 per cent of the SMG recipients in the NHIES are under 16 and the remainder are adults (some of whom live in households with no children). This could be resolved by designing the survey in such a way that ensures that child grants can only be assigned to the relevant child in the household.

Gaps

A number of pieces of information were lacking (either because the questions do not exist as they are not included in the questionnaire, or because they were repeatedly not supplied) which limits the adequacy of the NHIES for use as an underpinning dataset for NAMOD. Some of the gaps have more consequence than others, and are summarized below.

²⁴ Correspondence with Mr Quita Sapalov, Namibia Statistics Agency.

- 1) Information about disability. One of the most important gaps for NAMOD's purposes is information about disability, which is required for simulating the DG (adults) and SMG (children). There is not a question on disability status; however, with regard to adults there is a question on reason for not working in the past seven days, for which one of the responses is 'unable to work due to illness, disabled' (D7). This can be used as a proxy for disability for adults in addition to reported receipt. In the absence of a question on disability for children, and as the data on the reported receipt of grants was problematic (see below) it was not possible to simulate SMG.
- 2) Identification of spouse. Spouse person number is used in EUROMOD for the determination of assessment units and may be used in the calculations of eligibility for benefits where the income of the applicant and spouse needs to be taken into account, or in determining tax deductions on the basis of payments made by the applicant on behalf of his/her spouse and dependants. In fact, in the EUROMOD set-up a partner variable is required, regardless of whether it is actually used to model any policies. The NHIES does not have a household roster, and only provides information on relationship to head of household (and the person numbers of the case's biological mother and father if present in the same household). There is not any information on a person's spouse/partner or other relationships in the household. It is possible, using the relationship to head of household variable, to determine the spouse for the head of household, but other couples will be more difficult to accurately identify. Although the status quo can mostly be modelled without detailed information on relationships, the scope for modelling different policy options (both taxes and benefits) is constrained by the inability to reliably identify an individual's spouse.
- 3) Information about premiums paid for education policies. The NHIES does not have a suitable question on premiums paid for education policies (they are included in a single question on premiums paid by the household for life and endowment policies). Therefore it was not possible to deduct these payments from gross income in the calculation of income tax.
- 4) Section 2.2 on deductions by the employer was not supplied. These questions relate to car loan, housing loan, or mortgage, house rent, income tax, medical aid, insurance, pension, social security, and other deductions.
- 5) Information about prisoners. Low-income parents are eligible to apply for the CMG if the other biological parent of the child is in prison, but information on prison attendance is not included in the NHIES.
- 6) Information about absent biological parents. Eligibility for CMG is determined on the basis of the status of the child's biological parents, including their incomes and whether they are in receipt of OAG or DG (see Table A1 in the Appendix). A considerable number of children live in households with a live biological parent living elsewhere whose status (other than being alive) could not be determined.
- 7) Information about war veteran status. War veteran status was not asked about in the NHIES (and is probably of little relevance in terms of the objectives of the survey). Eligibility for the WVS could have only been modelled using the question on actual receipt (though again there are problems with the data which result from ambiguous questions in the questionnaire resulting in inconsistent data—see the paragraph on survey design above).

- 8) Individual-level expenditure data. Expenditure is only recorded at household level (as in other countries) in the survey and was allocated to the head of household for the purposes of simulating the VAT.

4.2 Data and policy time points

After collating the necessary NHIES datasets, a rectangular file was constructed in STATA using five of the datasets that had been supplied. These comprised four individual-level files and one household-level file.

The NHIES fieldwork was carried out between June 2009 and July 2010 and the monetary variables are an average for the whole period²⁵ so a time point of December 2009 (an approximate mid-point) is assumed. NAMOD Version 2.1 contains tax and benefit policy rules for April 2013²⁶ and June 2015 and so the income and expenditure data was inflated within the model to these two time points using the consumer price index (CPI) (NSA 2013b; NSA 2015).

Furthermore, the weights within the dataset supplied necessarily related to the time of data collection (see above). Given that the policy simulations in the model are for 2013 and 2015, in an ideal situation the weights would be recast to reflect the demographic structure in 2013 and 2015. It is standard practice within microsimulation modelling to re-weight the input dataset to reflect such demographic changes. Unfortunately, mid-year estimate population data for 2013 and 2015 is not available. Consequently, the re-weighting of the data was undertaken to reflect the time point of the decennial Census in 2011. The constraining variables used in the re-weighting were region, age band, and gender. When mid-year population estimates become available it will be a straightforward exercise to re-weight to a more recent time point. The population of Namibia is estimated to have risen from 2.11 million in 2011 to 2.20 million in 2013, and 2.28 million in 2015 (NSA 2014; NPC 2015).

5 Results

5.1 Grant eligibility and receipt

Using NAMOD it is possible to simulate several of Namibia's grants in order to estimate how many people are eligible for each of them. Table 2 shows figures for 2015: the number of eligible people for each grant (column A), as well as reported receipt of the grants in the NHIES (column B) and actual receipt based on administrative data (column C). A take-up rate is presented in the final column, calculated as the number of recipients based on administrative data divided by the number of people identified using NAMOD as eligible for each grant (i.e. C/A). As can be seen and as reported above, it was not possible to simulate the SMG and the WVS using the NHIES; however, we do show reported receipt (B) and administrative data on receipt (C) for these two grants.

²⁵ Correspondence with Quita Sapalov, NSA.

²⁶ April 2013 was the most up-to-date time point available at the time of the initial study. In the SOUTHMOD study all time points have been harmonized to June 2015.

Table 2: Eligibility, receipt, and take-up of grants in 2015

Grant	A Eligible (NAMOD)	B Reported receipt (NHIES using survey weights for 2011)	C Actual receipt (administrative data)	D Take-up rate (C/A) %
Child Maintenance Grant	108,880	29,846	131,230**	120.5
Foster Care Grant	31,498	8,458	20,018**	63.6
Vulnerable Child Grant	122,382	N/A	21,153**	17.3
Old Age Grant	149,329	64,363	152,272***	102.0
Disability Grant	33,683	14,910	31,663***	94.0
Special Maintenance Grant*	-	5,956	4,972**	-
War Veterans Subvention*	-	3,504	-	-

Note: (*) Could not be simulated in NAMOD due to lack of information in the NHIES. (**) June 2015 supplied by Ministry of Gender Equality and Child Welfare. (***) June 2015 supplied by Ministry of Poverty Eradication and Social Welfare.

Source: Column A: Authors' calculations using NAMOD Version 2.1; Column B: NHIES 2011; Column C: see Note; Column D: Authors' calculations.

There are very large discrepancies between reported receipt in the NHIES (in column B) and actual receipt based on administrative data (column C). The discrepancies are likely to exist for a number of reasons including a probable increase in grant take-up rates between 2009 when the NHIES was in the field and 2015 (the time point of the administrative data); re-weighting the NHIES data to 2011 (as undertaken here) would not take a significant increase in take-up into account. A second possible reason is that the NHIES may under-capture receipt of grants: it is common internationally for survey data to under-capture grant receipt. A third possible reason could be errors of inclusion in column C (i.e. the presence of ineligible recipients within the administrative data system).

Column A shows the number of people that have been identified using NAMOD to be eligible for each of the grants. The OAG was the most straightforward grant to simulate. Using the simulated figure (column A) for the number of older people who are eligible for OAG, this yields a take-up rate of 102 per cent. For the DG, NAMOD identifies 33,683 people as eligible, which generates a take-up rate of 94 per cent.

The take-up rate for FCG in 2015 was 63.6 per cent. Two things should be kept in mind when considering this take-up rate: first, it is of course possible for children to be put into the custody of a temporary carer even though their biological parents are alive, whereas in NAMOD potentially eligible children are identified solely on the basis of being double-orphans; and second the 2009/10 NHIES identifies more double-orphans than the 2011 Census (the Census has 22,833 double-orphans aged less than 18, and 24,500 double-orphans aged 18–24)²⁷. If the higher levels of double-orphanhood amongst the 18–24s than the 0–17s in the Census signify that double-orphanhood amongst children is reducing, then the earlier time point of the NHIES should imply that there would at that point have been more double-orphans aged 0–17 than at the time of the 2011 Census. Again, re-weighting the NHIES to a 2011 time point (as undertaken here) would not take any subsequent decrease in double-orphanhood into account.

The CMG is the most complex to interpret given the nature of the grant's rules. It is also simulated using a means test and so is dependent on the quality of the income data. Using NAMOD, 108,880 children were identified as eligible for CMG, which gives a take-up rate of 120 per cent.

²⁷ Figures supplied by UNICEF Namibia.

The VCG was simulated based upon full roll-out of the grant (whereas in reality there have, to date, been only limited time windows for registration for this new grant).²⁸ According to the analysis conducted here, the current take-up rate for this grant is just 17.3 per cent. As the grant is rolled out more widely, it is anticipated that this take-up rate will increase.

If there was a hundred per cent take-up of the simulated grants, their cost in 2015 (excluding administrative costs of providing the grant) would have been N\$326.6m for CMG, N\$94.5m for FCG, N\$1792m for OAG, and N\$404.2m for DG per year.

5.2 Personal income tax and VAT

Personal income tax and VAT were both simulated for 2015. Table 3 below shows the simulated amounts and the reported amounts from the Ministry of Finance. As can be seen, the simulated personal income tax is only 29.7 per cent of the Ministry of Finance's (MoF) figure, and the simulated VAT is only 19.2 per cent of the MoF's figure.

Table 3: Simulated and reported personal income tax and VAT in Namibia in 2015

Tax	Simulated N\$ A	Reported N\$ B	Extent of Capture (A/B) %C
Personal income tax	3,210,797,568	10,794,000,000	29.7
Value added tax	2,236,806,656	11,678,000,000	19.2

Source: Simulations from NAMOD V2.2; Administrative data comprises revised budget for 2015/16 for 'Income tax on individuals', and 'VAT + Additional Sales Tax + General Sales' (MoF 2016: 26).

The simulated personal income tax is very low, and is probably due to under-reportage of income in the NHIES. It may also reflect the fact that high-income people are often less likely to agree to participate in a survey and so they could well be under-represented in the NHIES. This additionally highlights the importance of incorporating the new NHIES as an underpinning dataset when it is released: the new NHIES will not only be much more up-to-date but is likely to have captured incomes more effectively, which will increase the amount of personal income tax simulated.

Unlike with personal income tax, a household survey cannot be expected to capture all income streams for VAT as not all expenditure is made by households, and so it should not be expected that NAMOD would simulate VAT amounts similar to the total reported VAT income.²⁹

5.3 Impact of grants on poverty and inequality

It is possible using the output data from NAMOD to explore the impact of grants on poverty and inequality in Namibia. Table 4 below shows the extent of poverty before grants and after grants. For this analysis we used the poverty lines reported in NSA (2012c) which were then adjusted using the CPI to a 2015 time point. The equalization scales were used as in NSA (2012c). The poverty head count (P0) refers to the proportion of people that fall below the poverty line. The poverty depth measure (P1) summarizes how far people are from the poverty line. The poverty severity measure (P2) places greater emphasis on people that are further away from the poverty line (Foster et al. 1984).

²⁸ Personal correspondence with UNICEF Namibia.

²⁹ The proportion of VAT captured (19.2 per cent) is very similar to the proportion of VAT captured in South Africa (19.3 per cent) using SAMOD (Wright et al. 2011: 21).

An important distinction must be signalled between the poverty analysis presented here and the poverty analysis presented in NSA (2012c): the analysis presented in this report uses *income* data, whereas NSA (2012c) is based on *consumption* data. As the NHIES data yields consumption data that far exceeds the income data, the poverty figures presented here will inevitably be *higher* than those derived using expenditure data.

The ‘before-grants’ scenario is based on income having excluded all reported or simulated grants. The ‘after-grants’ scenario includes within the income data the simulated receipt of CMG, FCG, VCG, OAG, and DG, and reported receipt (in NHIES) for SMG and WVS.

Table 4: Impact of social security on ‘severe poverty’ in Namibia in 2015

Poverty	‘Before grants’	‘After grants’
P0	0.63	0.49
P1	0.48	0.25
P2	0.41	0.17

Note: Poverty line set at N\$367.19 per adult equivalent per month.

Source: Authors’ calculations using NAMOD Version 2.1.

In Table 4 we see that 63 per cent of the population are in severe poverty ‘before grants’ i.e. in a situation with no social assistance/social allowances. The ‘after-grants’ scenario in the final column shows that social grants reduce poverty by 14 percentage points, to 49 per cent. The ‘after-grants’ figures for the poverty depth (P1) and poverty severity (P2) measures also reveal the poverty alleviating impact of the grants. It must be remembered that the ‘after-grants’ scenario adds in the simulated CMG, FCG, OAG, and DG assuming *full take-up*. It should also be noted that the ‘after-grants’ scenario includes *reported* (in the NHIES) receipt of SMG and WVS as these grants could not be simulated in NAMOD. If WVS is significantly under-reported in the NHIES then the ‘after-grants’ poverty rates would fall further if WVS could either be simulated in NAMOD or was better captured by the NHIES.

Table 5 presents the same analysis but this time uses the higher poverty line of N\$500.04 per adult equivalent per month. Using this threshold, the grants have reduced poverty by 8 percentage points from 68 per cent to 60 per cent.

Table 5: Impact of social security on ‘poverty’ in Namibia in 2015

Poverty	‘Before grants’	‘After grants’
P0	0.68	0.60
P1	0.53	0.33
P2	0.45	0.22

Note: Poverty line set at N\$500.04 per adult equivalent per month.

Source: Authors’ calculations using NAMOD Version 2.1.

If we measure the impact of social security on inequality in Namibia, the Gini coefficient ‘before grants’ is 0.79 whereas ‘after grants’ it falls to 0.69.

6 Conclusion

Microsimulation modelling requires access to robust microdata which contains all the necessary variables that are required to simulate a country’s tax and benefit policies that relate to individuals. This version of NAMOD has a number of strengths: it uses reasonably up-to-date data that has been collected by government, and is built using the EUROMOD platform which has been developed over many years and used in a large number of countries including most

locally South Africa. NAMOD contains the policy rules for each of the grants as well as VAT and personal income tax.

The current version of NAMOD is undermined by the underpinning dataset. The data required to ascertain eligibility for certain policies is not available in the NHIES and so the SMG and WVS could not be simulated. There were also a number of other challenges related to the NHIES data (see Section 4) and it is recommended that these issues are explored further. Any improvements that can be made will enhance future versions of the NHIES which could in turn be used by NAMOD as an improved underpinning microdataset.

In spite of these challenges, NAMOD provides a starting point from which government can explore issues such as promoting take-up of grants or making changes to the social security system. The use of NAMOD will additionally enhance the use and scrutiny of NHIES data within government and academia, encourage debate about the strengths and weaknesses of survey and administrative data, as well as provide a tool for considering ways in which poverty and inequality can be reduced in Namibia.

Finally, NAMOD is now part of a broader initiative which is being led by UNU-WIDER in collaboration with the University of Essex and SASPRI to promote tax-benefit microsimulation modelling in developing countries. This initiative includes the development of models with country partners in Tanzania, Mozambique, Zambia, Ghana, and Ethiopia, as well as Vietnam and Ecuador further afield. There is therefore an expanding group of people with familiarity with the EUROMOD interface who are undertaking modelling in developing countries using the EUROMOD platform which offers many opportunities for shared learning.

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Appendix

Table A1: Classification of NHIES children by biological parent's status and presence in child's household

Group	Bio mother in hh	Bio father in hh	Bio mother alive	Bio father alive	Is their child potentially eligible for CMG?*
1	✓	✓	✓	✓	Yes if one or both of the parents receives OAG or DG. Note: no means test is applied (MGECW).
2	✓	x	✓	✓	Yes if mother is in receipt of OAG or DG. Note: no means test is applied ((MGECW).
3	✓	x	✓	x	Child is a single-orphan. Yes if mother's income falls below means test.
4	x	✓	✓	✓	Yes if father is in receipt of OAG or DG. Note: no means test is applied ((MGECW).
5	x	✓	x	✓	Child is a single-orphan. Yes if father's income falls below means test.
6	x	x	✓	✓	Child is not an orphan but not living with a biological parent. We cannot consider these children in NAMOD for CMG as the grant is routed through the biological parent and neither of them live in the child's household.
7	x	x	✓	x	Child is a single-orphan but not living with a biological parent. We cannot consider these children in NAMOD for CMG as the grant is routed through the biological parent and neither of them live in the child's household.
8	x	x	x	✓	Child is a single-orphan but not living with a biological parent. We cannot consider these children in NAMOD for CMG as the grant is routed through the biological parent and neither of them live in the child's household.
9	x	x	x	x	These are double-orphans so are eligible for FCG and therefore not considered in NAMOD for CMG

Note: *Other criteria are applied relating to the child's age and education status.

Source: Authors' illustration.