EXPERT PANEL ON

BASIC INCOME SUPPORT

SUPPLEMENTARY MODELLING REPORT

REPORT INTO THE APPROPRIATENESS AND FEASIBILITY OF A SYSTEM OF BASIC INCOME SUPPORT FOR SOUTH AFRICA

A report produced under the supervision of the International Labour Organisation for the Department of Social Development and the South African Government

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PANEL MEMBERS:
Alex van den Heever: Chair • Margaret Chitiga-Mabugu • Jan van Heerden • Michael Noble

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ABBREVIATIONS

BIG	Basic Income Grant
BIS	Basic Income Support
CGE	Computable General Equilibrium (model)
COVID-19	Coronavirus disease of 2019
COVID-SRD	Special Social Relief of Distress Grant created during COVID-19
CPI	Consumer Price Index
CT	Corporate Tax
DSD	Department of Social Development
DSLI	Decent Standard of Living Index
EPWP	Expanded Public Works Programme
ETI	Employment Tax Incentive
FPL	Food Poverty Line
FTAA	Free Trade Area of Americas
GDP	Gross Domestic Product
HFIAS	Household Food Insecurity Access Scale
IEJ	Institute for Economic Justice
IMF	International Monetary Fund
LBPL	Lower Bound Poverty Line
MS	Microsimulation
NIDS	National Income Dynamics Study
NSNP	National School Nutrition Programme
OECD	Organisation for Economic Co-operation and Development
OPG	Older Persons Grant
PIT	Personal Income Tax
SALDRU	Southern Africa Labour and Development Research Unit
SAMOD	South African Tax-benefit Microsimulation Model
SASSA	South African Social Security Agency
CGE-Sim	Computable General Equilibrium Model Simulation
SRD	Social Relief of Distress Grant
UBIG	Universal Basic Income Grant
UBPL	Upper Bound Poverty Line
UNICEF	United Nations Children's Fund
VAT	Value Added Tax
WS	Wage Subsidy

Part 1

Purpose and approach to the work of the panel

An overview is provided of the members and terms of reference of the Panel.

PART 1.1 : PURPOSE

1. This Expert Panel (Panel) was established as part of an International Labour Organisation (ILO) initiative together with the Department of Social Development (DSD) to examine the salience and feasibility of a Basic Income Grant option for South Africa.
2. This is a further iteration of the BIS Expert Panel (Panel 1) work carried out in 2021 (BIS Expert Panel, 2021) and has been constituted to examine the economic and social effects of the COVID social relief of distress (SRD) Grant as presently implemented.
3. In this respect the analytical focus is narrower than before and should be read in conjunction with the 2021 Panel 1 report.

PART 1.2 : PANEL MEMBERS

4. The panel of experts for this round, Panel 2, is made up of specialist expertise in microsimulation modelling in the field of social protection; computable general equilibrium (economic) modelling; and public finance.
5. The panel deliberations also involved staff from the Social Security division of the Department of Social Development (DSD) and the ILO regional office based in South Africa.
6. Members of the Panel:
    - 6.1. Prof (adjunct) Alex van den Heever: Panel Chair;[1]
    - 6.2. Prof Margaret Chitiga-Mabugu;[2]
    - 6.3. Prof Jan van Heerden;[3] and
    - 6.4. Prof Michael Noble (CBE)[4].
7. The scope of work of for Panel 2 involves the following:
    - 7.1. Building on the work performed by the 2021 EP, perform follow-up economic and costing analyses of BIS options, focusing only on the short- and medium-term.
    - 7.2. The evaluation addresses the following with respect to the COVID SRD Grant as presently implemented:
        - 7.2.1. financing options, on the assumption that the grant would need to be fully financed out of new taxes;
        - 7.2.2. economic implications at national and provincial levels, including household consumption and sectoral output changes;
        - 7.2.3. poverty and inequality outcomes at national and provincial levels; and
        - 7.2.4. comparative analyses of a wage subsidy approach targeted at the lowest income categories in employment.

1 Holds the Chair of Social Security Systems, Administration and Management Studies at the Wits School of Governance.

2 Dean of the Faculty of Economic and Management Sciences, University of Pretoria.

3 Professor of Economics in the Faculty of Economic and Management Sciences at the University of Pretoria.

4 Director and Senior Research Fellow at the South African Social Policy Research Insights (SASPRI). He is Emeritus Professor of Social Policy at the University of Oxford in the UK, Emeritus Fellow of Green Templeton College at the University of Oxford. He is a Research Affiliate, Centre for Microsimulation and Policy Analysis, at the University of Essex. His main research interests are in poverty, deprivation, inequality, tax policy and social security policy particularly in sub-Saharan Africa. He specialises in quantitative research methods and tax-benefit microsimulation and is committed to evidence-informed policy making.

Part 2

Approach

The approach to the analyses carried out for this report are outlined here.

PART 2.1 : INTRODUCTION

9. In the Panel 1 report (BIS Expert Panel, 2021) the terms of reference were broader and included a substantial contextual review together with a strategic modelling exercise. This report does not repeat the contextual review and instead builds on the modelling work only.
10. The original analysis examined the implications of a Basic Income Support grant (BIS) at scale. The purpose was to understand the economic, fiscal and social outcomes of a standard version of a support grant.
11. The key features of the modelled versions of the BIS involved a grant allocated to income-compromised adults from the ages of 18 to 59. Two models were used. A microsimulation model (MS) and a computable general equilibrium (CGE) model.
12. The MS model examined 15 policy scenarios to offer an indication of both cost and social impact with grants that vary the benefit value and the applicable means tests (including universal options). Out of these, three were selected for analysis using the CGE model.
13. Of these three scenarios, only one was examined with multiple simulations. This was a means tested grant with a benefit value set at the lower bound poverty line (LBPL) and a means test equivalent to that applied to the Child Support Grant (GSG).
14. The results indicated that it was possible to implement a grant of this nature with economic growth protected, a balanced budget approach and important redistributive affects.
15. Flowing from this analysis it was concluded that:
    - 15.1. The SRD arrangement posed limited economic and fiscal risks and should be made permanent.
    - 15.2. To minimise behavioural impacts on the tax system, it was proposed that a phased approach be adopted for the progressive enhancement of the SRD benefit over time with the objective, together with the overall social assistance framework, of eliminating poverty at the upper bound poverty level (UBPL).
    - 15.3. An entry-level version of the grant, the BIS, should be considered at the starting benefit value set at the LBPL.
16. As the initial report focused on the strategic outcomes of a large version of the BIS, it did not examine in detail the medium-term options for the grant.
17. The practical medium-term considerations for Government, however, need to prioritise the stabilisation of the SRD Grant, together with adjustments to keep pace with inflation and to build in some progressive improvement.
18. This iteration of the Expert Panel (Panel 2) therefore focuses exclusively on the SRD Grant as implemented to understand the economic, fiscal and social implications of making it permanent.

Part 2.2 : WHAT DO WE NEED TO UNDERSTAND?

19. Social grants are government transfers to households which effectively reflect a redistribution of income from high-income households to low-income households.
20. The redistributive nature of such grants however raises concerns about the impact they may have on economic growth and the possible incentive effects on those who must pay for the grant.
21. Consistent with such concerns are policy prescriptions that argue for growth strategies to be prioritised that directly address unemployment as the central lever to alleviate poverty and income inequality. Such approaches keep redistributive strategies, such as social grants, to a minimum until such time as growth has provided fiscal space for grater social generosity.
22. Conversely, it can be argued that social grants, up to an optimal threshold, yield positive economic and social outcomes. In this view, suboptimal transfers below such a threshold systematically distort growth capabilities downward, resulting in structural unemployment, permanent strata of extreme poverty and structural income inequality.
23. At face value both arguments can appear plausible. Both arguments support the view that economic growth is important but differ on the role of social factors in promoting that growth. The former downplays the role of social factors, while the latter sees them as a central feature of long-term growth performance.
24. As was noted in Panel 1, evidence is emerging in favour of the second argument, suggesting that narrow growth strategies result in less sustainable growth over time (Halter, Oechslin, & Zweimüller, 2014; OECD, 2021; Ostry, Berg, & Tsangarides, 2014; Piketty & Saez, 2014).
25. However, policy strategies are invariably shaped by the local context. What works well in one setting may not work well in another.
26. South Africa, for instance, can be classed as a small open economy, limiting the opportunities for the competitive expansion of manufactured products, both for domestic and international consumption. Redistributive strategies that would work well in Brazil or India may therefore prove counterproductive in South Africa.
27. What appears settled in the international research, is that positive redistribution is necessary to address the systematic distributional failures of all market economies. Such strategies are not anti-market, but rather mitigate their harmful features while simultaneously expanding an economy's long-term growth capabilities.
28. Differences in the pre- and post-redistribution positions of all OECD countries indicate that all the most industrialised countries in the world experience inequality and poverty broadly equivalent to that of South Africa, but for their redistributive policies (see for instance Department of Social Development & Wits School of Governance, 2021, p. 24).
29. The question, therefore, is not whether there is a trade-off between growth and redistribution, but rather whether it is properly understood how to progressively deepen redistribution in a sustainable way that is sensitive to the domestic context.
30. It is probable that there are growth/redistribution trade-offs if redistributive policies are pursued without careful consideration of fiscal effects and temporary but unsustainable changes in household demand.[5]
31. Understanding how to build sustainable income-redistribution policies in context is however poorly researched in South Africa, either empirically or through modelling.
32. It is for this reason the work in Panels 1 and 2 was pursued.

5 This aspect is fully discussed by the BIS Expert Panel (2021)

33. The primary question before Panel 2, therefore, is whether it is possible to implement income redistribution in the form of the SRD Grant on a permanent basis in such a manner that economic growth and public finances are protected?
34. The research in Panel 1 concluded that the lowest risk approach to the implementation of the BIS as a permanent grant was to fully finance it from tax revenue rather than to rely on debt financing. This is referred to here as a balanced budget approach to finance the outlay.
35. In addressing the primary question, the following additional questions also need to be considered.
    35.1. Assuming a balanced-budget approach to financing the transfers, what is the optimal mix of financing options?
    35.2. How are poverty and inequality affected by the transfers, both nationally and provincially?
    35.3. What are the affects by economic sector of the transfers, both nationally and provincially?
    35.4. Are the outcomes of the SRD Grant likely to be replicated for real improvements in the benefit value and eligibility criteria?
    35.5. How government do funded employment strategies compare to social transfers?
    35.6. What happens when we combine social transfers with employment strategies?

Part 2.3 : APPROACH

36. Following the approach used by Panel 1, a MS model is used in conjunction with a CGE model. There are some important differences from the models used by Panel 1.
    36.1. First, the MS model has been updated to allow for more discrete tax options to be examined.
    36.2. Second, a different CGE model is used which can examine a more disaggregated breakdown of households by income and provide results by province.
37. The Panel 1 report provides a review of both MS and CGE models and their potential for use iteratively which is not repeated here.[6] Nevertheless, the following concluding remarks from Panel 1 are re-stated here as they are applicable to this report.
    37.1. "*Microsimulation approaches are useful in illustrating direct costs, distributive effects (poverty and inequality and direct tax implications. However, their static top-down design features cannot properly examine economic multiplier effects and any behaviour changes.*" (BIS Expert Panel, 2021, p. 143)
    37.2. "*Computable general equilibrium (CGE) models offer the opportunity to examine more indirect effects of a policy within reasonable parameters. However, their ability to assess long-term supply-side effects cannot be relied upon. As with other types of economic model, the immediacy of certain effects may be overstated.*" (BIS Expert Panel, 2021, p. 143)
    37.3. "*The use of CGE models together with microsimulation models is increasing in attempts to take advantage of what each does well. This extends to iterative simulations where the outputs of one become the inputs of the other in several simulation cycles.*" (BIS Expert Panel, 2021, p. 144)
    37.4. "*The use of models for policy analysis however comes with a health warning. Economic models only provide broad indications of how aspects of the economy may react to policy designs and are as good as the model designs and assumptions. They cannot however be used as projections or even firm indications of a holistic economic response.*" (BIS Expert Panel, 2021, p. 144)
    37.5. "*Model results should therefore always be interpreted, with consideration given to how features of the real-world economy that cannot be accurately modelled may qualify the model results.*" (BIS Expert Panel, 2021, p. 144)
38. The approach adopted by Panel 2 is in essence the same as for Panel 1, apart from changes to the models used and the policy scenarios.

6 See BIS Expert Panel (2021, Part 3).

Part 3

The Models

This part provides an overview of the models used and their key assumptions.

PART 3.1 : THE COMPUTABLE GENERAL EQUILIBRIUM MODEL

39. To model the provision of SRD grants to all qualifying households, as well as the financing of the grants, the South African version of the "TERM[7]" model of Australia is used[8].
40. It is a bottom-up multi-regional CGE model which treats each province of South Africa as a separate economy. The model simulates the effects of the grants on the national economy, but also on each provincial economy. Moreover, it measures the impact of regional shocks in some of the provinces on other provinces and the national economy.
41. The model has 30 main industry groups, and 30 commodities.
    41.1. Each industry could theoretically produce all the commodities, but the model has been simplified such that each industry mostly produces just one or two commodities.
    41.2. There are four final demanders in each region: households, investors, governments and foreign buyers (which could be foreign households, investors, industries or governments).
    41.3. A useful feature of the model is that it also measures regional imports and exports, and these prove to play a significant role in the determination of provincial gross geographic products (GGPs) and other macroeconomic variable values.
42. Unlike the Australian version of TERM, there are multiple households, namely twelve groups distinguished by income. The poorest decile is split into two ventiles, the next eight are by decile, and the richest decile is split into two ventiles.
43. The model can therefore measure changes in the distribution of income or poverty levels on both a national and provincial level.
44. The basic production function for all industry production is the Leontief function, which means that inputs into the production process are used in fixed proportions. If an industry wants to double output, it must therefore double all inputs, irrespective of input prices.[9]
45. Transportation costs play a very important role in the model and is included in the purchaser's price of a commodity.
    45.1. A buyer would therefore rather source from a nearby industry than from one far away.
    45.2. Distances between the capitals of the nine provinces as well as to the different ports of import and
    44.3. export are used to build a gravity mechanism, determining where industries would source their inputs from, or which ports of import and export they will use.
46. The demand for factors of production also follows the constant elasticity of substitution (CES) functional form. An average level of factors grows proportionally with output, but an industry could substitute labour for capital or vice versa.
47. Labour demand is also modelled using the CES demand functional form. Once the industry has decided about the capital-labour ratio it prefers, different occupational groups (there are 11 in the model) are chosen. Different wage levels play a strong role, as well as the substitutability of one occupation for another.
    47.1. If a university wants to accept more students, it will need more personnel of all types, but a security guard could hardly be a substitute for a professor.
    47.2. The university would look at the cost of one occupational group relative to another, but price is not the

7 The "Enormous Regional Model".

8 The model was built by a PhD student in Economics at the University of Pretoria, Mr Francois Stofberg, and refined by Profs Mark Horridge of the Center of Policy Studies in Melbourne, and Prof Jan van Heerden, University of Pretoria.

9 It works like grandma's cookies: if she wants to double the output, she needs to double the amount of flour, sugar, baking powder, and primary factors used to produce the cookies. She cannot substitute sugar for flour if flour becomes too expensive relative to sugar, because then the cookies will flop. However, grandma can choose where to buy the needed amount of flour, depending on different suppliers' prices, and her demand for specific inputs follows the constant elasticity of substitution form. Depending on relative prices and the substitutability of the goods from different sources, she will decide where to source the flour from. For example, she could source from the domestic market or from abroad. She will look at the relative prices between domestic flour and imported flour, as well as how substitutable the two types of flour are, and then decide

only factor. The substitutability of one group for another also plays a role.

47.3. This is generally how the CES function works, and this functional form is utilised throughout the model.

48. Export demand is a very simple function of domestic versus foreign prices of commodities.

48.1. If South Africa's price levels increase relative to world prices, which are exogenous in our model, then the demand for South African commodities decrease.

48.2. Since South Africa is a small open economy, exports play a significant role in the model.

49. Household demand follows the Linear Expenditure System (LES) format.

49.1. Households have a subsistence demand for all commodities, which they will buy first, without looking at the price of the goods.

49.2. They will then use the money left over in their budgets to buy "luxury" components of the same goods.[10]

49.3. The price of petrol will, for instance, affect the amount of petrol that is consumed. On a national or provincial level, the subsistence demand is only a function of the size of the population, but luxury demand is a function of the disposable incomes of households.

50. Unlike households, who maximise utility subject to budget constraints and industries who minimise costs or maximise profits given certain quantities to be produced, there is no theory of government behaviour.

51. Government is modelled in two possible ways:

51.1. exogenously, with its behaviour determined by the modeler (from information published by the government itself, such as in the regular medium-term budget information sessions); or

51.2 endogenously, and specifically tied to household behaviour.[11] [12]

52. Governments receive direct and indirect tax income, as well as transfers from all the role-players in the economy.

52.1. The indirect taxes could be modelled as general sales taxes (GSTs)[13] or a value added tax (VAT) system. Only the latter is used in this exercise, as South Africa has a VAT system.

52.2. Individual households as well as companies pay direct income taxes as well. The model therefore includes production taxes and subsidies.

52.3. Government could also borrow and build up debt over time, which needs to be serviced on an annual basis. Simulations in this Panel 2 exercise keep the annual government budgets balanced. In other words, the grants transferred to households need to be financed either by indirect or direct taxes, or a combination of the two.

53. The general method of performing dynamic simulations with a CGE model is to start with a baseline forecast of the macroeconomy, without any grants given. A second forecast, the policy simulation, is then performed and compared to the baseline. The model reports the deviations from the baseline that happen as a result of the policy simulation.

10 It works like grandma's cookies: if she wants to double the output, she needs to double the amount of flour, sugar, baking powder, and primary factors used to produce the cookies. She cannot substitute sugar for flour if flour becomes too expensive relative to sugar, because then the cookies will flop. However, grandma can choose where to buy the needed amount of flour, depending on different suppliers' prices, and her demand for specific inputs follows the constant elasticity of substitution form. Depending on relative prices and the substitutability of the goods from different sources, she will decide where to source the flour from. For example, she could source from the domestic market or from abroad. She will look at the relative prices between domestic flour and imported flour, as well as how substitutable the two types of flour are, and then decide.

11 If households prosper, governments will receive more tax revenue and be able to spend more, and therefore also prosper; however, if the population suffers and has little money to pay as taxes to the government, the government will also have to tighten the belt buckle.

12 It is also possible to have a counter-cyclical response to what households do.

13 A GST would tax all transactions at a given rate. This will include inter-industry transactions, which would result in different effective consumption tax rates on final demand. A value-added tax (VAT) however eliminates the inter-industry consumption taxes and applies the relevant tax rate exclusively to final demand.

PART 3.2 : THE MICROSIMULATION MODEL

54. The analysis for this modelling exercise was undertaken using a South African tax-benefit microsimulation model called 'SAMOD'.[14]
55. SAMOD is a static tax-benefit model which measures the first order effects of policy reforms and has been used extensively for policy research (Wright & Mpike, 2021).
56. The model has an underpinning dataset that was derived from the fifth wave of the National Income Dynamics Study (NIDS) (SALDRU, 2018).
57. NIDS is a national panel study carried out by the University of Cape Town. Although it is designed as a panel study, a specific set of weights enables the dataset to be used as a cross-sectional nationally representative dataset (Branson and Wittenberg, 2019).
58. The underpinning dataset was adjusted for the Panel 1 study by recasting the survey weights to reflect the most up-to-date available data about demographic and labour market changes that had occurred since 2017 when the fifth wave of NIDS was conducted.[15]
59. This reweighting step was necessary to ensure that SAMOD's input dataset reflects demographic and labour market changes since 2017, including the impact of the pandemic and associated lockdown on people's incomes.
60. Without this modification, the pre-pandemic labour market situation would be reflected in the input dataset which would understate the extent of poverty.
61. Nevertheless, the COVID-19 pandemic continued throughout 2021 and 2022 and so any estimates of costs for means-tested options relies on the assumption that circumstances in 2022 will remain broadly the same as in the final quarter of 2020.
62. An important change to the underpinning dataset for this study was the inclusion of expenditure data from the fifth wave of NIDS. Although the expenditure data in NIDS is not as detailed as in other surveys, 72 categories of expenditure could be incorporated into the input dataset.
63. Zero-rated and exempt items are identified as fully as possible given the broad nature of some of the expenditure categories in NIDS.
64. This allowed a simulation of VAT to be undertaken in SAMOD for the first time using NIDS data. This simulation captured 73% of total VAT in the base year (2017), a respectable result as a household survey will never capture 100% of VAT.[16]
65. Within SAMOD it is possible to simulate the eligibility criteria of an SRD Grant/BIS very precisely to estimate who is eligible for the SRD/BIS as well as the cost.
66. The simulated results enable the impact of a range of different options to be tested, in terms of their cost and distributional impact. These are estimates of the first-order effects - or the next-day financial impact - of the interventions, and so do not shed light on behavioural responses to the policy changes.
67. The baseline or counterfactual is the 2022 tax-benefit policies with no SRD Grant or BIS.

14 SAMOD Version 7.5 - BISEP was used for this study and was run using EUROMOD microsimulation software version 3.4.4.

15 Specifically, the survey weights were adjusted to reflect the 2020 mid-year population estimates supplied by Statistics South Africa, and the labour market profile of the final quarter of 2021 using the Quarterly Labour Force Survey (Statistics South Africa, 2021). The technique for adjusting the weights in this way is called iterative proportional fitting (IPF) (also referred to as 'raking') and the Stata .ado file 'ipfraking' was utilised for this purpose. For further details about this technique see Appendix B of (Barnes et al., 2021).

16 For comparison, the simulation of VAT in SAMOD using the Living Conditions Survey yielded 69% of total VAT.

Part 4

Model scenarios

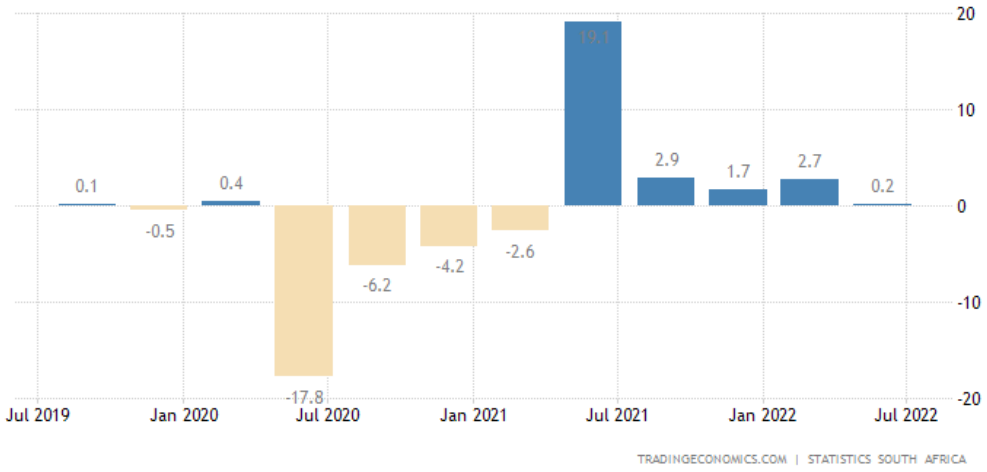
This part of the report describes the model scenarios analysed and their associated assumptions.

PART 4.1 : CGE MODEL ASSUMPTIONS

Baseline CGE Forecast

68. The first step in a modelling simulation exercise is to run a baseline forecast. This would typically incorporate macroeconomic forecast data from inter alia the National Treasury (of South Africa) and the World Economic Outlook Database from the International Monetary Fund (IMF).
69. The forecasts used are of the GDP expenditure components, employment and population growth. The various tax rates are not altered in the baseline simulation. Tax revenue in the baseline is calculated from initial tax rates in the model database and the underlying performance of the relevant economic drivers.
70. The year of the database is 2016, which is the same as in the modelling exercise conducted by Panel 1. The Social Accounting Matrix (SAM) devised by van Seventer and Davies (2019) is used to extend the model database which was built from Statistics South Africa's Supply-Use Tables (Statistics South Africa, 2019).
71. As is the case with most other economies in the world, South Africa is still recovering from the effects of Covid-19 pandemic. This complicates the baseline economy from 2016 onwards as the GDP changes involved large upward and downward movements (together with all the related macroeconomic variables) (Figure 4.1).

Figure 4.1: South Africa's Annual Growth Rate



Source: Statistics South Africa

72. The approach adopted therefore used a "vanilla" baseline [17], which assumes a smooth growth path for GDP, followed by similar growth paths for the GDP expenditure components of household consumption, investment expenditure, government expenditure, exports, population growth and employment.
73. Gross domestic product and most other variables are therefore allowed to grow at 2.0% per annum for the duration of the forecast period, with government expenditure above 2.0% and employment below. This reflects historical patterns.
74. Were the data from Figure 4.1 used, all the variables in the model would oscillate between positive and negative numbers and it would be difficult to obtain a stable forecast. The variables would rather diverge from an equilibrium.[18] [19]

17 Proposed by Prof Mark Horridge who is one of the original developers of the CGE model used in this exercise.

18 The model equations are mostly written in percentage change form, and it is impossible to determine the percentage change in a variable that changes from a positive to a negative number, and vice versa. (What is the per cent change from -1 to +1, for example?).

19 The word "forecast" is significant. While some true values of the variables used in the model are known – the historical ones – most are forecast far into the future without knowing what the future will hold. A stable baseline forecast is therefore adopted rather than a very unstable one containing a few correct historical values.

Simulations

75. The two models (CGE and MS) are applied in accordance with their relative strengths to examine the relevant policy options.
    75.1. First, the MS model examines first order costs and distributional effects.
    75.2. Second, the CGE model analyses long-term structural economic effects.
76. In contrast to the analyses performed by Panel 1, both Panel 2 models explore outcomes for a wider set of households at both a national and provincial level.
    76.1. Panel 1 examined results by decile (one tenth).
    76.2. Panel 2 continues to use deciles but splits the top (decile 10) and the bottom (decile 1) into ventiles (one twentieth) to provide more clarity on the impacts on the top and bottom earners.
77. The policy options and simulations are coordinated, with some important iterations between the two.
    77.1. Information on the grant impact by decile and ventile are generated using the MS model and used as shock variables in the CGE model.
    77.2. The CGE results for household disposable income are supplied to the MS model to calculate long-term gini coefficients[20] and poverty outcomes by province and nationally.
78. Similar to the Panel 1 work, a distinction is made between policy options and simulations.
    78.1. The former refers to a strategic intervention, such as the SRD Grant programme.
    78.2 The latter refers to alternative approaches to the achievement of the strategic interventions.
79. Two main policy options (interventions) are analysed:
    79.1. first, is the SRD Grant; and
    79.2. second, is a wage subsidy (WS) for low-income workers.
80. The WS subsidy is used to examine a complementary policy option to the SRD Grant and to understand how it impacts differently on social and economic outcomes.
    80.1. The WS is given to the four lowest earning occupational groups, on the assumption that this will reduce their cost of employment, thereby increasing labour demand for these occupations.
    80.2. The occupational groups are: domestic workers, elementary workers, operators and skilled agricultural workers.
    80.3. While similar, the WS differs from the present Employment Tax Incentive (ETI)[21], which is not expressly targeted by occupational group and can be claimed by a wider range of income groups. The WS is therefore more redistributive than the ETI.
81. Four CGE simulations are performed for the two policy options: two for the SRD Grant; one for the WS; and one combined SRD Grant and WS. The model is set to balance any new expenditure with a tax increase as required. The only decision to be made, is which tax to use. Two tax options are considered, VAT or Personal Income Tax (PIT)
82. All four simulations adopt a balanced budget approach.
    82.1. **CGE Sim 1 - SRD VAT:** the SRD Grant outlay is primarily financed using an exogenous increase in VAT and any shortfall made up by an increase in PIT.[22] The grant outlay is set at R50 billion assuming a first order VAT recovery of approximately R5 billion based on the MS modelling.[23]
    82.2. **CGE Sim 2 - SRD PIT:** the SRD Grant outlay of R50 billion is financed entirely through an increase in the PIT of the top three deciles.
    82.3 **CGE Sim 3 - WS PIT:** the WS outlay of R50 billion is financed entirely through PIT increases on the top three deciles.

20 Gini coefficients are a measure of income inequality. The values used in this report range from 1, the most unequal, to 0, the most equal. A healthy distribution of income would range from around 2.5 to 3.5. South Africa is presently assessed to be above 0.6, which is very unequal (BIS Expert Panel, 2021).

21 For more information see https://www.sars.gov.za/types-of-tax/pay-as-you-earn/employment-tax-incentive-eti/how-does-the-employment-tax-incentive-eti-work/.

22 To achieve a balanced budget, it was necessary to allow PIT rates to be flexible in the model. The PIT rate increased in the first few years of the simulation but quickly converged to the baseline.

23 The MS model estimates an outlay of R55 billion for 13.1 million beneficiaries with a first order VAT recovery of R5.3 billion. This has been rounded off to become an outlay of R50 billion that should be funded from an adjustment to the tax system.

82.4. **CGE Sim 4 – SRD&WS PIT:** the SRD Grant outlay of R50 billion is combined with a WS at 50% of the cost of the SRD Grant (R25 billion), both of which are financed entirely through PIT.

83. In practice, it is unlikely that new taxes will be raised for a specific programme, such as the SRD Grant, as a host of financing options are always available to government annually other than debt financing.

84. These include inter alia: budget re-prioritisation; savings from efficiencies; and increased tax collections due to economic growth, tax system restructuring and bracket creep (i.e., where no tax rate changes are required).

85. This modelling exercise therefore adopts the most conservative fiscal approach possible and assumes that any fiscal gap resulting from the relevant programme in every year will be financed by adjustments to the tax system.

86. The reason for doing this is to fully understand the standalone programme costs and benefits. A similar exercise could be performed for any programme financed by government to test whether there are net positive or negative outcomes.

87. The SRD Grant expenditure shock applied to the model is based on the existing eligibility criteria (income up to R624 per month) and the existing grant value (R350).

88. As the MS model overestimates the number of eligible beneficiaries, the highest number of monthly enrolments, amount to 13.1 million (see discussion below), achieved to date was used instead.

89. The distribution of the shock by household income, derived from the MS model, is in accordance with Table 4.1.

Table 4.1: Shares of grants given to the different household groups, in billions of Rands[24] [25]

(Percentage (%)

	D1	D2	D3	D4	**D5**	**D6**	**D7**	**D8**	**D9**	**D10**	**Total**
Share	18.0	19.2	16.2	12.7	9.7	6.7	6.5	5.1	3.5	2,6	100

24 "V" in the table refers to "ventile". "D" in the table refers to "decile".

25 V1 is the poorest 5% of all households, V2 the next 5%, while D2 is the second poorest decile. Similarly, V20 is the richest 5%, V19 the next richest 5%, with D9 the second richest decile of all households.

PART 4.2 : MICROSIMULATION SCENARIOS

90. The MS model performs a partial analysis of a wider range of SRD Grant simulations than is possible with the CGE model. The wage subsidy (WS) also cannot be modelled using the MS model. The simulations therefore principally examine variations in the SRD Grant financing arrangements.
91. The MS model normally assumes the full take-up of benefits by eligible beneficiaries and tax compliance. In practice, however, beneficiary take-up is far less than the modelled result. For this reason, simulations using the likely take up are also performed.
92. There are therefore two approaches to the assumed beneficiary numbers.
    91.1. The first, is the modelled number, which appears to overstate the actual number of beneficiaries. These simulations are broadly indicated as falling under scenario 2a in **Table 4.2** with an indicative 16.7 million beneficiaries.
    91.2. The second, is broadly consistent with the maximum annual number of beneficiaries based on take-up patterns during the periods in which the grant was implemented. These simulations are broadly indicated as falling under scenario 2b in **Table 4.2** with an indicative 13.1 million beneficiaries.
93. The SRD Grant value adopted for all simulations is R350 and is consistent with the grant as implemented in 2022. The means test set for all simulations is at the value presently adopted as policy in 2022, which is R624.
94. As the analysis is undertaken in 2022, the usual 2022 tax and benefit policies are simulated in each modelled scenario for the various financing options.
95. This version of SAMOD simulates policies for the Older Persons Grant, Disability Grant, Care Dependency Grant, Child Support Grant, Foster Child Grant and contributions to the Unemployment Insurance Fund. It also simulates the PIT rules, including rebates and medical tax credits and VAT. These can be evaluated together with the various scenarios for an SRD Grant. [26]
96. In SAMOD, the SRD Grant options are assigned to individuals in the input dataset who are aged 18-59 inclusive and not in receipt of the Disability Grant.
97. A means test is applied to an individual's income where applicable. In other words, the sum of the individual's means-testable income[27] needs to be less than a specified threshold (i.e., R624 per month for the SRD Grant) to qualify for benefits.
98. Income from other social grants is disregarded in the means test. This is because, apart from the Disability Grant, all other grants are not available for adults from the ages of 18 to 59. For instance, while the CSG is provided to adult caregivers, the grant is for the protection of children from the ages of 0 to 18.
99. It was assumed that applicants for the SRD Grant are South African citizens, permanent residents or refugees registered with Home Affairs and resident within the borders of South Africa.
100. A new addition to the analysis for this study is the examination of the VAT recovered from the payment of the SRD Grant. In this instance it is assumed that some portion of the SRD Grant is spent on VAT-able items, and this additional VAT is recovered in the same financial year as the SRD Grant outlay.
101. Analysis of expenditure patterns in the Living Conditions Survey revealed that approximately 70% of household expenditure is on standard-rated items and the rest on zero-rated or exempt items. A new expenditure variable was therefore created to reflect this. This expenditure variable was added to the household level income aggregate on which VAT is calculated in SAMOD.
102. Table 4.2 summarises the different systems (tax-benefit arrangements) that were simulated to understand the SRD Grant.
103. The baseline is the 2022 tax-benefit system without a simulation of the SRD Grant (SA_2022_noSRD).
104. Systems for Scenario 2a were run first, but it was decided to replace these with the systems shown under Scenario 2b where the number of beneficiaries was capped at 13.1 million (rather than 16.7 million under Scenario 2a) using a random number function.
105. Having simulated the SRD Grant in SA_2022_bsa13m (using a grant amount of R350 and means test of

27 An aggregate of income from employment, property, private pensions, interest, private transfers, compensation and other income, minus contributions to private health insurance and pensions, and with income tax and social insurance contributions deducted.

R62428) and established the VAT recovery from the grant in SA_2022_bsa13m_VR, the remaining systems under Scenario 2b attempt to finance the SRD Grant through changes to VAT and PIT.

106. There are three systems which adjust the VAT policy (SA_2022_bsa13m_VATa, b and c), four systems which adjust the PIT policy (SA_2022_bsa13m_PITa, b, c and d), and one system which combines a VAT and PIT adjustment (SA_2022_bsa13m_PV1).

Table 4.2 Summary of tax-benefit systems modelled in SAMOD for 2022 (2022 values)[29] [30]

Scenario	SAMOD system name	Benefit amount (Rands)	Means test (Rands)	Description
Baseline	SA_2022_noSRD	/	/	The 2022 policy without SRD
2a	SA_2022	350	624	The standard policy for 2022
	SA_2022_VR	350	624	70% of the grant is spent on standard rated items
2b	SA_2022_bsa13m	350	624	The standard policy for 2022 with beneficiaries capped at approx. 13 million
	SA_2022_bsa13m_VR	350	624	70% of the SRD Grant is spent on standard rated items
	SA_2022_bsa13m_VATa	350	624	Increase VAT rate to 16%
	SA_2022_bsa13m_VATb	350	624	Abolish zero-rated and exempt items
	SA_2022_bsa13m_VATc	350	624	Combine increased VAT rate and abolished zero/exempt items
	SA_2022_bsa13m_PITa	350	624	Fiscal drag (100%)
	SA_2022_bsa13m_PITb	350	624	Increase band rates for band 1 by 1 percentage point, bands 2, 3, 4 and 5 by 2 percentage points and bands 6 and 7 by 3 percentage points
	SA_2022_bsa13m_PITc	350	624	Increase band rates for band 1 by 1 percentage point, band 2 by 2 percentage points, bands 3, 4 and 5 by 3 percentage points and bands 6 and 7 by 4 percentage points
	SA_2022_bsa13m_PITd	350	624	Combine fiscal drag and increased band rates (PITb)
	SA_2022_bsa13m_PV1	350	624	Combine 1% VAT change and increased band rates (bands 2, 3, 4 and 5 by 2 percentage points and bands 6 and 7 by 3 percentage points)

Source: SAMOD V7.5 - BISEP.

28 This is the means test as amended on 16th August 2022.

29 VAT Recovery (VR) is included in all systems except SA_2022_noSRD, SA_2022 and SA_2022_bsa13m.

30 Not all of these model results are reported. Only key results related to the CGE model results are discussed. This is to avoid a proliferation of results, not all of which materially impact on policy choices.

Part 5

Modelling analysis – results

This part of the report provides the results of the technical work carried out by the Panel.

PART 5.1 : INTRODUCTION

107. The results from the CGE analysis, which involves the iterative use of the CGE and MS models, are presented for four simulations as described in Part 4.1. For ease of reference, the simulations are summarised in Table 5.1.
108. Note that the Panel 1 report only provided the poverty and income inequality outcomes based on the MS analysis. In this report, however, the poverty and inequality outcomes are produced by the MS model based on results from the CGE model.
109. The results from the MS analysis produced independently of the CGE model are therefore discussed separately as they reflect partial outcomes for the variables analysed.
110. The MS results nevertheless provide indicators of total cost, more specific tax rates, certain first order[31] tax recoveries and first order poverty and income inequality outcomes.

Table 5.1 : CGE Simulations

CGE Sim 1	The SRD Grant outlay of R50 billlion is financed primarily using an increase in VAT in the early years of the simulation.
CGE Sim 2	The SRD Grant outlay of R50 billion is financed entirely through an increase in the PIT of the top three deciles.
CGE Sim 3	The wage subsidy (WS) outlay, equivalent to R50 billion, is financed entirely through PIT increases on the top three deciles.
CGE Sim 4	The SRD Grant outlays of R50 billion is combined with a wage subsidy (WS) at 50% of the cost of the SRD Grant (R25 billion), both of which are financed entirely through PIT.

PART 5.2 : SOCIAL OUTCOMES

Overview

111. The results reported in this section reflect the CGE model outcomes for 2023, or the second year of simulations.
112. The disposable income outcomes from the CGE model were used as inputs in the MS model to estimate poverty and inequality outcomes.
113. Although these results are for a single year, they will be reflective of the CGE model outcomes over the full timeline for which results are generated, i.e., to 2045.

Poverty

114. Changes in the LBPL for the four simulations are reported in Table 5.2 at both the national and provincial levels.
115. The national Baseline poverty rate stands at 32.7%, with a significant variation by province.
    - 115.1. Both the Western Cape (WC) and Gauteng (GT) have the lowest **Baseline** poverty rates of 22.6% and 23.0% respectively.
    - 115.2. Eastern Cape (EC), North West (NW) and Limpopo (LP) have the worst poverty rates at 47.8%, 43.4% and 42.8% respectively.
    - 115.3. KwaZulu-Natal (KZ), Northern Cape (NC) Mpumalanga (MP) and Free State (FS) are broadly similar to the national poverty rate at 35.7%, 33.7% 31.3% and 27.9% respectively.

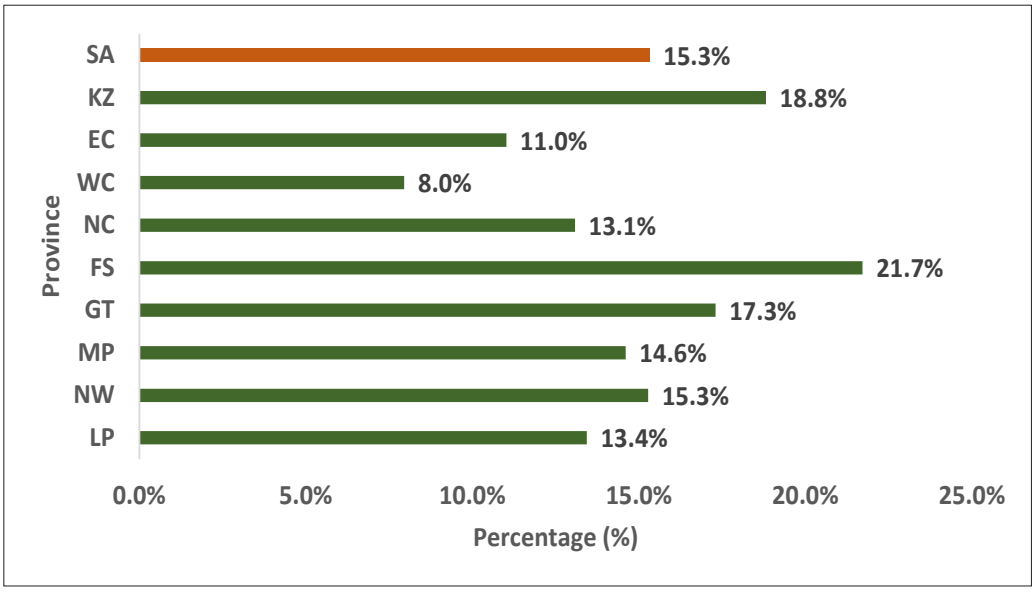
31 This refers to direct impacts. MS models however cannot measure indirect impacts which result from the resulting flow of funds that circulate through all firms and households and back to government through taxes. The CGE model is better at providing indirect impacts.

Table 5.2 : National and Provincial LBPL Outcomes

Province	Baseline	CGE Sim1	CGE Sim2	CGE Sim3	CGE Sim4
LP	**42.8%**	38.4%	37.1%	39.5%	37.1%
NW	**43.4%**	37.8%	36.8%	38.3%	36.4%
MP	**31.3%**	27.1%	26.7%	27.3%	26.4%
GT	**23.0%**	20.7%	19.0%	20.8%	19.0%
FS	**27.9%**	22.0%	21.9%	22.6%	21.0%
NC	**33.7%**	29.8%	29.3%	30.3%	28.6%
WC	**22.6%**	20.9%	20.8%	21.3%	20.3%
EC	**47.8%**	43.0%	42.5%	44.7%	42.3%
KZ	**35.7%**	29.5%	29.0%	30.2%	28.4%
SA	**32.7%**	**27.9%**	**27.7%**	**29.1%**	**27.4%**

116. The results show significant reductions in the national poverty rate for all four simulations, with CGE Sim 1, 2 and 4 in the range 27.4% to 27.9%. CGE Sim 3 (the wage subsidy) has the weakest impact, moving only to 29.1%.
117. CGE Sim 2, where the SRD Grant is financed from PIT, shows a stronger reduction in poverty than for CGE Sim 1, which is financed by VAT.
118. This outcome is also reflected in the provincial results.
119. The approach to financing the grant therefore has implications for the impact on poverty outcomes, with the more regressive VAT financing dampening the distributional outcomes.
120. The MS model's partial analysis however only shows a slight movement at the national level for equivalent scenarios, with a decline from 32.7% to only 30.3%.[32]
121. The CGE model therefore provides a more complete estimate of the changes in poverty than the MS model on its own.
122. For CGE Sim2, which has the strongest poverty reduction effects for the standalone SRD simulations, there is a national 15.3% reduction in poverty, with dramatic provincial reductions in the cases of FS (21.7%), KZ (18.8%) and GT (17.3%) (Figure 5.1).
123. While GT demonstrates a significant percentage reduction in the poverty rate, both the WC and GT have similar overall poverty profiles and similar overall poverty outcomes in all the simulations.

Figure 5.1: Percentage National and Provincial Reductions in the LBPL for CGE Sim2



32 See **Part 5.6** where the MS headline results are presented.

Income Inequality

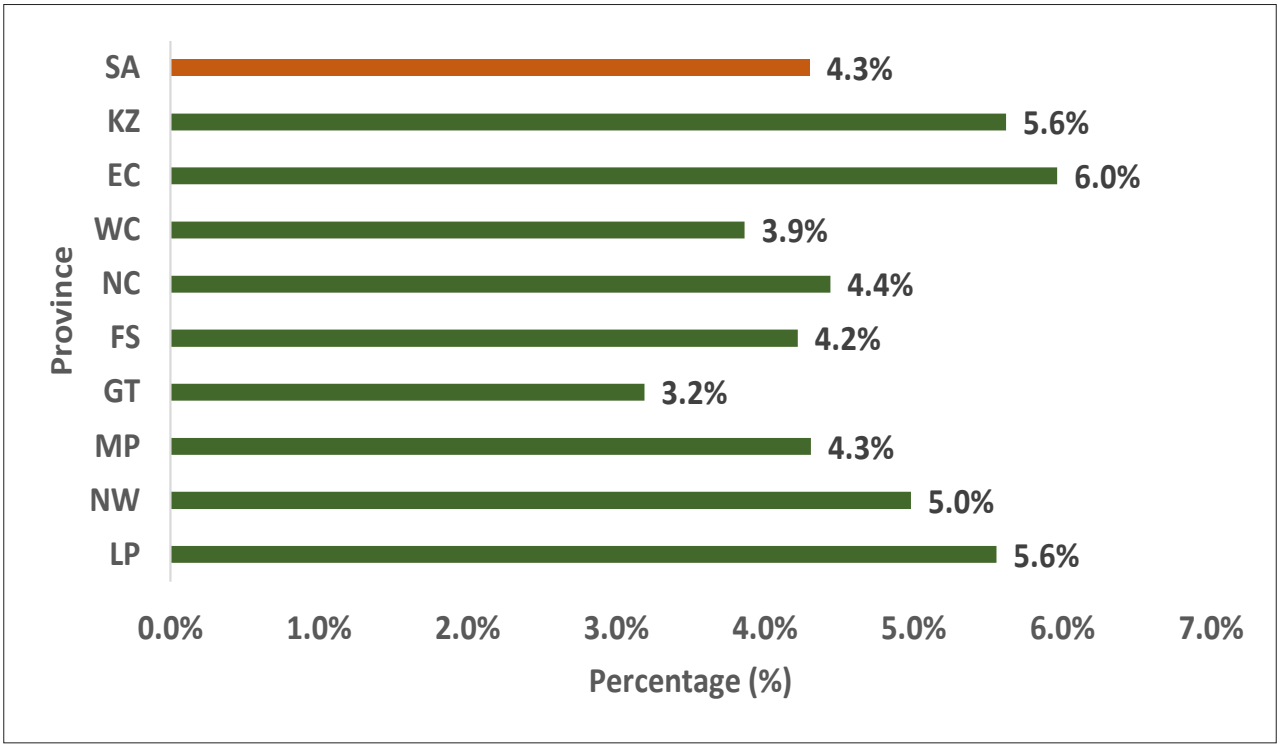
124. As with the poverty rates, the CGE results demonstrate a material reduction in income inequality, from the Baseline of 0.64 to 0.61 for all four simulations (Table 5.3).
125. By way of contrast, the partial analysis produced by the MS model only sees a reduction to 0.62 at the national level.
126. The outcomes for CGE Sim2 are slightly better than for CGE Sim1 and CGE Sim3, and largely similar to CGE Sim4.
127. Of all the provinces, WC has the lowest Baseline income inequality at 0.60. This improves in all simulations to 0.58. However, some provinces catch up and even overtake WC with CSG Sim2. For instance, KZ moves from 0.61 to 0.57 and FS moves from 0.61 to 0.58.

Table 5.3 : National and Provincial Gini Coefficient Outcomes

Province	Baseline	CGE Sim1	CGE Sim2	CGE Sim3	CGE Sim4
LP	**0.62**	0.59	0.59	0.60	0.59
NW	**0.64**	0.61	0.60	0.61	0.60
MP	**0.64**	0.62	0.62	0.62	0.62
GT	**0.62**	0.60	0.60	0.60	0.60
FS	**0.61**	0.58	0.58	0.59	0.58
NC	**0.65**	0.63	0.63	0.63	0.62
WC	**0.60**	0.58	0.58	0.58	0.58
EC	**0.65**	0.62	0.61	0.62	0.61
KZ	**0.61**	0.58	0.57	0.58	0.57
SA	**0.64**	**0.61**	**0.61**	**0.61**	**0.61**

128. When changes from the Baseline to CGE Sim2 are examined, the largest reductions in income inequality occur in EC (6.0%), LP (5.6%), KZ (5.6%) and NW (5.0%) in contrast to the national reduction of 4.3%.

Figure 5.2 : Percentage National and Provincial Reductions in the Gini Coefficient for CGE Sim2



Disposable Incomes

129. Underlying the poverty and inequality outcomes are the changes in disposable incomes that result from the various interventions modelled through the simulations. These are reflected in Figure 5.3 by ventile and decile.[33]

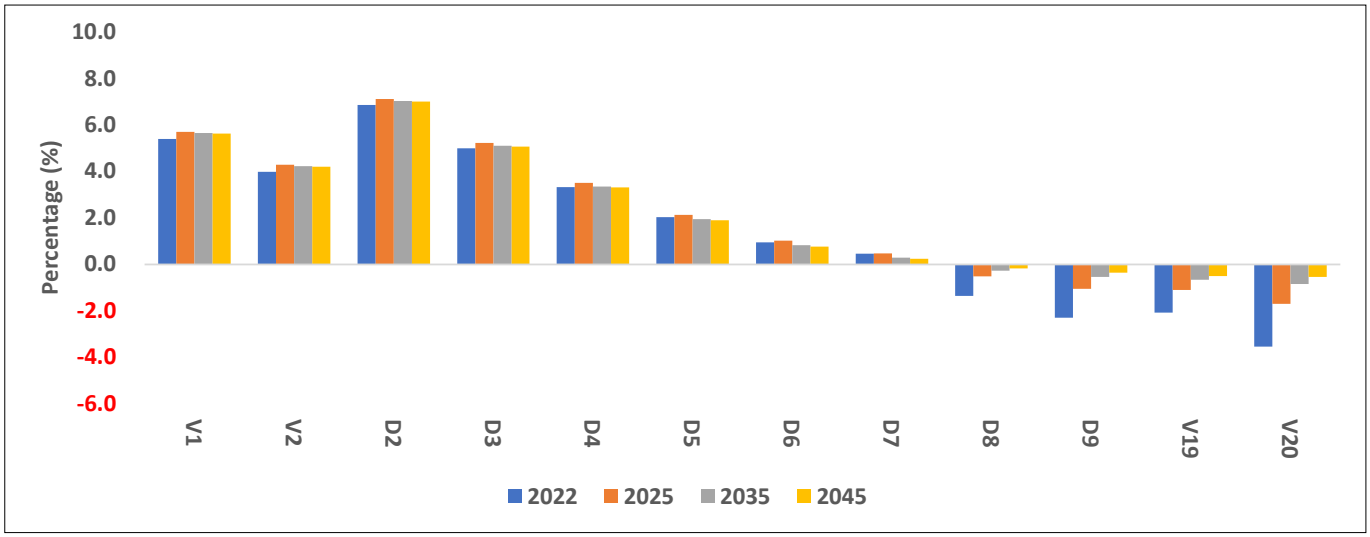
130. From the breakdown of results over time, CGE Sim1 shows that the negative variation from the Baseline degrades over time for the higher-income households, unlike for CGE Sim2 and CGE Sim4.

131. Consistent with the reduced impact in poverty and inequality indicated above, CGE Sim3, although redistributive, is far less so than the other three simulations. This illustrates why CGE Sim3 has less impact on poverty and inequality than the other three policy simulations.

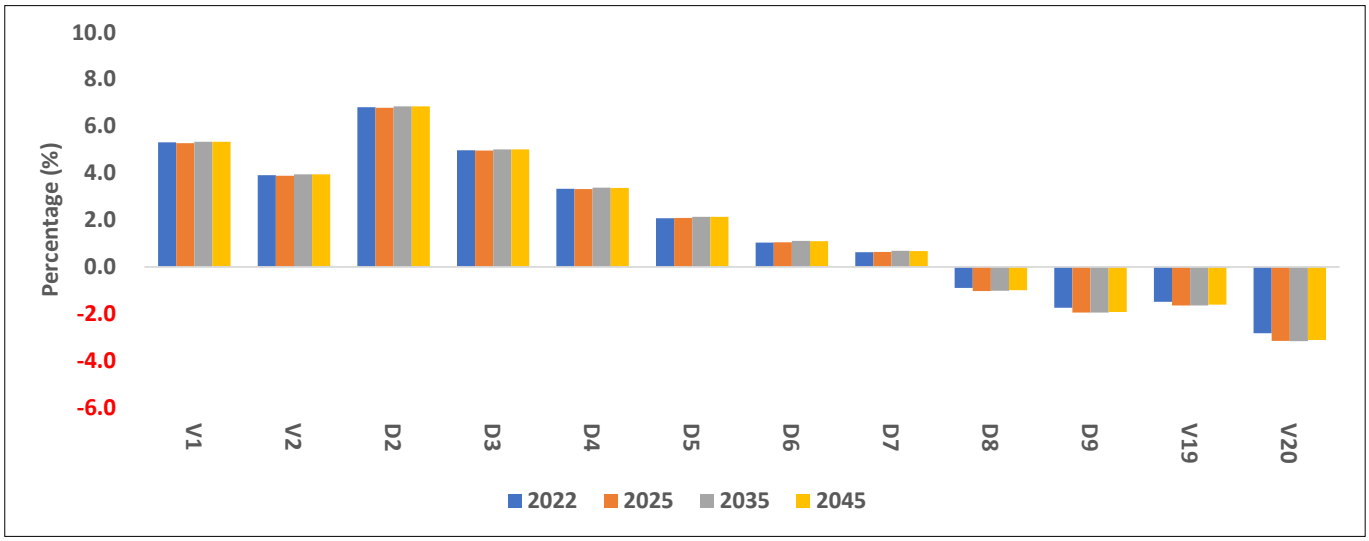
132. This result is further illustrated in Figure 5.4, which shows the variation from the Baseline for ventiles 1 and 20 for all four simulations by province.

Figure 5.3: Disposable Income: Variations from the Baseline for the Years 2022 to 2045[34]

CGE Sim1

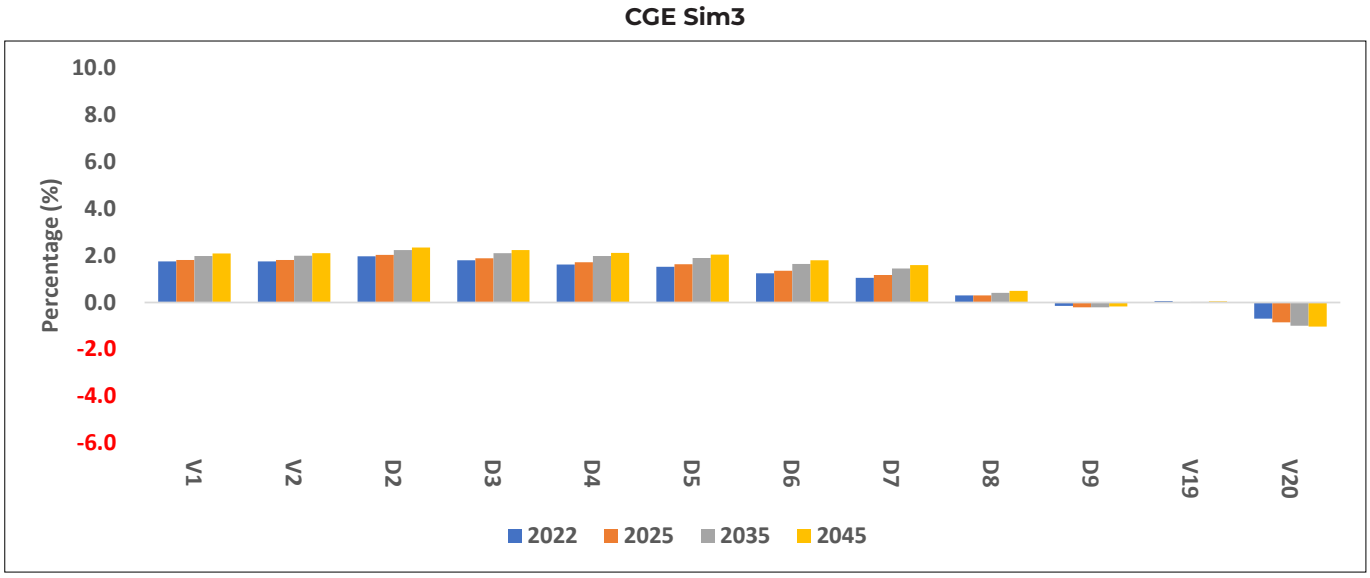


CGE Sim2



33 The first decile (lowest income households) is divided into two ventiles (V1 and V2). The tenth decile (highest income households) is also divided into two ventiles (V19 and V20).

34 Note that all the axes have the same scale to illustrate more clearly differences in the degree to which the disposable income results vary from the **Baseline**.



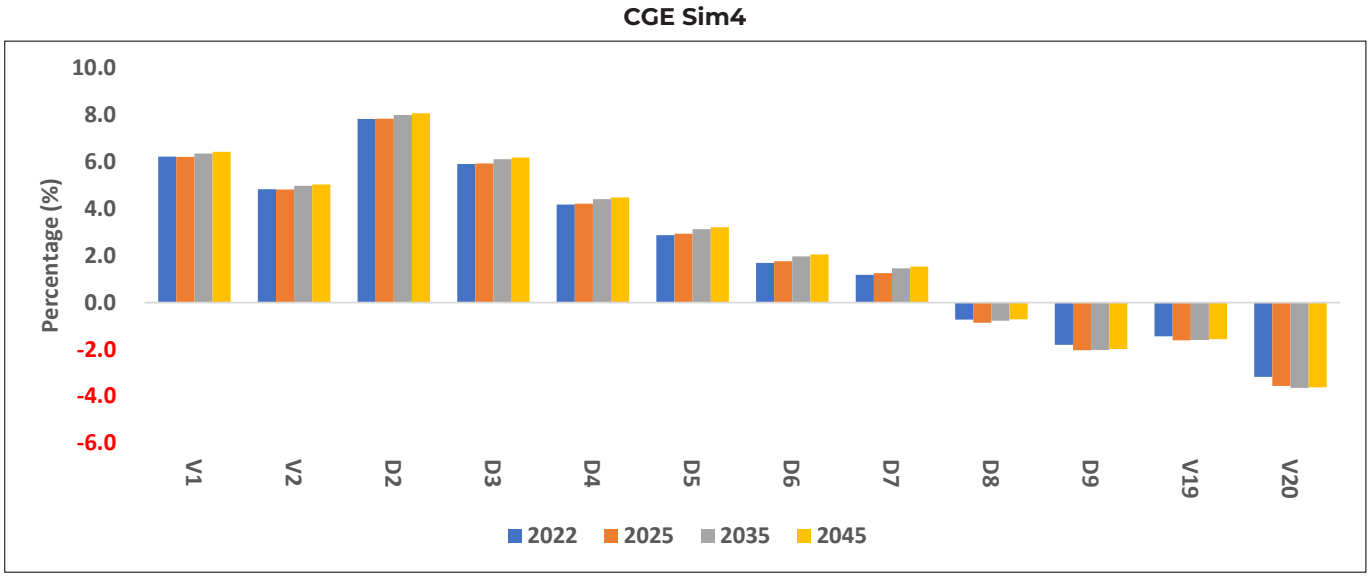
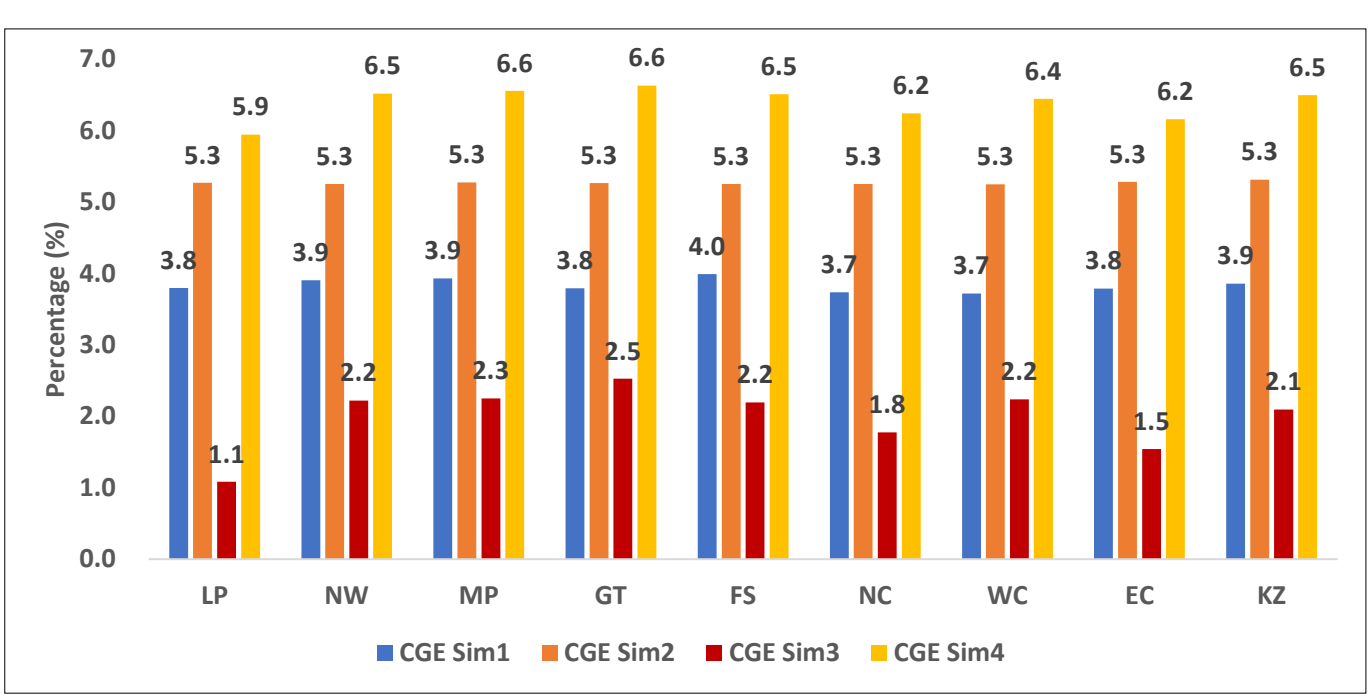
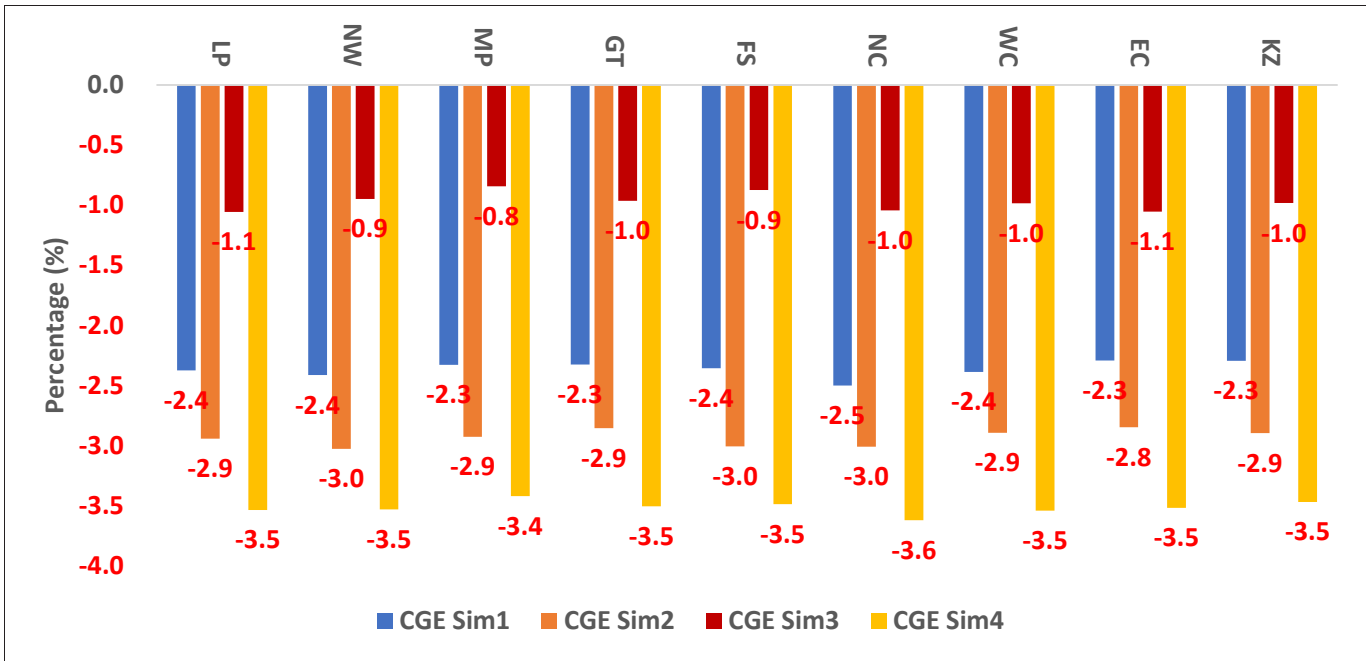


Figure 5.4: Disposable Income: Variations from the Baseline for the Year 2035 for Ventiles 1 and 20



Ventile 20


LP
NW
MP
GT
FS
NC
WC
EC
KZ
0.0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
Percentage (%)
-2.4
-2.9
-1.1
-3.5
-2.4
-3.0
-0.9
-3.5
-2.3
-2.9
-0.8
-3.4
-2.3
-2.9
-1.0
-3.5
-2.4
-3.0
-0.9
-3.5
-2.5
-3.0
-1.0
-3.6
-2.4
-2.9
-1.0
-3.5
-2.3
-2.8
-1.1
-3.5
-2.3
-2.9
-1.0
-3.5
CGE Sim1
CGE Sim2
CGE Sim3
CGE Sim4

Conclusions

133. The reduced poverty and inequality outcomes are material for all four simulations, with the weakest results for the WS simulation, or CGE Sim3.
134. Of the standalone SRD Grant simulations, CGE Sim2 (PIT financed) outperforms CGE Sim 1 (VAT financed).
135. The CGE Sim4 outcomes are strongly redistributive, but not significantly different to CGE Sim2.
136. The SRD Grant also has important inter-provincial redistributive effects, with a material narrowing of the inter-provincial Gini Coefficient differentials around a lower national result of 0.61 (CGE Sim2).

PART 5.3 : ECONOMIC OUTCOMES

Overview

137. This section reports on the key economic outcomes of the simulations. Together with the fiscal outcomes, the economic outcomes indicate the positive/negative economic implications of the SRD Grant and related interventions. These outcomes offer insight into the sustainability of the proposed programmes of social support.
138. Eight indicators of economic output are reflected for each of the four simulations.
    138.1. Real Household Expenditure (HH Exp);
    138.2. Real Investment Expenditure (Inv Exp);
    138.3. Exports (Exports);
    138.4. Imports (Imports);
    138.5. Gross Domestic Product (GDP);
    138.6. Employment (Empl);
    138.7. Wages (WAGES); and
    138.8. Consumer Price Index (CPI).

National Output

139. Although the distributional effects of the four simulations were broadly positive, the economic outcomes vary considerably. The following provides a picture of the long-term economic implications of the simulations, using the model results for 2035 (Figures 5.5 and 5.6).
    139.1 **CGE Sim1** shows broadly negative effects on economic output from 2022 to 2045. This is largely driven by the influence of increased prices on goods and services resulting from the increase in VAT. This would suggest that there are risks to any over-reliance on VAT as a method of financing government programmes in general, and the SRD Grant in particular.
    139.2 **CGE Sim2** is broadly neutral in its impacts on aggregate economic output. This implies that the distributional outcomes indicated by the poverty and inequality outcomes can be preserved without any identifiable harmful effects for the economy. The slightly reduced investment expenditure arises from changes in aggregate savings due to the transfer of income from higher to lower earners. However, the effects are not large. The positive growth for the first seven years of the simulation are largely due to improved household expenditure levels resulting from the transfer.
    139.3 **CGE Sim3** is broadly positive for economic output, due largely to the positive employment and growth effects resulting from WS. The core model assumption is that the reduced cost of employment resulting from the WS is entirely passed on to consumers through product price reductions. Were this not to be the case, however, (i.e., if the subsidy were used to boost profits instead) the effects would be reduced accordingly. If it is assumed that the integrity of the WS can be preserved through time, the positive effects on output appear long-lasting.
    139.4 **CGE Sim4**, which combines **CGE Sim2** and 50% of **CGE Sim3**, exhibits many of the beneficial growth attributes of **CGE Sim3**. Although the programme costs are 50% higher than for CGE Sim2, the outcomes combine positive distributional and growth outcomes.
140. The reason for the output fall in CGE Sim1 followed by a gradual improvement relates to the general equilibrium design of the model.
    140.1. Household consumption falls below the **Baseline**, as with GDP, due to higher domestic prices because of the increased VAT rate.
    140.2. Whereas the CPI in **CGE Sim2** decreases and then converges back to the **Baseline**, it rises in CGE Sim1

and remains at two percentage points above the **Baseline**, which was the increase in the VAT rate.

139.5. Total domestic demand then falls, which leads to a fall in employment. Aggregate employment, however, is modelled to converge back to the baseline, which is achieved by decreasing real wages overtime.

The fall in domestic demand also leads to decreasing domestic prices, and a decreased export price index. As exports are not subject to the increased VAT rate, export volumes increase.

So, GDP in **CGE Sim1** recovers towards the baseline because: first, exports gradually increase; second, mports stay below the baseline for the duration of the forecast period; and third, real wages continue to decrease which decreases the cost of production, causing a gradual increase in investment expenditure.

Figure 5.5: National Output: Variations from the Baseline for the Year 2035

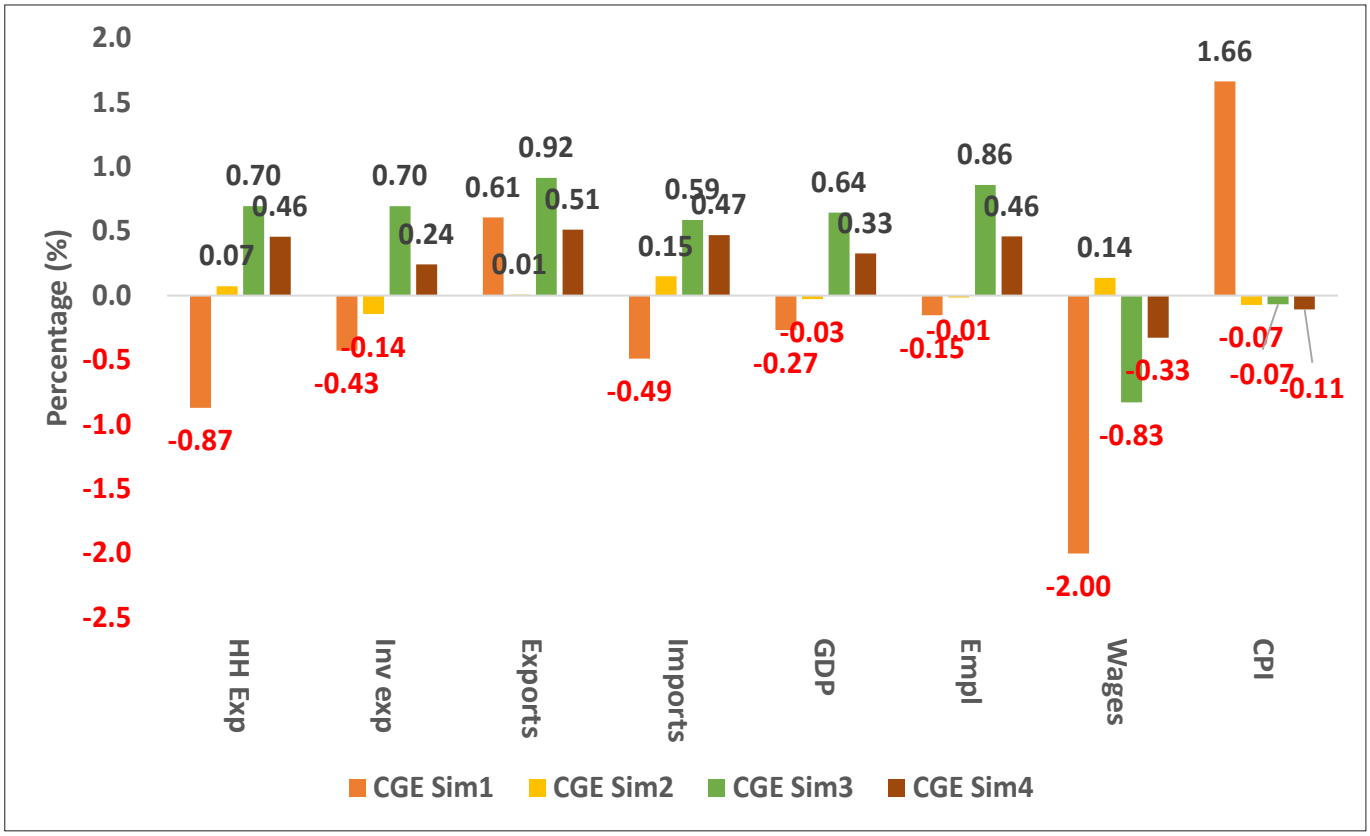
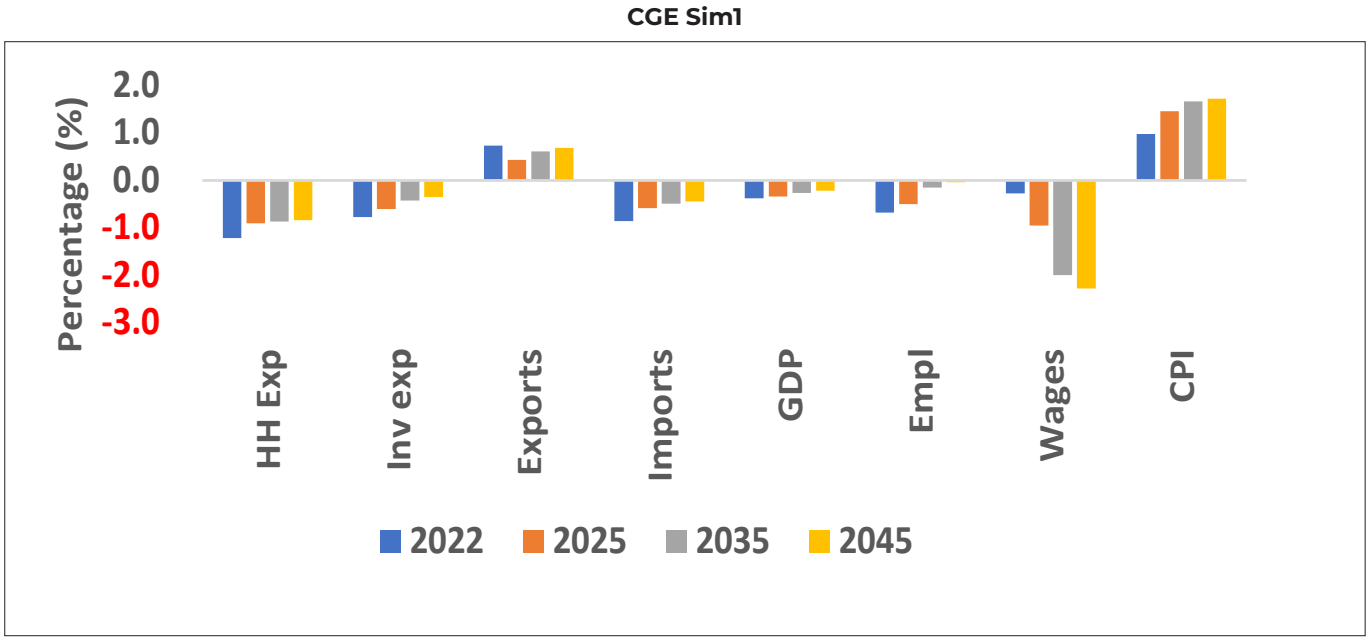
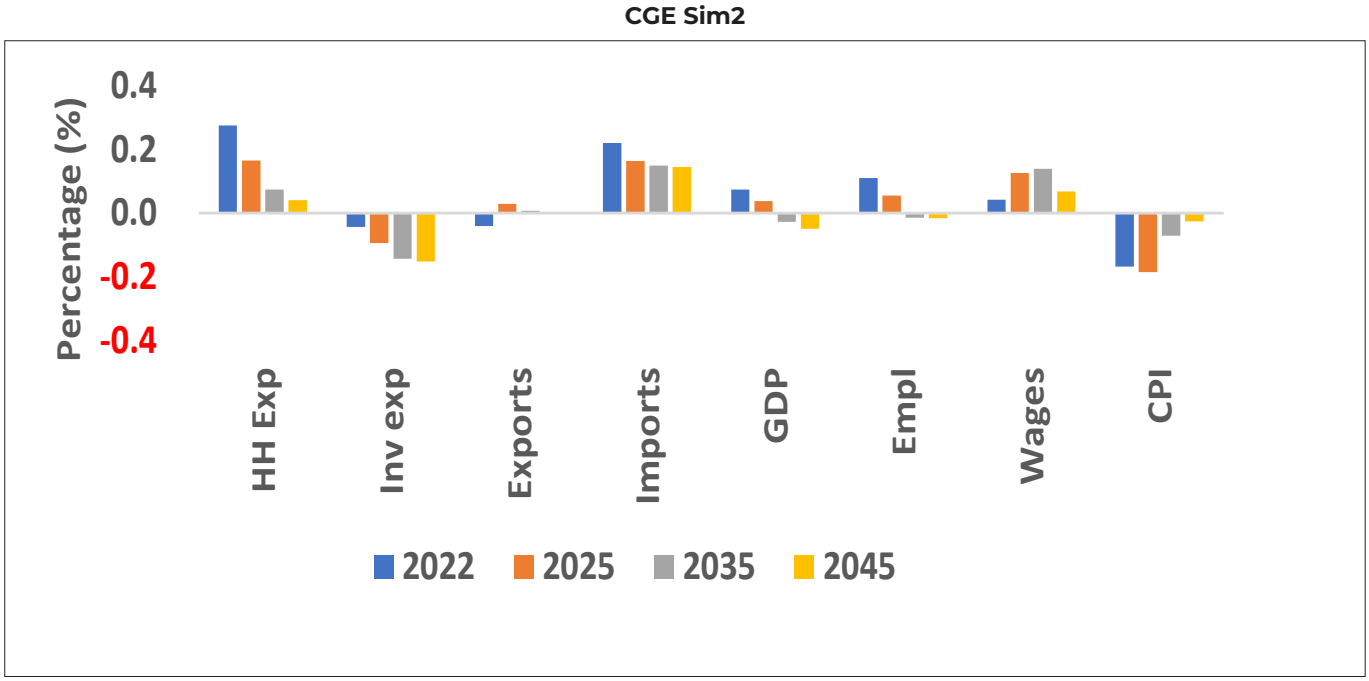
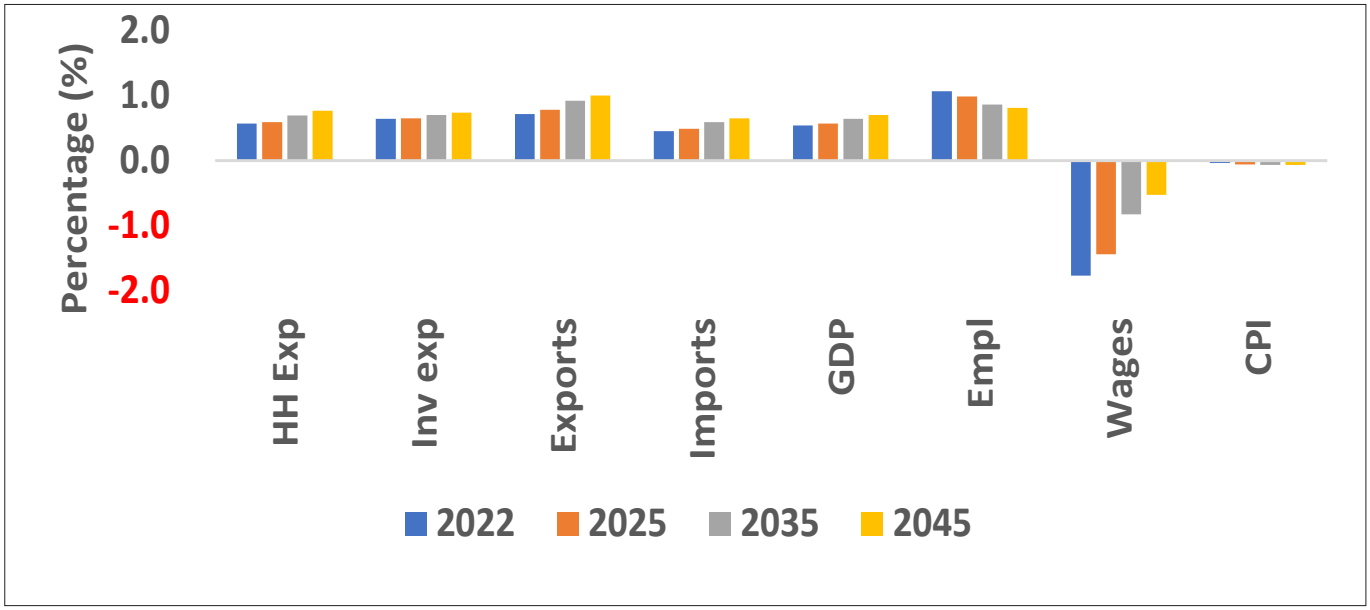


Figure 5.6: National Output Outcomes 2022 to 2045

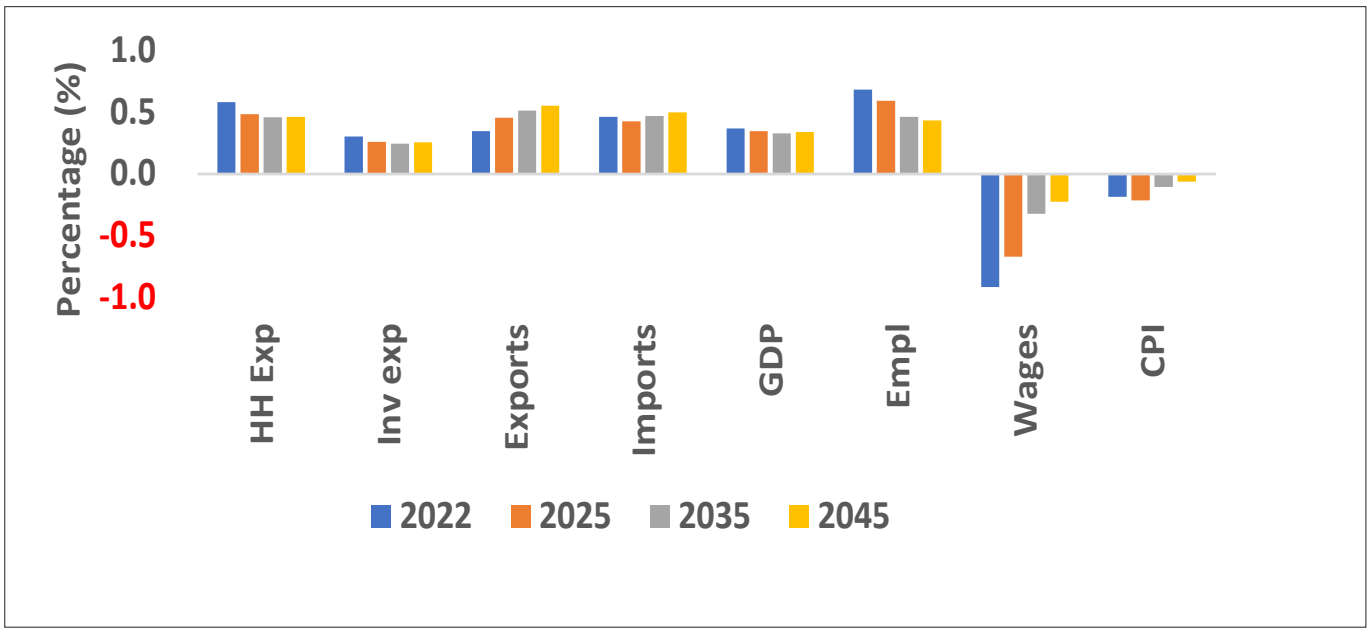




CGE Sim3



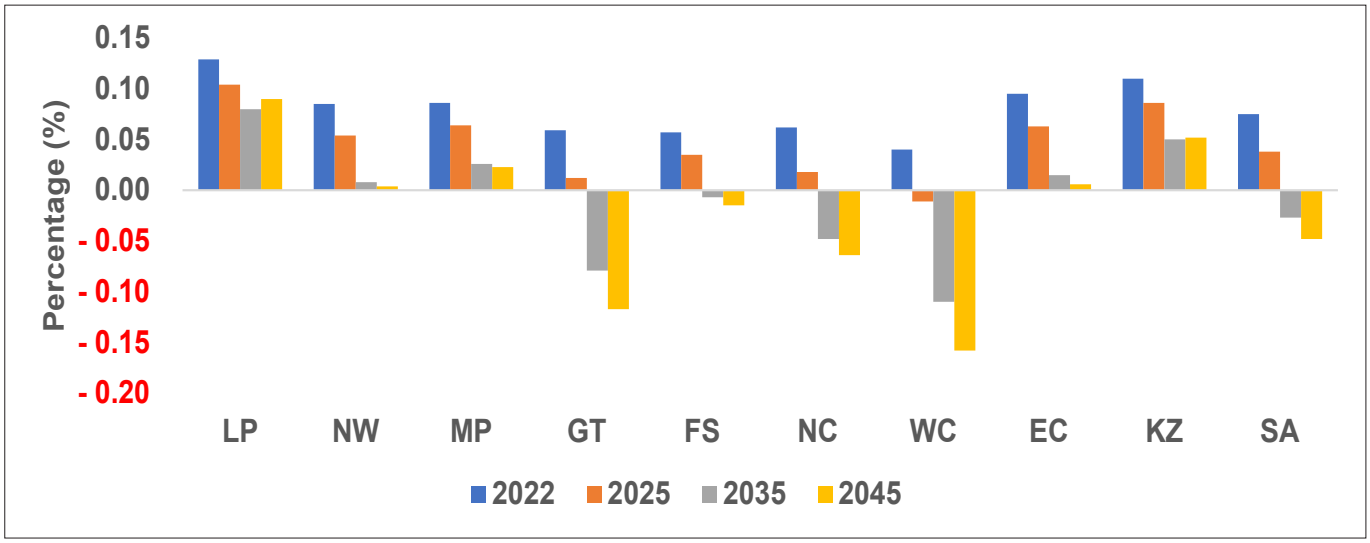
CGE Sim4



Provincial Output

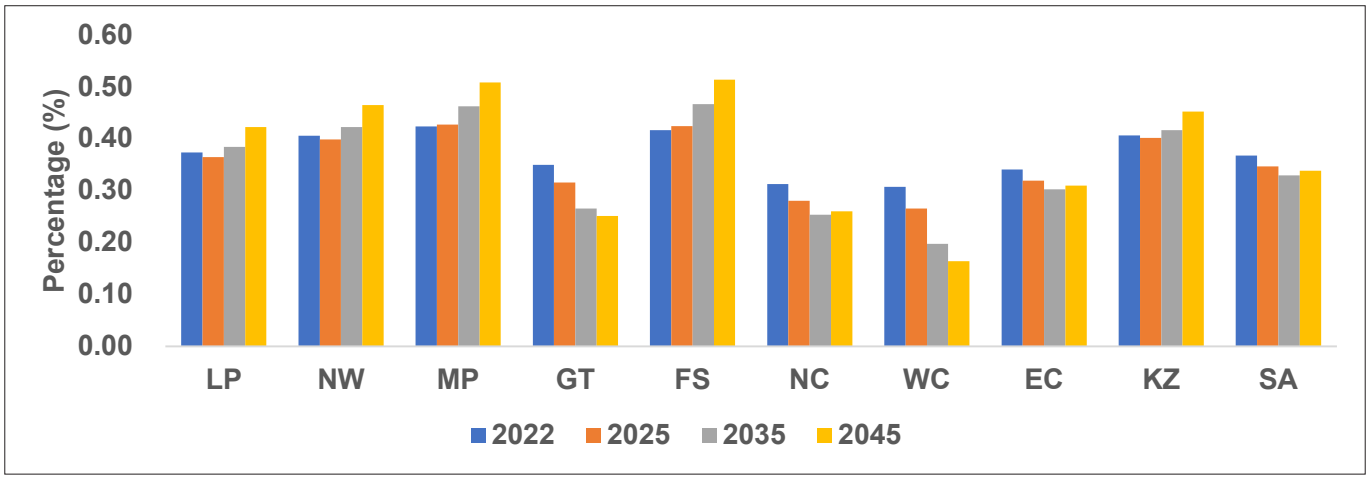
141. If the VAT-funded SRD Grant option is excluded as entirely negative for output, the CSG Sim2, by way of contrast has differential implications for provincial output due to the inter-provincial redistribution of income and subsequent expenditure that occurs (Figure 5.7).
142. Provinces that experience positive economic growth outcomes over the entire model period of 2022 to 2045 include LP, NW, MP, EC, and KZ. Provinces that experience initial positive growth followed by negative growth include GT, FS, NC and WC.
143. As already noted above, the variations from the Baseline, both positive and negative, over the full period from 2022 to 2045 are small. It is important to note that any possible positive multiplier effects are offset by the negative multiplier effects resulting the tax increases.

Figure 5.7: CSG Sim2: Provincial Variations from the Baseline for GDP from 2022 to 2045



144. Where the WS is combined with the SRD Grant, CGE Sim4, there are positive growth effects across all provinces arising from the supply-side cost reductions (Figure 5.8). Improvements in economic output are more pronounced in the more rural provinces, with GT and the WC benefiting to a lesser extent.

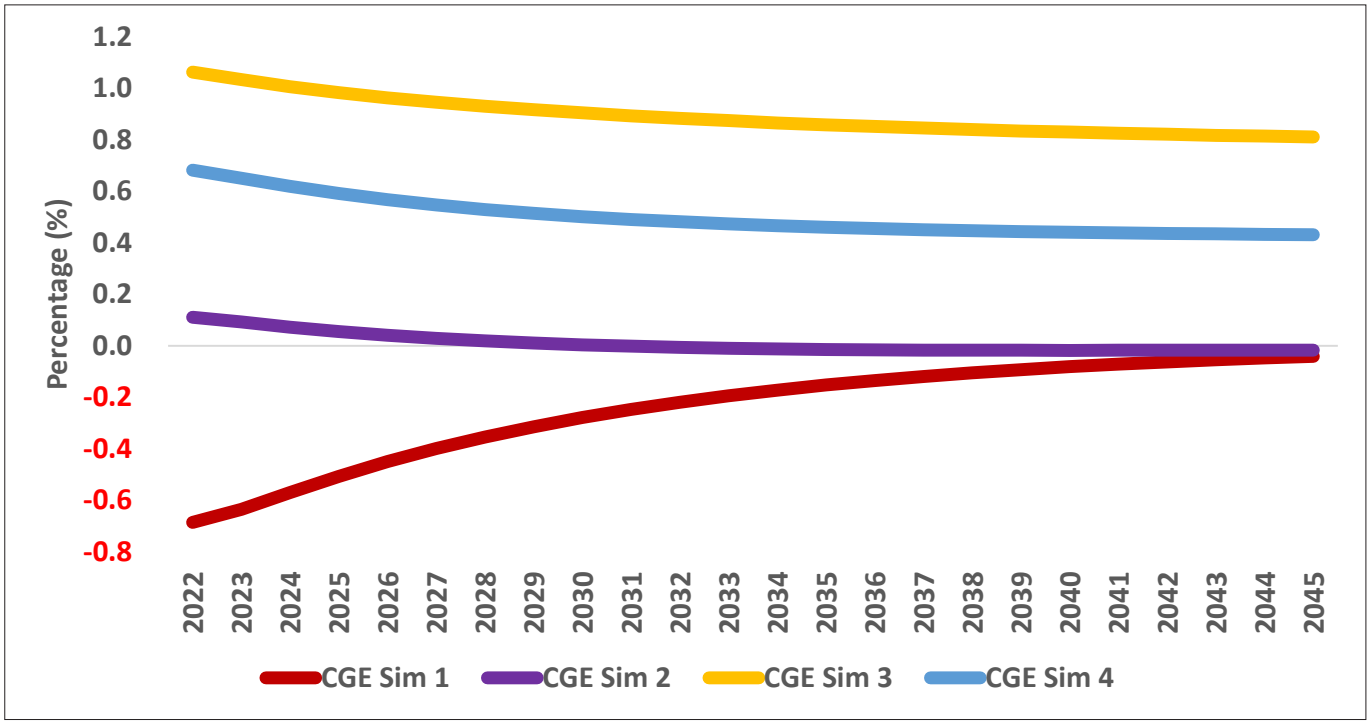
Figure 5.8: **CSG Sim4: Provincial Variations from the Baseline for GDP from 2022 to 2045**



Employment

145. The employment variations from the Baseline largely follow the changes in GDP with the headline national results for all four simulations indicated in Figure 5.9.
146. The results for CGE Sim1 suggest an initial loss of employment, which gradually disappears over time. CGE Sim2 shows an initial improvement in employment, followed by a gradual convergence on the Baseline over time. Both CGE Sim3 and CGE Sim4 show net positive employment results consistent with the results for GDP.
147. As already noted above, the employment results are influenced by the relaxation of the full-employment general equilibrium assumptions in the CGE model and the assumption that the wage subsidy is not captured by employers as profits.

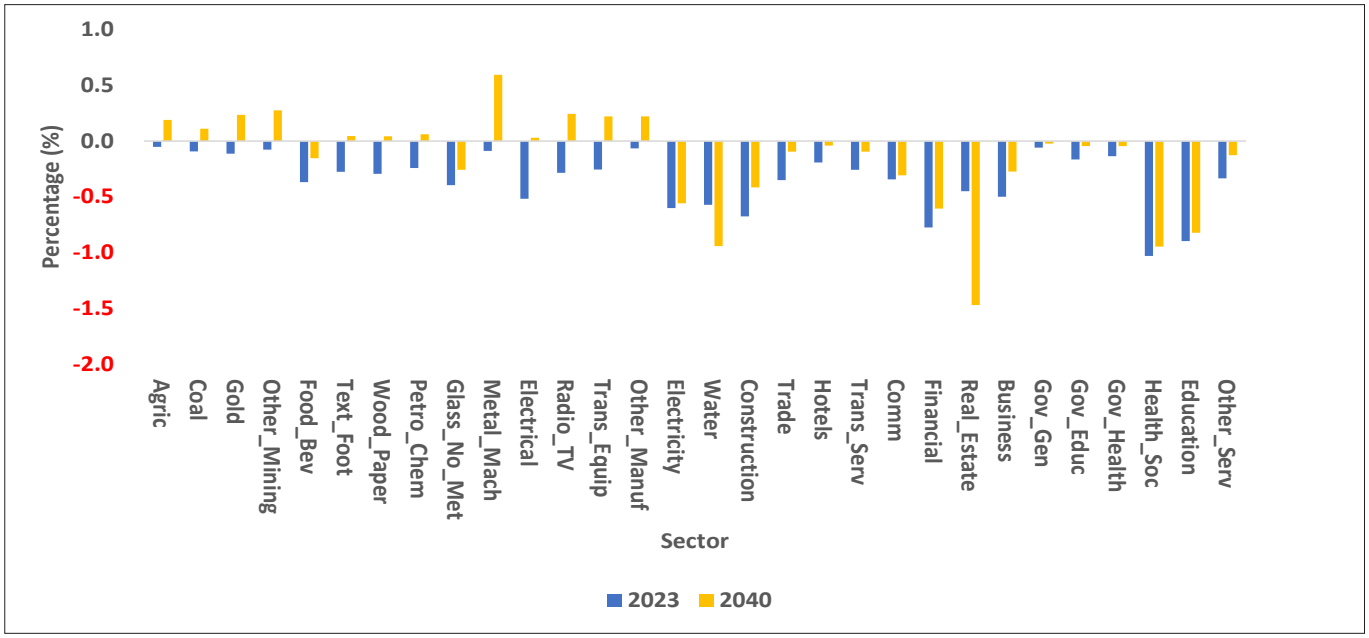
Figure 5.9: **National Variations from the Baseline for Employment from 2022 to 2045**



PART 5.4 : SECTORAL EFFECTS

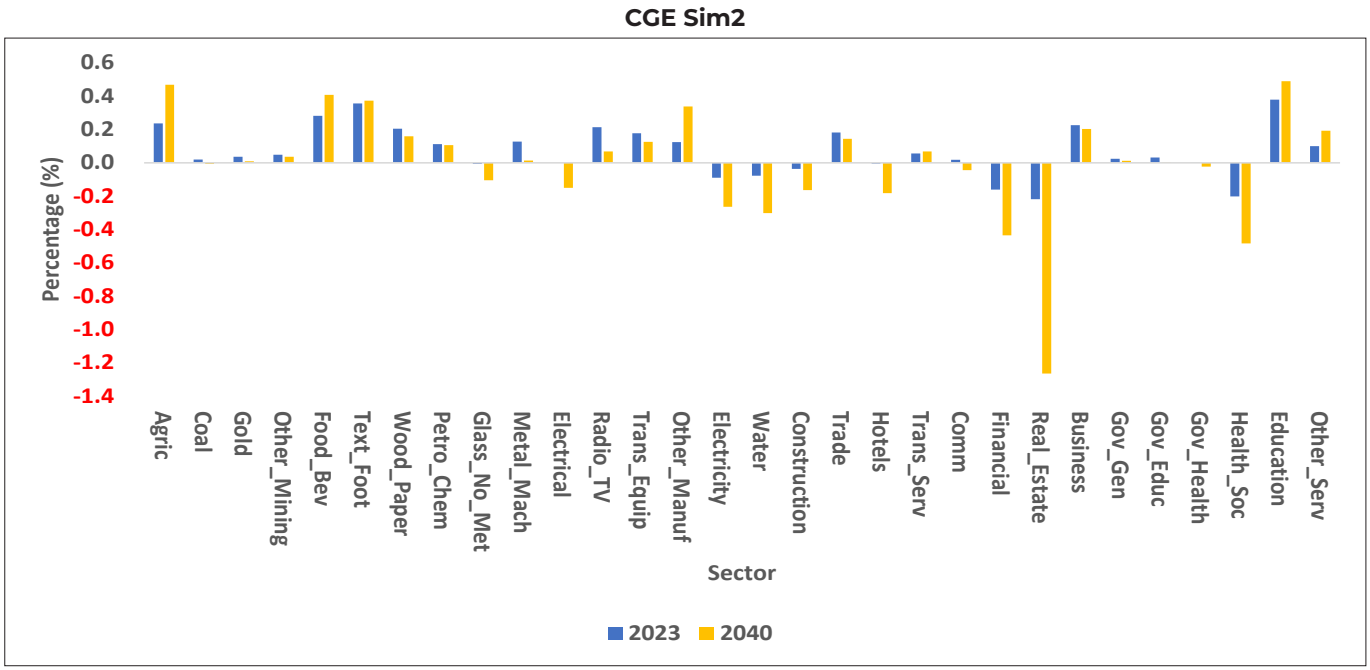
148. This section reports on the national sectoral output variations from the Baseline resulting from the four simulations (Figure 5.10).[35]
149. Consistent with the overall GDP results reported above, CGE Sim1 results in generally negative sectoral declines in output relative to the Baseline. The price effects resulting from the VAT increase overwhelm the demand improvements.[36]
150. In contrast to CGE Sim1, CGE Sim2 shows a shift away from primary industries and services toward manufacturing. These positive deviations from the Baseline are mostly sustained over the long term and are driven by the redistributive nature of the SRD Grant coupled with a progressive tax regime.
151. Both CGE Sim3 and CGE Sim4 show across-the-board positive output deviations from the Baseline, with a shift in emphasis to manufacturing relative to primary industries and services. The redistributive nature of CGE Sim4 results in a stronger shift to manufacturing relative to CGE Sim3.
152. Apart from CGE Sim1, all three scenarios influence the structure of industry in favour of manufacturing consistent with a redirection of domestic consumption expenditure.

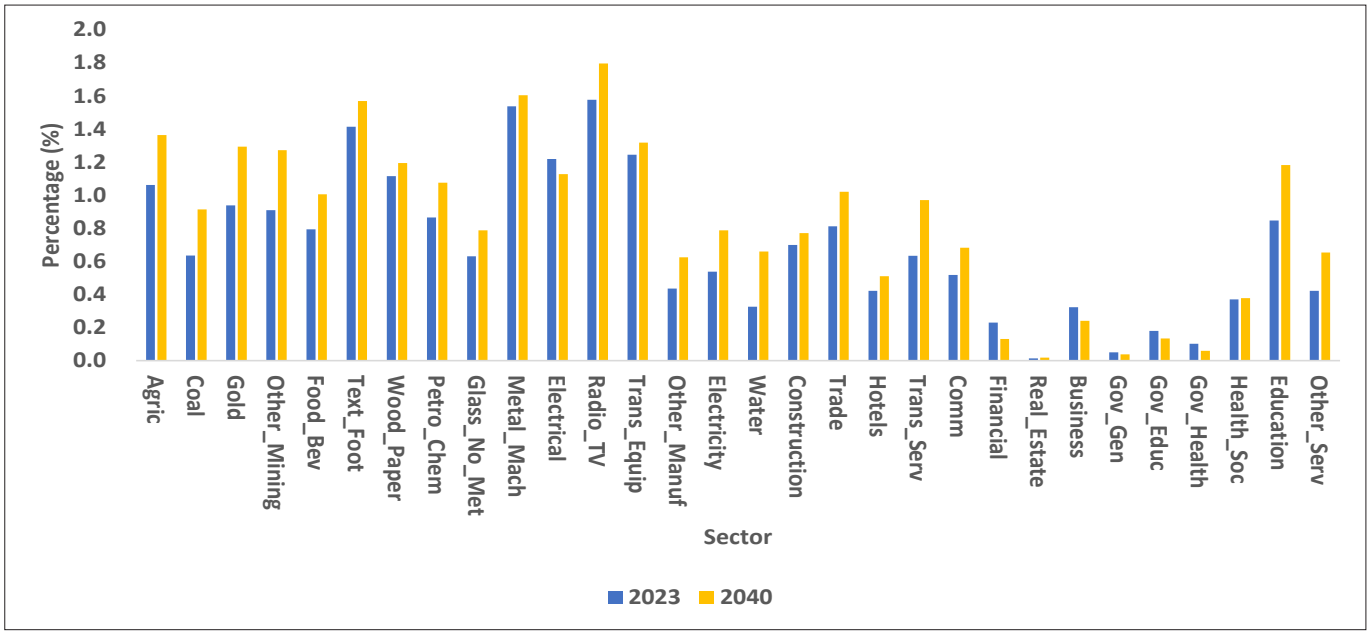
Figure 5.10: National Variations in Sectoral Output from the Baseline for 2023 and 2040

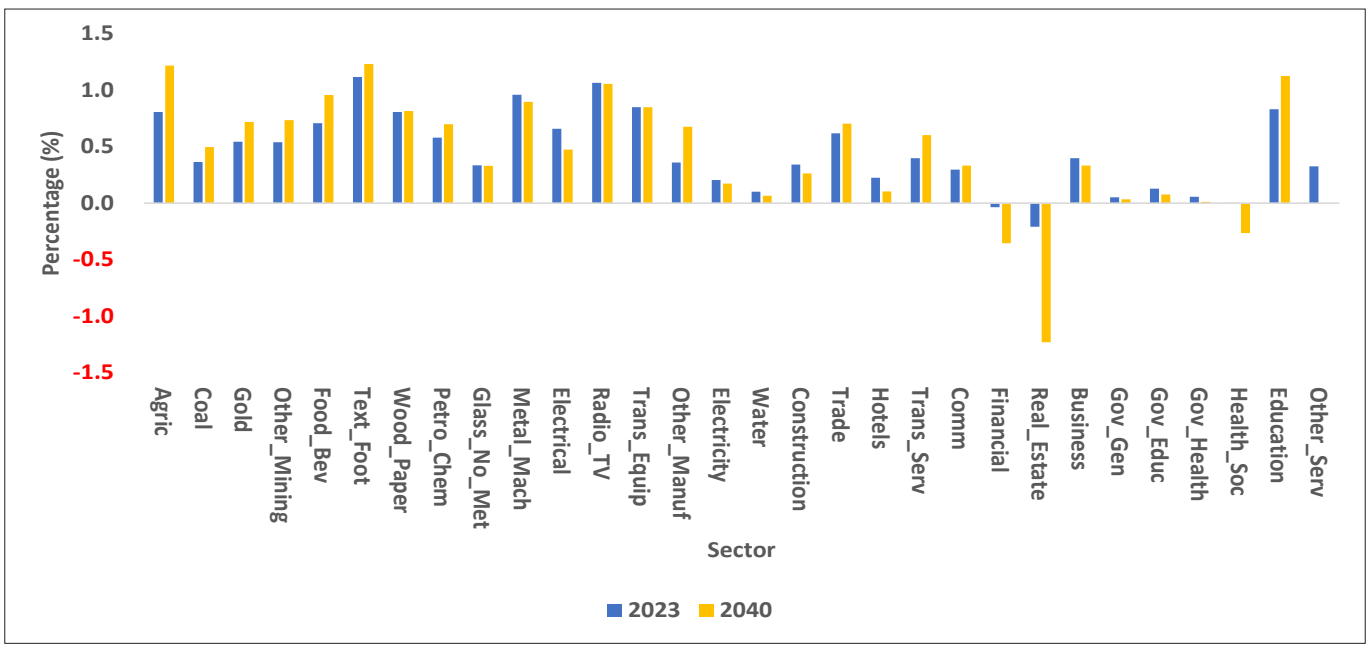


35 **Annexure A** provides more detail on the national results in table form, while **Annexure B** provides provincial results for specific industries. The provincial results are not discussed in this section as they largely follow the national trends.

36 Exports and imports are the only two components contributing positively to GDP, while household and investment expenditure contribute negatively. The government in this simulation is modelled to stay on the baseline, except for the SRD grants offered to households. Services are generally not im ported or exported, so the only two possible positive influences that are available, do not apply to services. Primary commodities and manufacturing goods are imported and exported, and hence most of them show positive output results towards the latter part of the forecast period.


CGE Sim2
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
-0.8
-1.0
-1.2
-1.4
Percentage (%)
Agric
Coal
Gold
Other_Mining
Food_Bev
Text_Foot
Wood_Paper
Petro_Chem
Glass_No_Met
Metal_Mach
Electrical
Radio_TV
Trans_Equip
Other_Manuf
Electricity
Water
Construction
Trade
Hotels
Trans_Serv
Comm
Financial
Real_Estate
Business
Gov_Gen
Gov_Educ
Gov_Health
Health_Soc
Education
Other_Serv
Sector
2023
2040


CGE Sim3
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Percentage (%)
Agric
Coal
Gold
Other_Mining
Food_Bev
Text_Foot
Wood_Paper
Petro_Chem
Glass_No_Met
Metal_Mach
Electrical
Radio_TV
Trans_Equip
Other_Manuf
Electricity
Water
Construction
Trade
Hotels
Trans_Serv
Comm
Financial
Real_Estate
Business
Gov_Gen
Gov_Educ
Gov_Health
Health_Soc
Education
Other_Serv
Sector
2023
2040


CGE Sim4
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
Percentage (%)
Agric
Coal
Gold
Other_Mining
Food_Bev
Text_Foot
Wood_Paper
Petro_Chem
Glass_No_Met
Metal_Mach
Electrical
Radio_TV
Trans_Equip
Other_Manuf
Electricity
Water
Construction
Trade
Hotels
Trans_Serv
Comm
Financial
Real_Estate
Business
Gov_Gen
Gov_Educ
Gov_Health
Health_Soc
Education
Other_Serv
Sector
2023
2040

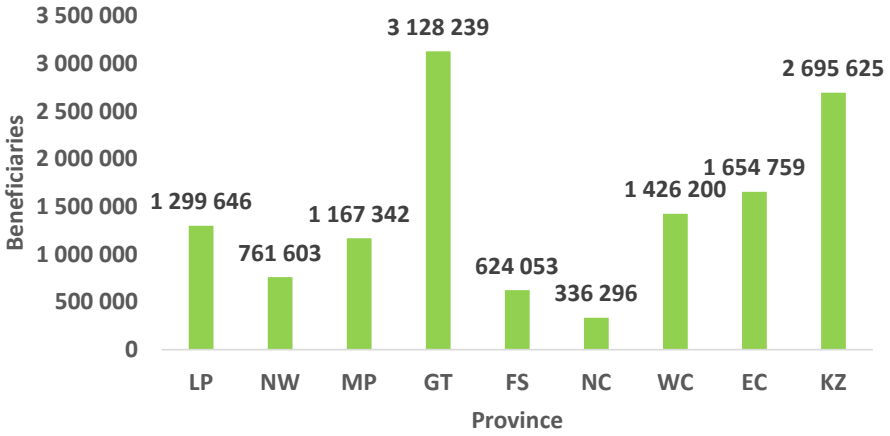
PART 5.5 : MICROSIMULATION RESULTS

153. The MS model was used to provide first order partial estimates of the SRD Grant outcomes. Important amongst these are the overall estimate of beneficiaries and the resulting provincial breakdown and the net cost of the grant after accounting for a VAT recovery. This provided the input variables for the CGE model simulations.
154. The MS model also provided first order estimates of the impact of the SRD Grant on poverty and inequality. These were then compared to the poverty and inequality estimates that result from disposable income changes to households as a result from the CGE modelling. The MS model used the CGE disposable income outputs to model the final poverty and inequality estimates.

Table 5.4: Microsimulation Estimates for Cost, Poverty and Income Inequality (MS estimates applicable to 2022)[37]

Prov	SRD cost (R'million)	Baseline LBPL	Baseline Gini	MS LBPL	MS Gini	CGE Sim2 LBPL	CGE Sim2 Gini
LP	5 459	42.8%	0.62	39.5%	0.60	37.1%	0.59
NW	3 199	43.4%	0.64	39.0%	0.61	36.8%	0.60
MP	4 903	31.3%	0.64	28.1%	0.63	26.7%	0.62
GT	13 139	23.0%	0.62	21.1%	0.61	19.0%	0.60
FS	2 621	27.9%	0.61	23.1%	0.59	21.9%	0.58
NC	1 412	33.7%	0.65	30.8%	0.64	29.3%	0.63
WC	5 990	22.6%	0.60	22.0%	0.59	20.8%	0.58
EC	6 950	47.8%	0.65	45.3%	0.62	42.5%	0.61
KZ	11 322	35.7%	0.61	31.4%	0.59	29.0%	0.57
SA	54 994	32.7%	0.64	30.2%	0.61	27.7%	0.61
VAT recovery	5 302						
Net cost	49 691						

Figure 5.11: Microsimulation Estimated Distribution of SRD Grant Beneficiaries by Province



155. Approximately 57% of all SRD beneficiaries are likely to be based in three provinces, GT (3.1 million), KZ (2.7 million) and EC (1.7 million) (Figure 5.11).
156. The total estimated cost of the SRD Grant, based on 13.1 million beneficiaries, is R55 billion, with an estimated R5.3 billion recovered in VAT payments in the same financial year (Table 5.4). The net cost of the SRD Grant is therefore conservatively[38] estimated at R50 billion.
157. As reported earlier, the MS model underestimates the poverty and inequality outcomes for the SRD Grant relative to the CGE model (Table 5.4). Here the results of the CGE Sim2 poverty and inequality outcomes are compared to the MS model outcomes.

37 The CGE results are from **Part 5.2** in this report.

38 This is a conservative estimate as no other tax recoveries (i.e., from Corporate Taxes, PIT and other excise taxes) are taken into account.

Part 6

Discussion

The results from Part 5 are discussed here.

PART 6.1 : FISCAL OUTCOMES

158. The CGE modelling analysis sought to evaluate the four redistributive policy interventions as standalone programmes with dedicated financing through taxes. In reality the SRD grant has already been implemented without raising additional taxes or financed through borrowing.
159. This modelling approach was, however, not adopted to evaluate the raising of new taxes, but instead to examine the net costs and benefits of different financing options of the SRD Grant and related policies.
160. As a balanced budget approach was adopted, the programme is never financed through borrowing. Of interest is whether the alternative combinations of expenditure and taxation have net negative/positive effects on the economy, the distribution of income and poverty.
161. The analysis showed that VAT as a financing approach, while not substantially offsetting the distributional outcomes as measured by the LBPL and the Gini Coefficient, had negative outcomes for economic output. The PIT financed SRD Grant however had positive economic and distributional outcomes.
162. The wage subsidy (WS) intervention (CGE Sim3) financed by PIT demonstrated strong positive improvements in economic output relative to the Baseline, suggesting that as an intervention it is also sustainable. However, the distributional outcomes were far weaker than for CGE Sim2.
163. However, the model assumed that there would be no leakage of the WS into, inter alia, employer profits. Such leakage is however hard to prevent.
164. The combined WS and SRD Grant (CGE Sim3) performed well for both distributional and economic outcomes indicating that were this configuration to prove feasible, i.e., were it possible to prevent leakage from the WS, it would be sustainable.

PART 6.2 : GROWTH, INEQUALITY AND POVERTY

165. Of the four policy configurations, CGE Sim3 proved to be the least redistributive, although it generated the strongest economic growth outcomes. CGE Sim1, by way of contrast, produced good distributive outcomes, but poor growth results. CGE Sim2, by way of contrast, demonstrated both positive distributional and growth outcomes, as did CGE Sim4.
166. The results indicate that when employment and social protection strategies are combined, inclusive growth opportunities exist.
167. There are however differences between the partial distributional outcomes of the MS model and the more complete CGE analysis possible using the CGE model. The differences are material.
168. The Panel 1 analysis could only examine the distributional effects using the MS model, understating these critical outcomes. The more complete distributional analysis used by Panel 2 therefore suggests that even a relatively modest social grant benefit, such as the SRD Grant, has material social implications with strong opportunities for inclusive growth approaches.

PART 6.3: SECTORAL OUTCOMES

169. The sectoral results indicate that the SRD Grant options result in a shift away from services to manufacturing production. CGE Sim1 produces few positive changes in economic output due to the price-effects of VAT compared to CGE Sim2. The wage subsidy policy configurations also exhibit sectoral shifts in favour of manufacturing, although almost all sectors benefit.
170. The sectoral shifts in favour of manufacturing result from the redistributive financing options for CGE Sim2, CGE Sim3 and CGE Sim4. In all three the increased taxation of the highest earners produces a structural change in disposable incomes toward lower income households, and a consequential structural change in consumption toward products important to lower income households.

PART 6.4 : PROVINCIAL OUTCOMES

171. The redistributive effects of the four policy configurations are both income-related and spatial, with provinces with a preponderance of lower income groups benefiting to a greater extent.
172. The provinces with the greatest number of SRD Grant beneficiaries tend to be those with the largest overall populations, with the largest number in GT (3.1 million). The next largest are KZ (2.7 million) and EC (1.7 million).
173. There are also significant reductions in poverty rates by province for CGE Sim2 (the best performing version of the SRD Grant), in terms of the LBPL, for the more rural provinces. For instance: EC moves from 47.8% to 42.5%; NW moves from 43.4% to 36.8%; LP moves from 42.8% to 37.1%; and KZ moves from 35.7% to 29.0%.
174. The changes in income inequality for CGE Sim2 by province are also quite dramatic. For instance: EC moves from 0.65 to 0.61; NW moves from 0.64 to 0.60; LP moves from 0.62 to 0.59; and KZ moves from 0.61 to 0.57.

Part 7

Findings

The findings derived from all evidence collated and documented by the Panel is reflected here.

PART 7.1 : INCLUSIVE GROWTH

175. The SRD Grant offers significant redistributive opportunities, diminished only by the choice of financing option. Where PIT rather than VAT is used, economic output deviates positively from the Baseline while also achieving material positive distributional outcomes.
176. Inclusive growth options appear strong when the SRD Grant is combined with a wage subsidy that targets the lowest occupational groups. However, in practice the achievement of a well-targeted wage subsidy scheme may provide difficult.
177. Microsimulation estimates of the SRD Grant outcomes for poverty and income inequality significantly understate those generated by a CGE model. The impact of the SRD Grant on poverty and inequality are therefore potentially more significant than previously understood. This is despite the relatively modest nature of the benefits and the entitlements.
178. The altered consumption patterns arising from the SRD Grant induce a shift toward improved manufacturing output relative to services and primary production. These shifts can be strengthened by related employment creation programmes.

PART 7.2 : FINANCING

179. The negative outcomes for economic output resulting from the use of VAT to finance the SRD Grant suggest that it should not be considered to address any financing gaps in the programme in future until further work is carried out to evaluate any complex interactions with the economy.
180. Given South Africa's extreme income inequality, revenue raising options for new redistributive programmes, such as the SRD Grant, should make use of progressive taxation options.
181. There is however no evidence at present that there is any requirement to increase taxes to finance the implemented SRD Grant.

PART 7.3 : VIABILITY OF THE SRD GRANT

182. The modelling results show that, depending upon how it is financed, the SRD Grant can be introduced in a manner that is fiscally and economically sustainable while at the same having a material impact on poverty and income inequality if implemented at the level of 13.1 million beneficiaries.
183. The modelling work produced in this report analysed the SRD Grant on a zero-based budgeting basis, effectively assuming that the outlay must be financed from new sources of revenue.
184. The analysis performed in this report reinforces the findings and recommendations of Panel 1, with the added proviso that the distributional consequences of the SRD Grant are more significant than the original analysis showed.
185. While large one-off shocks to the tax system were not supported by Panel 1 and are also not supported by Panel 2, the results in this report indicate, that real incremental improvements in the value of the SRD Grant as proposed by Panel 1 are likely to have beneficial outcomes and should be pursued.

PART 7.4 : EMPLOYMENT STRATEGIES

186. A wage subsidy targeted at the four lowest income occupational categories shows promise for improving economic output but is less effective in addressing poverty and inequality in comparison to the SRD Grant.
187. When the interventions are combined, however, there are potential gains for economic output, poverty and inequality.
188. Replicating the modelled wage subsidy with an equivalent programme in practice, however, may prove difficult. Two problems will need to be solved in design: first, is to ensure that the relevant occupational groups can be targeted; and second, the approach must avoid the leakage of the subsidy into employer profits.
189. While more work is needed to better identify an effective government subsidised employment intervention, such approaches are not substitutes for income-protection. They are instead complementary, as they have distinct, although related, social objectives.

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ANNEXURE A : SECTORAL OUTPUTS

Table A1: CGE Sim1 - Sector Results

Sector	2023	2030	2035	2040
Agric	-0.05	0.10	0.15	0.19
Coal	-0.09	0.02	0.07	0.11
Gold	-0.11	0.07	0.16	0.23
Other_Mining	-0.08	0.11	0.21	0.28
Food_Bev	-0.37	-0.22	-0.18	-0.15
Text_Foot	-0.28	-0.07	0.01	0.05
Wood_Paper	-0.29	-0.09	-0.00	0.04
Petro_Chem	-0.24	-0.06	0.02	0.06
Glass_No_Met	-0.39	-0.31	-0.28	-0.26
Metal_Mach	-0.09	0.29	0.48	0.59
Electrical	-0.52	-0.19	-0.06	0.03
Radio_TV	-0.28	0.02	0.16	0.24
Trans_Equip	-0.26	0.03	0.15	0.22
Other_Manuf	-0.07	0.11	0.18	0.22
Electricity	-0.60	-0.60	-0.58	-0.56
Water	-0.57	-0.84	-0.91	-0.94
Construction	-0.68	-0.52	-0.46	-0.42
Trade	-0.35	-0.19	-0.13	-0.10
Hotels	-0.19	-0.09	-0.06	-0.04
Trans_Serv	-0.26	-0.17	-0.12	-0.09
Comm	-0.34	-0.32	-0.31	-0.31
Financial	-0.77	-0.66	-0.62	-0.60
Real_Estate	-0.45	-1.19	-1.39	-1.47
Business	-0.50	-0.33	-0.29	-0.27
Gov_Gen	-0.06	-0.04	-0.03	-0.02
Gov_Educ	-0.17	-0.09	-0.06	-0.05
Gov_Health	-0.14	-0.08	-0.06	-0.05
Health_Soc	-1.03	-0.99	-0.97	-0.94
Education	-0.90	-0.83	-0.82	-0.82
Other_Serv	-0.33	-0.22	-0.16	-0.13

Table A2: CGE Sim2 - Sector Results

Sector	2023	2030	2035	2040
Agric	0.24	0.36	0.42	0.47
Coal	0.02	0.01	-0.00	-0.01
Gold	0.04	0.02	0.01	0.01
Other_Mining	0.05	0.04	0.04	0.04
Food_Bev	0.28	0.35	0.38	0.41
Text_Foot	0.36	0.35	0.36	0.37
Wood_Paper	0.21	0.17	0.16	0.16
Petro_Chem	0.11	0.10	0.10	0.11
Glass_No_Met	-0.01	-0.07	-0.09	-0.11
Metal_Mach	0.13	0.05	0.03	0.01
Electrical	0.00	-0.11	-0.14	-0.15
Radio_TV	0.21	0.13	0.09	0.07
Trans_Equip	0.18	0.14	0.13	0.13
Other_Manuf	0.13	0.23	0.29	0.34
Electricity	-0.09	-0.20	-0.24	-0.26
Water	-0.08	-0.22	-0.27	-0.30
Construction	-0.04	-0.12	-0.15	-0.16
Trade	0.18	0.16	0.15	0.14
Hotels	-0.00	-0.09	-0.14	-0.18
Trans_Serv	0.06	0.06	0.07	0.07
Comm	0.02	-0.02	-0.03	-0.04
Financial	-0.16	-0.32	-0.39	-0.44
Real_Estate	-0.22	-0.85	-1.11	-1.27
Business	0.23	0.20	0.20	0.20
Gov_Gen	0.02	0.02	0.01	0.01
Gov_Educ	0.03	0.01	0.01	0.00
Gov_Health	0.00	-0.02	-0.02	-0.02
Health_Soc	-0.20	-0.39	-0.45	-0.48
Education	0.38	0.44	0.47	0.49
Other_Serv	0.10	0.14	0.16	0.19

Table A3: CGE Sim3 - Sector Results

Sector	2023	2030	2035	2040
Agric	1.06	1.21	1.29	1.36
Coal	0.64	0.77	0.85	0.91
Gold	0.94	1.11	1.21	1.29
Other_Mining	0.91	1.09	1.19	1.27
Food_Bev	0.79	0.88	0.95	1.01
Text_Foot	1.41	1.48	1.53	1.57
Wood_Paper	1.12	1.14	1.17	1.19
Petro_Chem	0.87	0.96	1.02	1.08
Glass_No_Met	0.63	0.70	0.75	0.79
Metal_Mach	1.54	1.57	1.59	1.61
Electrical	1.22	1.16	1.14	1.13
Radio_TV	1.58	1.69	1.75	1.80
Trans_Equip	1.25	1.28	1.30	1.32
Other_Manuf	0.44	0.51	0.57	0.63
Electricity	0.54	0.68	0.74	0.79
Water	0.33	0.51	0.59	0.66
Construction	0.70	0.73	0.75	0.77
Trade	0.81	0.92	0.98	1.02
Hotels	0.42	0.46	0.49	0.51
Trans_Serv	0.63	0.81	0.90	0.97
Comm	0.52	0.60	0.65	0.68
Financial	0.23	0.17	0.15	0.13
Real_Estate	0.01	0.01	0.01	0.02
Business	0.32	0.26	0.25	0.24
Gov_Gen	0.05	0.04	0.04	0.04
Gov_Educ	0.18	0.15	0.14	0.13
Gov_Health	0.10	0.08	0.07	0.06
Health_Soc	0.37	0.37	0.37	0.38
Education	0.85	1.03	1.12	1.18
Other_Serv	0.42	0.53	0.60	0.65

Table A4: CGE Sim4 - Sector Results

Sector	2023	2030	2035	2040
Agric	0.81	1.03	1.14	1.22
Coal	0.36	0.43	0.47	0.50
Gold	0.55	0.63	0.68	0.72
Other_Mining	0.54	0.64	0.69	0.74
Food_Bev	0.71	0.83	0.90	0.96
Text_Foot	1.12	1.16	1.20	1.23
Wood_Paper	0.81	0.79	0.80	0.82
Petro_Chem	0.58	0.63	0.67	0.70
Glass_No_Met	0.34	0.32	0.33	0.33
Metal_Mach	0.96	0.91	0.90	0.90
Electrical	0.66	0.54	0.50	0.48
Radio_TV	1.07	1.05	1.05	1.06
Trans_Equip	0.85	0.84	0.84	0.85
Other_Manuf	0.36	0.51	0.60	0.68
Electricity	0.20	0.17	0.17	0.17
Water	0.10	0.06	0.06	0.07
Construction	0.34	0.28	0.27	0.26
Trade	0.62	0.67	0.69	0.71
Hotels	0.23	0.17	0.14	0.10
Trans_Serv	0.40	0.50	0.56	0.60
Comm	0.30	0.31	0.32	0.33
Financial	-0.04	-0.23	-0.30	-0.36
Real_Estate	-0.21	-0.83	-1.08	-1.23
Business	0.40	0.34	0.33	0.33
Gov_Gen	0.05	0.04	0.04	0.03
Gov_Educ	0.13	0.09	0.08	0.08
Gov_Health	0.06	0.03	0.02	0.01
Health_Soc	0.00	-0.18	-0.24	-0.27
Education	0.83	1.00	1.08	1.13
Other_Serv	0.33	0.42	0.49	0.55

ANNEXURE B: SECTORAL OUTPUT BY PROVINCE

Table B1: Agriculture: Sectoral Output Variations from the Baseline by Province and Simulation

Year	LP	NW	MP	GT	FS	NC	WC	EC	KZ
	CGE Sim 1								
2023	-0.02	-0.05	-0.05	-0.06	-0.06	-0.05	-0.06	-0.04	-0.05
2030	0.15	0.10	0.10	0.08	0.08	0.09	0.08	0.12	0.11
2035	0.21	0.15	0.15	0.13	0.13	0.14	0.13	0.18	0.18
2040	0.25	0.17	0.19	0.16	0.15	0.16	0.16	0.22	0.22
	CGE Sim 2								
2023	0.34	0.30	0.24	0.25	0.28	0.26	0.20	0.22	0.22
2030	0.54	0.46	0.37	0.38	0.43	0.40	0.30	0.35	0.34
2035	0.64	0.54	0.44	0.44	0.50	0.47	0.34	0.41	0.40
2040	0.72	0.60	0.49	0.49	0.56	0.51	0.37	0.46	0.44
	CGE Sim 3								
2023	1.03	1.06	1.07	1.06	1.06	1.06	1.07	1.06	1.07
2030	1.13	1.19	1.22	1.21	1.19	1.19	1.22	1.20	1.22
2035	1.19	1.27	1.31	1.29	1.27	1.26	1.30	1.29	1.31
2040	1.24	1.34	1.39	1.37	1.34	1.33	1.38	1.36	1.39
	CGE Sim 4								
2023	0.89	0.86	0.82	0.82	0.85	0.83	0.77	0.79	0.80
2030	1.15	1.11	1.04	1.04	1.08	1.05	0.97	1.01	1.01
2035	1.29	1.24	1.16	1.15	1.20	1.16	1.06	1.12	1.12
2040	1.40	1.34	1.25	1.24	1.29	1.24	1.13	1.21	1.20

Table B2: Metal Machinery: Sectoral Output Variations from the Baseline by Province and Simulation

Year	LP	NW	MP	GT	FS	NC	WC	EC	KZ
	CGE Sim 1								
2023	-0.14	-0.13	-0.12	-0.09	-0.14	-0.09	0.01	-0.07	-0.11
2030	0.25	0.24	0.26	0.29	0.25	0.29	0.39	0.32	0.27
2035	0.44	0.43	0.44	0.47	0.43	0.47	0.58	0.51	0.45
2040	0.55	0.55	0.56	0.59	0.55	0.58	0.69	0.63	0.57
	CGE Sim 2								
2023	0.10	0.12	0.11	0.14	0.13	0.14	0.16	0.10	0.09
2030	0.01	0.03	0.03	0.07	0.04	0.05	0.09	0.02	0.01
2035	-0.02	-0.00	0.01	0.04	0.01	0.02	0.06	-0.00	-0.02
2040	-0.03	-0.01	-0.00	0.03	0.00	0.00	0.05	-0.02	-0.03
	CGE Sim 3								
2023	1.63	1.59	1.52	1.56	1.58	1.61	1.52	1.52	1.45
2030	1.65	1.63	1.54	1.61	1.61	1.62	1.54	1.55	1.46
2035	1.67	1.66	1.56	1.63	1.64	1.64	1.55	1.56	1.48
2040	1.68	1.68	1.57	1.65	1.66	1.64	1.55	1.57	1.48
	CGE Sim 4								
2023	0.98	0.98	0.94	0.99	0.98	1.01	0.99	0.93	0.87
2030	0.92	0.93	0.88	0.95	0.93	0.94	0.94	0.87	0.81
2035	0.90	0.91	0.87	0.94	0.92	0.92	0.92	0.85	0.79
2040	0.90	0.91	0.86	0.94	0.92	0.91	0.91	0.85	0.78

Table B3: Other Mining: Sectoral Output Variations from the Baseline by Province and Simulation

Year	LP	NW	MP	GT	FS	NC	WC	EC	KZ
	CGE Sim 1								
2023	-0.07	-0.08	-0.08	-0.08	-0.08	-0.07	-0.07	-0.08	-0.09
2030	0.11	0.11	0.10	0.11	0.10	0.12	0.13	0.11	0.09
2035	0.21	0.20	0.20	0.20	0.20	0.22	0.23	0.20	0.19
2040	0.28	0.27	0.27	0.28	0.26	0.29	0.30	0.28	0.26
	CGE Sim 2								
2023	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
2030	0.03	0.04	0.04	0.05	0.04	0.04	0.06	0.05	0.04
2035	0.02	0.03	0.04	0.06	0.04	0.04	0.06	0.05	0.03
2040	0.02	0.03	0.03	0.06	0.04	0.04	0.06	0.05	0.03
	CGE Sim 3								
2023	0.91	0.90	0.91	0.92	0.91	0.90	0.90	0.93	0.93
2030	1.07	1.06	1.07	1.12	1.08	1.07	1.06	1.12	1.12
2035	1.17	1.16	1.17	1.23	1.18	1.16	1.16	1.24	1.23
2040	1.25	1.24	1.26	1.33	1.26	1.24	1.24	1.33	1.32
	CGE Sim 4								
2023	0.53	0.53	0.54	0.55	0.54	0.54	0.54	0.55	0.55
2030	0.62	0.62	0.63	0.67	0.63	0.63	0.64	0.66	0.65
2035	0.66	0.67	0.68	0.73	0.69	0.68	0.70	0.72	0.71
2040	0.70	0.71	0.72	0.79	0.74	0.72	0.74	0.78	0.76

Table B4: Business Services: Sectoral Output Variations from the Baseline by Province and Simulation

Year	LP	NW	MP	GT	FS	NC	WC	EC	KZ
	CGE Sim 1								
2023	-0.45	-0.49	-0.49	-0.49	-0.50	-0.49	-0.54	-0.50	-0.50
2030	-0.25	-0.32	-0.31	-0.32	-0.32	-0.32	-0.38	-0.33	-0.33
2035	-0.19	-0.28	-0.26	-0.28	-0.28	-0.28	-0.35	-0.29	-0.28
2040	-0.15	-0.25	-0.23	-0.27	-0.26	-0.26	-0.34	-0.27	-0.26
	CGE Sim 2								
2023	0.26	0.24	0.24	0.21	0.22	0.22	0.23	0.25	0.23
2030	0.27	0.21	0.22	0.18	0.18	0.17	0.19	0.25	0.22
2035	0.29	0.21	0.23	0.17	0.18	0.16	0.19	0.26	0.23
2040	0.31	0.22	0.24	0.17	0.18	0.15	0.18	0.28	0.24
	CGE Sim 3								
2023	0.34	0.34	0.31	0.31	0.32	0.34	0.37	0.29	0.31
2030	0.28	0.28	0.24	0.25	0.25	0.28	0.33	0.21	0.24
2035	0.27	0.28	0.23	0.23	0.24	0.26	0.33	0.18	0.22
2040	0.26	0.28	0.22	0.22	0.23	0.25	0.33	0.16	0.22
	CGE Sim 4								
2023	0.44	0.42	0.40	0.38	0.39	0.40	0.42	0.41	0.39
2030	0.42	0.36	0.35	0.31	0.32	0.32	0.37	0.36	0.34
2035	0.43	0.36	0.35	0.30	0.30	0.30	0.36	0.36	0.35
2040	0.45	0.37	0.36	0.28	0.30	0.29	0.36	0.36	0.36

Table B5: Food and Beverages: Sectoral Output Variations from the Baseline by Province and Simulation

Year	LP	NW	MP	GT	FS	NC	WC	EC	KZ
	CGE Sim 1								
2023	-0.34	-0.38	-0.36	-0.42	-0.40	-0.43	-0.41	-0.35	-0.27
2030	-0.17	-0.24	-0.20	-0.29	-0.25	-0.32	-0.27	-0.20	-0.07
2035	-0.12	-0.20	-0.16	-0.27	-0.21	-0.30	-0.24	-0.16	0.01
2040	-0.09	-0.19	-0.13	-0.26	-0.19	-0.30	-0.22	-0.14	0.06
	CGE Sim 2								
2023	0.39	0.35	0.36	0.29	0.29	0.29	0.17	0.37	0.27
2030	0.52	0.44	0.46	0.35	0.36	0.34	0.18	0.47	0.35
2035	0.60	0.49	0.51	0.38	0.39	0.38	0.19	0.52	0.39
2040	0.67	0.53	0.55	0.40	0.42	0.40	0.19	0.57	0.43
	CGE Sim 3								
2023	0.77	0.82	0.84	0.81	0.84	0.77	0.77	0.72	0.80
2030	0.84	0.93	0.97	0.90	0.95	0.83	0.84	0.79	0.91
2035	0.89	1.00	1.05	0.97	1.03	0.88	0.89	0.84	0.98
2040	0.93	1.07	1.12	1.02	1.11	0.92	0.94	0.89	1.04
	CGE Sim 4								
2023	0.80	0.79	0.81	0.73	0.74	0.70	0.59	0.75	0.71
2030	0.98	0.94	0.98	0.84	0.88	0.80	0.64	0.90	0.84
2035	1.09	1.04	1.08	0.91	0.96	0.86	0.68	0.99	0.93
2040	1.18	1.12	1.16	0.96	1.03	0.91	0.70	1.05	1.00

Table B6: Other Services: Sectoral Output Variations from the Baseline by Province and Simulation

Year	LP	NW	MP	GT	FS	NC	WC	EC	KZ
	CGE Sim 1								
2023	-0.32	-0.34	-0.32	-0.35	-0.33	-0.36	-0.37	-0.32	-0.28
2030	-0.20	-0.23	-0.20	-0.24	-0.22	-0.26	-0.27	-0.20	-0.13
2035	-0.15	-0.18	-0.15	-0.20	-0.16	-0.23	-0.23	-0.15	-0.05
2040	-0.11	-0.15	-0.11	-0.17	-0.12	-0.20	-0.21	-0.11	0.01
	CGE Sim 2								
2023	0.14	0.11	0.11	0.09	0.10	0.10	0.07	0.11	0.12
2030	0.20	0.15	0.15	0.12	0.13	0.12	0.09	0.15	0.17
2035	0.25	0.18	0.18	0.14	0.16	0.14	0.10	0.18	0.22
2040	0.30	0.21	0.22	0.16	0.19	0.17	0.12	0.21	0.26
	CGE Sim 3								
2023	0.38	0.43	0.44	0.43	0.43	0.40	0.40	0.41	0.43
2030	0.47	0.54	0.56	0.54	0.55	0.49	0.49	0.50	0.55
2035	0.52	0.62		0.61	0.63	0.54	0.55	0.56	0.62
2040	0.57	0.68	0.71	0.67	0.69	0.59	0.60	0.61	0.68
	CGE Sim 4								
2023	0.34	0.34	0.35	0.32	0.33	0.31	0.29	0.32	0.35
2030	0.46	0.45	0.46	0.41	0.43	0.39	0.36	0.42	0.47
2035	0.54	0.52	0.53	0.47	0.50	0.44	0.41	0.49	0.56
2040	0.61	0.58	0.60	0.53	0.56	0.49	0.45	0.55	0.63

NOTES

Department of Social Development
Private Bag 901, Pretoria, 0001,
134 Pretorius Street, HSRC Building, Pretoria
Tel: +27 12 312 7650/ 7653/ 7654
Fax: +27 12 312 7949 / +27 (0) 86 716 7482
www.dsd.gov.za