ECONOMIC POLICY SCENARIOS FOR GROWTH AND DEVELOPMENT OF SOUTH AFRICA: 2019–2030

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Acknowledgements

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Executive Summary

The goal of this study was to identify a policy roadmap to achieve key growth and development targets that the South African government has committed to for 2030. To meet the objectives of the project, this report identifies seven cumulative economic policy scenarios for the period 2019 to 2030. With the help of the ADRS's Dynamically Integrated Macro-Micro Simulation Model of South Africa (DIMMSIM), the likely future impacts of the scenarios have been simulated to establish the sufficiency of policy measures to closely realise the government's key macroeconomic and developmental targets for 2030.

DIMMSIM is a multi-sector macroeconometric model of South Africa with a full household micro-simulation model of the country. It captures the dynamic interactions between the macroeconomic performance and household welfare. The simulations and projections of the model use various inputs that are exogenous to the model. These inputs include population data, policy parameters and other national and international parameters. For the duration of the forecast (2019 to 2030), the values of these parameters had to be carefully prepared and fed into the model. The report includes a through description of specifics of exogenous policy choices under the seven scenarios.

POLICY SCENARIOS

In the pursuit of a satisfactory answer to the core issue of what mix of policies can achieve the desired outcomes for 2030, the study considered and empirically examined a wide range of economic policy choices. After much consideration of policy options and hundreds of simulations, we found it the most appropriate to classify the future scenarios into a business-as-usual (BAU) scenario and six cumulative alternative scenarios. Each alternative scenario adds new measures or changes to one or more features of the previous scenario.

Business-as-Usual Scenario (Scenario 1): The BAU scenario presents a likely outlook for the future of the South African economy that basically resembles its recent performance. It is a construct of the future of the South African economy against which to compare other scenarios. According to this scenario, the future policy inputs into the economy will closely follow their most recent records. For example, through the Medium-Term Strategic Framework (MTSF) and Medium-Term Expenditure Framework (MTEF), fiscal policy will continue to prioritise lowering the debt-GDP ratio through expenditure measures, and monetary authorities will continue to use the setting of the interest rate to enforce strict adherence to the inflation targeting, with 6% as the ceiling for the inflation rate. Section 4.1 of the report provides the details of the scenario.

Microeconomic Policy Reform Scenario (Scenario 2): Some policy analysts believe that microeconomic policy reforms in South Africa can be sufficient to propel the economy on a significantly higher macroeconomic performance, namely higher growth and employment path. The purpose of this scenario is to examine the extent to which a multitude of microeconomic policy measures – that are being implemented or are under consideration in South Africa – affect the growth path of the economy. The measures, elaborated in the Treasury (2018) report, are in essence mainly supply-side measures for the reform of institutions and regulatory frameworks and agencies to remove the perceived "inefficiencies" and "imperfections" in the operation of the free market. It is believed that this will produce the necessary growth to yield full employment in South Africa. Section 4.2 of the report first

presents a brief overview of key microeconomic policy proposals before translating them into model scenarios and simulating their likely macroeconomic impact.

Trade and Industry Policy Scenario (Scenario 3): The industrial policy in South Africa utilises both supply- and demand-side measures to increase investment in the manufacturing sector and expand South African exports. The Industrial Policy Action Plan (IPAP) places strong emphasis on the manufacturing sector since the sector has relatively better spill-over effects. Even though each of IPAP's programme and policy interventions has had some desirable quantitative and qualitative impact, the extent of its overall success in raising investment and exports of the manufacturing sector is the outcome of its multiple, inter-dependent and cross-cutting measures and programmes. Therefore, to include and empirically examine the future impact of the trade and industrial policy, the model scenario is designed to capture three ultimate goals of the programme, namely to raise total investment in the manufacturing sector, expand exports, and increase the local content and procurement of locally manufactured products. Section 4.3 of the report provides details of this empirical policy scenario.

Macroeconomic Policy Reform Scenario (Scenario 4): Analysis of the weak performance of the South African economy in terms of growth and employment has clear implications for macroeconomic policies. Therefore, the report considers revisiting the macroeconomic policy approach of the BAU scenario that is also used in scenarios 1 to 3. Broadly speaking, the choices are between austerity-focused and growth-oriented macroeconomic policy frameworks. The "austerity" approach resorts to a sink-or-swim methodology, calls for strict austerity measures through government budget cuts, and contends that decreasing the deficit would create a business-friendly environment that would attract investment which in turn would grow the economy and increase employment. The "growth" approach, on the other hand, calls for growth friendly macroeconomic policies to provide a life raft for the country as it struggles to meet growth and employment targets. It argues that increasing GDP is the preferred approach to cutting the debt relative to GDP and attracting investments.

In South Africa, government's fiscal and monetary policy has followed the "austerity" approach to macroeconomic policy, composed of fiscal austerity, flexible exchange rate and strict inflation targeting. As in the case of the BAU scenario, scenarios 1 to 3 extend the current austerity approach to the macroeconomic policy to 2030. Scenario 4, on the other hand, assesses the likely effects of adopting the "growth" approach to the fiscal and monetary policy. The shift from the "austerity" to "growth" approach also allows for the use of macroeconomic policy tools for a more robust response to the country's developmental imperatives. The specifics of the scenario in terms of fiscal and monetary policy have been presented in section 4.4 of the report. This includes specific changes to choices related to public investment, government current expenditure and monetary policy.

Social Policy Scenario (Scenario 5): Besides targeting economic growth and labour-intensive sectors, as additional measures to lower the unemployment and poverty rates, this scenario considers what if the government begins to make the public works as the Employer of Last Resort (ELR) for the unskilled unemployed in South Africa. Moreover, the scenario considers some adjustments to the current social security programme in South Africa, including the introduction of a grant, namely caregiver grant, for the family member that takes care of a child who receives either a child support grant or a care dependency grant. Section 4.5 provides more on the specifics of the scenario.

Private Sector Support Scenario (Scenario 6): This scenario considers what if the Public-Private Growth Initiative (PPGI), which was established in early 2018, increased investments in the South African economy by R500 billion over the next 12 years, as it has proposed. The scenario also considers possible additional R100 billion investments in the South African manufacturing sector by the Public Investment Corporation (PIC). Section 4.6 elaborates on the details of each investment scenario.

External Support Scenario (Scenario 7): This scenario considers the inclusion of macroeconomic contributions of three fairly small favourable external developments related to the gold price, growth of international import and flow of foreign direct investment. Details of the scenario are provided in section 4.7 of the report.

SCENARIO RESULTS AND FINDINGS

The premise that we need a vision roadmap to ensure that we are moving in the right direction guides the use of ADRS's macro-micro model of South Africa to identify a policy roadmap to meet South Africa's development vision for 2030. The report provides a graphic comparison of scenarios in terms of their implications for the likely evolution of key economic and development indicators. It then analyses the results to identify and substantiate the key findings of the report (section 5).

Based on analysis of the model results, the report identifies the following 10 findings on the potential of using a combination of economic policy measures to harness poverty-reducing growth:

1. The cumulative scenarios of this report show that it is possible for economic policy to propel the economy on a fundamental economic reconfiguration and restructuring path as it relates to structural transformation and economic growth with significant reductions in the unemployment rate and poverty. However, this will be possible if the current austerity-focused economy policy framework gave way to a growth-oriented economic policy framework. Simulation results show that when the economy is underpinned by consistent implementation of growth-oriented policies, it will unleash a virtuous growth of output, employment, income and expenditure.

2. We identified and tested the potential of a combination of policy measures that include microeconomic reforms, trade and industrial policy, macroeconomic reforms, social policy measures and private sector support. We estimated the likely outcomes to include:

    2.1 an average growth rate of 5.74% for the period 2019-2030, which will more than double the size of the GDP;
    2.2 an 80% increase in the real per-capita GDP;
    2.3 an increase in the average investment-GDP ratio to 28%;
    2.4 more than double the CAGR of manufacturing output, relative to the BAU scenario;
    2.5 a debt-GDP ratio of 30.4% by 2030;
    2.6 an average deficit-GDP ratio of -3.2% during the twelve-year period;
    2.7 an increase in the available government funding for major government programmes such as the NHI, the land reform, free higher education, and other important social and economic services;
    2.8 a reduction in the unemployment rate by more than half, from the current 27.5% to 12.3% by 2030; and

2.9 a reduction in the poverty rate by about two-thirds, from the current 38% to 13% in 2030.

3. The results of Microeconomic Policy Reform Scenario (Scenario 2) highlight the limitations of depending solely on microeconomic policy reforms to propel the economy on the desired high growth and employment path.

4. Increased public investment raises output in both the short run, because of demand effects, and in the long run, as a result of supply effect. A well-coordinated annual increase in government current and capital spending boosts aggregate demand through fiscal multiplier and increases aggregate supply through time as the productive capacity of the economy increases.

5. When the scenario includes monetary policy reforms, as proposed, demand effects are stronger and economic performance is significantly enhanced. The measures especially provide SMMEs with the necessary life support and accentuate the decline in debt-GDP ratio by engendering a stronger growth.

6. If the public works programme is reoriented to become Employer of Last Resort and provide part-time jobs to all unskilled workers who cannot find jobs in the labour market, millions of workers who are currently excluded from the mainstream of the economy and have little or no chance of finding jobs in the future are provided livelihoods and a way out of poverty.

7. Each of the proposed scenarios has direct and indirect implications for the manufacturing sector. While the Microeconomic Policy Reform can raise the CAGR of manufacturing output by an additional 0.6 percentage points, the Trade and Industry Policy scenario will be able to add almost 1.5 percentage points to the CAGR of manufacturing output. An increase in PIC investment in manufacturing adds 0.35 percentage points to the growth rate of manufacturing sector and the PPGI is projected to help the average annual growth of the manufacturing sector by an additional 0.75 percentage points. The growth-oriented Macroeconomic Policy Reform scenario also has a significant impact on the manufacturing sector. It is projected to add 1.2 percentage points to the CAGR of manufacturing output.

8. The proposed scenarios are able to reverse the negative trend in the share of manufacturing sector in total output and employment. Under the BAU scenario, the current trend is projected to continue. However, the simulation results show that the proposed policy measures will be able to reverse the current trend during the next decade by generating relatively faster growth of the manufacturing sector.

9. The proposed policy measures are plausible and economically sustainable, as shown by the model simulations. In fact, the economy will be less vulnerable than without the proposed reforms.

10. The report shows that there is no one category of policy proposals that will be enough to overcome South Africa's growth and development challenges.

The goal of this project was to identify a policy roadmap to realise key growth and development targets that the government has committed to for 2030. The economic model that we used allowed us to design and test diverse policy scenarios and helped gradually build a composite scenario with

simulation results that show their potential to propel the economy on a path to reduce the unemployment rate by more than half (from the current 27.5% to 12.3%) and the poverty rate by approximately two-thirds (from the current 38% to 13%) by 2030.

Data driven predictions can succeed – and they can fail. It is when we deny our role in the process that the odds of failure rise. Before we demand more of our data, we need to demand more of ourselves.
Nate Silver, The Signal and the Noise, 2015

1. INTRODUCTION

The South African government is committed to meet the mounting economic challenges that beset the country and achieve important targets such as eradicating poverty, significantly reducing the unemployment rate, and more than doubling the size of the economy by 2030. It is of prime importance to identify policies that engender growth and development paths that are likely to meet these NDP targets for purpose of planning, implementation and monitoring.

This report presents the findings of an economic modelling exercise that simulated the likely future impact of alternative policy scenarios on key macro and micro- economic indicators in order to quantitatively evaluate the potential of each policy scenario to achieve the key NDP targets for 2030. It includes a series of policy and implementation choices that the simulation results indicate.

The premise that successful development outcomes are predicated on good policy design guides the application of modelling techniques to closely approximate the policy design required to meet the 2030 development targets. To undertake the modelling exercise, key government policy documents (e.g. NDP, 9 Point Plan, IPAP, and NGP) were used to identify various options, expressed as model scenarios. Quantitative impact analyses were then undertaken for each scenario using Dynamically Integrated Micro and Macro Economic Simulation Model of South Africa (DIMMSIM). For each scenario, DIMMSIM generated annual projections of relevant macroeconomic and economic sector indicators as described in subsequent sections. However, before taking a closer look at the scenarios and their simulation results, we introduce the model.

2. BASIC STRUCTURE AND FEATURES OF DIMMSIM

To meet the objectives of the project and properly respond to its scope, we use economic modelling techniques to design, simulate and evaluate the effectiveness of alternative growth and development policy scenarios to achieve key NDP targets. Following is a more detailed presentation of the proposed approach.

Over the last 15 years, ADRS has built a suite of 10 proprietary South African economic models which include two core models and eight specialised models. The two distinct core models were built using fundamentally different modelling techniques. The ADRS multi-sector Macroeconomic Model of South Africa (MEMSA) is a large multi-sector macroeconometric model built as a tool for designing, forecasting and conducting impact analyses of macroeconomic and industry policy scenarios. Its construction utilised time-series data and analysis. The ADRS South African Tax and Transfer Model (SATTSIM) is a microsimulation model built using household-level survey data. It is a tool for designing, forecasting

and conducting impact analyses of policies related to direct and indirect taxes, social security, public works, poverty and inequality.

DIMMSIM integrates MEMSA and SATTSIM to capture the dynamic interactions between the macroeconomic performance and the poverty and income distribution at household level. Following is a brief non-technical introduction to the DIMMSIM and its features.

2.1   DIMMSIM's Macroeconomic Component

The ADRSMEMSA is one of the two modules of DIMMSIM. It allows design and analyses of macroeconomics and industrial policies and produces projections of the paths of key indicators related to the economy and its economic sectors under various domestic and international contexts and policy options.

MEMSA is a bottom-up model with more than 3200 equations that capture the structure of the National Income and Product Account (NIPA) at sector and aggregate levels and produces projections that are consistent with various national accounting identities in nominal and real terms. The model includes more than 400 estimated equations that analytically and empirically capture the behaviour of the private and household sectors as part of capturing the working and dynamics of the economy from its production, expenditure and income perspectives.[1] MEMSA's equation system can be broken down into a number of blocks that include:

- **The Final Demand Block** encompasses 769 equations. It includes sets of estimated equations that capture the behaviour of the private sector as it relates to sectoral-level investment, exports and imports in 45 sectors; households in terms of expenditure on 27 categories of consumption goods and services; and the public sector in terms of final consumption expenditure and investment. The expenditure block of equations therefore produces projections of various components of aggregate demand in the economy that facilitate the model's projection of real and nominal GDP from the expenditure side.

- **The Production Block** includes 712 equations that represent sector and aggregate production-related activities in the economy. It includes sets of equations that produce projections of sector outputs, potential outputs, capital stock and capital productivity, all in nominal and real terms. Private sector decisions on how much to produce in various sectors of the economy are captured through 40 estimated equations that link the decisions to various demand, supply and price factors in the economy. Therefore, the equations of the production block generate consistent projections of nominal and real values for sector and aggregate outputs, namely value added at basic prices. The aggregate of sectoral value added at basic prices plus the net taxes and subsidies on products provide the model's annual projections of GDP from the production side.

- **The Price and Wage Block** is comprised of 413 equations that include time-series estimated behavioural equations for sector output prices (45), consumer prices (30) and investment prices (45). It also includes equations for sector import and export prices, sector- and economy-wide inflation

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[1] MEMSA uses the Autoregressive Distributed Lag (ARDL) estimation procedure, developed by Pesaran (1997) and Pesaran et al. (1996, 1999).
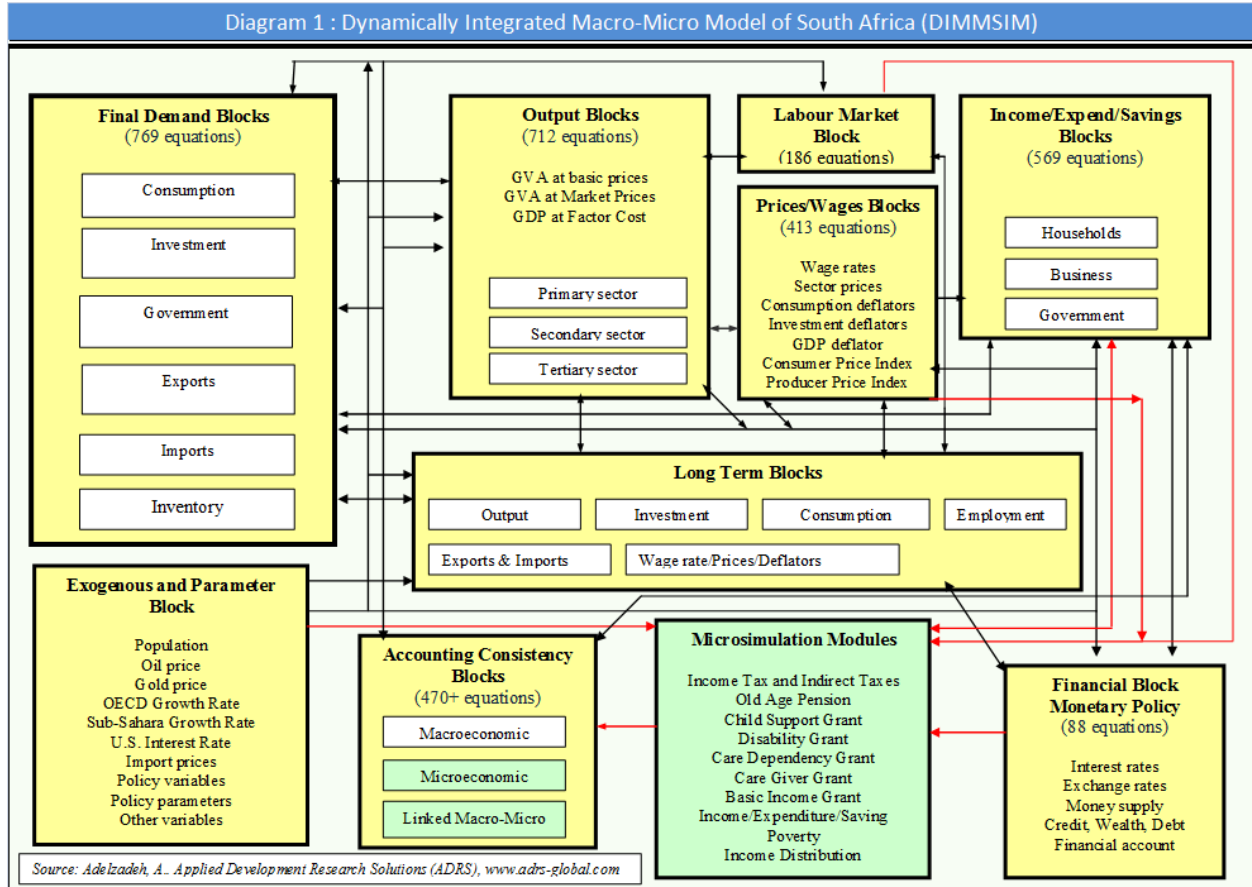
rates and 45 estimated equations for the sector-level real wage rate (i.e. average remuneration rates) and 45 calculated sectoral-level nominal wage rates.

- **The Labour Market Block** is comprised of 186 equations that include 40 estimated equations that capture factors that determine short- and long-term demand for sector-level employment. In addition, this block includes equations for sectoral labour productivity, labour force, unemployment rate and other labour market indicators.

- **The Income, Expenditure and Savings Block** includes 569 equations that capture a detailed breakdown of income, expenditure and savings of households, incorporated businesses and government, in both nominal and real terms. A combination of variables from this block, the labour market block, the price and wage block and the production block provides forecasts of the real and nominal GDP from the income side.

- **The Financial Block** embodies 88 equations for indicators related to the financial and monetary side of the economy, such as the interest rate, exchange rates, money supply, credit extensions, household financial assets and liabilities, and foreign direct and portfolio investments. The financial block variables are especially important determinants of variables in other equation blocks and include policy variables and time-series estimated variables.

- **The National Account Block** incorporates more than 470 equations. This block of equations is responsible for ensuring consistency and enforcing NIPA relationships within the economic system captured by the model. For example, it ensures that in the model, the calculation of GDP, both real and nominal, from the income, production and expenditure sides are comprised of relevant NIPA components and are consistent with each other at aggregate and sector levels, in nominal and real terms.

MEMSA's list of exogenous variables includes a number of domestic and international variables. Among exogenous inputs to the model are:

- General government and public corporation investment

- Monetary and fiscal policy rules

- Government current spending

- Tax and subsidy rates

- Population

- Oil prices

- Gold prices

- Annual growth rates of world and regional import demands

- U.S. interest and inflation rates

DIMMSIM's flowchart and economic sectors are presented in Diagrams 1 and 2.

Diagram 1 : Dynamically Integrated Macro-Micro Model of South Africa (DIMMSIM)

Final Demand Blocks
(769 equations)

- Consumption
- Investment
- Government
- Exports
- Imports
- Inventory

Output Blocks
(712 equations)

GVA at basic prices
GVA at Market Prices
GDP at Factor Cost

- Primary sector
- Secondary sector
- Tertiary sector

Labour Market Block
(186 equations)

Prices/Wages Blocks
(413 equations)

Wage rates
Sector prices
Consumption deflators
Investment deflators
GDP deflator
Consumer Price Index
Producer Price Index

Income/Expend/Savings Blocks
(569 equations)

- Households
- Business
- Government

Long Term Blocks

- Output
- Investment
- Consumption
- Employment
- Exports & Imports
- Wage rate/Prices/Deflators

Exogenous and Parameter Block

Population
Oil price
Gold price
OECD Growth Rate
Sub-Sahara Growth Rate
U.S. Interest Rate
Import prices
Policy variables
Policy parameters
Other variables

Accounting Consistency Blocks
(470+ equations)

- Macroeconomic
- Microeconomic
- Linked Macro-Micro

Microsimulation Modules

Income Tax and Indirect Taxes
Old Age Pension
Child Support Grant
Disability Grant
Care Dependency Grant
Care Giver Grant
Basic Income Grant
Income/Expenditure/Saving
Poverty
Income Distribution

Financial Block Monetary Policy
(88 equations)

Interest rates
Exchange rates
Money supply
Credit, Wealth, Debt
Financial account

Source: Adelzadeh, A., Applied Development Research Solutions (ADRS), www.adrs-global.com

Diagram 2: Economic Sectors of MEMSA

Model's Economic Sectors
with 7 variables for each sector
(output, employment, investment, exports, imports, prices, wage rates)

Primary	Manufacturing	Services
1. Agriculture, Forestry and Fishing 2. Coal Mining 3. Gold, uranium and ore mining 4. Other mining	5. Food 6. Beverage 7. Tobacco 8. Textiles 9. Wearing Apparel 10. Leather and Leather products 11. Footwear 12. Wood and wood products 13. Paper and paper products 14. Printing, publishing and recorded media 15. Coke & refined petroleum products 16. Basic chemicals 17. Other chemicals & man made fibres 18. Rubber products 19. Plastic products 20. Glass and glass products 21. Non-metalic minerals 22. Basic iron & steel 23. Basic non-ferrous metals 24. Metal products excl. machinery 25. Machinery and equipment 26. Electrical equipment 27. Tv, radio & communication equipment 28. Professional & scientific equipment 29. Motor vehicles, parts & accessories 30. Other transport equipment 31. Furniture 32. Other industries	33. Electricity, Gas and water 34. Building construction and engineering 35. Wholesale, retail trade, catering & accomodation services 36. Transport, storage, and communication 37. Financial services, business intermediation, insurance & real estate 38. Community, social & personal services 39. Other services 40. Households 41. General government

Aggregate Sectors

42. Total primary (sum of sectors 1 to 4)
43. Total manufacturing (sum of sectors 5 to 32)
44. Total services (sum of sectors 33 to 41)
45. Total economy (sum of sectors 1 to 41)

The macroeconomic module of DIMMSIM generates annual forecasts of a relatively large number of aggregates and sector-level, nominal and real variables and indictors. It includes indicators related to production, labour market, prices, wages, financial variables and incomes and expenditures of households, business and government. The model projections are consistent across aggregation levels, both in nominal and real terms. The model's key outputs include:

- Projection of key macroeconomic indicators

- Projection of demand for employment (expansion demand) for 45 sectors of the economy

- Projection of output, investment, exports, imports, wages and prices for 45 economic sectors

- Financial indicators such as the interest rate, credit extensions and money supply

- Trade indicators

- Income and expenditure indicators

- Sustainability indicators

- Labour market indicators

- Production indicators

- Demand (expenditure) indicators

2.2   DIMMSIM's Microsimulation Component

In DIMMSIM, the macroeconomic module is linked to a full microsimulation model of individuals and households to capture the interactions between macroeconomics, industrial structure, household poverty and income distribution in South Africa.

The modelling principle employed to build the South African household model is the microsimulation technique, whose application to socio-economic modelling was pioneered by Guy Orcutt in the United States in the late 50s and early 60s.[2] The South African microsimulation model, originally built as a static model (Adelzadeh, 2001), was subsequently expanded and complemented with dynamic properties to capture the interactions between the macroeconomy and the household sector.

The main components of the model are its database and its tax and social policy modules. The South African model uses a micro-database of individuals and households using official Household Survey, Income Expenditure Surveys, the Census and quarterly Labour Force Surveys, which are the main sources of countrywide economic and demographic microdata. The model's database is prepared in terms of family units because it relates closely to the definition of the financial unit used by many of the government tax and transfer programmes.[3] The model's database includes 125,830 individuals, making up 61,684 families or 29,800 households. The database includes weights for individuals, families and households, which are used to translate each of the three samples to their corresponding populations for a given year. Each unit record includes more than 400 columns of information for each individual in the family – including demographic, labour force, marital status, housing, income and expenditure information. Diagram 4 presents the flow chart of the model.

The South African microsimulation model includes three modules for government's taxation policies (i.e. personal income tax, excise tax and value-added tax), six modules for transfer programmes (i.e. old age grant, child support, disability grant, care dependency grant, caregiver support and the basic income grant), a public works module for government's Expanded Public Works Programme (EPWP) and two modules for poverty and inequality.

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[2] Orcutt, 1957; Orcutt et al., 1961.

[3] Since the South African national surveys use "households", the construction of the unit record of the South African model on the basis of family unit required a substantial amount of programming. The relational codes in the October Household Survey were used to break down households into the appropriate number of families.

Diagram 3: South African Social Security, Tax, Poverty and Distribution Microsimulation Model
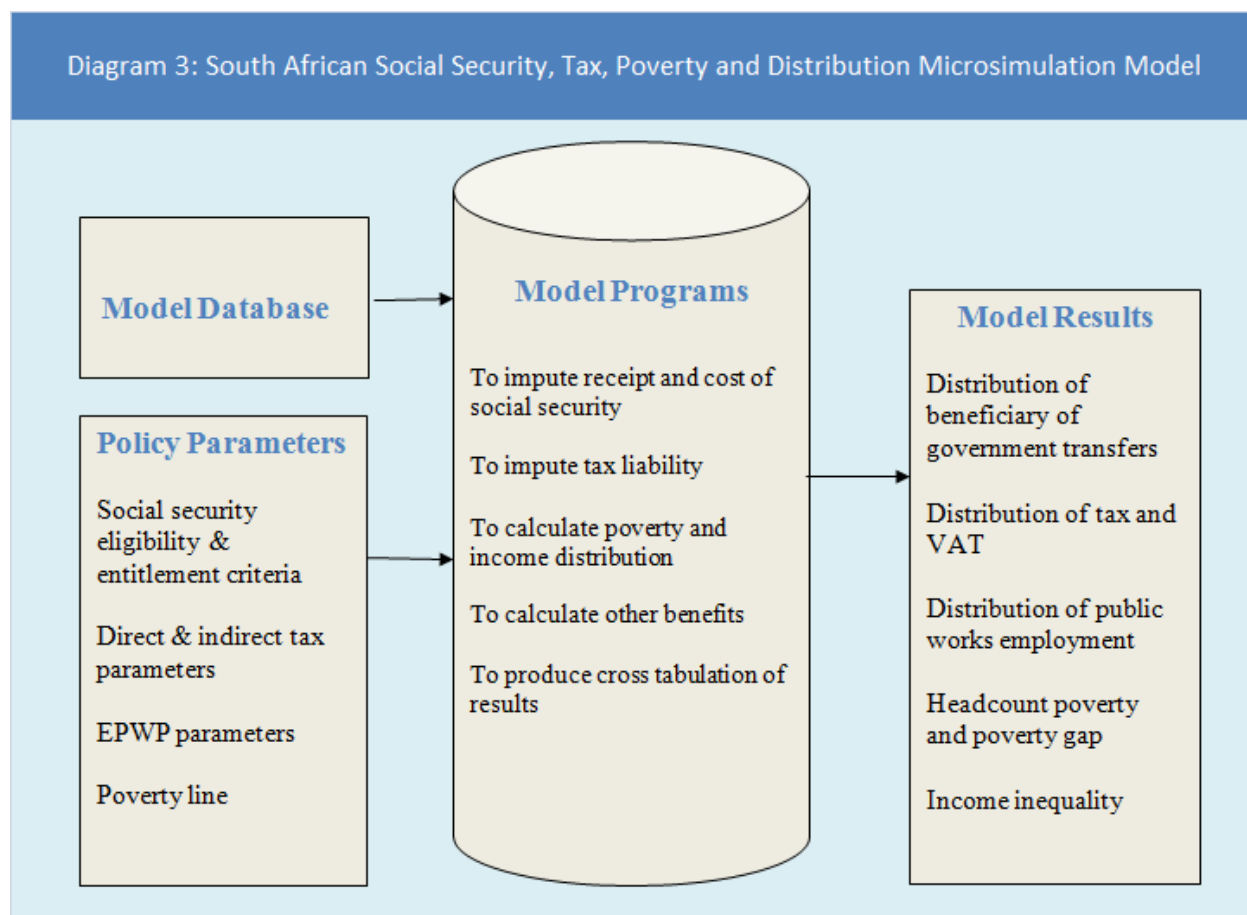
2.3 Interactions Among Modules of DIMMSIM

The model establishes two-way interactions between its macro and micro components such that (a) changes in macroeconomic variables (e.g. changes in prices, employment, wage rates, benefits and transfers) influence welfare of individuals and families; and (b) changes in household-level economic conditions (e.g. poverty, inequality, consumption, taxes, eligibility for social grant) influence macroeconomic outcomes. The Gauss-Seidel's iterative method is mainly used to solve the overall system. The procedure runs the two models for a number of interactions, allowing interactions between the macro and micro parts of the model before it converges and generates the final results for each year of the forecast period. This ensures that the results of each period reflect convergence of the macroeconomic variables and household-level variables at the aggregate level. Therefore, the two models are dynamically integrated and generate time-based results that reflect the actual process of policymaking and evaluation.

3. MODEL PREPARATION

The operation of the DIMMSIM model relies on extensive national and sector data that are up-to-date and consistent with each other in accounting terms. The main sources of data for the model are: various time-series data, including the NIPA (Reserve Bank); Statistics South Africa sector data prepared

by Quantec and in line with the national aggregate data; provincial time-series data (Quantec); national input-output data (Quantec); consolidated general government income and expenditure and its functional breakdown (Reserve Bank and National Treasury); national capital expenditure (National Treasury); public corporations' capital expenditure (National Treasury), and demographic and labour force data (Statistics South Africa).

The model's simulations and projections are also based on various inputs that are exogenous to the model. These include demographic data, policy parameters, and other national and international parameters. For the duration of the forecast (2019 to 2030), the values of these variables and parameters had to be carefully prepared and fed into the model.
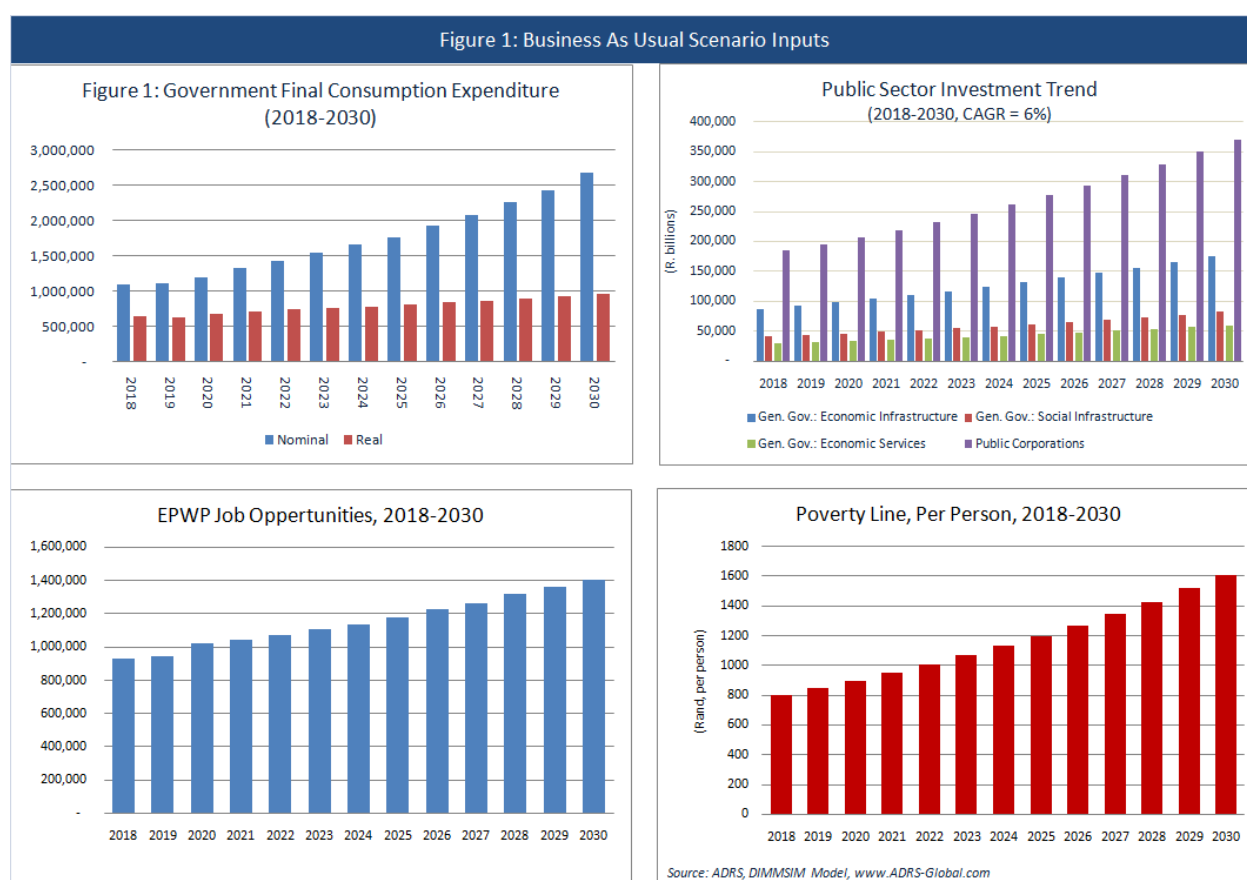
4.   POLICY SCENARIOS

This section focuses on the specification of various economic policy scenarios that were developed to answer the core issue of what mix of policies can achieve the key NDP targets. After much consideration of policy options and hundreds of simulations, we found it most appropriate to classify the future scenarios into a Business-as-Usual scenario and six cumulative alternative scenarios. Each alternative scenario adds new measures or changes to one or more features of the previous scenario.

4.1   Business-as-Usual Scenario (Scenario 1)

The Business-as-Usual (BAU) scenario presents a likely outlook for the future of the South African economy that basically resembles its recent performance. The BAU scenario is a construct of the future of the South African economy against which to compare other scenarios. According to this scenario, the future policy inputs into the economy will closely follow their most recent records. For example, through the Medium-Term Strategic Framework (MTSF) and the Medium-Term Expenditure Framework (MTEF), fiscal policy will continue to prioritise lowering the debt-GDP ratio through expenditure measures, and monetary authorities will continue to use the setting of the interest rate to enforce strict adherence to the inflation targeting, with 6% as the ceiling for the inflation rate. Figure 1 shows the budgets for public investment and government final consumption expenditure under the BAU scenario. Other features of the BAU scenario are:

- All components of the general government investment annually increase by 6%. These are investments in economic infrastructure, social infrastructure and business services.

- Investment by public corporations also annually increases by 6%.

- General government final consumption expenditure annually increases by 7.5%.

- No new micro, macro or social policy measures are introduced over the next 12 years.

- The fourth phase of the EPWP is introduced in 2019 with no changes to the number of job openings and remuneration rates used during the third phase (Figure 1).

- Social security programme remains unchanged, with grant amount adjusting by 6% annually.

▪ For 2019, the per-head poverty line of R850 for 2019 is used. The line is adjusted by 6% annually (Figure 1).

Figure 1: Business As Usual Scenario Inputs

Figure 1: Government Final Consumption Expenditure (2018-2030)

Public Sector Investment Trend (2018-2030, CAGR = 6%)

Legend: Gen. Gov.: Economic Infrastructure · Gen. Gov.: Social Infrastructure · Gen. Gov.: Economic Services · Public Corporations

EPWP Job Oppertunities, 2018-2030

Poverty Line, Per Person, 2018-2030

Source: ADRS, DIMMSIM Model, www.ADRS-Global.com

4.2   Microeconomic Policy Reform Scenario (Scenario 2)

According to Treasury (2018), microeconomic policy reforms in South Africa can be sufficient to propel the economy on a significantly higher macroeconomic performance, namely higher growth and employment path. The purpose of this scenario is to examine the extent to which a multitude of microeconomic policy measures – that are being implemented or are under consideration in South Africa – affect the growth path of the economy. The measures are in essence mainly supply-side measures for the reform of institutions and regulatory frameworks and agencies to remove the perceived "inefficiencies" and "imperfections" in the operation of the free market; it is believed that this will produce the necessary growth to yield full employment in South Africa. Our approach consists of first presenting a brief overview of key microeconomic policy proposals before translating them into model scenario and simulating their likely macroeconomic impact.

Treasury (2018) identifies five "key microeconomic policy interventions" designed to address "inefficiencies" in the South African economy and "enable the sustainable development of the South African economy". Together, they provide a comprehensive account of microeconomic policy reforms that have been pursued in South Africa. These key microeconomic policy interventions are:

▪ **Modernising network industries**: According to Treasury (2018), "South African network industries face serious challenges, including: (i) the absence of efficient economic regulation (which can lead to

inefficient investments and high prices); (ii) old and inadequately maintained infrastructure; and (iii) poorly managed state-owned companies with severe governance challenges that pose a significant burden on the fiscus." To address these challenges, the document proposes a number of interventions related to energy planning (electricity), telecommunications, transport and water to promote competitive pricing and private sector investment in network industries.

- **Lowering barriers to entry**: According to Treasury (2018), barriers to entry, as anti-competitive behaviours, "distort product markets and reduce the incentives for productivity and innovation". Therefore, to lower barriers to entry across sectors of the economy, Treasury (2018) proposes amending the Competition Act, making development finance more accessible to new entrants, and simplifying government incentive programmes. The proposals include a number of other specific interventions to reduce barriers to entry.[4]

- **Prioritising labour-intensive growth**: According to Treasury (2018), the South African economy is not generating employment fast enough and the unemployment rate continues to be the highest among the youth and those with less than matric education. Agriculture and services are identified as the most suited sectors for lowering unemployment. However, according to Treasury (2018), agriculture "needs more effective mobilisation of its commercially advanced capacity to support new market entrants, better land utilisation and improvements in productivity and market access". According to Treasury (2018), there is a need for "deliberate policy measures and interventions that can bias economic growth towards employment intensive sectors".

- **Implementing industrial and trade policy**: This topic is covered in section 4.3

- **Promoting export competitiveness and regional growth**: According to Treasury (2018), South Africa's exports are highly concentrated and in recent years export performance has been disappointing. Therefore, Treasury (2018) argues that "South Africa's ability to fully leverage global and regional value chains requires growing exports and improving export competitiveness, which means better integration into global and regional value chains."

According to Treasury (2018), the bulk of microeconomic interventions around the abovementioned five key microeconomic policy interventions include reforms in the telecommunications, agriculture, services and transport industries.[5] Therefore, based on the Treasury's policy proposals, we developed a set of model scenarios that capture the essence of the microeconomic policy interventions and their expected outcomes. Since we are interested in the macroeconomic impact of microeconomic interventions, we gave the above proposals the benefit of the doubt and assumed that the micro interventions would lead to the anticipated outcomes for the economic sectors and variables for which they have been designed. In this regard, we followed Treasury's approach to quantification of its proposals.[6] We therefore captured the proposed microeconomic policy reforms into following scenarios:

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[4] For more details, see Treasury (2018).

[5] Treasury (2018, p. 9).

[6] Treasury (2018).

We considered what if the proposed improvements in the tourism sector helped the sector's export to expand by an additional 8% to 10% annually over the medium term (between 2019 and 2021). Thereafter, the positive shock to the sector exports is expected to gradually settle to 5% by 2030. The output of the Trade, Catering and Accommodation Services, which includes tourism, is also expected to grow by an additional 2% to 4% over the next three years. Afterward, the positive shock to the sector's growth is expected to gradually decline and reach 1.4% by 2030.

- We considered what if the Treasury's proposed microeconomic measures helped the export from the agriculture sector to grow by an additional 1% in 2019 and by an additional half a percent every year after. Therefore, by 2030, due to the microeconomic measures, the export of the agriculture sector is expected to be 6% higher than the sector's performance without the measures.

- We considered what if the range of microeconomic measures proposed by the Treasury (2018) succeeded in lowering the price of transport, storage and communication sector over the next 12 years by 5% to 10% initially (between 2019 and 2021) and then by an additional 5% annually.

- We considered what if the proposed microeconomic reform measures directly boosted labour productivity in transport, storage and communication, agriculture, food sector, basic chemicals, iron and steel sector, and trade, catering and accommodation services. We therefore allowed for annual positive shock of 1% to the above sectors' labour productivities.

- We considered what if the proposed microeconomic policy reforms succeeded in improving competitiveness in the following sectors of the economy and led to the gradual lowering of their mark-up by two percentage points initially and an additional one percentage point during each subsequent year. The sectors that were considered are: trade, catering and accommodation services; transport, storage and communication; and financial intermediation, insurance, real estate and business services.

Section 5 will provide analysis of model results for the above scenario.

4.3   Trade and Industrial Policy Scenario (Scenario 3)

The main focus of the Microeconomic Policy Reforms scenario is on the supply-side measures designed to minimise market "inefficiencies" and enhance competitiveness. The industrial policy in South Africa utilises both supply- and demand-side measures to increase investment in the manufacturing sector and expand South African exports. The Industrial Policy Action Plan (IPAP) developed by the Department of Trade and Industry in 2007 places strong emphasis on the manufacturing sector since the sector has relatively better spill-over effects.[7]

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[7]"History has demonstrated that industrialisation is integral to sustained and sustainable economic development. No countries have been able to lift substantial sections of their populations out of poverty without industrialising; in most cases, rapidly growing economies have been characterised

IPAP uses a combination of supply-and demand-side incentives and programmes to promote investment and export in the manufacturing sector in general and in 12 strategic sectors in particular. The mix of supply-and demand-side measures used to promote investment and exports include:

- **Public Procurement and Local Content**: To support industrialisation and re-industrialisation, South African government has prioritised the procurement of locally manufactured products. The current procurement legislation provides the necessary instrument for the implementation of the local procurement policy. The legislation empowers the dti to designate sectors, subsectors and products with minimum local content threshold for local procurement by the entire government. All suppliers are required to meet the set of minimum thresholds for local content when they are tending for goods and services in the public sector. According to the dti, from March 2015 to 2017, almost R60 billion was locked into the country through local procurement policy.[8]

  In addition, Proudly SA has its focus on "buying local" and consumer education for the public and private sectors to open market access for locally manufactured products. The campaign has concluded localisation partnerships with a number of companies in the retail sector (including Edcon, Massmart, Foschini and others). Through its "Buy Back SA" campaign, consumers and businesses are encouraged to make local procurement decisions to allow more money to flow back into the domestic economy (IPAP, 2018, p. 45).

- **Industrial Financing**: Industrial financing is a critical element of the resourcing of IPAP and is accessible through incentives administered by government departments and loans/equity facilitated through development finance institutions. According to the dti, to stimulate and facilitate enterprise and industrial development, the department has used various incentives. The incentives target investment in plant, machinery and equipment, export marketing and acquisition of business development services.

- **Special Economic Zones (SEZ) and Industrial Parks**: The aims of South Africa's SEZ policy instrument are to: (a) promote the mastery of targeted industrial capabilities within the agreed on policy framework; (b) promote beneficiation and value addition to the country's resources; (c) develop the world-class infrastructure to support targeted industrial processes; (d) attract domestic and foreign direct investment; and (e) accelerate economic growth and employment. The work in this programme is ongoing, including the introduction of a package of incentive and other long-term supports.

According to the dti's ten-year review, the department's incentive programme has resulted in estimated investment of R326 billion (IPAP, p. 46). Clearly, this and other positive outcomes of industrial policy in South Africa are due to its diverse cross-cutting or – as dti puts it – transversal, focus areas. Even though each of IPAP's programme and policy interventions has had some desirable quantitative and

by an increasingly broad and diversified manufacturing sector. Manufacturing-led value addition has numerous well-recognised multiplier and spill-over effects; it embeds technology-intensity and skills formation as key elements of an upward and inclusive growth trajectory." (IPAP, 2018, p. 8). See Section 5.2.2 for the examination of whether higher growth in manufacturing lead to higher productivity growth in South Africa.

[8] See section on Public Procurement and Local Content, IPAP, 2018, p. 62.

qualitative impact, the extent of its overall success in raising investment and exports of the manufacturing sector is the outcome of its multiple, inter-dependent and cross-cutting measures and programmes. Therefore, to include and empirically examine the future impact of the trade and industrial policy, the model scenario is designed to capture three ultimate goals of the programme, namely to raise total investment in the manufacturing sector, expand exports, and increase the local content and procurement of locally manufactured products. To assess the expected future macroeconomic impact of trade and industrial policy measures, we therefore designed and simulated following scenarios:

- We considered what if the industrial policy measures, such as various industrial financing incentives, succeeded in directly and indirectly increasing total investment in the manufacturing sector during the next 12 years. More specifically, we considered the possibility that industrial policy measures will be responsible for the annual addition of R10 billion investments in the manufacturing sector during the next 12 years.[9]

- We considered what if trade and industrial policy measures, such as the SEZ and African integration programmes, succeeded in increasing total exports by an additional 1.5% after 2020.

- We considered what if the government's Proudly SA and Localisation policies succeeded in gradually reducing economic sectors' import dependency ratios[10] by 20% over the next 12 years.[11]

We used the ADRS linked macro-micro model to simulate the possible future impact of the above industrial policy scenarios. Section 5 provides an analysis of model results for the Industrial Policy scenario.

4.4   Macroeconomic Policy Reform Scenario (Scenario 4)

Analysis of the weak performance of the South African economy in terms of growth and employment has clear implications for macroeconomic policies. Scenarios 2 and 3 focused on microeconomic and trade and industrial policy and applied the status quo macroeconomic policy framework to the future. The current scenario adds to the above scenarios the likely impact of changes in the current macroeconomic policy. There are at least four reasons for considering a "what if" scenario for macroeconomic policy reforms.

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[9]This is in real terms; therefore, after the first year, the amount of investment in nominal terms adjusts to an average inflation rate of 6%.

[10]The estimation of sector-specific import dependency rate (IDR) takes into account both import content of intermediate inputs and imported final goods.

[11] For example, if a sector's IDR is currently 50%, the localisation scenario is designed to gradually reduce the sector's IDR to 40% by 2030, which is 20% lower than the sector's current IDR.

First, the macroeconomic policy toolkit enables the government to directly and indirectly respond to growth, employment and income distribution challenges facing the country, since government functions include: (a) providing income support to individuals and families through income transfers to the unemployed and the poor and to companies, such as investment subsidies and SMME supports; (b)providing employment as an employer when it directly hires people into public sector offices or provides a job to the unemployed; and (c) purchasing goods and services from the private sector, such as purchased of investment goods, infrastructure contracts, and buying of other goods and services, which indirectly affects employment;[12] (d) exacting taxes on individuals and businesses; and (e) managing the money and credit market.

Second, microeconomic policy reform is by no means a silver bullet to resolve the major macroeconomic ills of South African economy. Simulation results of the first three scenarios, which assume no change in macroeconomic policy (Section 5), show that their positive impacts on the future macroeconomic path of the economy significantly fall short of the needed level of economic activity and jobs. Needless to say, their projected outcomes are much lower than the government goals for growth, employment and poverty for 2030.

Third, many of the microeconomic policy reform measures, as described in Treasury (2018), have macroeconomic policy implications that need to be given consideration if the final reforms are to receive proper financial and institutional support. For example, proposals such as the need to increase the level of support to the tourism firms, expanding effective, affordable and integrated transport systems, implementation of early childhood development programme at national level, support to the agriculture sector, and improving financing of industrial policy have clear medium- to long-term fiscal policy implication, such as the fiscal policy. To the extent that microeconomic and industrial policy measures are important, an ongoing fiscal austerity will only weaken their potential contributions.

Finally, to evaluate what mix of micro and macro- economic policy measures can achieve the desired growth and development outcomes, we need to consider the choice between austerity-focused and growth-oriented macroeconomic policy framework. In European Union, economic recovery was elusive after the international crisis in 2008. In 2012, the EU fell into a double-dip recession with unprecedented unemployment rates in many member states, indicating that the EU, unlike other world powers, was not bouncing back from the 2008 financial crisis. At the same time, public debt in the European Union had significantly increased. In response to these dual issues afflicting the region, namely falling GDP and rising government debt, there was much debate among EU leaders on how to move forward and which policies will best assist the struggling economies. Through these debates, two distinct camps emerged.

The first camp, resorting to sink or swim methodology, called for strict austerity measures through government budget cuts. The "austerity" camp controlled the debate for several years. They contended that decreasing the deficit would create a business-friendly environment that would be attractive to investment and would in turn increase GDP and employment. The "growth" camp, on the other hand,

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[12]Tcherneva (2012). In 2017, Public Procurement amounted to about R850 billion.

called for growth-friendly policies to provide a life raft for those countries struggling to meet targets, arguing that increasing GDP is the preferred approach to cutting the debt relative to GDP.

In South Africa, facing low growth, high unemployment and debt-GDP ratio of close to 50%, government's fiscal and monetary policy has followed the "austerity" camp approach, composed of fiscal austerity, flexible exchange rate and strict inflation targeting.[13] The last three scenarios include the extension of the austerity approach to 2030. As we look for the most effective policies to address South Africa's economic crisis, it is critical to include an assessment of the likely effects of the "growth" approach to evaluate which mix of the micro and macro proposals better address the current crisis from the perspective of growth, employment and national debt management.

Therefore, the Macroeconomic Policy Reform scenario considers "what if" fiscal and monetary policies were directed to pursue the "growth" approach to South Africa's macroeconomic challenges. The shift from the "austerity" to "growth" approach allows for considering "what if" fiscal and monetary policy tools were available for a more robust response to the country's developmental imperatives. The specifics of the scenario are as follows:

- **Investment by public sector**: The scenario's overall public investment approach is designed as an initial response to the recent significant drop in the growth rate of investment and the related, even more alarming, evidence that in recent years gross investment has not been sufficient to make up for capital depreciation. Between 2013 and 2016, gross nominal investment increased by R89.6 billion. Over the same period, total consumption of fixed capital (capital depreciation) increased by R137.2 billion (Reserve Bank data). This means that gross investment has not been keeping up with capital depreciation, which has led to an expanding backlog of replacement and maintenance investment, and deteriorating quality of public infrastructure, further hampering productivity and socio-economic opportunities.

  Therefore, this scenario emphasises investment-led growth as a way of reversing the above trend and investing in current and long-term infrastructure needs of the country. This scenario therefore considers "what if" both government and public corporations systematically increased their investment in economic infrastructure (e.g. roads, bridges, dams, electricity and water supply), social infrastructure (e.g. schools, hospitals, parks and administrative services) and economic services (e.g. business enterprises) by 10% annually over the next 12 years, which will be 4% above the BAU scenario.

  Under the Macroeconomic Policy Reform scenario, the general government's investment in economic infrastructure is pegged to increase from R87 billion in 2018 to close to R420 billion in 2030. Similarly, government investment in social infrastructure will increase from R40.1 billion in 2018 to R196 billion by 2030, while economic services is increased from about R30 billion to R143 billion during the same period. At the same time, investment by public corporations is pegged to gradually increase from R184 billion in 2018 to R578 billion by 2030. As stated earlier, the increased public investment provides for the allocation of significantly higher investment funds over the projection period for building roads, bridges, railways, schools, hospitals, public housing, R&D, and other economic and social infrastructure (Figure 2).

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[13]Treasury (2018).

▪ **General government final consumption expenditure**: Secondly, this scenario factors in various reports on the need to provide adequate, affordable and quality social services to all South Africans, and takes steps to remedy the recent decline in the growth of government expenditure on goods and services.[14] This scenario specifically asks "what if," relative to the BAU scenario, government's annual current expenditure were raised by an additional 3% in order to provide more financial support for the delivery of social services over the next 12 years. Thus, the scenario expands government final consumption expenditure from a little more than R1 trillion in 2018 to R3.67 trillion by 2030, which means that, relative to the BAU scenario, during the next 12 years, it will be able to spend R3.61 more on the delivery of individual and collective social services. Therefore, under the Macroeconomic Policy Reform scenario, government final consumption expenditure is designed to annually increase by about 11%, which is 2.5% above the average growth rate of government spending over the last five years, but is similar to the average growth of government spending between 1994 and 2008 (Figure 2).

Figure 2: Macroeconomic Policy Reform Scenario
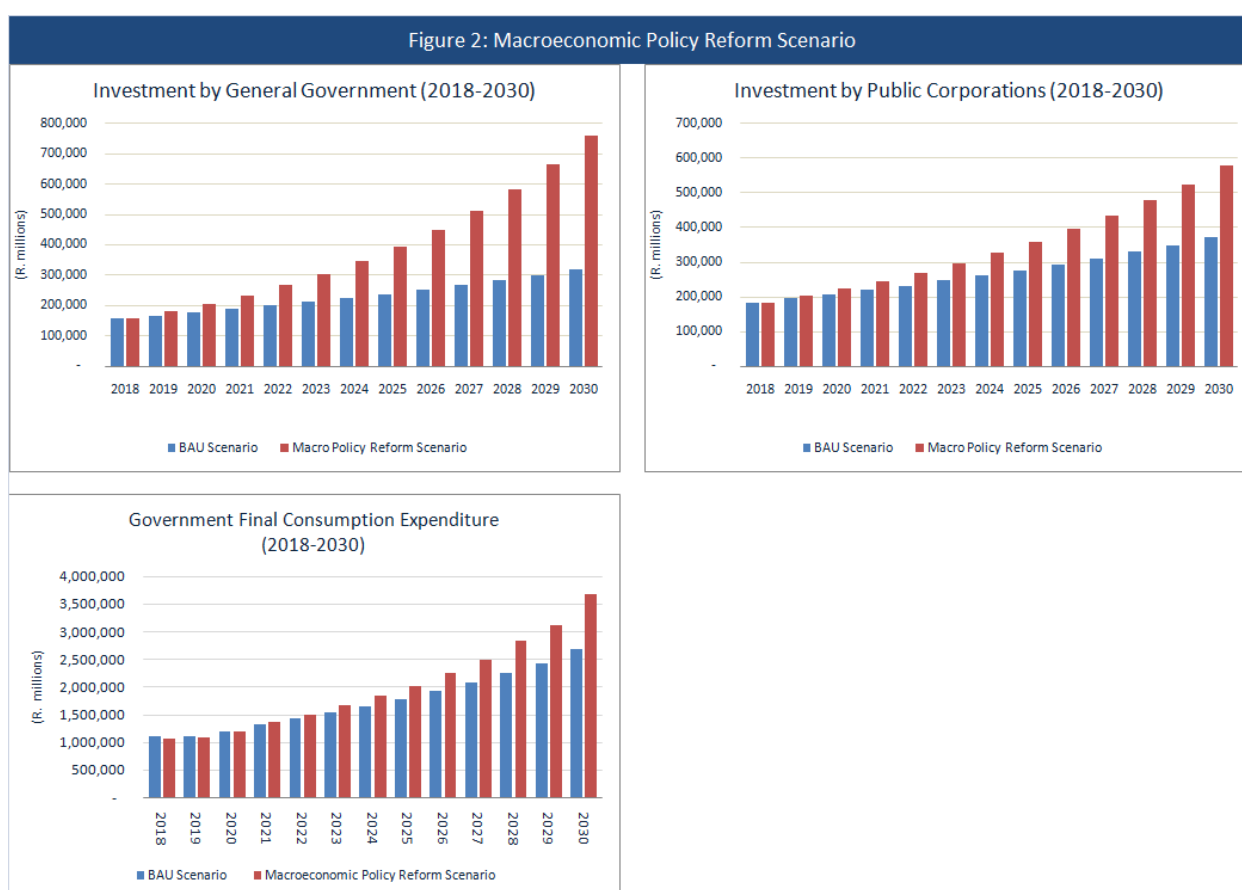
▪ **Monetary policy rule**: This scenario considers "what if" current interest rate and credit extension policies were adjusted to lower the cost of borrowing while easing access to credit by the private

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[14]During 2000, government final consumption expenditure grew at an average annual rate of 12.3%. Since 2010, the rate has decreased to 8.1% (2011–2018) (Reserve Bank Bulletin, First Quarter of 2019, National Account).

sector (business and households), mainly to support the government stated objectives of promoting black-owned businesses, properties and the growth of small and medium enterprises in general.

To accommodate this last policy choice, the monetary policy component of the Macroeconomic Policy Reform scenario includes two possible ways that monetary policy can potentially bolster government policies and programmes while accommodating the scenario's aim of stimulating the economy to achieve key economic targets for 2030 (strengthening its ability to achieve key economic targets for 2030). Replacement of the current single mandate inflation targeting rule with a dual mandate rule (e.g. the nominal GDP targeting) that directs the Reserve Bank to use monetary policy tools to achieve a growth target of 6% with the target upper bound of 8% for the inflation rate. The combination of the two will help lower the average interest rate and eases access to credit by households and private businesses, especially the SMMEs.

- **Credit extension**: The CAGR of credit extension to the private sector is currently much lower than the rate for the period after 1994. Between 1994 and 2008, the credit extension to the private sector grew at an average annual rate of 15.3%. In comparison, between 2010 and 2017, the corresponding rate has less than halved, that is 7.5%. This has limited private investment, especially the growth of the SMMEs. Under this scenario, we considered "what if" monetary authorities adopted necessary measures to double the recent rate of growth of the credit extension to the private, that is increase from 7.5% to 15%.

4.5 Social Policy Support Scenario (Scenario 5)

Given South Africa's extremely high unemployment rate, even Scenario 4 that generates a relatively high rate of growth and employment will still leave the unemployment rate and poverty rate between 15% and 20% by 2030. This means that we need additional measures, besides targeting economic growth and labour-intensive sectors, to further tackle the high level of unemployment and poverty.

The Social Policy Support scenario is designed to add new measures to the last scenario's social security and public works programmes. Given the objectives of reducing the unemployment rate to a single digit (NDP 6%) and to eradicate poverty by 2030, the Social Policy scenario is designed to examine the potential contributions of policy reforms in this area to achieve the aforementioned goals.

According to the latest Quarterly Labour Force Survey, the labour force in South Africa includes about 10 million working age unemployed persons, using the expanded definition of unemployed.[15] More than 60% of this group have less than secondary school education. The South African economy has been creating employment at a slow pace and increasingly for high-skilled workers. With the rising demand for skilled labour, there is little or no chance that the private sector will generate jobs for 6 million unskilled unemployed workers in South Africa. That leaves the public sector as their last chance for employment. This scenario considers what if the government began to gradually, within 7 years,

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[15]Statistics South Africa, Quarterly Labour Force Survey, first quarter of 2019, P0211.

make the public works as the employer of last resort for the unskilled unemployed in South Africa, originally catering for 70% of the unskilled unemployed before expanding the service to all unskilled unemployed after 2027.[16] Moreover, the scenario includes increasing the daily remuneration rate for the public works to R160 per day, which will be adjusted upward by 6% annually.

Moreover, the Social Policy scenario considers two adjustments to the current social security programme in South Africa. First, it proposes the introduction of a grant, namely caregiver grant, for the family member that takes care of a child who receives either a child support grant or a care dependency grant. The programme is designed to allocate only one caregiver grant per family. The initial value of the grant is proposed at R300 per month and is designed to increase by 6% annually.

[16]Antonopoulos (2007) provides a summary table of the cross-country variations in the policies and content of guaranteed employment programmes. This includes, amongst other things, overcoming challenges related to the source of financing, types of projects, eligibility criteria for the participants, method of remuneration, institutional arrangements, degree of decentralisation, level of community involvement and the length of guaranteed employment for participants.
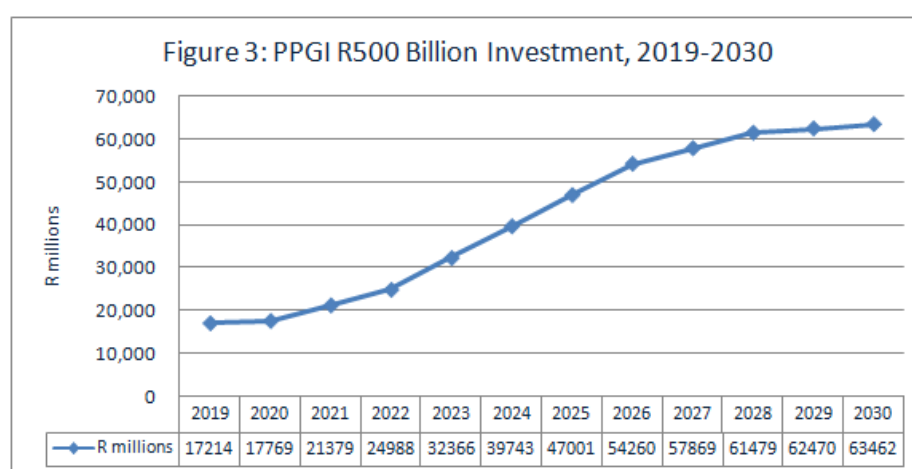
Box 1: Partial List of Types of EPWP Jobs

Following is a partial list of works that can benefit and are needed within community services, public works, private sector and public enterprises:

- Water conservation and water harvesting

- Drought proofing, forestation and tree plantation

- Irrigation canals including micro and minor irrigation works

- Provision of irrigation facility to land beneficiaries of land reforms

- Renovation of traditional water bodies including unsifting of tanks

- Flood control and protection works including drainage in waterlogged areas

- Rural connectivity to provide all-weather access

- Any other works that may be identified by the central government in consultation with a provincial government

- Landscaping, garden maintenance, pathways, storm water disposal, painting, cleaning gutters, glazing, basic maintenance

- After-school supervision for all levels of after-school activities

- Childminders, school feeding programmes, old age care

- Road maintenance

- Waste collection

- Cleaning streets

- Environmental clean-up and recycling

- Access roads

- Housing programmes

- Forestry

- Working for water

- Community schemes of all types

- Community catchment management

- Making building materials

- Brickmaking

- Park maintenance

- School maintenance

- Food gardens

4.6   Private Sector Support Scenario (Scenario 6)

In April 2018, the Public-Private Growth Initiative (PPGI) was established with the goal of aligning strategic planning between the private sector and government to improve economic growth and the working relationship between business and government. The PPGI partnership has identified 14 sectors, mainly in manufacturing, to invest at least R500 billion over the next five years. Therefore, under the Private Sector Support scenario, we have considered what if the PPGI increased investment in the South African economy by R500 billion over the next 12 years. The scenario assumes that the PPGI's new investment amount will be initially small before it accelerates between 2021 and 2027 and tempers off during 2028 to 2030. Figure 3 provides the investment trajectory that we have used to represent the possible path of the PPGI-committed investment.

Figure 3: PPGI R500 Billion Investment, 2019-2030

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
R millions	17214	17769	21379	24988	32366	39743	47001	54260	57869	61479	62470	63462

The Private Sector Support scenario also includes possible additional investment by the Public Investment Corporation (PIC) in the South African economy. A top priority of the PIC is to deliver healthy returns to its clients. Simultaneously, however, it is expected to contribute to the broader socio-economic development of South Africa. To fulfil its dual mandate, the PIC may use its investment in priority economic sectors (e.g. infrastructural investments in previously disadvantaged and underdeveloped communities) as an indicator of its contribution to the broader socio-economic development of the country. This scenario considers what if PIC increased its investment in the South African economy by R100 by annually investing R20 billion in the manufacturing sector between 2019 and 2023 (5 years).

4.7   External Support Scenario (Scenario 7)

This scenario considers the impact of three favourable external developments on the South African economy.

First, it considers the possibility of a gradual increase in foreign direct investment in South Africa. The rationale for this possibility is that the implementation of microeconomic reforms, trade and industry policy, macroeconomic reforms, social policy reform, and private sector supports is projected to put the economy on a much better growth path which we assume will increase the inflow of FDI in to South

African economy. Therefore, we considered what if the level of foreign direct investment in South Africa gradually increased from 0.05% to 0.13% of GDP between 2019 and 2030.

Second, historically, the gold price annually increased by about 4% on average. In recent years, however, the gold price has increased at a much slower pace. For the BAU scenario and all other scenarios, we therefore assumed 1% average annual growth rate for the gold price during 2019 and 2030. Given the gold price's much higher historical growth rate, we have considered what if the gold price annually increased, relative to the assumption of 1% increase under scenarios 1 to 6, by an additional 1%.

Finally, scenarios 1 to 6 assume that the nominal value of total world import annually grows by 6.1%. In Scenario 7, we have considered what if the world annual import grew by an additional 2%.

5.   SCENARIO RESULTS

In this section, we present simulation results for the seven aforementioned cumulative future scenarios using DIMMSIM, which is ADRS's linked macro-micro model of South Africa. The model generates extensive results for a wide range of indicators related to the macroeconomy, industrial sectors and households' poverty and inequality.[17] Given the space limitation, we first provide a visual (overview) comparison of scenarios in terms of their implications for the likely evolution of key economic and development indicators. We then analyse the results to identify and substantiate the key findings of the report.

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[17] The macroeconomic component of the model generates annual results in real and nominal terms for 45 economic sectors. The results include annual values for sector outputs, investments, employments, exports, imports, wage rates and prices. The model produces results for 26 categories of household consumption expenditures in both real and nominal values. Moreover, the model's projections include more than 100 prices and deflators, 16 categories of private sector's income and expenditure, 16 categories of households' income and expenditure, and 28 categories of government sector income and expenditure. The microsimulation component of the model estimates annual forecasts of poverty, inequality, budget for and distribution of social grants, and direct and indirect taxes in aggregate levels and the cross-tabulation of results by region, gender, race, locality and family type.

5.1 Scenario Results in Graphs and Tables

5.1.1 Economic Growth

Figure 4 compares the seven economic scenarios in terms of the outlook for economic growth for the 2019–2030 period.

Figure 4: Comparison of Scenario Results: Economic Growth

5.1.2 Composition of GDP

Figure 5 compares the seven scenarios in terms of the future outlook for the distribution of the GDP between households and government final consumption expenditure, investment and exports.


Figure 5: Comparison of Scenario Results: Composition of GDP
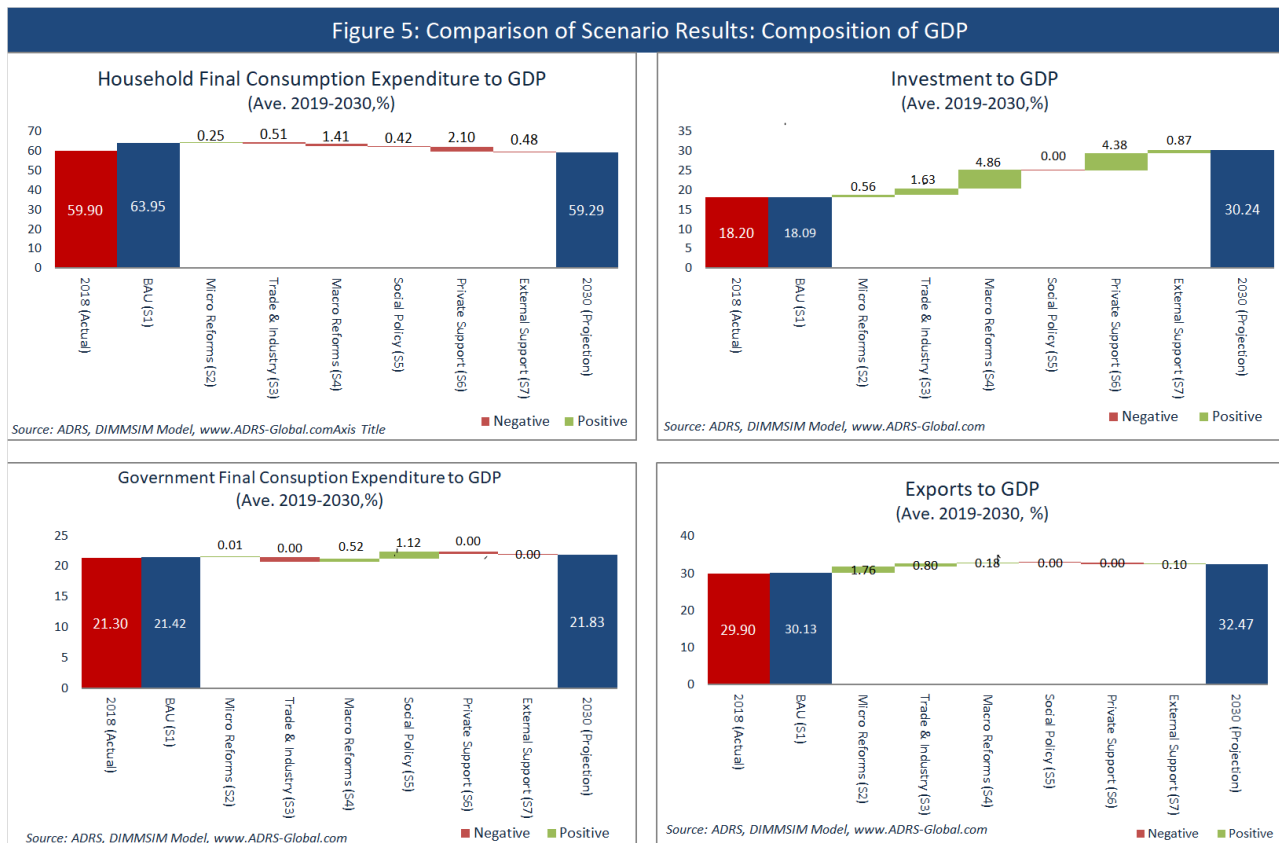
5.1.3   Structure of GDP

Figure 6 compares the seven scenarios in terms of the future outlook for the composition of output. They show the contribution of each scenario to the CAGR of primary, manufacturing and services outputs over the period 2019 to 2030, thus highlighting the likely extent of the restructuring and re-industrialisation of the economy over time.

Figure 6: Comparison of Scenario Results: Structure of GDP
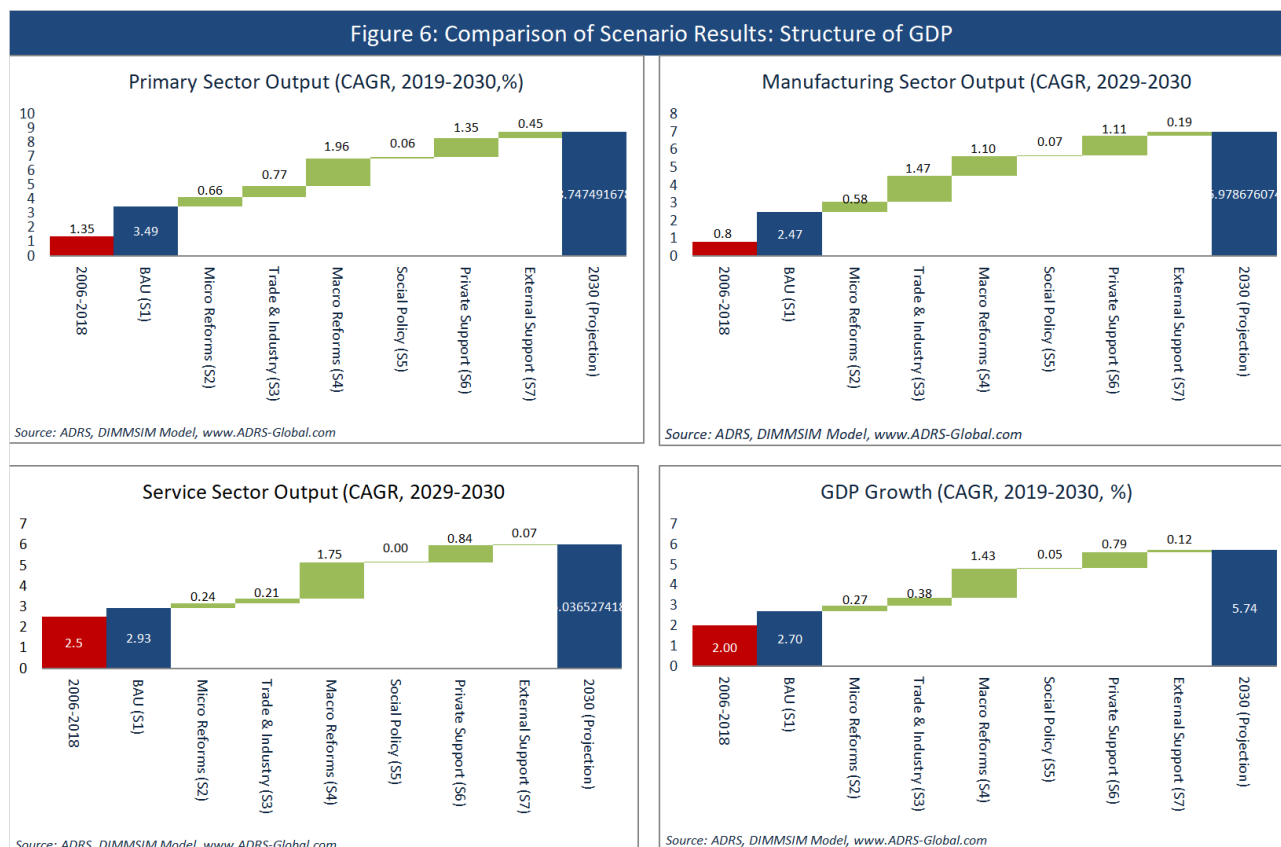
5.1.4   Employment and Unemployment

Figure 7 compares the seven scenarios in terms of the extent that each is expected to contribute to job creation and decline in the unemployment rate. The last graph in this group clearly shows the inverse relationship between growth and the unemployment rate in South Africa.

Figure 7: Comparison of Scenario Results: Employment and Unemployment
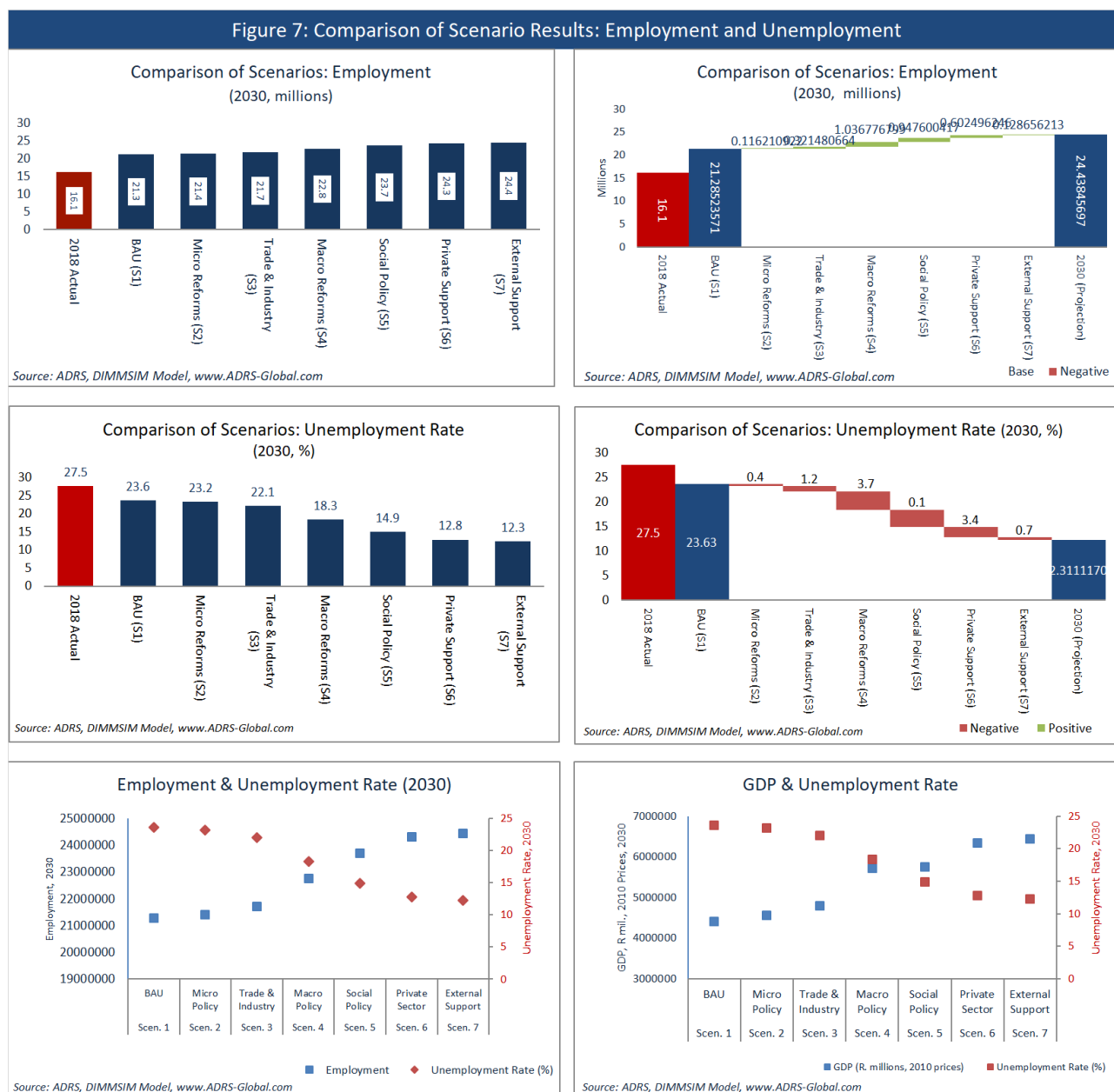
5.1.5 Poverty and Inequality

Figure 8 captures the contribution of the seven scenarios to reducing the poverty rate by 65% over the next 12 years. It also uses the model results to show how reductions in the unemployment rate and poverty rate or directly related.

Figure 8: Comparison of Scenario Results: Poverty
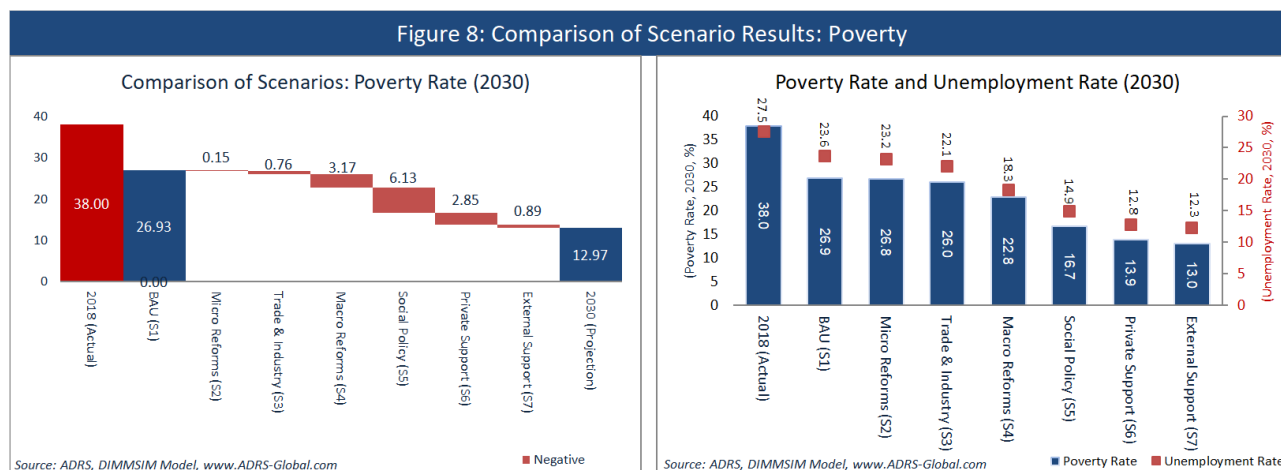
5.2 Analysis of Scenario Results

5.2.1 General Discussion

The premise that we need a vision roadmap to ensure that we are moving in the right direction guides the use of ADRS's macro-micro model of South Africa to identify a policy roadmap to meet South Africa's development vision for 2030.

With the BAU scenario (Scenario 1), the real size of the economy (in 2010 prices) is projected to grow by about 40%, from R3,144 billion in 2018 to R4,415 billion in 2030, which translates to compound annual growth rate (CAGR) of 2.86% over the next 12 years (i.e. 2019–2030). The real per capita GDP is expected to increase from R55,600 in 2018 to reach R67,900 by 2030. Total employment in the economy will increase to 21.3 million by 2030, thus adding a little more than 5 million jobs to the economy over the projection period. By 2030, the unemployment rate is expected to decline from 27.5% in 2018 to 23.63% in 2030, and the poverty rate is projected to gradually decline to 27% from 38% in 2018.

The above simulation results of the BAU scenario highlight the significant gap between the likely future performance of the economy under this scenario and the government's targets for 2030. It shows that if future economic performance follows that of the past, as represented by the BAU scenario, there will be some progress, but relative to the targets for 2030, the scenario will significantly under-deliver. For example, under the BAU scenario, by 2030 the unemployment rate will still be about four times higher than the NDP target of 6%. The per capita GDP will reach only about 60% of its target, and more than one-fourth of the population will still live in poverty. At the same time, as the debt-GDP ratio is

projected to rise under the BAU scenario, fiscal austerity is expected to continue to restrict government's ability to expand social services to the growing population.

The Microeconomic Policy Reform scenario (Scenario 2) is predicated on the understanding that South Africa's current low growth and high unemployment performance is mainly due to "inefficiencies" in the country's market economy, which can be overcome through microeconomic or, as it is referred to, structural reforms. Since South Africa's Treasury Department has been a major proponent of this argument, we used its suggestions (Treasury, 2018) of needed microeconomic reform measures to construct the Microeconomic Policy Reform scenario and simulated its likely future impact on key macroeconomic indicators.

As the figures in Section 6.1 show, the Microeconomic Policy Reform scenario has a small positive impact on the future performance of macroeconomic indicators. The scenario is projected to add 0.3% to the average annual growth rate (from 2.7% to 2.97%). The model projections show that the positive effect of the scenario is more felt on the targeted sectors (e.g. agriculture, tourism, transportation) than on aggregate macroeconomic indicators. Therefore, compared to the BAU scenario, the size of the economy in 2030 will be only R152 billion larger (in 2010 constant prices), the unemployment rate will still be above 23%, and the poverty rate will be lower by less than half a percent. Overall, Scenario 2 highlights the limitations of microeconomic policy reforms to lead to high growth and high employment performance, thus indicating that no one category of policy proposals is going to be enough to overcome South Africa's growth and development challenges.

The Trade and Industrial Policy scenario (Scenario 3) uses demand- and supply-side measures to promote investment in the manufacturing sector, South African exports and the use of locally manufactured goods. The model results show that the scenario has the potential to add 0.4% to Scenario 2's average growth rate, thereby, together with Scenario 1, growing the economy at CAGR of 3.35% for the period 2019 to 2030. The model projections show that government's trade and industry support policies and measures potentially improve Scenario 2 results by adding R81 billion to average annual real GDP and more than R100,000 to average annual employment over the period 2019 to 2020. By 2030, under Scenario 3, the unemployment rate and poverty rate are projected at 22% and 26% respectively.

As Figures 4 and 5 show, the Trade and Industry scenario is expected to improve the average growth rate of economic sectors, particularly the manufacturing sector. Even though the focus of the Trade and Industrial Policy scenario is on the manufacturing sector, it has important spin-off effects on the primary and service sectors. Compared to Scenario 2, the Trade and Industry scenario is projected to help improve the average growth rate of the manufacturing sector by 1.47 percentage points, from 3.05% to 4.52%. At the same time, the primary and services sectors are expected to grow at CAGR of 4.93% and 3.38%, which are 0.77 and 0.21 percentage points higher than the Scenario 2 results.

If South Africa were not suffering from high poverty and unemployment crises, one could have considered Scenario 3's average GDP growth of 3.5% over the next 12 years a decent performance. However, given the circumstances and goals of eradicating poverty and reducing the unemployment rate to a single digit by 2030, the economy needs a much faster rate of growth, job creation and poverty reduction.

In Scenario 4, the addition of Macroeconomic Policy Reform measures has the potential to significantly improve the performance of key macroeconomic and development indicators. This includes adding 1.4% to the CAGR of GDP and reducing the unemployment rate and poverty rate by 3.7 and 3.2 percentage points respectively. Analysis of the impact of the Macroeconomic Policy Reform scenario can be broken down between its fiscal and monetary policy impact.

The simulation results of the fiscal policy elements of the scenario (e.g. public investment and government current expenditure) show that the scenario's support for annual increases in government current and capital spending affect the economy in two ways. First, they boost aggregate demand through the fiscal multiplier. Second, the aggregate supply increases over time, as the productive capacity of the economy increases with the higher infrastructure capital stock ("hysteresis"). Relative to Scenario 3, the CAGR of domestic aggregate demand, represented by the real gross domestic expenditure, is projected to increase from 5.05% to 6.34%. During the same period, the CAGR of aggregate supply, represented by real gross value added at basic prices, is projected to increase from 4.11% to 4.88%.[18]

As Figure 9 below shows, even though relative to Scenario 3, the fiscal policy component of Scenario 4 is designed to allocate a significantly larger amount towards the delivery of social services over the next 12 years. The average of the ratio of government expenditure on goods and services to GDP (21.3%) will be only 0.1% higher than the average for BAU Scenarios (21.2%). Scenario 4's relatively better growth performance makes this outcome possible.[19]

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[18] Dutt (2006) shows that both aggregate demand and aggregate supply have a role to play; long-run growth can be affected by aggregate demand. He argues "[t]o the extent aggregate demand is an important determinant of long-run growth, we can rely on many of the results of post-Keynesian and structuralist growth theories, which have been ignored in mainstream growth theory, in understanding growth: for instance, it is

possible for income distributional improvements to increase the rate of economic growth, as well as for expansionary fiscal and monetary policy to have a positive effect on growth."

[19] Under Scenario 3, government final consumption expenditure is designed to annually increase by 9%, which is less than 1% above the average growth rate of government spending over the last five years, but is more than 2% lower than average growth of government spending between 1994 and 2008. Thus, over the next 13 years, government spending is expected to increase from R950 billion in 2017 to R2,915 billion in 2030.

Figure 9: Government Final Consumption Expenditure (% of GDP)
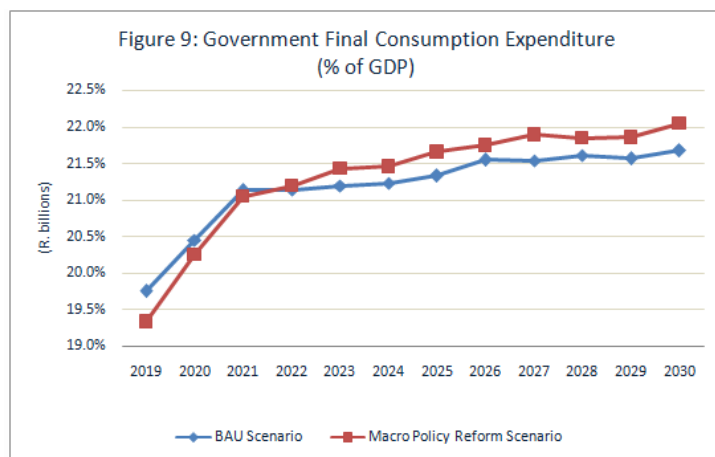
The monetary policy measures of Scenario 4, on the other hand, help establish significantly lower average interest rates and higher growth of credit extensions to the private sector than scenarios 1 to 3 Relative to Scenario 3, the average interest rate for the period 2019–2030 will be 3.1 percentage points lower and the CAGR of credit extension to the private sector will be 3.5 percentage points higher. These outcomes of the scenario have further positive effects on the economy, especially on the growth of small- and medium-sized enterprises that significantly depend on access to affordable finance. Our simulation of the impact of changes to the monetary policy shows that these changes are expected to increase the average annual real GDP by R52 billion, annually add 100,000 jobs to the economy and lower the poverty rate by 0.23 percentage points.

Figure 10: Interest Rate and Credit Extension to the Private Sector
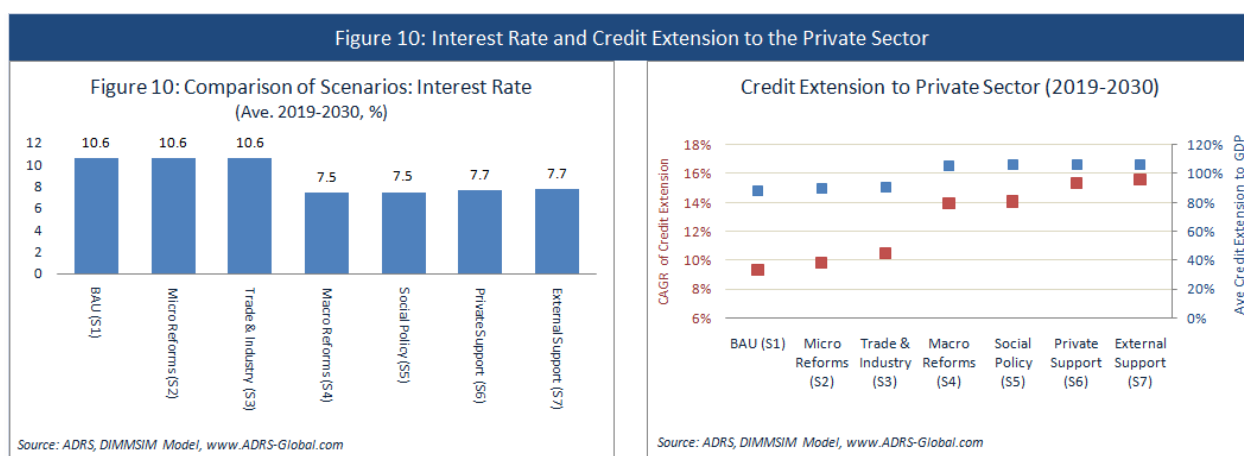
Overall, with the inclusion of the Macroeconomic Policy Reform scenario, the economy will be underpinned by consistent implementation of stimulus-oriented policies that potentially unleash virtuous moderate growth of output, employment, income and expenditure. The growth path is supported by policy measures that help gradually shift, in favourable directions, both aggregate demand and aggregate supply accompanied by rising employment, income and expenditure of households and businesses, thus improving the fundamentals of the economy and foundation of sustainable growth.

Despite improving the fundamentals of the economy and significantly improving the performance of key indicators, relative to the last scenario, the results of the macro scenario still fall considerably below the key NDP macroeconomic and poverty targets for 2030. Consequently, the next scenario considers additional measures that can potentially bring the country closer to achieving those targets.

The aim of the Social Policy scenario (Scenario 5) is to consider the potential of two existing government social policy programmes to reduce poverty and chronic unemployment among unskilled workers.[20] The first change relates to the expansion of the current social security programme to include a caregiver grant, 7% annual increase in all grant amounts, and to increase the child support grant to R500 per month in 2019. The second change is to build up the EPWP to become Employer Last Resort (ELR) for the unemployed who are also unskilled. The simulation of Scenario 5 has been conducted in stages to allow separate assessment of the impact of the two policy measures.

Model projections show that the introduction of a caregiver grant along with above improvements in the grant amounts will expand total household income and expenditure.[21] The dynamic effect of the increase in income and expenditure associated with the policy is estimated to increase, relative to results of Scenario 4, the average real GDP by R29 billion and add 13,000 jobs to average annual employment. Therefore, the CAGR of GDP is expected to increase by 0.05 percentage points and the real GDP per capita by R540. Finally, the introduction of a caregiver grant along with above improvements in the grant amounts helps reduce the poverty rate by an additional 0.8 percentage points.

In terms of the fiscal impact of the scenario, simulation results show that the net budgetary effect of the above changes to the social security programme is that it will increase government's average annual total expenditure by about R11 billion, taking into account the positive effect of the scenario on the government's income from direct and indirect taxes. Overall, the cost of the above expansion of current social security is expected to increase the average deficit-GDP ratio for the period from -2.29 to -2.41 and increase the average debt-GDP ratio for the period from 46.26 to 46.73.

Figure 11 shows the evolution of the EPWP to the ELR over the next 12 years. It shows the initial expansion of the EPWP to cover 70% of the unemployed who are also unskilled before it is expanded further after 2027 to cover 100% of the unemployed who are also unskilled. Figure 11 also shows that the initial expansion of the programme is likely to be followed by its gradual contraction as the economy creates a larger number of jobs under the broader scenario. The EPWP is therefore projected to initially expand from serving about 900,000 unemployed in 2018 to 4.6 million in 2019, which is equivalent to 70% of the projected number of unemployed who are also unskilled in that year. After 2020, as the unemployment rate is projected to gradually decline, the need for EPWP jobs also gradually contracts. The programme is expected to expand again in 2028 to serve 100% of the unskilled who are also unemployed. By 2030, the programme is expected to provide part-time job opportunities for 2.7 million unemployed (an equivalent of 1.2 million full-time jobs).

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[20] See Section 4.5 for details of the scenario.

[21] The share of household final consumption expenditure in total GDP is expected to increase by 0.08 percentage points.

Figure 11: Public Sector Employment (2018-2030)
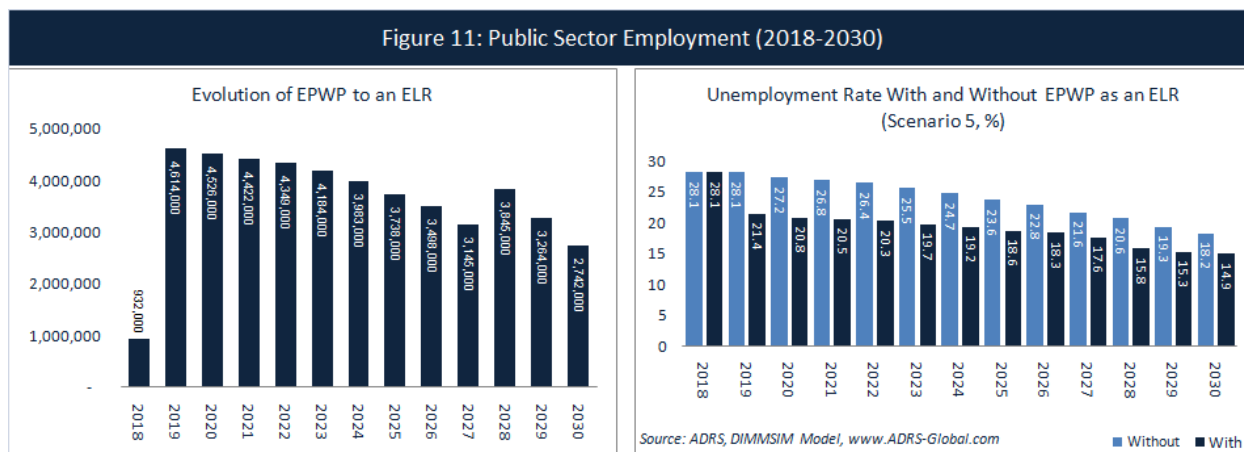
The public works module of the DIMMSIM captures the direct and indirect effects of the EPWP programme on employment, households' income and expenditure and poverty. The model projections show that, due to the extension of the EPWP as ELR, the unemployment rate in 2030 will be 3.3% lower than Scenario 4 (Figure 11).[22] The addition of EPWP as ELR will also be responsible for 2.4 percentage points reduction in the poverty rate.

The adoption of the EPWP as the ELR has important cost implications, especially during the years that the unemployment rate will still be high. Figure 12 presents the estimated annual cost of the EPWP over the next 12 years.

Figure 12: EPWP Total Remuneration
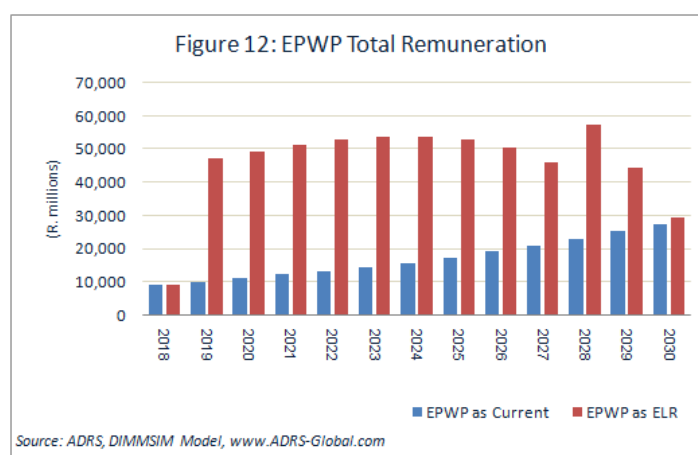
Overall, the simulation results show that Scenario 5 is effective in reducing, relative to Scenario 4, the poverty rate by an additional 3.2 percentage points and the unemployment rate by 3.8 percentage points by 2030. Scenario 5 as a culmination of microeconomic, trade and industry, macroeconomic and social policy reform measures is projected to put the economy on a growth path characterised by a high rate of economic growth (CAGR of GDP at 4.83%), much lower unemployment rate (14.9% by 2030) and a poverty rate of 16.7% in 2030. These likely outcomes for the next decade are significantly better than the likely outcomes of the BAU scenario. However, they are still high relative to the stated goals for 2030.

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[22] For the estimation of the impact of the EPWP on the unemployment rate, only one-third of the total number of EPWP jobs during a given year is counted as part of the total employment for that year.

The Private Sector scenario (Scenario 6) considers the implications of two possible injections of investments in the South African economy by the Public Investment Corporation (PIC) and the Public-Private Growth Initiative group (PPGI). The scenario considers "what if" PIC invested R100 billion in the manufacturing sector during the next five years. The PPGI investment that we have considered is R500 billion in various sectors of the economy over the next 12 years. Section 5 provides more details about both investment scenarios.

The model forecast of the impact of Scenario 6 shows that the combination of the two investments will raise the CAGR of GDP for the period 2019 to 2030 by 0.8 percentage points to 5.62%, and it will lower the unemployment rate by an additional 2.1 percentage points, from 14.9% under Scenario 5 to 12.8% in 2030. Total employment under Scenario 6 is expected to be higher than Scenario 5 by 602,000 at the end of the forecast period, 2030.

The Scenario's impact on the economy is partly due to its significant spin-off effects. For example, the simulation results of the PIC injection of R100 billion into the manufacturing sector over the next five years (2019–2023) show that the impact of the investment goes beyond the investment period. Relative to the scenario that does not include the PIC investment (Scenario 5), it shows higher investment, output and employment during the 7 years after the shock period (2024–2030). This reflects the dynamic effects, namely the spin-off effects, of the increased sector investment during 2019–2023. By expanding the productive capacity of the sector and the economy, as it directly and indirectly augments the physical stock, the five-year investment injection contributes to the long-term growth of the sector and the economy.

In DIMMSIM, the spin-off effects of sector investments are also captured through the sectoral inter-dependency within the model (i.e. backward and forward sector linkages), which transmits an increase in investment expenditure in a particular sector (e.g. agriculture) into increased demand and output from sectors that produce (or import) the necessary capital goods and raw materials (e.g. machinery and equipment sector). Over time, increases in investment also induce additional expenditure in the economy through their impact on household income and expenditure.

Overall, this scenario is a culmination of a comprehensive policy proposal that harnesses the potential of both the public and private sector to propel the economy on a growth path which doubles the size of the GDP over the next 12 years and significantly reduces the unemployment and poverty rates. It also makes budgetary provision for expanded social services and social policy programmes.

The External Support scenario (Scenario 7) is a combination of three possibilities for the gold price, growth of international import and flow of foreign direct investment to South Africa. In all previous scenarios (scenarios 1–6), the gold price was assumed to increase by 1% annually, reflecting the commodity's recent mixed performance. However, over the last 8 years, the gold price has increased by close to 4% annually on average.[23] Scenario 7 therefore considers the likely impact of 2%, instead of 1%, annual increase in the gold price. Scenario 7 also incorporates a more optimistic view of the world economy by considering the possibility that imports by the rest of the world will grow faster, by 2%, than what was assumed under the previous scenarios.

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[23]Reserve Bank historical data on gold, code RB5357.

Finally, the scenario includes a rise in the flow of FDI to South Africa. Currently, total FDI flow to the country is equal to 0.05% of GDP. In the model, the level of FDI is thus expected to increase as the economy grows, and the faster the economy grows, the larger the net foreign investment in the country will be. Under the External Support scenario, the annual net FDI flow is expected to increase from 0.05% of GDP to 0.13% over the period 2019–2030, reflecting positive international response to South Africa's much improved economic performance under reforms proposed for scenarios 2 to 6.

If, according to the External Support scenario, the gold price, the import demand from the rest of the world and the FDI net inflow to South Africa increase at faster rates, these additional stimuli to the South African economy are expected to particularly help the trade sectors. Simulations that include the above improved external conditions show addition of 0.44% to the CAGR of the GDP, thus enabling the scenario to place the economy on a growth path with CAGR of GDP at 5.74% for the period 2019–2030. This means that by 2030, the South African real GDP will be more than twice (2.05 times) its size in 2018. Moreover, under Scenario 7, the unemployment rate in 2030 is projected at 12.3%, which is less than half of the unemployment rate in 2018. The combined policy measures and external environment is projected to generate 24.4 million jobs in 2030, which will be 3.15 million more than the BAU scenario results for the same years. The combined policy scenario is also expected to gradually halve the poverty rate by 2030, from 38% in 2019 to 13% at the end of the forecast period.

Overall, the policy mix of Scenario 7 is expected to deliver the NDP targets for economic growth, investment and per capita GDP; it will also cut the rates of unemployment and poverty by more than half over the next 12 years. Under Scenario 7's relatively high growth path is an average 28.2% investment-GDP ratio for the period, and annual expansion of domestic aggregate demand and aggregate supply at average rates of 6.95% and 5.35% respectively. Finally, by 2030, the real per capita GDP is projected to reach R98,930 in 2010 prices, which is 80% above its value for 2018.
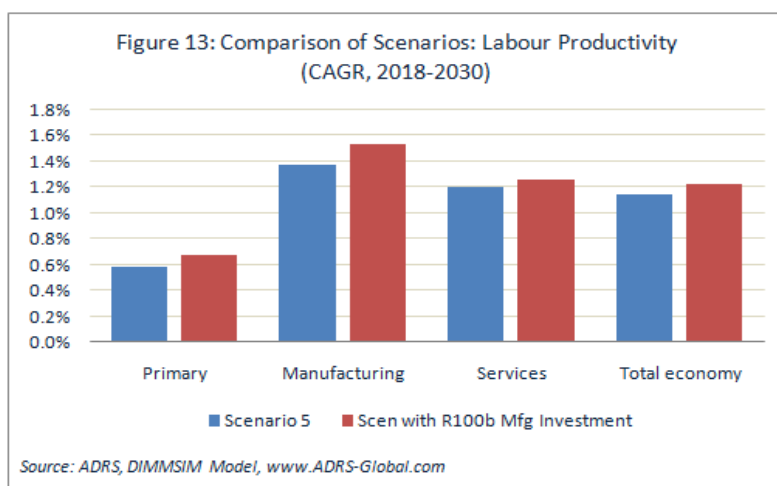
5.2.2   Manufacturing Spill-over Effects

The dti's ten-year review of the Industrial Policy Action Plan (IPAP) argues that "industrial investment in targeted technologies and sectors spills over to the rest of the economy, resulting in generalised productivity improvement and increased welfare. Industrial policy has traditionally placed a strong emphasis on the manufacturing sector, precisely because of such spill-over effects …." (R Davies Forward to IPAP, 2018, p. 3). This argument has its origin in the so-called Kaldor's three "Laws", which state that higher growth in manufacturing lead to higher productivity growth – both within the manufacturing sector and across the economy, raising economic growth.[24]

We used DIMMSIM results for two of the scenarios to examine whether Kaldor's law applies to South Africa. We compared the results of Scenario 5, the Social Policy scenario, with the results of the model for the investment of R100 billion in the manufacturing sector over the course of five years, 2019 to 2023. The only difference between the two runs is the PIC investment in the manufacturing sector. All other aspects of the two scenarios are exactly the same.

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[24] Kaldor (1966, 1967).

Figure 13 compares the two scenarios in terms of their impact on the CAGR of labour productivity of the primary, manufacturing, services and total economy. The results confirm that investment in the manufacturing sector lead to higher productivity growth in the manufacturing sector and across the economy, namely the primary sector, services and total economy. In Section 5.2.2, we also summarised the positive impact of the same investment scenario on economic growth.

Figure 13: Comparison of Scenarios: Labour Productivity (CAGR, 2018-2030)

Source: ADRS, DIMMSIM Model, www.ADRS-Global.com

We also used the model to compare the manufacturing sector with the primary and services sectors in terms of the macroeconomic multiplier effects of similar investment in each sector. We therefore used DIMMSIM to simulate the impact of a R10 billion increase in investment in the manufacturing sector to compare the results with the results of a similar amount of investment in the primary and services sectors. The simulation results of the three scenarios show the following:

(a) For every R1 million extra investment in manufacturing sector over the next 12 years, GDP will increase, on average, by R10.27 million. This macroeconomic GDP multiplier for investment in manufacturing is 18% higher than the corresponding multiplier for the primary sector and 7% higher than the value for the services sector.

(b) Every R1 million extra investment in manufacturing sectors over the next 12 years is estimated to generate six additional jobs in the economy. This macroeconomic employment multiplier for investment in manufacturing is more than twice the employment multiplier effect for investment in the primary sector and about 40% higher than the corresponding number for the service sector.

These findings are in line with similar findings for other countries and confirm that growth of the manufacturing sector has a relatively larger macroeconomic spill-over.[25]

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[25] The literature on testing the validity of the Kaldor's three laws is extensive at both country level and regional level. For example, Bernat (1996), Guo (2007), McCombie (1983), Thrilwall (1983) and Alexiou et al. (2010).

5.2.3   Crowding-in Effect

The simulation results shed light on the important question of whether public investment in South Africa crowds-in (i.e. attracts) or crowds-out (i.e. deters) private sector investment. A comparison of average annual growth rates of public and private investments over the twelve-year projection period shows that scenarios with higher (lower) annual public investment induce higher (lower) private investment with its corresponding positive impact on output (Figure 14). Overall, public investment in South Africa is found to significantly catalyse and crowd-in private investment. Figure 14 shows that relative to the BAU scenario, the increase in public investment under the Macroeconomic Policy Reform scenario leads to a faster average annual growth rate of private sector investment. Moreover, the average interest rate for the twelve-year period is found to be slightly lower, and not higher, than the BAU results.

The simulation results show that an increase in public spending (e.g. public infrastructure investment) affects the economy in two ways. First, it boosts aggregate demand through the short-term fiscal multiplier, of which the magnitude may vary with the state of the economy.[26] It also crowds-in private investment, given the highly complementary nature of infrastructure services. "Over time, there is also a supply-side effect of public infrastructure investment as the productive capacity of the economy increases with the higher infrastructure capital stock."[27]

Figure 14: Crowding-in Effect of Public Investment
(Scenario 4 compared to Scenario 3)
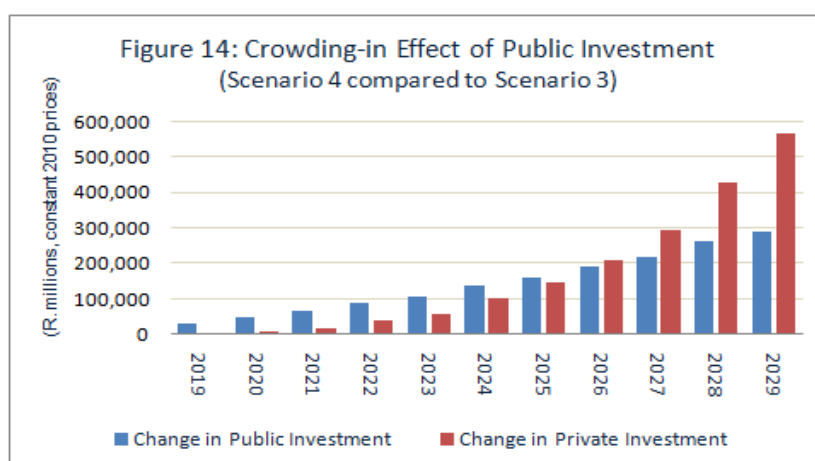
5.2.4   Fiscal Sustainability

Figure 15 compares scenarios in terms of their impact on two fiscal indicators, namely government deficit-GDP ratio and public debt-GDP ratio. The differences in the projected performance of these fiscal indicators stem from the economy-wide dynamic effect of the scenarios, specially their direct and indirect effects on growth and government revenue. What clearly stand out from the simulation results are:

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[26] Auerbach & Gorodnichenko (2012, 2013).

[27] Abiad et al. (2015, p. 6).

(a)   Even though the level of general government expenditure differs across scenarios, neither of the scenarios would cause major deteriorations in one or more of the fiscal indicators over the next 12 years;

(b)   Due to their positive effects on growth and government revenue, fiscal indicators related to scenarios 4 and 6 are projected to perform relatively better than both the BAU and Microeconomic Policy scenarios, due to their large positive effects on growth and government revenue.

Overall, the impact of the scenarios on the public debt-to-GDP ratio essentially depends on their growth dynamics. The results show that higher public spending is not associated with an increase in the debt-to-GDP ratio when "the boost to GDP from higher government investment and current expenditure will be larger than the public debt taken to finance it."[28] Moreover, combining investment-led stimuli with monetary policy support can lead to a stronger growth impact and accentuate the reduction of the public debt-to-GDP ratio. A sustained rise in output reduces the public debt-to-GDP ratio as the denominator increases. It thus reduces risks on debt as current debt-to-GDP ratio moves further away from its default limit.[29] An increase in public investment reduces public debt. The bigger the concern about the debt, the more critical it is to find ways to increase output.

A long-term permanent increase in public investment boosts private investment in both the short and the long term (Figure 14). The large output effects imply that the debt-to-GDP ratio declines. The increase in government spending will also affect the debt-to-GDP ratio, which may increase or decrease, depending on the size of the fiscal multiplier and on the elasticity of revenues to output.[30]

Figure 15: Sustainability of Deficit and Debt Across Scenarios

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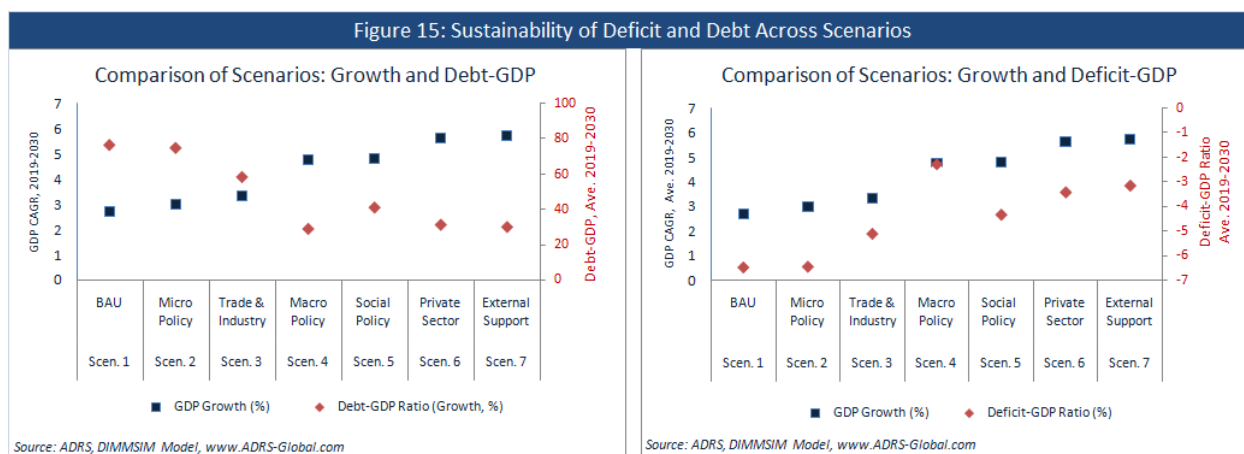
[28] Abiad et al. (2015, p. 11).

[29] Mourougane et al. (2016, p. 7).

[30] Abiad et al. (2015, pp. 6, 20).

6.   CLASSIFICATION OF SCENARIOS

Given the simulation results of the scenarios for the next 12 years, it is possible to classify them in terms of "low", "middle" and "high" scenarios. Scenarios 1 and 2 (BAU scenario and Microeconomic Policy Reform scenario) can be classified as "low" growth and employment scenarios since they are expected to generate relatively weak economic growth, and high unemployment and poverty rates.

Scenarios 3 and 4 are examples of "moderate" scenarios, especially Scenario 4. Depending on the scenario, the economy is likely to grow at CAGR of 3.3% to 4.8%. It is only under Scenario 4 (Macroeconomic Policy Reform scenario) that the unemployment rate is projected to drop below 20% by 2030.

Scenarios 5, 6 and 7 can be classified as "high" growth and employment scenarios. Relative to scenarios 1 to 4, not only are they expected to grow at CAGR of between 4.8% and 5.7%, they are also expected to produce much better outcomes for unemployment rate and poverty. Under these scenarios, halving the rates of unemployment and poverty by 2030 becomes possible.

7.   SUMMARY AND CONCLUSIONS

This report has identified seven cumulative economic policy scenarios for South Africa for the period 2019 to 2030. With the help of the ADRS's Dynamically Integrated Macro-Micro Simulation Model of South Africa (DIMMSIM), the likely future impacts of the scenarios were simulated and reported. Our goal was to identify a minimum set of policy measures that are sufficient to realise the key macroeconomic and developmental targets of the NDP. Based on analysis of the model results, the report identifies the following ten findings on the potential of using a combination of economic policy measures to harness poverty-reducing growth:

1. The cumulative scenarios of this report show that it is possible for economic policy to propel the economy on a fundamental economic reconfiguration and restructuring path as it relates to structural transformation and economic growth with significant reductions in the unemployment rate and poverty. However, this will be possible if the current austerity-focused economy policy framework gave way to a growth-oriented economic policy framework. Simulation results show that when the economy is underpinned by consistent implementation of growth-oriented policies, it will unleash a virtuous growth of output, employment, income and expenditure

2. We identified and tested the potential of a combination of policy measures that include microeconomic reforms, trade and industrial policy, macroeconomic reforms, social policy measures and private sector support. We estimated the likely outcomes to include:
    a. an average growth rate of 5.74% for the period 2019–2030, which will more than double the size of the GDP;
    b. an 80% increase in the real per-capita GDP;
    c. an increase in the average investment-GDP ratio to 28%;

> d. more than double the CAGR of manufacturing output, relative to the BAU scenario;
>
> e. a debt-GDP ratio of 30.4% by 2030;
>
> f. an average deficit-GDP ratio of -3.2% during the twelve-year period;
>
> g. an increase in the available government funding for major government programmes such as the NHI, the land reform, free higher education, and other important social and economic services;
>
> h. a reduction in the unemployment rate by more than half, from the current 27.5% to 12.3% by 2030; and
>
> i. a reduction in the poverty rate by about two-thirds, from the current 38% to 13% in 2030.

3. The results of Microeconomic Policy Reform Scenario (Scenario 2) highlight the limitations of depending solely on microeconomic policy reforms to propel the economy on the desired high growth and employment path.

4. Increased public investment raises output in both the short run, because of demand effects, and in the long run, as a result of supply effect. A well-coordinated annual increase in government current and capital spending boosts aggregate demand through fiscal multiplier and increases aggregate supply through time as the productive capacity of the economy increases.

5. When the scenario includes monetary policy reforms, as proposed, demand effects are stronger and economic performance is significantly enhanced. The measures especially provide SMMEs with the necessary life support and accentuate the decline in debt-GDP ratio by engendering a stronger growth.

6. If the public works programme is reoriented to become Employer of Last Resort and provide part-time jobs to all unskilled workers who cannot find jobs in the labour market, millions of workers who are currently excluded from the mainstream of the economy and have little or no chance of finding jobs in the future are provided livelihoods and a way out of poverty.

7. Each of the proposed scenarios has direct and indirect implications for the manufacturing sector. While the Microeconomic Policy Reform can raise the CAGR of manufacturing output by an additional 0.6 percentage points, the Trade and Industry Policy scenario will be able to add almost 1.5 percentage points to the CAGR of manufacturing output. An increase in PIC investment in manufacturing adds 0.35 percentage points to the growth rate of manufacturing sector and the PPGI is projected to help the average annual growth of the manufacturing sector by an additional 0.75 percentage points. The growth-oriented Macroeconomic Policy Reform scenario also has a significant impact on the manufacturing sector. It is projected to add 1.2 percentage points to the CAGR of manufacturing output.

8. The proposed scenarios are able to reverse the negative trend in the share of manufacturing sector in total output and employment. Under the BAU scenario, the current trend is projected to continue. However, the simulation results show that the proposed policy measures will be able to reverse the current trend during the next decade by generating relatively faster growth of the manufacturing sector.

9. The proposed policy measures are plausible and economically sustainable, as shown by the model simulations. In fact, the economy will be less vulnerable than without the proposed reforms.

10. The report shows that there is no one category of policy proposals that will be enough to overcome South Africa's growth and development challenges.

The goal of this project was to identify a policy roadmap to realise key growth and development targets that the government has committed to for 2030. The economic model that we used allowed us to design and test diverse policy scenarios and helped gradually build a composite scenario with simulation results that showed their potential to propel the economy on a path to reduce the unemployment rate by about 55%, from the current 27.5% to 12.3%, and the poverty rate by more than 60%, from the current 38% to 13%.

8. REFERENCES

Abiad, M.A., Furceri, D. & Topalova, P. 2015. The macroeconomic effects of public investment: evidence from advanced economies. Washington, D.C.: International Monetary Fund. (IMF working papers, WP/15/95, May.)

Alexander, W.E. & Caramazza, F. 1994. Money versus credit: the role of banks in the monetary transmission process. (In Balino, T. & Cottarelli, C. Frameworks for monetary stability: policy issues and country experiences. Washington, D.C.: IMF. p. 397-422.)

Alexiou, C. & Tsaliki, P. 2010. An empirical investigation of Kaldor's Growth Laws: evidence from the Mediterranean Region. Indian economic journal, 58(3):144-155.

Antonopoulos, R. 2007. The right to a job, the right types of projects: employment guarantee policies from a gender perspective. Annandale-on-Hudson: Levy Economics Institute of Bard College. (Economics working paper collection, no. 516.)

Arestis, P. 2011. A critical appraisal of the new consensus macroeconomics. (In Arestis, P., ed. microeconomics, macroeconomics and economic policy. London: Palgrave Macmillan. p. 99-115.)

Auerbach, A.J. & Gorodnichenko, Y. 2012. Measuring the output responses to fiscal policy. American economic journal: economic policy, 4(2):1-27.

Auerbach, A.J. & Gorodnichenko, Y. 2013. Output spillovers from fiscal policy. American economic review, 103(3):141-146.

Bernat jr, G.A. 1996. Does manufacturing matter? A spatial econometric view of Kaldor's Laws. Journal of regional science, 36(3):463-77.

Dutt, A.K. 2006. Aggregate demand, aggregate supply and economic growth. International review of applied economics, 20(3):319-336.

Guo, D. 2007. The leading role of manufacture in regional economic growth in China: a spatial econometric view of Kaldor's Law. (Workshop on Agglomeration and Growth in Knowledge-Based Societies, Kiel, Germany, April 20-21. p. 19-20.)

Kaldor, N. 1966. Causes of the slow rate of economic growth of the United Kingdom. London: Cambridge University Press.

Kaldor, N. 1967. Strategic factors in economic development. Ithaca, N.Y.: Cornell University. School of Industrial and Labor Relations.

Mahonye, N., Marko, K. & Amina, C. 2016. Institutions, credit markets and development in Sub-Saharan Africa. Banks and bank systems, 11(4):169-178.

McCombie, J. 1983. Kaldor's Law in retrospect. Journal of post-Keynesian economics, 5(3):414-129.

Mourougane, A., Botev, J., Fournier, J.M., Pain, N. & Rusticelli, E. 2016. Can an increase in public investment sustainably lift economic growth? Paris: OECD. Economics Department. (Working papers, no. 1351, ECO/WKP(2016)75, November.)

Orcutt, G. 1957. A new type of socio-economic system. Review of economics and statistics, 39(2):116-123.

Orcutt, G., Greenberg, M., Korbel, J. & Rivlin, A. 1961. Microanalysis of socioeconomic systems: a simulation study. New York: Harper & Row.

Pesaran M.H., Shin, Y. & Smith, R.J. 1999. Bounds testing approaches to the analysis of long run relationships. Edinburgh: University of Edinburgh. Edinburgh School of Economics. (ESE discussion papers 46.)

Pesaran, M.H. 1997. The role of economic theory in modelling the long run. Economic journal, 107:178-191.

Pesaran, M.H., Shin, Y. & Smith, R.J. 1996. Testing for the existence of a long-run relationship. Cambridge: University of Cambridge. Department of Applied Economics. (DAE working paper no. 9622.)

Reserve Bank (2019). Quarterly Bulletin. First Quarter.

Silver, N. 2015. The signal and the noise: why so many predictions fail - but some don't. London: Penguin Books.

South Africa. Department of Trade and Industry. 2018. Industrial policy action plan (IPAP) 2018/19-2020/21. Pretoria: Department of Trade and Industry.

South Africa. National Treasury. 2018. Achieving economic transformation, inclusive growth and competitiveness: a growth agenda for the South African economy. Pretoria: National Treasury.

Stats SA. 2019. Quarterly labour force survey, first quarter of 2019. Pretoria: Department Statistics South Africa. (Statistical release P0211.)

Tcherneva, P.R. 2012. Beyond full employment: the employer of last resort as an institution for change. Annandale-on-Hudson: Levy Economics Institute of Bard College. (Working paper no. 732.)

Thirlwall, A.P. 1983. A plain man's guide to Kaldor's Growth Laws. Journal of post-Keynesian economics, 5(3):345-358.

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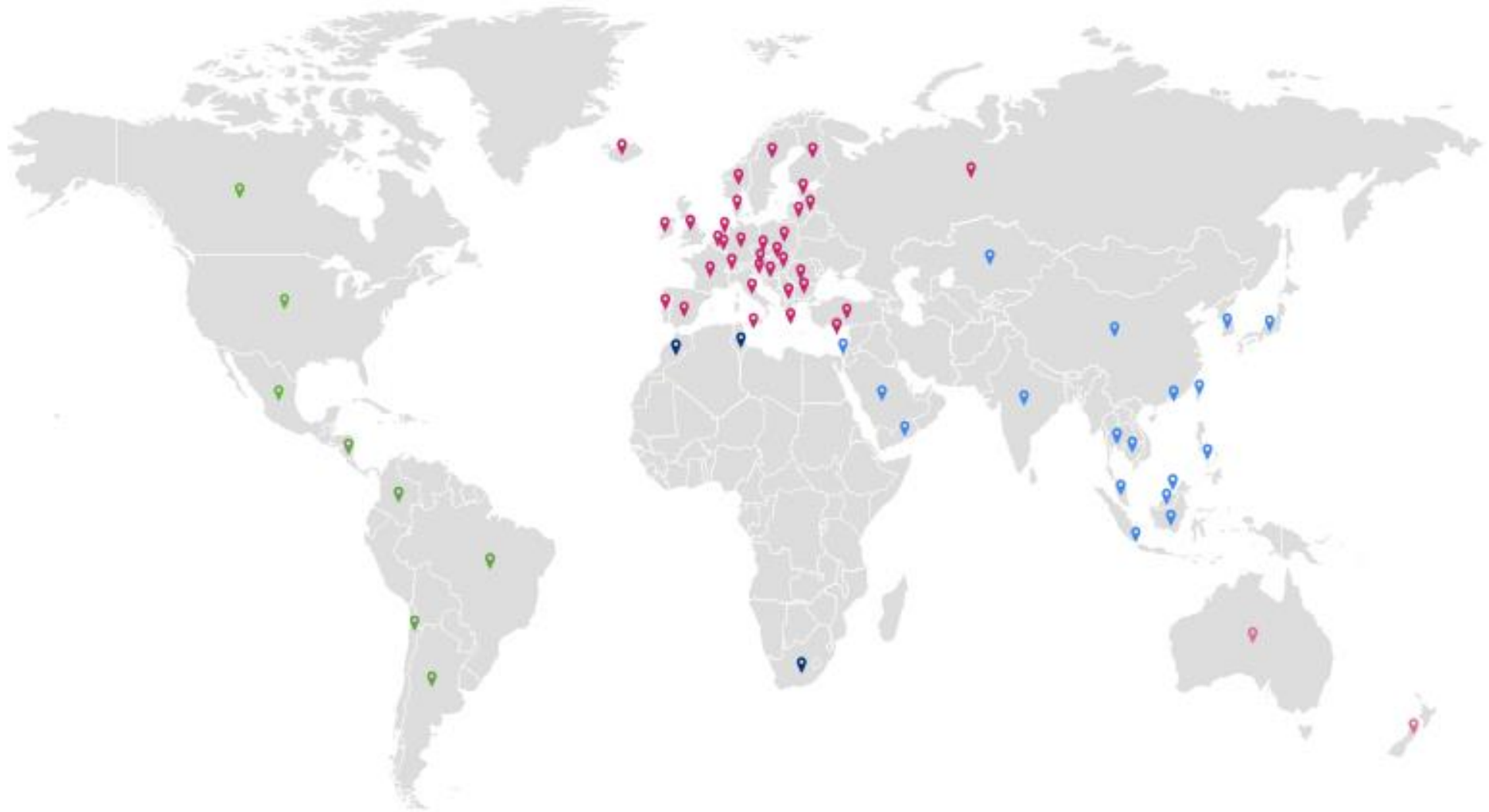
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Morocco | Tunisia | South Africa (Suite of Macro and Micro Economic Models)

ASIA

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EUROPE

Austria | Belgium | Bulgaria | Croatia | Cyprus | Czech Republic | Denmark | Estonia | Finland | France | Germany | Greece | Hungary | Iceland | Ireland | Italy | Latvia | Lithuania | Luxembourg | Macedonia | Malta | Netherlands | Norway | Poland | Portugal | Romania | Russian | Federation | Slovakia | Slovenia | Spain | Sweden | Switzerland | Turkey | United Kingdom

NORTH & CENTRAL AMERICA

Canada | Mexico | United States of America

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