

Southern Africa – Towards Inclusive Economic Development (SA-TIED)

A 2019 Social Accounting Matrix for South Africa with occupational and capital stock detail

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Abstract: This technical note describes the compilation of a 2019 Social Accounting Matrix (SAM) for South Africa. The SAM is based on a supply table and a use table for 2019 published by Statistics South Africa and on national accounts available from the South African Reserve Bank. Disaggregation of wage earnings by industry and occupation is extracted from Stats SA’s labour market dynamics survey data while household income and outlays are disaggregated using the Stats SA 2015 living conditions survey. A disaggregation of capital stock earnings by industry is based on the annual financial statistics survey for the year 2019.

Key words: social accounting matrix, national accounts, supply table, use table, factor earnings, occupations

JEL classification: E16, C63, J4, O55

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Supplementary material is freely available to download from the webpage of this technical note: [SASAM 2019 occ & educ for distribution](https://www.wider.unu.edu/publication/2019-social-accounting-matrix-south-africa-occupational-and-capital-stock-detail) (<https://www.wider.unu.edu/publication/2019-social-accounting-matrix-south-africa-occupational-and-capital-stock-detail>).

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List of acronyms

AFS	Annual financial statistics
AMLAIR	Automation, machine learning, artificial intelligence and robotics
CGE	Computable general equilibrium
GDP	Gross domestic product
GOS	Gross operating surplus
LCS	Living conditions survey
LMD	Labour market dynamics
NA	National accounts
QLFS	Quarterly labour force survey
SAM	Social Accounting Matrix
SARB	South Africa Reserve Bank
Stats SA	Statistics South Africa
SIC	Standard Industrial Classification (for South Africa)
ST	Supply table
SUT	Supply-use table
SUTSAM	Supply-Use Table SAM, contains single household and single labour account
UT	Use table

1 Introduction

A growing literature over several decades has examined the polarizing effects of technological change in many countries. The founding literature suggests that automation, machine learning, artificial intelligence, and robotics (AMLAIR) disrupts the traditional occupational hierarchy. Rather than leading to upskilling, higher productivity and wages, and upward mobility of workers in lower-skilled occupations, the new technologies displace middle-skilled, routinizable occupations. This may lead to relative polarization, in which the shares of middle-skilled workers in total employment and/or wages decline, while the shares of those in both higher-skilled, non-routinizable occupations and in lower-skilled jobs requiring human intervention rise. Absolute polarization—a decline in the number of middle-skilled occupations—may not happen because of economic growth.

In two earlier papers we explored whether polarization might occur in South Africa. Drawing on data from 1993 to 2017 to undertake a decomposition analysis, in Davies and van Seventer (2020a) we found that there may have been mild polarization. However, we argued that because of slow adoption of global technologies, past data would not provide a good guide to future trajectories. In Davies and van Seventer (2020b) we therefore used a computable general equilibrium (CGE) model to explore possible consequences of new technology adoption. Our model had polarization built into its structure, but nonetheless allowed us to explore possible ameliorating factors and likely consequences. We found that the displacement of middle-skilled occupations was not offset either by the stimulatory effects of the new technology on productivity or by the investment required for new technology adoption. We also found that the effects on South Africa’s already unacceptably high inequality would be exacerbated not only by the polarization in the labour market but also by a bias towards capital income.

The current note is part of a project to update and improve our previous work. Although contaminated by COVID-19, there are five more years of data available, capturing five more years of technology adoption. Furthermore, there have been improvements in the data that are available. The revisions to the national accounts in 2021 have made available more disaggregated supply and use tables. The global literature has also grown, providing new insights to draw on. The growth in the artificial intelligence component of the new technology has widened the range of occupations and tasks that might be displaced.

The analysis will be based on an economy-wide modelling framework that uses data from a Social Accounting Matrix (SAM). In the current paper, the SAM of the earlier analysis (van Seventer and Davies 2019) is updated from 2016 to 2019 and expanded in several respects. This note outlines the construction of that 2019 SAM.

SAMs are economy-wide databases that are used together with analytical techniques to strengthen evidence-based policy analysis. This SAM is a consistent data framework that captures information contained in South Africa’s 2019 national accounts (SARB 2022) and a supply table (ST) and a use table (UT) (both Stats SA 2022) for the same year. A SAM is an ex-post accounting framework. Within its square format, total receipts must equal total payments for each of its accounts. Since the required data are not drawn from a single source, the underlying information is manipulated to make it internally consistent. The South African ST and UT fit together in a seamless manner to create a SAM with a single wage earnings account and a single household outlay account. This Supply-Use Table SAM (SUTSAM) is consistent with the national accounts (NA). Data to disaggregate wage earnings by occupation are sourced from the 2018 and 2019 labour market dynamics report (LMD) (Stats SA 2020a and 2021a). Gross operating surplus are disaggregated by type of capital stock, drawing on data in the Stats SA annual financial statistics (Stats SA 2020b).

Household income and outlays are disaggregated by household expenditure group using 2015 living conditions survey (LCS) (Stats SA 2017) data. The distributional sub-matrix, which shows how earnings and GOS are distributed to households, is constructed using data from the LCS (Stats SA 2017) and the 2019 LMD (Stats SA 2021a).

Details on the construction of the SAM are discussed in the next section, followed by a section that focusses on further disaggregation. How physical quantities for employment are derived is reported in Section 4. Section 5 makes some observations about some variables not normally included in SAM construction. Concluding remarks are made in Section 6.

2 Construction of a 2019 SAM for South Africa

A SAM is an economy-wide data framework that usually represents the real economy of a single country. A SAM is a square matrix, like an oversized chessboard, in which some but not all cells contain data. For each nonzero single entry, some form of double entry book-keeping is undertaken for a set of accounts that represent various economic agents. A SAM identifies productive activities, commodity markets, and factors of production, as well as a range of institutions such as enterprises, households, government, and the rest of the world. Each account is represented by a row and a matching column. Incomes and transfers received by an account appear along its row, while expenditures or outlays are shown down its column. A cell therefore shows payments from the account of its column to the account of its row. The underlying principles of double-entry accounting require that, for each account in the SAM, total revenue (the row total) must equal total expenditure (the column total). An aggregate or macro SAM for South Africa (with verbal explanations instead of numbers) is shown in Table 1.

The 2019 SAM described in this document identifies about half the number of activities and the same number of commodity markets as in the Stats SA ST and UT for 2019, i.e. 61 productive activities and 108 commodities. The number of activities is reduced in order to accommodate the robustness of the disaggregation of wage earnings in the UT using the LMD data. While a full list of activities and commodities can be found in Stats SA (2021c: 152–56; 162–66), Table A1 in the Appendix offers a mapping from Stats SA ST and UT to the 2019 SAM. In order to be able to maintain a time series of supply-use tables for South Africa at the greatest level of industry detail, the number of activities is similar to the previous series of Stats SA STs and UTs (see for example Stats SA 2018) but not quite the same.¹

Labour market detail is extracted from the 2018 and 2019 LMD data sets (Stats SA 2020a and 2021a) and disaggregates the single labour category of the Stats SA UT into ten occupations (see item ii in the list below). Stats SA (2020b) annual financial statistics is used to disaggregate the single account for the earnings of the production factor capital into six broad types of capital stock. Household detail is derived from the 2015 living conditions survey (Stats SA 2017) and identifies expenditure deciles, with the highest decile split into five categories of 2 per cent. The source data contains a single product tax, representing VAT, import duties and other excise taxes. We separate import duties from other product taxes using unpublished data supplied by Stats South Africa.

¹ The industry detail is one fewer than the previous Stats SA SUTs (2018), because the new and more disaggregated SUT identifies ‘casting of metals’ as a separate industry which involves both iron & steel as well as non-ferrous metals. In the previous SUT, casting of metals was aggregated with iron and steel and non-ferrous metal respectively. There is no sufficiently detailed information to disaggregate ‘casting of metals’ into iron & steel and non-ferrous metals. For our purposes a new industry is created which combines iron & steel, non-ferrous metals as well as their respective casting of metals.

Table 1: Basic structure of a 2019 SAM for South Africa

Activities	Commodities	Labour	Capital	Enterprises	Households	Government	Net activity taxes	Net product taxes	Import duties	Income taxes	Changes in inventories	Accumulation	Rest of the world	Total
	Output of total domestic economy													Gross output
Commodities	Intermediate consumption	Transactions Margins			Final consumption expenditure by households	Final consumption expenditure government					Change in inventories + residual item	Gross fixed capital formation	Exports of goods & services	Total demand
Labour	Compensation of employees												Compensation SA residents in RoW	Labour income
Capital	Net operating surplus + Depreciation												Property income paid: RoW	Capital income
Enterprises				Gross operating surplus of corporations, adjusted for property income paid to / received from RoW	Net property income + other current transfers received: corporations - non-life insurance claims paid: corporations	Property income paid: households + net non-life insurance premiums: households	Social contributions received: financial corporations + property income paid: general government						Secondary distribution of income	Enterprise earnings
Households			Compensation of residents	Gross operating surplus / mixed income of households	Misc transfers paid: corporations + property income received: households + non-life insurance claims: households + adj for the change in net equity in pension fund reserves: households		Misc current transfers paid: general government + social benefits received: households						Misc current transfers paid: RoW	Household earnings
Government				Gross operating surplus of general government	Social benefits paid by corporations property income received by General government	Misc transfers received: general government + Social contributions paid: households	Net social contributions received: General government	Net other taxes on production in all industries	Net taxes on products - import duties	Import duties	Current taxes on income and wealth		Current international co-operation paid: RoW	Government receipts
Net activity taxes	Net other taxes on production in all industries													Net other taxes on production in all industries
Net product taxes		Net taxes on products - import duties												Net taxes on products - import duties
Import duties		Import duties												Import duties
Income taxes				Current taxes on income and wealth paid by corporations	Current taxes on income and wealth of households									Current taxes on income and wealth
Changes in inventories												Change in inventories + residual item		Change in inventories + residual item
Accumulation				Residual: corporations + Gross saving of corporations	Residual: households and NPISHs + Gross saving of households and NPISHs	Gross saving of General government							Current external balance: RoW	Savings
Rest of the world		Imports of goods & services	Compensation of South African employees	Property income received: RoW	Secondary distribution of income	Misc current transfers received: RoW	Current international co-operation received: RoW							Foreign exchange outflows
Total	Gross output	Total Supply	Distribution of labour income	Distribution of capital income	Enterprise outlays	Household outlays	Government outlays	Net other taxes on production in all industries	Net taxes on products - import duties	Taxes on international trade and transactions: Import duties	Current taxes on income and wealth paid by corporations + current taxes on income and wealth of households	Change in inventories + residual item	Gross fixed capital formation (investment) + change in inventories + residual item	Foreign exchange inflow

Source: own descriptions and labels.

Table 2: A 2019 Macro SAM for South Africa (billions of rands [ZAR])

	Activities	Commodities	Labour	Capital	Enterprises	Households	Government	Net activity taxes	Net product taxes	Import duties	Income taxes	Changes in inventories	Accumulation	Rest of the world	Total
Activities		11,037													11,037
Commodities	5,992					3,589	1,104					24	865	1,532	13,107
Labour	2,732													13	2,745
Capital	2,206													110	2,317
Enterprises				1,402	858	460	688							15	3,422
Households			2,730	542	1,190		660							45	5,167
Government				124	429	454	265	106	520	49	774			1	2,723
Net activity taxes	106														106
Net domestic product taxes		520													520
Import duties		49													49
Income taxes					238	536									774
Changes in inventories													24		24
Accumulation					692	97	-44							144	890
Rest of the world		1,502	15	248	15	31	50								1,861
Total	11,037	13,107	2,745	2,317	3,422	5,167	2,723	106	512	57	774	24	890	1,861	

Source: own representation of South Africa's 2019 NA (SARB 2022), 2019 ST and UT (Stats SA 2022), and Stats SA unpublished data.

The macro SAM shown in Table 2 is derived from, and therefore consistent with, the national accounts. It provides controls for the disaggregation into a micro SAM. The micro SAM expands a macro SAM with industry, commodity market, factor market, and institutional detail, hence the term ‘micro’ SAM. The expansion draws on data from sources other than the NA, as explained below. By applying proportions identified in these other sources to the aggregates in the macro SAM, we ensure consistency with the NA. We thus end up with a picture of the economy which gives more detail of interactions and transactions than the NA, but nonetheless can replicate the published NA.²

The list below explains how each macro SAM entry is derived and broadly how, where necessary, it is disaggregated to arrive at the micro SAM. The notation for SAM entries is (row, column), that is (receiving account, paying account), and the values are in billions of 2019 South African rands. KBP refers to the SARB series of national accounts in their Quarterly Bulletin of the South African Reserve Bank.

- i (Commodities,Activities)...Rb5,992
KBP6871J: Production account: Intermediate consumption of total domestic economy. Intermediate inputs are disaggregated across activities identified in the SAM according to the 2019 UT.
- ii (Labour,Activities)...Rb2,732
KBP6000J: Compensation of employees. Total labour income is disaggregated across activities according to shares in the 2019 UT. Labour income is subsequently split across ten occupation groups:
 - 1) Legislators, senior officials and managers
 - 2) Professionals
 - 3) Technical and associate professionals
 - 4) Clerks
 - 5) Service workers and shop and market sales workers
 - 6) Skilled agricultural and fishery workers
 - 7) Craft and related trades workers
 - 8) Plant and machine operators and assemblers
 - 9) Elementary occupation
 - 10) Domestic workers

Workers’ compensation is drawn from the 2018 and 2019 LMD data sets (Stats SA 2020a and 2021a). A mapping from SIC codes identified by the LMD to UT industries is reported in the Appendix, Table A2. From the LMD data employment and average wage (Rands per annum) are extracted for SAM activities by 1digit SASCO for 2018 and 2019 which is then multiplied to get the wage bills. There are some sectors/occupations that have employment but no wage (none have a wage but no employment), they were given the national wage for that occupation. The percentage shares of occupations in each sector are calculated and averaged for the two years.

² This consistency is important for policy purposes since many policies are driven by evidence in the NA. But putting that consideration aside, it can also be argued that while surveys can provide an accurate picture of the structure of what they survey, they do not always give an accurate measure of the levels. A firm survey gives us a better idea of, say, the ratio of high to low skill workers employed than of the number of such workers. That requires appropriate weighting of the survey responses. Often the weights are derived from more aggregated data.

- iii (Capital,Activities)...Rb2,206
 KBP6001J: Net operating surplus + KBP6002J: Consumption of fixed capital (Depreciation). Total capital income is disaggregated across activities according to shares in the 2019 UT. A further disaggregation by SAM industry and type of capital stock is based on the Stats SA AFS (2020b). The following types of capital stock are identified:
- 1) Land
 - 2) Buildings, Construction Works & Land Improvements (Immovables)
 - 3) Network, Computer & Other IT Equipment (NITC)
 - 4) Transport Equipment
 - 5) Machinery
 - 6) Intangible assets
- Mapping to the detailed AFS capital stock types is reported in Table A3. Not shown here are types: Capital Works in Progress and Other property, plant and equipment. Capital Works in Progress is ignored since it is assumed that it cannot earn an income if it is not installed yet. Other property, plant and equipment has been aggregated with 5) Machinery. The shares of the above six types of capital stock in each industry from the AFS have then been used for disaggregation of GOS in the SAM.
- iv (Net activity taxes,Activities)...Rb106
 KBP6600J: Other taxes on production in all industries - KBP6601J: Other subsidies on production in all industries. Net activity taxes are disaggregated across activities according to shares in the 2019 UT.
- v (Activities,Commodities)...Rb11,037
 KBP6870J: Production account: Output of total domestic economy. It is equal to the activities' total costs, the sum of i - iv above, i.e. costs of intermediate inputs, labour costs, rewards for the production factor capital, and activity tax. Total cost of production is what local producers supply to the market which for each activity is disaggregated across the commodities that they make according to the shares in the 2019 ST.
- vi (Net dom prod taxes,Commodities)...Rb520
 KBP6603J: Taxes on products - KBP6604J: Subsidies on products - KBP4590J: National government tax revenue: Taxes on international trade and transactions: Import duties. Domestic taxes less subsidies on products together with import duties is equal to taxes on products as reported by the national accounts. Disaggregation of this control total (taxes less subsidies on products less import duties) across products is based on 2019 ST shares after import duties, discussed below in (vii), are subtracted.
- vii (Import duties,Commodities)...Rb049
 Custom duties collected are made available by Statistics South Africa as unpublished data. Together with net domestic product tax (see (vi) above) they make up net product tax that is reported in the national accounts.
- viii (Rest of the world,Commodities)...Rb1,502
 KBP6014J: Imports of goods & services. Disaggregated to commodity level based on 2019 ST shares.
- ix (Households,Labour)...Rb2,730
 KBP6240J: Compensation of residents. Disaggregated across types of labour (by occupation) and household income classes according to 2015 LCS shares for four types of labour identified by highest level of education attained. These shares have

- been expanded to occupation by using a mapping of occupations by education from the 2019 LMD.
- x (Rest of the world,Labour)...Rb015
KBP6207J: Compensation of South African employees abroad. Disaggregated across types of labour as residual by subtracting ix above from the sum of ii above and xli below.
 - xi (Enterprises,Capital)...Rb1,402
KBP6706J: Generation of income account: Gross operating surplus of Financial corporations + KBP6746J: Generation of income account: Gross operating surplus of non-financial corporations + KBP6904J: External account of primary incomes and current transfers: Property income paid: ROW - KBP6901J: External account of primary incomes and current transfers: Property income received: ROW. Disaggregated by type of capital by applying the macro SAM share of total income from capital to each type of capital stock.
 - xii (Households,Capital)...Rb542
KBP6826J: Generation of income account: Gross operating surplus / mixed income of households and NPISHs. Distribution is based on 2015 LCS shares (household income from self-employment and business and from subsistence farming). Disaggregated by type of capital by applying the macro SAM share of total income from capital to each type of capital stock.
 - xiii (Government,Capital)...Rb124
KBP6786J: Generation of income account: Gross operating surplus of General government. Income earned by government from holdings in productive activities. Disaggregated by type of capital by applying the macro SAM share of total income from capital to each type of capital stock.
 - xiv (Rest of the world,Capital)...Rb248
KBP6901J: External account of primary incomes and current transfers: Property income received: ROW. Disaggregated by type of capital as a residual by summing iii above and xlii below and subtracting the sum of xi – xiii above.
 - xv (Enterprises,Enterprises)...Rb858
KBP6707J: Allocation of primary income account: Property income received: Financial corporations + KBP6710J: Allocation of primary income account: Property income paid: Financial corporations - KBP6747J: Allocation of primary income account: Property income received: Non-financial corporations + KBP6752J: Allocation of primary income account: Property income paid: Non-financial corporations + KBP6716J: Secondary distribution of income account: Other current transfers received: Financial corporations - KBP6720J: Secondary distribution of income account: Non-life insurance claims paid: Financial corporations.
 - xvi (Households,Enterprises)...Rb1,190
KBP6721J: Secondary distribution of income account: Miscellaneous transfers paid: Financial corporations + KBP6762J: Secondary distribution of income account: Miscellaneous current transfers paid: Non-financial corporations + KBP6827J: Allocation of primary income account: Property income received: Households and NPISHs + KBP6838J: Secondary distribution of income account: Non-life insurance claims: Households and NPISHs + KBP6845J: Use of disposable income account: Adjustment for the change in net equity in pension fund reserves: Households & NPISHs. Disaggregated across household income classes according 2015 LCS shares. The following LCS items are included: 'Income from letting of fixed property', 'Interest received', 'Dividends of Listed

- Companies’, ‘Dividends of Unlisted Companies’, ‘Pension from previous employment’, ‘Annuities from own investment’, ‘Payments received from boarders and other non-members’, ‘Claims’, ‘Non-refundable bursaries’, ‘Benefits, donations and gifts’, and ‘Cash’.
- xvii (Government,Enterprises)...Rb429
 KBP6718J: Secondary distribution of income account: Social benefits paid by Financial corporations + KBP6759J: Secondary distribution of income account: Social contributions paid by non-financial corporations + KBP6787J: Allocation of primary income account: Property income received: General government.
- xviii (Income taxes,Enterprises)...Rb238
 KBP6717J: Secondary distribution of income account: Current taxes on income and wealth paid by Financial corporations + KBP6758J: Secondary distribution of income account: Current taxes on income and wealth paid by non-financial corporations.
- xix (Accumulation,Enterprises)...Rb692
 KBP6724J: Use of disposable income account: Residual: Financial corporations + KBP6725J: Use of disposable income account: Gross saving of Financial corporations + KBP6764J: Use of disposable income account: Residual: Non-financial corporations + KBP6765J: Use of disposable income account: Gross saving of non-financial corporations.
- xx (Rest of the world,Enterprises)...Rb015
 KBP6918J: Secondary distribution of income account: Net non-life insurance premiums received : ROW + KBP6919J: Secondary distribution of income account: Non-life insurance claims received: ROW
- xxi (Commodities,Households)...Rb3,589
 KBP6007J: Final consumption expenditure by households: Total (PCE). Disaggregated across products according to the expenditure shares in the 2019 UT and across household expenditure classes using shares from the 2015 LCS. Since the commodities are very similar to those used in an earlier SAM for South Africa (van Seventer et al. 2019) which also used the 2015 LCS, the same shares were used with a couple of exceptions. This is discussed in the next section.
- xxii (Enterprises,Households)...Rb460
 KBP6832J: Allocation of primary income account: Property income paid: Households and NPISHs + KBP6842J: Secondary distribution of income account: Net non-life insurance premiums: Households and NPISHs. Disaggregated across household income classes using shares from the 2015 LCS for the following outlay items: ‘interest on mortgage bonds’, ‘contribution to pension, provident and annuity funds’ and ‘employer contribution to pension, provident and annuity funds’.
- xxiii (Government,Households)...Rb454
 KBP6797J: Secondary distribution of income account: Miscellaneous transfers received: General government + KBP6840J: Secondary distribution of income account: Social contributions paid: Households. Disaggregated across household income classes using shares from the 2015 LCS for income tax payments (see next item for details).
- xxiv (Income taxes,Households)...Rb536

- KBP6245J: Current taxes on income and wealth of households. Disaggregated across household income classes using shares from the 2015 LCS based on the distribution of outlays for income tax purposes for the following items: 'SITE - income tax', 'PAYE - income tax', 'According to assessment - income tax', 'Amnesty tax', 'Penalty late submission of tax'.
- xxv (Accumulation,Households)...Rb097
- KBP6846J: Use of disposable income account: Residual: Households and NPISHs + KBP6848J: Use of disposable income account: Gross saving of households and NPISHs. Disaggregated across household income classes using shares from the 2015 LCS for the following items: 'Listed company - shares 12 months', 'Unlisted company - shares 12 months', 'Unit trusts 12 months', 'Investment plans 12 months', 'Other investments 12 months', 'Deposits into savings 12 months', and offset by 'Withdrawals from savings'.
- xxvi (Rest of the world,Households)...Rb031
- KBP6909J: External account of primary incomes and current transfers: Miscellaneous current transfers received: ROW. Disaggregated across household income classes using total income shares from the 2015 LCS for the same items as transfers by households to enterprises (see item xxi above).
- xxvii (Commodities,Government)...Rb1,104
- KBP6008J: Final consumption expenditure by general government. Disaggregated across products according to the expenditure shares in the 2019 UT.
- xxviii (Enterprises,Government)...Rb688
- KBP6715J: Secondary distribution of income account: Social contributions received: Financial corporations + KBP6791J: Allocation of primary income account: Property income paid: General government.
- xxix (Households,Government)...Rb660
- KBP6801J: Secondary distribution of income account: Miscellaneous current transfers paid: General government + KBP6836J: Secondary distribution of income account: Social benefits received: Households and NPISHs. Disaggregated across household income classes using shares from the 2015 LCS for the following items: 'Old age pensions', 'Disability grants', 'Family and other allowances', and 'Workmen's compensation Funds'.
- xxx (Government,Government)...Rb265
- KBP6794J: Secondary distribution of income account: Social contributions received: General government + KBP6798J: Secondary distribution of income account: Social benefits paid: General government.
- xxxi (Accumulation,Government)...Rb-044
- KBP6803J: Use of disposable income account: Gross saving of General government.
- xxxii (Rest of the world,Government)...Rb050
- KBP6908J: External account of primary incomes and current transfers: Current international co-operation received: ROW.
- xxxiii (Government,Net activity taxes)...Rb106
- KBP6600J: Other taxes on production in all industries - KBP6601J: Other subsidies on production in all industries. Net activity taxes are disaggregated across activities according to shares in the 2019 UT.
- xxxiv (Government,Net dom prod taxes)...Rb512

- KBP6603J: Taxes on products - KBP6604J: Subsidies on products - KBP4590J: National government tax revenue: Taxes on international trade and transactions: Import duties. Domestic taxes less subsidies on products together with import duties is equal to taxes on products as reported by the national accounts. Disaggregation of this control total (taxes less subsidies on products less import duties) across products is based on 2019 ST shares after import duties, discussed below in (vii), are subtracted.
- xxxv (Government,Import duties)...Rb057
- KBP4590J: National government tax revenue: Taxes on international trade and transactions: Import duties. Total Import duties are part of national government tax revenue as reported in the public finance statistics of the SARB Quarterly Bulletin and together with net domestic product tax (see (vi) above) make up net product tax that is reported in the national accounts.
- xxxvi (Government,Income taxes)...Rb774
- KBP6717J: Secondary distribution of income account: Current taxes on income and wealth paid by Financial corporations + KBP6758J: Secondary distribution of income account: Current taxes on income and wealth paid by non-financial corporations.
- xxxvii (Commodities,Ch in inventories)...Rb024
- KBP6010J: Change in inventories + KBP6011J: Residual item. Disaggregated across products according to the expenditure shares in the 2019 UT.
- xxxviii (Commodities,Accumulation)...Rb865
- KBP6009J: Gross fixed capital formation (Investment). Disaggregated across products according to the expenditure shares in the 2019 UT.
- xxxix (Ch in inventories,Accumulation)...Rb024
- KBP6010J: Change in inventories + KBP6011J: Residual item. Disaggregated across products according to the expenditure shares in the 2019 UT.
- xl (Commodities,Rest of the world)...Rb1,532
- KBP6013J: Exports of goods & services. Disaggregation to commodity level is based on the 2019 UT.
- xli (Labour,Rest of the world)...Rb013
- KBP6208J: Compensation of South African residents in the rest of the world. Disaggregated across types of labour (occupations) according to shares in total labour income using weighted average shares across industry of ii above.
- xlii (Capital,Rest of the world)...Rb110
- KBP6904J: External account of primary incomes and current transfers: Property income paid: RoW. Disaggregation across types of capital is based on the proportions to total domestic earnings (see iii above).
- xliii (Enterprises,Rest of the world)...Rb015
- KBP6934J: Secondary distribution of income account: Net non-life insurance premiums paid : ROW + KBP6935J: Secondary distribution of income account: Non-life insurance claims paid: ROW
- xliv (Households,Rest of the world)...Rb045
- KBP6912J: External account of primary incomes and current transfers: Miscellaneous current transfers paid: RoW. The distribution across household income classes is the same as for what households receive from enterprises (see xvi above).

- xliv (Government,Rest of the world)...Rb001
 KBP6911J: External account of primary incomes and current transfers: Current international co-operation paid: RoW.
- xlvi (Accumulation,Rest of the world)...Rb144
 KBP6913J: External account of primary incomes and current transfers: Current external balance: RoW.

3 Balancing and disaggregating the SUTSAM

As mentioned before, Stats SA's ST and UT are consistent with the SARB NA. This allows a SUTSAM to be constructed that aggregates up to the macro SAM in Table 2. The SUTSAM reports a single wage earnings account and a single household account. For most applications it is useful to disaggregate both. The dimensions along which they are disaggregated depends on the application and available data. While we are constructing a SAM which can be used in a wide range of applications, our primary application will be to study the impact of new technology adoption on the economy.

In our previous work (Davies and van Seventer 2020a, b), we worked with the single household of the SUTSAM and focused on the functional distribution of income. In the work going forward we want to be able to explore impacts on the size distribution. For South African SAMs intended with general use in mind, it has become conventional to split the households by income or, more commonly, consumption distributions. We think that this disaggregation will be adequate for examining new technology adoption. Most of the immediate impact of new technology adoption is within production activities, directly influencing the distribution of income between gross operating surplus and wages, and between wages of different types of labour. The SAM shows how income from these sources are distributed among households. This will depend on the pattern of occupational skills and capital ownership within whatever household structure is adopted. We think that can be adequately captured using a household disaggregation based on consumption.

Past South African SAMs (for example, van Seventer et al. 2019) have disaggregated the wage earnings account by education level or by occupation. The current SAM is intended to be used to examine impacts of technical change on occupations and tasks related to them. We therefore focus on an occupational disaggregation. This entails splitting wages within activities (see ii above) and exploring the distribution of occupations across households (see ix above).

It is less usual to split the GOS (or capital) account in SAMs. However, since the technical change in which we are interested is largely embodied in capital, we do make such a split in the current SAM. This is explained in iii above and discussed in more detail in Section 4 below.

The SUTSAM was disaggregated across labour income, capital income, and household groups using the 2018 and 2019 LMD data (Stats SA 2020a and 2021a), the AFS data (Stats SA 2020b), and the 2015 LCS (Stats SA 2017) data, respectively. Since the SUTSAM is balanced, this can be set up such that it results in imbalances for the household accounts only. This is achieved by first disaggregating the wage earnings by occupation for each activity using the 2018 and 2019 LMD data (see ii in the previous section) as well as the rental incomes from capital using the AFS data (see iii in the previous section). Summing across activities and including foreign earnings (see xli and xlii in the previous section) results in total labour income for each occupation group and total income for each type of capital stock.

Next, household outlays are disaggregated across household expenditure groups for each commodity and for each of the other outlay items (taxes, transfers, and savings) using the 2015 LCS data. Since the commodity classifications of the SUTs before and after the benchmarking are reasonably close, the data extracted from the LCS for use in the 2015 SAM (van Seventer et al. 2019) is used here for the 2019 SAM. For two commodities (*p024: Pasta and food n.e.c.* and *p041: Basic chemicals, fertiliser and pesticides*), the 2015 SAM offers more detail, and their 2015 weighted averages were used. For a number of other commodities, the 2019 SAM requires more detail than the 2015 SUT but in all these cases, the LCS does not offer more detail than what is used for the 2015 SAM. In these cases, the proxies used for the 2015 SAM are applied here to cover the extra detail of the 2019 SAM. For *p057: Wastes, scraps*, there is no LCS data and the distribution of household expenditure across household consumption groups for *p056: Oth manufacturing* was used as a proxy. Similarly, for *p105: Membership orgs*, *p106: Recreational & cultural*, *p107: Oth serv n.e.c.*, and *p108: Domestic serv*, the LCS extraction for *cosrv: Other services n.e.c.* of the 2015 SAM was used as a proxy.

Next, total household outlays for each household group were derived by summing across all commodities and other outlays. Total household outlays must equal total household income for each household income group, and we use the former as the benchmark for the latter.

Initial shares of household income by source—wages & salaries by occupation (see x above), income from all types of capital (see xii above),³ dividends and various transfers—were obtained from 2015 LCS data (see x and xii above).⁴ These shares were then applied to the total outlays of each household income group. Finally, the household income accounts were balanced using a biproportional scaling method, also known as RAS (Miller and Blair 2009: 313–36). In doing so, all other non-household-related entries of the SUTSAM as well as total household outlays do not change. The result is a fully disaggregated micro SAM with detailed wage and rental earnings and detailed household categories which remains consistent with the national accounts aggregates.

4 Supplementary data

SAMs are typically presented in monetary values. However, some modellers and other users may wish to refer to the physical quantities that are associated with certain monetary flows in the SAM. In particular, physical quantities of employment and capital stock data related to wage earnings and gross operating surplus flows recorded in the SAM can be useful. However, while capital stock estimates can be drawn from the 2019 annual financial statistics (AFS) (Stats SA 2020b) as ‘Carrying Value of Property, Plant and Equipment, and Intangible Assets at the end of the financial year’, a number of industries are not covered. In particular, capital stock data for ‘Agriculture’, some ‘Finance’, ‘Public Administration’, and ‘Business Services’ are not fully available from the AFS data. Moreover, the sum of capital stock as reported by the AFS data is nowhere near the capital stock data for those matching 1-digit industries as reported for 2015 by the SARB.⁵ It is also unclear how the 2019 SARB data can be reflatd from constant to current prices. Further

³ The LCS only offers a single distribution of income from capital to households.

⁴ We explored using the general household survey (GHS) rather than the LCS to derive sources of income by household group, since the GHS for 2018 is available. However, the GHS collects household expenditure data as a grouped variable, and the task of deriving incomes by source matching the household disaggregation in the SAM is not obvious.

⁵ SARB capital stock data is reported in constant 2015 prices. The 2015 observations are therefore in constant and current prices and can be compared with the AFS data.

attempts to create physical capital stock data have therefore been abandoned. In this case modelling users typically use the GOS industry distribution as a proxy for physical capital stock by making the assumption that the price (rental rate) of capital is equal to unity.

Employment data were derived from the 2018 and 2019 LMD data sets (Stats SA 2020a and 2021a) using the same method of allocating labour as for wage earnings (see item ii in the previous section).

The SAM documented in this note has been constructed with future analysis based on the occupational structure of labour in mind. There are other applications for which skills disaggregation based on educational attainments is useful and many SAMs for previous years have been constructed using such a disaggregation. To provide some continuity with those SAMs, we include a SAM with the compensation of employees allocated across four educational levels in the accompanying workbook. The four categories are:

- ‘primary’ workers with some or no primary schooling, i.e. grades 1–7;
- ‘middle’ workers who have completed grade 10;
- ‘secondary’ workers who have completed grade 12;
- ‘tertiary’ workers who have at least some post-secondary or higher education.

The allocation was based on data in the LMD (Stats SA, 2020a; Stats SA, 2021a). The precise method for allocating is described in detail in van Seventer and Davies (2023, *forthcoming*).

5 Observations on new variables

Compared to standard SAMs (van Seventer et al. 2019), the SAM discussed in this report has been expanded in a number of ways:

1. Wage earnings and employment by industry have been disaggregated at the 1-digit occupation level of disaggregation instead of level of education.
2. Gross operating surplus is disaggregated by broad type of capital stock.
3. The distribution of wage and capital income to households is expanded to occupations (instead of level of education) and broad types of capital stock.

It may be useful to consider these new features in more detail.**5.1 Earnings by industry and occupation**

Table 3 reports on earnings shares by industry and occupation. In the first panel, industry earnings are distributed across occupations. For example, managers account for 21 per cent of wage earnings in agriculture, skilled agricultural workers 7 per cent, and elementary workers 59 per cent.

In the second panel the earnings by occupations across industries are shown. In the first column, it can be seen that agriculture accounts for 1.2 per cent the wage earnings by managers, government 12 per cent, and business services 10 per cent, wholesale trade 7.5 per cent, and financial intermediation 6 per cent. Interestingly, government accounts for more than a third of wage earnings by sales workers.

5.2 Wage earnings by households

Table 4 shows how wage earnings are distributed to households. As expected, most earnings by higher-skilled occupation flow to higher-income households while lower-skilled earnings to a larger degree do so to lower-income households.

5.3 Capital earnings by households

As noted earlier, the UT provides a single GOS row, showing capital earnings in each sector. The AFS shows 21 capital types which we aggregate into six, according to the mapping in Table A3. The shares of each type for each sector were used to split the sector's GOS (see (iii) in Section 2). This implicitly assumes the 'return' on each type of capital is the same across the sector. Table 5 shows the results. See Appendix B for a more detailed discussion of methods for allocating GOS to different types of capital. As explained in Appendix B, using the capital stocks allocates a lower share of GOS to short-lived assets, such as computer equipment and motor vehicles, than would an allocation based on flows of capital services. However, the data do not allow the latter approach to be taken in this study.

The distribution of the flow of capital income to disaggregated households is shown in the first panel of Table 6. Although the LCS and other household surveys show ownership of assets such as ICT and vehicles, the income flows we need to identify here are those from the assets used in activities, not in households. It does not make sense to disaggregate capital income flows from activities to households by type of (non-financial) asset. This would amount to identifying what part of a company's dividend derives from plant and equipment, what part from ICT, etc. The flows are thus uniform across types of capital stock, and the overall pattern matches the pattern derived for the single GOS from the LCS.

60	aoact	Other activities	12.6%	0.1%	2.1%	4.5%	60.6%	0.0%	1.4%	2.4%	16.3%	0.0%	100.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%	0.2%	0.0%	0.1%	
61	anobs	Non-observed, informal, non-profit, households,	1.8%	0.4%	0.0%	1.8%	2.2%	0.0%	0.1%	0.4%	23.1%	70.4%	100.0%	0.5%	0.1%	0.0%	1.1%	1.6%	0.0%	0.1%	0.4%	18.3%	100.0%	6.4%
	total	Total	24.8%	18.7%	11.9%	10.3%	8.9%	0.2%	7.2%	5.4%	8.1%	4.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

Source: own calculations using a 2019 SAM for South Africa based on 2019 ST and UT (Stats SA 2022) and LMD data (Stats SA 2021a).

Table 4: Wage earnings distribution shares, household type by occupation, 2019

			manager	profession-	technical	clerical	sales	skilled	craft	operators	elemen-	domestic	total	manager	profession-	technical	clerical	sales	skilled	craft	operators	elemen-	domestic	total																																																																																																												
			mang	prof	tech	cler	sale	skag	craf	oper	elmn	doms	mang	prof	tech	cler	sale	skag	craf	oper	elmn	doms	mang	prof	tech	cler	sale	skag	craf	oper	elmn	doms	mang	prof	tech	cler	sale	skag	craf	oper	elmn	doms	mang	prof	tech	cler	sale	skag	craf	oper	elmn	doms	mang	prof	tech	cler	sale	skag	craf	oper	elmn	doms	mang	prof	tech	cler	sale	skag	craf	oper	elmn	doms	mang	prof	tech	cler	sale	skag	craf	oper	elmn	doms	mang	prof	tech	cler	sale	skag	craf	oper	elmn	doms	mang	prof	tech	cler	sale	skag	craf	oper	elmn	doms	mang	prof	tech	cler	sale	skag	craf	oper	elmn	doms	mang	prof	tech	cler	sale	skag	craf	oper	elmn	doms	mang	prof	tech	cler	sale	skag	craf	oper	elmn	doms
			1	hhd1	Households – Decile 1	0.1%	0.0%	0.0%	1.1%	0.9%	0.0%	12.7%	9.5%	48.5%	27.1%	100.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	1.9%	1.9%	6.4%	6.4%	1.1%																																																																																																									
2	hhd2	Households – Decile 2	0.5%	0.4%	0.2%	3.1%	2.7%	0.1%	13.0%	9.7%	45.2%	25.3%	100.0%	0.0%	0.0%	0.0%	0.5%	0.5%	0.5%	2.9%	2.9%	9.0%	9.0%	1.6%																																																																																																												
3	hhd3	Households – Decile 3	1.1%	0.8%	0.5%	6.2%	5.4%	0.1%	17.8%	13.2%	35.1%	19.6%	100.0%	0.1%	0.1%	0.1%	1.1%	1.1%	1.1%	4.6%	4.6%	8.1%	8.1%	1.9%																																																																																																												
4	hhd4	Households – Decile 4	1.1%	0.8%	0.5%	8.8%	7.6%	0.2%	18.1%	13.5%	31.7%	17.7%	100.0%	0.1%	0.1%	0.1%	2.0%	2.0%	2.0%	5.9%	5.9%	9.2%	9.2%	2.3%																																																																																																												
5	hhd5	Households – Decile 5	2.5%	1.9%	1.2%	10.3%	8.9%	0.2%	20.0%	14.9%	25.7%	14.4%	100.0%	0.3%	0.3%	0.3%	3.0%	3.0%	3.0%	8.4%	8.4%	9.6%	9.6%	3.0%																																																																																																												
6	hhd6	Households – Decile 6	4.7%	3.6%	2.3%	12.5%	10.8%	0.2%	18.7%	13.9%	21.3%	11.9%	100.0%	0.9%	0.9%	0.9%	5.8%	5.8%	5.8%	12.3%	12.3%	12.5%	12.5%	4.8%																																																																																																												
7	hhd7	Households – Decile 7	8.2%	6.2%	3.9%	18.5%	15.9%	0.3%	14.1%	10.5%	14.4%	8.1%	100.0%	2.1%	2.1%	2.1%	11.2%	11.2%	11.2%	12.1%	12.1%	11.1%	11.1%	6.2%																																																																																																												
8	hhd8	Households – Decile 8	15.1%	11.4%	7.3%	15.6%	13.4%	0.3%	13.7%	10.2%	8.4%	4.7%	100.0%	6.5%	6.5%	6.5%	16.1%	16.1%	16.1%	20.2%	20.2%	11.0%	11.0%	10.7%																																																																																																												
9	hhd9	Households – Decile 9	26.1%	19.7%	12.6%	13.1%	11.3%	0.2%	6.6%	4.9%	3.5%	2.0%	100.0%	22.4%	22.4%	22.4%	27.0%	27.0%	27.0%	19.5%	19.5%	9.2%	9.2%	21.3%																																																																																																												
10	hhd10	Households – Percentile 90-92	29.8%	22.5%	14.4%	10.2%	8.8%	0.2%	4.9%	3.6%	3.6%	2.0%	100.0%	6.7%	6.7%	6.7%	5.5%	5.5%	5.5%	3.8%	3.8%	2.5%	2.5%	5.6%																																																																																																												
11	hhd11	Households – Percentile 92-94	30.2%	22.7%	14.5%	11.7%	10.1%	0.2%	4.9%	3.7%	1.3%	0.7%	100.0%	7.1%	7.1%	7.1%	6.7%	6.7%	6.7%	4.0%	4.0%	0.9%	0.9%	5.9%																																																																																																												
12	hhd12	Households – Percentile 94-96	32.3%	24.4%	15.6%	7.9%	6.8%	0.1%	1.5%	1.1%	6.6%	3.7%	100.0%	11.6%	11.6%	11.6%	6.8%	6.8%	6.8%	1.8%	1.8%	7.3%	7.3%	8.9%																																																																																																												
13	hhd13	Households – Percentile 96-98	37.3%	28.1%	17.9%	5.9%	5.1%	0.1%	1.5%	1.1%	1.9%	1.0%	100.0%	15.6%	15.6%	15.6%	6.0%	6.0%	6.0%	2.2%	2.2%	2.4%	2.4%	10.4%																																																																																																												
14	hhd14	Households – Percentile 98-100	40.0%	30.1%	19.2%	5.1%	4.4%	0.1%	0.3%	0.2%	0.5%	0.3%	100.0%	26.6%	26.6%	26.6%	8.1%	8.1%	8.1%	0.6%	0.6%	0.9%	0.9%	16.5%																																																																																																												
	total	Total	24.8%	18.7%	11.9%	10.3%	8.9%	0.2%	7.2%	5.4%	8.1%	4.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%																																																																																																													

Source: own calculations using a 2019 SAM for South Africa based on 2019 ST and UT (Stats SA 2022) and LMD data (Stats SA 2021a), and 2015 LCS data (Stats SA 2017).

Table 5: GOS earnings shares, industry by capital stock type, 2019

		Land	Immov	Network,	Transport	Machinery	Intangible	total	Land	Immov	Network,	Transport	Machinery	Intangible	total
		land	immo	mach	nltc	trnp	inta		land	immo	mach	nltc	trnp	inta	
1	aagri	Agriculture	16.3%	17.9%	59.6%	0.2%	5.8%	0.1%	9.1%	1.3%	3.9%	0.1%	1.1%	0.0%	2.2%
2	afore	Forestry	16.3%	17.9%	59.6%	0.2%	5.8%	0.1%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
3	afish	Fishing	0.9%	13.8%	24.4%	0.6%	40.8%	19.6%	0.1%	0.1%	0.2%	0.0%	1.1%	0.3%	0.3%
4	acool	Mining of coal and lignite	1.9%	11.5%	74.0%	0.1%	0.7%	11.8%	0.9%	0.8%	4.4%	0.0%	0.1%	1.3%	2.0%
5	agold	Mining of gold and uranium ore	2.4%	35.1%	52.6%	0.2%	0.7%	9.0%	0.5%	0.9%	1.2%	0.0%	0.0%	0.4%	0.8%
6	amore	Mining of metal ores	1.1%	29.2%	50.6%	0.2%	3.7%	15.2%	1.3%	4.3%	6.7%	0.2%	1.4%	3.8%	4.4%
7	aoain	Other mining and quarrying	1.9%	9.3%	71.7%	0.4%	4.6%	12.1%	0.2%	0.2%	1.1%	0.0%	0.2%	0.3%	0.5%
8	afood	Food	4.4%	18.1%	46.7%	0.9%	4.4%	25.5%	2.4%	1.3%	3.0%	0.4%	0.8%	3.2%	2.2%
9	abevt	Beverages and tobacco	0.3%	18.2%	55.0%	0.1%	3.1%	23.2%	0.1%	1.0%	2.8%	0.0%	0.4%	2.2%	1.7%
10	aweav	Spinning, weaving and finishing of textiles	4.0%	21.0%	64.4%	1.2%	3.9%	5.5%	0.3%	0.2%	0.5%	0.1%	0.1%	0.1%	0.3%
11	aknit	Knitted, crouched fabrics, wearing apparel, fur articles	0.8%	12.4%	55.5%	2.9%	6.0%	22.3%	0.1%	0.1%	0.5%	0.2%	0.1%	0.4%	0.3%
12	aleat	Tanning and dressing of leather	8.6%	21.0%	64.9%	0.6%	4.4%	0.5%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
13	afoot	Footwear	11.9%	25.7%	55.0%	0.4%	1.9%	5.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
14	awood	Sawmilling, planing of wood, cork, straw	8.5%	25.1%	44.9%	0.2%	8.8%	12.4%	0.5%	0.2%	0.3%	0.0%	0.2%	0.1%	0.2%
15	apapr	Paper	1.4%	9.9%	84.6%	0.2%	1.2%	2.7%	0.4%	0.3%	2.6%	0.1%	0.1%	0.2%	1.0%
16	aprint	Publishing, printing, recorded media	0.5%	20.5%	45.5%	1.4%	2.3%	29.8%	0.0%	0.3%	0.5%	0.1%	0.1%	0.6%	0.4%
17	apetr	Coke oven, petroleum refineries	2.0%	9.7%	73.5%	0.4%	7.9%	6.5%	1.4%	0.9%	5.8%	0.3%	1.8%	1.0%	2.6%
18	abchm	Nuclear fuel, basic chemicals	0.5%	6.9%	88.3%	0.1%	0.7%	3.5%	0.0%	0.1%	1.0%	0.0%	0.0%	0.1%	0.4%
19	aochm	Other chemical products, man-made fibres	4.7%	15.7%	43.5%	0.8%	2.2%	33.1%	1.1%	0.5%	1.2%	0.1%	0.2%	1.7%	0.9%
20	arubb	Rubber	1.1%	21.6%	73.3%	0.5%	2.3%	1.3%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%
21	aplas	Plastic	10.0%	5.1%	77.2%	0.3%	4.3%	3.1%	0.4%	0.0%	0.4%	0.0%	0.1%	0.0%	0.2%
22	aglass	Glass	0.4%	8.8%	38.1%	0.3%	0.8%	51.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
23	anmmi	Non-metallic minerals	3.7%	11.6%	66.8%	0.4%	4.3%	13.2%	0.3%	0.1%	0.6%	0.0%	0.1%	0.2%	0.3%
24	amets	Metal products (ferr, non-ferr & casting of metals)	0.9%	11.1%	66.6%	0.2%	1.1%	20.1%	0.2%	0.4%	2.0%	0.0%	0.1%	1.1%	1.0%
25	afabm	Fabricated metal products	2.6%	9.4%	68.2%	0.7%	10.3%	8.8%	0.5%	0.2%	1.5%	0.1%	0.6%	0.4%	0.7%
26	amach	Machinery and equipment	4.4%	16.9%	45.4%	1.7%	12.4%	19.3%	0.8%	0.4%	1.0%	0.3%	0.8%	0.8%	0.7%
27	aemch	Electrical machinery and apparatus	2.6%	13.8%	27.7%	1.2%	10.5%	44.1%	0.1%	0.1%	0.1%	0.0%	0.1%	0.3%	0.1%
28	ardtv	Radio, tv, communication equipment and apparatus	0.4%	15.5%	48.6%	1.5%	2.6%	31.4%	0.0%	0.0%	-0.1%	0.0%	0.0%	-0.1%	-0.1%
29	amopt	Medical, precision, optical, watches and clocks	0.7%	9.2%	52.6%	1.7%	6.0%	29.9%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.1%
30	amvtp	Motor vehicles, trailers, parts	4.4%	16.9%	73.0%	1.1%	1.5%	3.1%	1.1%	0.5%	2.1%	0.2%	0.1%	0.2%	0.9%
31	aoatr	Other transport equipment	12.8%	35.1%	37.5%	0.6%	8.7%	5.3%	0.4%	0.1%	0.1%	0.0%	0.1%	0.0%	0.1%
32	afurn	Furniture	0.0%	3.9%	27.2%	2.0%	15.8%	51.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
33	aomnf	Manufacturing n.e.c., recycling	6.0%	5.8%	56.3%	2.2%	8.8%	20.9%	0.4%	0.1%	0.5%	0.1%	0.2%	0.3%	0.3%
34	aelcg	Electricity, gas, steam and hot water supply	0.3%	1.7%	92.2%	2.8%	1.0%	2.0%	0.2%	0.2%	8.3%	1.9%	0.3%	0.3%	3.0%
35	awatd	Collection, purification and distribution of water	0.2%	30.0%	66.9%	0.2%	1.1%	1.6%	0.0%	1.1%	2.2%	0.0%	0.1%	0.1%	1.1%
36	acnst	Construction	6.1%	21.3%	50.4%	0.5%	19.0%	2.6%	2.6%	1.2%	2.5%	0.2%	2.7%	0.2%	1.6%
37	awtrd	Wholesale trade, commission trade	6.1%	35.2%	30.3%	1.3%	12.0%	15.1%	10.6%	8.0%	6.2%	2.0%	6.9%	5.8%	6.7%
38	artrd	Retail trade	4.7%	19.2%	42.6%	2.6%	5.1%	25.7%	3.6%	1.9%	3.8%	1.7%	1.3%	4.4%	3.0%
39	amtvs	Sale, maintenance, repair of motor vehicles	7.3%	27.7%	24.1%	1.1%	13.4%	26.3%	4.1%	2.1%	1.6%	0.6%	2.6%	3.3%	2.2%
40	aacst	Hotels and restaurants	21.5%	46.4%	12.7%	3.3%	3.3%	12.8%	6.0%	1.7%	0.4%	0.8%	0.3%	0.8%	1.1%
41	alltrp	Land transport, transport via pipe lines	0.4%	25.9%	34.4%	0.9%	37.8%	0.6%	0.3%	2.5%	2.9%	0.6%	9.2%	0.1%	2.8%
42	awtrp	Water transport	9.7%	11.4%	67.4%	0.3%	6.1%	5.1%	0.3%	0.0%	0.2%	0.0%	0.1%	0.0%	0.1%
43	aatrp	Air transport	5.8%	14.9%	5.0%	0.9%	71.8%	1.7%	0.4%	1.0%	0.0%	0.1%	1.7%	0.0%	0.3%
44	atrp	Auxiliary transport	5.9%	43.2%	19.7%	1.7%	11.1%	18.4%	1.9%	1.8%	0.7%	0.5%	1.2%	1.3%	1.2%
45	apost	Post and telecommunication	0.7%	7.5%	14.9%	61.7%	0.7%	14.5%	0.6%	0.9%	1.6%	49.9%	0.2%	3.0%	3.6%
46	afins	Financial intermediation	1.1%	15.4%	5.8%	2.8%	6.9%	68.0%	1.2%	2.2%	0.7%	2.7%	2.6%	16.6%	4.3%
47	aofin	Insurance and pension funding	1.1%	15.4%	5.8%	2.8%	6.9%	68.0%	0.2%	0.4%	0.1%	0.5%	0.5%	2.9%	0.7%
48	ainsp	Activities to financial intermediation	1.1%	15.4%	5.8%	2.8%	6.9%	68.0%	0.5%	1.0%	0.3%	1.2%	1.1%	7.4%	1.9%
49	areal	Real estate activities	5.8%	64.9%	15.4%	0.5%	9.4%	4.0%	20.9%	30.7%	6.5%	1.4%	11.4%	3.2%	14.0%
50	arent	Renting of machinery and equipment	1.4%	10.2%	20.8%	1.3%	64.6%	1.7%	0.3%	0.3%	0.5%	0.2%	4.1%	0.1%	0.7%
51	acomp	Computer and related activities	0.3%	13.8%	13.6%	21.6%	2.9%	47.9%	0.1%	0.7%	0.6%	7.2%	0.4%	4.1%	1.5%
52	arsea	Research and experimental development	18.3%	46.2%	20.2%	2.1%	2.7%	10.5%	0.9%	0.3%	0.1%	0.1%	0.0%	0.1%	0.2%
53	aoobs	Other business activities	2.6%	20.0%	24.0%	5.0%	14.5%	33.8%	3.3%	3.3%	3.5%	5.5%	6.2%	9.5%	4.9%
54	apuba	Government	2.6%	20.0%	24.0%	5.0%	14.5%	33.8%	2.6%	2.6%	2.8%	4.3%	4.8%	7.4%	3.8%
55	aeduc	Education	18.3%	46.2%	20.2%	2.1%	2.7%	10.5%	13.3%	4.4%	1.7%	1.4%	0.7%	1.7%	2.8%
56	aheal	Health and social work	1.0%	41.9%	23.3%	1.3%	3.4%	29.1%	0.6%	3.2%	1.6%	0.6%	0.7%	3.8%	2.2%
57	awast	Sewerage and refuse disposal	3.8%	26.3%	30.0%	1.7%	20.6%	17.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
58	amorg	Activities of membership organisations	8.1%	66.4%	16.0%	2.1%	3.2%	4.0%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.1%
59	arecr	Recreational, cultural and sporting activities	6.1%	54.0%	25.2%	2.1%	4.0%	8.6%	1.4%	1.7%	0.7%	0.4%	0.3%	0.4%	0.9%

60	aoact	Other activities	0.5%	35.8%	18.8%	5.6%	33.0%	6.3%	100.0%	0.0%	0.1%	0.0%	0.1%	0.2%	0.0%	0.1%
61	anobs	Non-observed, informal, non-profit, households,	0.5%	35.8%	18.8%	5.6%	33.0%	6.3%	100.0%	1.3%	13.0%	6.1%	13.4%	30.6%	3.9%	10.7%
	total	Total	3.9%	29.6%	33.1%	4.5%	11.6%	17.4%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: own calculations using a 2019 SAM for South Africa based on 2019 ST and UT (Stats SA 2022) and AFS data (Stats SA 2020b).

Table 6: GOS Earnings distribution shares, household type by capital stock type, 2019

			Land	Immovables	Network, Computer & Other IT	Transport Equipment	Machinery	Intangible assets	total	Land	Immovables	Network, Computer & Other IT	Transport Equipment	Machinery	Intangible assets	total
1	hhd1	Households – Decile 1	3.9%	29.6%	33.1%	4.5%	11.6%	17.4%	100.0%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
2	hhd2	Households – Decile 2	3.9%	29.6%	33.1%	4.5%	11.6%	17.4%	100.0%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
3	hhd3	Households – Decile 3	3.9%	29.6%	33.1%	4.5%	11.6%	17.4%	100.0%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%
4	hhd4	Households – Decile 4	3.9%	29.6%	33.1%	4.5%	11.6%	17.4%	100.0%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%
5	hhd5	Households – Decile 5	3.9%	29.6%	33.1%	4.5%	11.6%	17.4%	100.0%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%
6	hhd6	Households – Decile 6	3.9%	29.6%	33.1%	4.5%	11.6%	17.4%	100.0%	3.9%	3.9%	3.9%	3.9%	3.9%	3.9%	3.9%
7	hhd7	Households – Decile 7	3.9%	29.6%	33.1%	4.5%	11.6%	17.4%	100.0%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%
8	hhd8	Households – Decile 8	3.9%	29.6%	33.1%	4.5%	11.6%	17.4%	100.0%	11.7%	11.7%	11.7%	11.7%	11.7%	11.7%	11.7%
9	hhd9	Households – Decile 9	3.9%	29.6%	33.1%	4.5%	11.6%	17.4%	100.0%	20.9%	20.9%	20.9%	20.9%	20.9%	20.9%	20.9%
10	hhd10	Households – Percentile 90-92	3.9%	29.6%	33.1%	4.5%	11.6%	17.4%	100.0%	7.2%	7.2%	7.2%	7.2%	7.2%	7.2%	7.2%
11	hhd11	Households – Percentile 92-94	3.9%	29.6%	33.1%	4.5%	11.6%	17.4%	100.0%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%
12	hhd12	Households – Percentile 94-96	3.9%	29.6%	33.1%	4.5%	11.6%	17.4%	100.0%	9.7%	9.7%	9.7%	9.7%	9.7%	9.7%	9.7%
13	hhd13	Households – Percentile 96-98	3.9%	29.6%	33.1%	4.5%	11.6%	17.4%	100.0%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%
14	hhd14	Households – Percentile 98-100	3.9%	29.6%	33.1%	4.5%	11.6%	17.4%	100.0%	19.6%	19.6%	19.6%	19.6%	19.6%	19.6%	19.6%
	total	Total	3.9%	29.6%	33.1%	4.5%	11.6%	17.4%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: own calculations using a 2019 SAM for South Africa based on 2019 ST and UT (Stats SA 2022) and AFS data (Stats SA 2020b).

60	aoact	Other activities	9.8%	0.2%	2.3%	5.5%	52.9%	0.0%	1.6%	4.5%	23.2%	0.0%	100.0%	1.9%	0.1%	0.5%	0.9%	5.6%	0.0%	0.2%	0.9%	1.8%	0.0%	1.8%
61	anobs	Non-observed, informal, non-profit, households,	0.2%	0.0%	0.0%	0.1%	1.5%	0.0%	0.0%	0.2%	19.4%	78.6%	100.0%	0.2%	0.0%	0.0%	0.1%	0.7%	0.0%	0.0%	0.2%	6.7%	100.0%	7.9%
	total	Total	9.0%	5.6%	8.7%	10.4%	16.6%	0.4%	11.8%	8.4%	22.9%	6.2%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: own calculations using 2019 LMD data (Stats SA 2021a).

6 Concluding remarks

This report describes how a 2019 SAM was compiled for South Africa. The Stats SA ST and UT are consistent with the SARB NA. This allows for a SUTSAM to be constructed that aggregates up to the macro SAM in Table 2. The SUTSAM reports a single wage earnings account and a single household account. The SUTSAM was disaggregated across labour, capital, and household groups using the 2018 and 2019 LMD data (Stats SA 2020a and 2021a), the AFS data (Stats SA 2020b), and the 2015 LCS (Stats SA 2017) survey data. Physical employment estimates are added to the data pack.

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Appendix A

Table A1: Mapping of Stats SA SUT SIC classified industries to SAM industries

2019 SUT		2019SAM	
i001	Agriculture	aagri	Agriculture
i002	Forestry	afore	Forestry
i003	Fishing	afish	Fishing
i004	Coal mining	acoal	Mining of coal and lignite
i005	Oil & gas extraction	aomin	Other mining and quarrying
i006	Gold mining	agold	Mining of gold and uranium ore
i007	Metal ores mining	amore	Mining of metal ores
i008	Other mining	aomin	Other mining and quarrying
i009	Services to mining	aomin	Other mining and quarrying
i010	Meat, frt, veg, oils & fats	afood	Food
i011	Dairy	afood	Food
i012	Grain & animal feeds	afood	Food
i013	Other food products	afood	Food
i014	Beverages	abevt	Beverages and tobacco
i015	Tobacco	abevt	Beverages and tobacco
i016	Textiles	aweav	Spinning, weaving and finishing of textiles
i017	Other textiles	aweav	Spinning, weaving and finishing of textiles
i018	Knitted fabrics	aknit	Knitted, crouched fabrics, wearing apparel, fur articles
i019	Wearing apparel	aknit	Knitted, crouched fabrics, wearing apparel, fur articles
i020	Leather	aleat	Tanning and dressing of leather
i021	Footwear	afoot	Footwear
i022	Sawmilling of wood	awood	Sawmilling, planing of wood, cork, straw
i023	Wood products	awood	Sawmilling, planing of wood, cork, straw
i024	Paper	apapr	Paper
i025	Publishing	aprint	Publishing, printing, recorded media
i026	Printing & reproduction	aprint	Publishing, printing, recorded media
i027	Coke products	apetr	Coke oven, petroleum refineries
i028	Petroleum refineries	apetr	Coke oven, petroleum refineries
i029	Basic chemicals	abchm	Nuclear fuel, basic chemicals
i030	Other chemicals	aochm	Other chemical products, man-made fibres
i031	Rubber	arubb	Rubber
i032	Plastic	aplas	Plastic
i033	Glass	aglass	Glass
i034	Non-metallic minerals	anmmi	Non-metallic minerals
i035	Iron & steel	amets	Metal products (ferr, non-ferr & casting of metals)
i036	Precious metals	amets	Metal products (ferr, non-ferr & casting of metals)
i037	Casting of metals	amets	Metal products (ferr, non-ferr & casting of metals)
i038	Structural metal	afabm	Fabricated metal products
i039	Oth fabricated metal	afabm	Fabricated metal products
i040	General purpose mach	amach	Machinery and equipment
i041	Special purpose mach	amach	Machinery and equipment
i042	Household appliances	aemch	Electrical machinery and apparatus
i043	Computing machinery	aemch	Electrical machinery and apparatus
i044	Electric motors	aemch	Electrical machinery and apparatus
i045	Other electric	aemch	Electrical machinery and apparatus
i046	Oth electr compnts	ardtv	Radio, television, communication equipment and apparatus
i047	Television & radios	ardtv	Radio, television, communication equipment and apparatus
i048	Medical appliances	amopt	Medical, precision, optical instruments, watches and clocks
i049	Motor vehicles	amtpv	Motor vehicles, trailers, parts
i050	Vehicle bodies	amtpv	Motor vehicles, trailers, parts
i051	Vehicle parts	amtpv	Motor vehicles, trailers, parts
i052	Ships, boats	aotrp	Other transport equipment
i053	Railway equipment	aotrp	Other transport equipment
i054	Aircraft	aotrp	Other transport equipment
i055	Other Trnsp Equipm	aotrp	Other transport equipment
i056	Furniture	afurn	Furniture
i057	Other manufacturing	aomnf	Manufacturing n.e.c, recycling
i058	Recycling	aomnf	Manufacturing n.e.c, recycling
i059	Electricity	aelcg	Electricity, gas, steam and hot water supply
i060	Water	awatd	Collection, purification and distribution of water
i061	Construct site preps	acnst	Construction
i062	Construct engineering	acnst	Construction
i063	Construct installation	acnst	Construction
i064	Construct completion	acnst	Construction
i065	Construct equipm rent & ops	acnst	Construction
i066	Fee basis wholesale	awtrd	Wholesale trade, commission trade
i067	Agr raw materials wholesale	awtrd	Wholesale trade, commission trade
i068	Household goods wholesale	awtrd	Wholesale trade, commission trade
i069	Non-agr wholesale	awtrd	Wholesale trade, commission trade

i070	Mach & equipm wholesale	awtrd	Wholesale trade, commission trade
i071	Other wholesale	awtrd	Wholesale trade, commission trade
i072	Non-specialised retail	artrd	Retail trade
i073	Food & bev retail	artrd	Retail trade
i074	Household goods retail	artrd	Retail trade
i075	Other retail	artrd	Retail trade
i076	Repair of goods	artrd	Retail trade
i077	Motor vehicles trade	amtv	Sale, maintenance, repair of motor vehicles
i078	Repair of vehicles	amtv	Sale, maintenance, repair of motor vehicles
i079	Motor vehicle parts trade	amtv	Sale, maintenance, repair of motor vehicles
i080	Automotive fuel retail	amtv	Sale, maintenance, repair of motor vehicles
i081	Accommodation	aacct	Hotels and restaurants
i082	Restaurants	aacct	Hotels and restaurants
i083	Railway transport	altrp	Land transport, transport via pipe lines
i084	Other transport	altrp	Land transport, transport via pipe lines
i085	Water transport	awtrp	Water transport
i086	Air transport	aatrp	Air transport
i087	Supp transport activities	atrp	Auxiliary transport
i088	Postal courier activities	apost	Post and telecommunication
i089	Telecommunications	apost	Post and telecommunication
i090	Monetary intermediation	afin	Financial intermediation
i091	Oth fin intermediation	afin	Financial intermediation
i092	Insurance & pensions	ainsp	Insurance and pension funding
i093	Auxiliary to financial act	aofin	Activities to financial intermediation
i094	Auxiliary to insur & pens	ainsp	Insurance and pension funding
i095	Owner occupied	areal	Real estate activities
i096	Own real estate activities	areal	Real estate activities
i097	Fee basis real est activities	areal	Real estate activities
i098	Renting of transport equipm	arent	Renting of machinery and equipment
i099	Renting of machinery	arent	Renting of machinery and equipment
i100	Renting of household goods	arent	Renting of machinery and equipment
i101	Hardware consultancy	acom	Computer and related activities
i102	Software consultancy	acom	Computer and related activities
i103	Data processing	acom	Computer and related activities
i104	Oth computer related serv	acom	Computer and related activities
i105	Research & development	arsea	Research and experimental development
i106	Legal & accounting	aobus	Other business activities
i107	Architect & engineering	aobus	Other business activities
i108	Advertising	aobus	Other business activities
i109	Oth business activities	aobus	Other business activities
i110	Central government	apuba	Government
i111	Provincial government	apuba	Government
i112	Local government	apuba	Government
i113	Education	aeduc	Education
i114	Human health	aheal	Health and social work
i115	Veterinary	aheal	Health and social work
i116	Social work	aheal	Health and social work
i117	Sewage & refuse	awast	Sewerage and refuse disposal
i118	Buss, empl & prof orgs	amorg	Activities of membership organisations
i119	Oth membership orgs	amorg	Activities of membership organisations
i120	Radio,TV & entertainment	arecr	Recreational, cultural and sporting activities
i121	Libraries & oth cult serv	arecr	Recreational, cultural and sporting activities
i122	Sport & recreational serv	arecr	Recreational, cultural and sporting activities
i123	Other services	aoact	Other activities
i124	Informal, non-prof & hh	anobs	Non-observed, informal, non-profit, households,

Table A2: Mapping of LMD SIC classified industries to UT industries

LMD Code	SIC Code	LMD SIC Description	Rebased SUT Industry Code	Rebased SUT Industry Full Description
1	111	Growing of crops	i001	Agriculture, hunting, forestry and fishing
2	112	Farming of animals	i001	Agriculture, hunting, forestry and fishing
3	113	Growing of crops combined with farming of animals(mixed farming)	i001	Agriculture, hunting, forestry and fishing
4	114	Agricultural and animal husbandry services, except veterinary activities	i001	Agriculture, hunting, forestry and fishing
5	115	Game hunting, trapping and game propagation, including related services	i001	Agriculture, hunting, forestry and fishing
6	116	Production of organic fertilizer	i001	Agriculture, hunting, forestry and fishing
7	121	Forestry and related services	i002	Forestry, logging and related services
8	122	Logging and related services	i002	Forestry, logging and related services
9	131	Ocean and coastal fishing	i003	Fishing, operations of fish hatcheries and fish farms
10	132	Fish hatcheries and fish farms	i003	Fishing, operations of fish hatcheries and fish farms

LMD Code	SIC Code	LMD SIC Description	Rebased SUT Industry Code	Rebased SUT Industry Full Description
11	210	Mining of coal and lignite	i004	Mining of coal and lignite
12	221	Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction, excluding surveying	i005	Extraction of crude, petroleum and natural gas
13	230	Mining of gold and uranium ore	i006	Mining of gold and uranium ore
14	241	Mining of iron ore	i007	Iron ore mining; chrome mining; copper mining; manganese mining; platinum mining; other metal ore mining
15	242	Mining of non-ferrous metal ores	i007	Iron ore mining; chrome mining; copper mining; manganese mining; platinum mining; other metal ore mining
16	251	Stone quarrying, clay and sandpits	i008	Dimension stone; Limestone and lime works; Other stone quarrying; Diamond mining; Chemical and fertiliser minerals, phosphates and other; Extraction and evaporation of salt; Other mining and quarrying n.e.c. (stones, asbestos and other minerals and materials)
17	252	Mining of diamonds (including alluvial diamonds)	i008	Dimension stone; Limestone and lime works; Other stone quarrying; Diamond mining; Chemical and fertiliser minerals, phosphates and other; Extraction and evaporation of salt; Other mining and quarrying n.e.c. (stones, asbestos and other minerals and materials)
18	253	Mining and quarrying N.E.C.	i008	Dimension stone; Limestone and lime works; Other stone quarrying; Diamond mining; Chemical and fertiliser minerals, phosphates and other; Extraction and evaporation of salt; Other mining and quarrying n.e.c. (stones, asbestos and other minerals and materials)
19	290	Service activities incidental to mining of minerals	i009	Service activities incidental to mining of minerals
20	301	Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats	i010	Production, processing and preserving of meat and meat products; Processing and preserving of fish and fish products; Processing and preserving of fruit and vegetables; Manufacture of vegetable and animal oils and fats
21	302	Manufacture of dairy products	i011	Dairy products (milk, butter, cheese, ice cream, milk powder and other milk products)
22	303	Manufacture of grain mill products, starches and starch products and prepared animal feeds	i012	Manufacture of grain mill products, breakfast foods, starches, starch products and prepared animal feeds;
23	304	Manufacture of other food products	i013	Bakery products; sugar including golden syrup and castor sugar; cocoa, chocolate and sugar confectionery and the manufacture of other food products n.e.c. (e.g. coffee, nuts, spices, condiments)
24	305	Manufacture of beverages	i014	Spirits and wines; beer, sorghum and other malt and soft drinks and mineral waters
25	306	Manufacture of tobacco products	i015	Tobacco
26	311	Spinning, weaving and finishing of textiles	i016	Spinning, weaving and finishing of textiles (animal fibres, vegetable fibres, wool)
27	312	Manufacture of other textiles	i017	Made-up textile articles (blankets, tents, automotive textile goods and other); carpets, rugs and mats; and manufacture of other textiles n.e.c.
28	313	Manufacture of knitted and crocheted fabrics and articles	i018	Knitted and crocheted fabrics
29	314	Manufacture of wearing apparel, except fur apparel	i019	Wearing apparel (clothing, tailoring, hats, etc.)
30	316	Tanning and dressing of leather; manufacture of luggage, handbag,	i020	Tanning, dressing of leather, manufacture of luggage, handbags, saddler and harness
31	317	Manufacture of footwear	i021	Footwear
32	321	Sawmilling and planing of wood	i022	Sawmilling, planing, preserving of wood and other mill products
33	322	Manufacture of products of wood, cork, straw and plaiting material	i023	Products of wood, cork, straw and plaiting materials
34	323	Manufacture of paper and paper products	i024	Manufacture of paper and paper products
35	324	Publishing	i025	Publishing of books, newspapers and other recorded media
36	325	Printing and service activities related to printing	i026	Printing and service activities related to printing; and reproduction of recorded media
37	326	Reproduction of recorded media	i026	Printing and service activities related to printing; and reproduction of recorded media
38	331	Manufacture of coke oven products	i027	Coke oven products
39	332	Petroleum refineries / synthesisers	i028	Petrol, fuel oils, lubricating oils and greases primarily from crude oil; other petroleum or synthesised products n.e.c. and nuclear fuel
40	333	Processing of nuclear fuel	i028	Petrol, fuel oils, lubricating oils and greases primarily from crude oil; other petroleum or synthesised products n.e.c. and nuclear fuel
41	334	Manufacture of basic chemicals	i029	Basic chemicals; fertilisers and nitrogen compounds; and plastics in primary form and synthetic rubber
42	335	Manufacture of other chemical products	i030	Pesticides, other agro-chemical products; paints, varnishes, printing ink, mastics; pharmaceuticals, medicinal chemicals and botanical products; soap, detergents, polishing, perfumes and toilet preparations and manufacture of other chemical products (e.g. edible salt, explosives, adhesives)

LMD Code	SIC	LMD SIC Description	Rebased SUT Industry Code	Rebased SUT Industry Full Description
43	336	Manufacture of manmade fibers	i030	Pesticides, other agro-chemical products; paints, varnishes, printing ink, mastics; pharmaceuticals, medicinal chemicals and botanical products; soap, detergents, polishing, perfumes and toilet preparations and manufacture of other chemical products (e.g. edible salt, explosives, adhesives)
44	337	Manufacture of rubber products	i031	Rubber tyres and tubes, rethreading of tyres; other rubber products
45	338	Manufacture of plastic products	i032	Plastic products
46	341	Manufacture of glass and glass products	i033	Glass and glass products
47	342	Manufacture of non-metallic mineral products N.E.C.	i034	Non-structural non-refractory ceramic ware; cement, lime and plaster; articles of concrete, cement and plaster; and other non-metallic mineral products n.e.c.
48	351	Manufacture of basic iron and steel	i035	Basic iron and steel
49	352	Manufacture of basic precious and non-ferrous metals	i036	Basic precious and non-ferrous metals
50	353	Casting of metals	i037	Casting of metals
51	354	Manufacture of structural metal products, tanks, reservoirs and steam generators	i038	Structural metal products, tanks, reservoirs and steam generators
52	355	Manufacture of other fabricated metal products; metalwork service activities	i039	Other fabricated metal products, metalwork service activities
53	356	Manufacture of general purpose machinery	i040	Engines and turbines and other general purpose machinery
54	357	Manufacture of special purpose machinery	i041	Special purpose machinery
55	358	Manufacture of household appliances N.E.C.	i042	Household appliances n.e.c.
56	359	Manufacture of office, accounting and computing machinery	i043	Office, accounting, computing machinery
57	361	Manufacture of electric motors, generators and transformers	i044	Electric motors, generators and transformers
58	362	Manufacture of electricity distribution and control apparatus	i044	Electric motors, generators and transformers
59	363	Manufacture of insulated wire and cable	i044	Electric motors, generators and transformers
60	364	Manufacture of accumulators, primary cells and primary batteries	i044	Electric motors, generators and transformers
61	365	Manufacture of electric lamps and lighting equipment	i044	Electric motors, generators and transformers
62	366	Manufacture of other electrical equipment N.E.C.	i045	Other electrical equipment n.e.c.
63	371	Manufacture of electronic valves and tubes and other electronic components	i047	Television, radio receivers, sound or video recording, reproducing apparatus
64	372	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	i047	Television, radio receivers, sound or video recording, reproducing apparatus
65	373	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods	i047	Television, radio receivers, sound or video recording, reproducing apparatus
66	374	Manufacture of medical appliances and instruments and appliances for measuring, checking, testing, navigating and for other purposes except optical instruments	i048	Medical and surgical equipment and orthopaedic appliances; instruments for measuring, checking, testing, navigation and other purposes; and optical instruments and photographic equipment
67	375	Manufacture of optical instruments and photographic equipment	i048	Medical and surgical equipment and orthopaedic appliances; instruments for measuring, checking, testing, navigation and other purposes; and optical instruments and photographic equipment
68	376	Manufacture of watches and clocks	i048	Medical and surgical equipment and orthopaedic appliances; instruments for measuring, checking, testing, navigation and other purposes; and optical instruments and photographic equipment
69	381	Manufacture of motor vehicles	i049	Motor vehicles
70	382	Manufacture of bodies (coachwork) for motor vehicles;	i050	Bodies for motor vehicles, trailers and semi-trailers
71	383	Manufacture of parts and accessories for motor vehicles and their engines	i051	Parts, accessories for motor vehicles and their engines
72	384	Building and repairing of ships and boats	i052	Building, repairing of ships and boats
73	385	Manufacture of railway and tramway locomotives and rolling stock	i053	Railway, tramway locomotives, rolling stock
74	386	Manufacture of aircraft and spacecraft	i054	Aircraft and spacecraft
75	387	Manufacture of transport equipment N.E.C.	i055	Manufacture of transport equipment n.e.c.
76	391	Manufacture of furniture	i056	Furniture
77	392	Manufacturing N.E.C...	i057	Other manufacturing n.e.c. (brooms, pens, signs, engraving)
78	395	Recycling N.E.C.	i058	Recycling of metal waste and scrap n.e.c.; and recycling of non-metal waste and scrap n.e.c.
79	411	Production, collection and distribution of electricity	i059	Electricity and Gas - Production, collection, distribution
80	412	Manufacture of gas; distribution of gaseous fuels through mains	i059	Electricity and Gas - Production, collection, distribution
81	413	Steam and hot water supply	i059	Electricity and Gas - Production, collection, distribution
82	420	COLLECTION, PURIFICATION AND DISTRIBUTION OF WATER	i060	Water - Collection, purification, distribution and own collection
83	501	Site preparation	i061	Site preparation
84	502	Building of complete constructions or parts thereof; civil engineering	i062	Building of complete constructions or parts thereof, Civil engineering
85	503	Building installation	i063	Building installation

LMD Code	SIC Code	LMD SIC Description	Rebased SUT Industry Code	Rebased SUT Industry Full Description
86	504	Building completion	i064	Building Completion
87	505	Renting of construction of demolition equipment with operators	i065	Renting of construction or demolition equipment with operators
88	611	Wholesale trade on a fee or contract basis	i066	Wholesale trade on fee or contract basis
89	612	Wholesale trade in agricultural raw materials, livestock, food, beverages and tobacco	i067	Wholesale trade in agricultural raw materials and livestock and foodstuffs, beverages and tobacco products
90	613	Wholesale trade in house-hold goods	i068	Wholesale trade in textiles, clothing and footwear and other household goods
91	614	Wholesale trade in non-agricultural intermediate products, waste and scrap	i069	Wholesale trade in solid, liquid and gaseous fuels and related products; metal and metal ores; construction materials, hardware, plumbing and heating equipment and supplies and in other intermediate products, waste and scrap
92	615	Wholesale trade in machinery, equipment and supplies	i070	Wholesale trade in machinery, equipment and supplies
93	619	Other wholesale trade	i071	Other wholesale trade n.e.c.
94	621	Non-specialised retail trade in stores	i072	Retail trade in non-specialised stores with food, beverages and tobacco predominating; and in non-specialised stores
95	622	Retail trade in food, beverages and tobacco in specialised stores	i073	Retail trade in food, beverages, tobacco in specialised stores
96	623	Other retail trade in new goods in specialised stores	i074	Retail trade in pharmaceutical and medical goods, cosmetic and toilet articles; textiles, clothing, footwear and leather goods; household furniture appliances, articles and equipment; hardware, paints and glass; other retail trade in specialised stores; and retail trade in second hand goods in stores
97	624	Retail trade in second-hand goods in stores	i074	Retail trade in pharmaceutical and medical goods, cosmetic and toilet articles; textiles, clothing, footwear and leather goods; household furniture appliances, articles and equipment; hardware, paints and glass; other retail trade in specialised stores; and retail trade in second hand goods in stores
98	625	Retail trade not in stores	i075	Other retail trade not in stores
99	626	Repair of personal and household goods	i076	Repair of personal and household goods
100	631	Sale of motor vehicles	i077	Wholesale and retail sale of motor vehicles and motor cycles
101	632	Maintenance and re-pair of motor vehicles	i078	Maintenance and repair of motor vehicles
102	633	Sale of motor vehicle parts and accessories	i079	Sale of new and used parts and accessories
103	634	Sale, maintenance and repair of motor cycles and related parts and accessories	i077	Wholesale and retail sale of motor vehicles and motor cycles
104	635	Retail sale of automotive fuel	i080	Retail sale of automotive fuel
105	641	Hotels, camping sites and other provision of short stay accommodation	i081	Hotels, camping sites and other provision of short-stay accommodation
106	642	Restaurants, bars and canteens	i082	Restaurants, bars, canteens, take-away counters, caterers
107	643	Shebeen	i124	Non-observed including informal, illicit, non-profit institutions, and households
108	711	Railway transport	i083	Railway transport
109	712	Other land transport	i084	Other scheduled passenger land transport (buses, coaches); other non-scheduled passenger land transport (taxis, safaris) and freight transport by road
110	713	Transport via pipelines	i084	Other scheduled passenger land transport (buses, coaches); other non-scheduled passenger land transport (taxis, safaris) and freight transport by road
111	721	Sea and coastal water transport	i085	Sea and coastal water transport, coastal or ocean shipping
112	722	Inland water transport	i085	Sea and coastal water transport, coastal or ocean shipping
113	730	AIR TRANSPORT	i086	Air transport
114	741	Supporting and auxiliary transport activities; activities of travel agencies	i087	Cargo handling; other supporting transport activities (parking garages, salvaging vessels, toll roads, etc.); travel agency and related activities and activities of other transport agencies
115	751	Postal and related courier activities	i088	National postal activities and courier activities
116	752	Telecommunication	i089	Telecommunication
117	811	Monetary intermediation	i090	Monetary intermediation
118	818	Cash loans	i091	Other financial intermediation
119	819	Other financial intermediation N.E.C.	i091	Other financial intermediation
120	821	Insurance and pension funding, except compulsory social security	i092	Life insurance; pension funding; medical aid funding; and other insurance n.e.c.
121	831	Activities auxiliary to financial intermediation, except insurance and pension funding	i093	Activities auxiliary to financial intermediation
122	832	Activities auxiliary to insurance and pension funding	i094	Activities auxiliary to insurance and pension funding
123	841	Real estate activities with own or leased property	i096	Real estate activities with own or leased property
124	842	Real estate activities on a fee or contract basis	i097	Real estate activities on a fee or contract basis
125	851	Renting of transport equipment	i098	Renting of land and air transport equipment
126	852	Renting of other machinery and equipment	i099	Renting of construction and civil engineering machinery and equipment; and office machinery and equipment; and other machinery and equipment n.e.c.
127	853	Renting of personal and household goods N.E.C.	i100	Renting of personal and household goods
128	861	Hardware consultancy	i101	Hardware consultancy
129	862	Software consultancy and supply	i102	Software consultancy and supply

LMD Code	SIC	LMD SIC Description	Rebased SUT Industry Code	Rebased SUT Industry Full Description
130	863	Data processing	i103	Data processing
131	864	Data base activities	i103	Data processing
132	865	Maintenance and repair of office, accounting and computing machinery	i104	Other computer-related activities
133	869	Other computer related activities	i104	Other computer-related activities
134	871	Research and experimental development on natural sciences and engineering	i105	Research and experimental development on social sciences and humanities
135	872	Research and experimental development on social sciences and humanities	i105	Research and experimental development on social sciences and humanities
136	881	Legal, accounting, bookkeeping and auditing activities; tax consultancy; market research and public opinion research; business and management consultancy	i106	Legal activities; accounting, bookkeeping and auditing, tax consultancy; marketing research; and business and management consultancy
137	882	Architectural, engineering and other technical activities	i107	Architectural, engineering and other technical activities
138	883	Advertising	i108	Advertising (agents, signwriting, window-dressing, etc.)
139	889	Business activities N.E.C.	i109	Business activities n.e.c. (labour recruitment, security, photographic, packaging, etc.)
140	911	Central government activities	i110	Public administration and defence - central government activities
141	912	Regional services council activities	i111	Regional services council activities
142	913	Local authority activities	i112	Local authority activities
143	914	Provincial administrations	i111	Regional services council activities
144	915	SA Defense force	i110	Public administration and defence - central government activities
145	916	SA Police service	i110	Public administration and defence - central government activities
146	917	Correctional service	i110	Public administration and defence - central government activities
147	920	EDUCATION	i113	Education
148	931	Human health activities	i114	Human health activities (hospitals, medical practices, clinics, chiropractors, etc.)
149	932	Veterinary activities	i115	Veterinary activities
150	933	Social work activities	i116	Social work activities
151	940	OTHER COMMUNITY, SOCIAL AND PERSONAL SERVICE ACTIVITIES	i117	Sewage and refuse disposal, sanitation and similar activities
152	951	Activities of business, employers and professional organisations	i118	Activities of business, employers and professional organisations
153	952	Activities of trade unions	i119	Activities of other membership organisations (religious, political)
154	959	Activities of other membership organizations	i119	Activities of other membership organisations (religious, political)
155	961	Motion picture, radio, television and other entertainment activities	i120	Motion picture, radio, television and other entertainment (production and distribution, film and tape renting, etc.)
156	962	News agency activities	i120	Motion picture, radio, television and other entertainment (production and distribution, film and tape renting, etc.)
157	963	Library, archives, museums and other cultural activities	i121	Library, archives, museums and other cultural activities
158	964	Sporting and other recreational activities	i122	Sporting and other recreational activities
159	990	OTHER SERVICE ACTIVITIES	i123	Other service activities (dry-cleaning, hairdressing, funerals, etc.)
160	10	PRIVATE HOUSEHOLDS WITH EMPLOYED PERSONS	i124	Non-observed including informal, illicit, non-profit institutions, and households

Sources: adapted from Stats SA (2018) and Stats SA (2021c).

Table A3: Mapping of detailed AFS capital stock types to broad SAM capital stock types

Detailed AFS Types of Capital Stock	Aggregate Description used in SAM	Aggr Label
1 Land	Land	Land
2 Residential buildings	Buildings, Construction Works & Land Improvements	Immovables
3 Non-residential buildings	Buildings, Construction Works & Land Improvements	Immovables
4 Construction works, roads and parking areas	Buildings, Construction Works & Land Improvements	Immovables
5 Land improvements	Buildings, Construction Works & Land Improvements	Immovables
6 Network equipment	Network, Computer & Other IT Equipment	NITC
7 Computers and other IT equipment	Network, Computer & Other IT Equipment	NITC
8 Motor vehicles and other transport equipment	Transport Equipment	TranspEq
9 Plant, machinery and other office equipment	Machinery	Machinery
10 Capital work in progress	Capital Works in Progress	CWinProgr
11 Other property, plant and equipment	Other property, plant and equipment	OtherEq
12 Intangible assets	Intangible assets	Intangible
13 Computer software	Intangible assets	Intangible
14 Databases	Intangible assets	Intangible
15 Mineral exploration and evaluation	Intangible assets	Intangible
16 Patents and trademarks	Intangible assets	Intangible
17 Goodwill and marketing assets	Intangible assets	Intangible
18 Research and development	Intangible assets	Intangible
19 Entertainment, literary and artistic originals	Intangible assets	Intangible
20 Contracts, leases and licences	Intangible assets	Intangible
21 Capital work in progress (intangible)	Intangible assets	Intangible
22 Other intellectual property products	Intangible assets	Intangible

Source: adapted from Stats SA (2020b).

Table A4: Mapping of detailed AFS industries to SAM industries

AFS 2019 SIC	AFS 2019	Most Detailed Classification Common to New and Old SSA SUTs		
		#Code	Label	Description
12	Forestry, logging and related services	I002	afore	Forestry
13	Fishing, operations of fish hatcheries and fish farms; service activities incidental to fishing	I003	afish	Fishing
2100	Mining of coal (hard) and lignite (brown coal)	I004	acoal	Mining of coal and lignite
2211; 2212	Extraction of crude petroleum oils and natural gas; service activities incidental to oil and gas extraction, excluding surveying	I007	aomin	Other mining and quarrying
2300	Mining of gold and uranium ore	I005	agold	Mining of gold and uranium ore
2410; 2421; 2422; 2423; 2424	Mining of iron ore; mining of chrome; mining of copper; mining of manganese; mining of platinum group metals	I006	amore	Mining of metal ores
2429	Other metal ore mining including mineral sands e.g. rutile, zircon, ilmenite, leucoxene (except gold and uranium)	I006	amore	Mining of metal ores
2511	Dimension stone (granite, marble, slate, and wonderstone)	I007	aomin	Other mining and quarrying
2512	Limestone and limeworks	I007	aomin	Other mining and quarrying
2519	Other stone quarrying, including stone crushing and clay and sandpits	I007	aomin	Other mining and quarrying
2520	Mining of diamonds (including alluvial diamonds)	I007	aomin	Other mining and quarrying
2531	Mining of chemical and fertilizer minerals	I007	aomin	Other mining and quarrying
2532	Extraction and evaporation salt	I007	aomin	Other mining and quarrying
2539	Other mining and quarrying n.e.c.	I007	aomin	Other mining and quarrying
2900	Service activities incidental to mining of minerals	I007	aomin	Other mining and quarrying
3011	Production, processing and preserving of meat and meat products	I008	afood	Food
3012	Processing and preserving of fish and fish products	I008	afood	Food
3013	Processing and preserving of fruit and vegetables	I008	afood	Food
3014	Manufacture of vegetable and animal oils and fats	I008	afood	Food
3020	Manufacture of dairy products	I008	afood	Food
3031; 3032; 3044	Manufacture of grain mill products; manufacture of starches and starch products; manufacture of macaroni, noodles, couscous and similar farinaceous products	I008	afood	Food
3033	Manufacture of prepared animal feeds	I008	afood	Food
3041	Manufacture of bakery products	I008	afood	Food
3042	Manufacture of sugar, including golden syrup and castor sugar	I008	afood	Food
3043	Manufacture of cocoa, chocolate and sugar confectionery	I008	afood	Food
3049	Manufacture of other food products n.e.c.	I008	afood	Food
3051	Distilling, rectifying and blending of spirits; ethyl alcohol production from fermented materials; manufacture of wine	I009	abevt	Beverages and tobacco
3052	Manufacture of beer and other malt liquors and malt	I009	abevt	Beverages and tobacco
3053	Manufacture of soft drinks, production of mineral waters	I009	abevt	Beverages and tobacco
3060	Manufacture of tobacco products	I009	abevt	Beverages and tobacco
3111	Preparation and spinning of textile fibres; weaving of textiles	I010	aweav	Spinning, weaving and finishing of textiles
3112	Finishing of textiles	I010	aweav	Spinning, weaving and finishing of textiles
3121	Manufacture of made-up textile articles, except apparel	I010	aweav	Spinning, weaving and finishing of textiles
3122	Manufacture of carpets, rugs and mats	I010	aweav	Spinning, weaving and finishing of textiles
3123	Manufacture of cordage, rope, twine and netting	I010	aweav	Spinning, weaving and finishing of textiles
3129	Manufacture of other textiles n.e.c.	I010	aweav	Spinning, weaving and finishing of textiles
3130	Manufacture of knitted and crocheted fabrics and articles	I011	aknit	Knitted, crouched fabrics, wearing apparel, fur articles
3140; 3150	Manufacture of wearing apparel; dressing and dyeing of fur; manufacture of articles of fur	I011	aknit	Knitted, crouched fabrics, wearing apparel, fur articles
3161	Tanning and dressing of leather	I012	aleat	Tanning and dressing of leather
3162	Manufacture of luggage, handbags and the like, saddlery and harness	I012	aleat	Tanning and dressing of leather

3170	Manufacture of footwear	I013	afoot	Footwear
3210	Sawmilling and planing of wood	I014	awood	Sawmilling, planing of wood, cork, straw
3221	Manufacture of veneer sheets; manufacture of plywood, laminboard, particle board and other panels and boards	I014	awood	Sawmilling, planing of wood, cork, straw
3222	Manufacture of builders' carpentry and joinery	I014	awood	Sawmilling, planing of wood, cork, straw
3223	Manufacture of wooden containers	I014	awood	Sawmilling, planing of wood, cork, straw
3229	Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials	I014	awood	Sawmilling, planing of wood, cork, straw
3231	Manufacture of pulp, paper and paperboard	I015	apapr	Paper
3232	Manufacture of corrugated paper and paperboard and of containers of paper and paperboard	I015	apapr	Paper
3239	Manufacture of other articles of paper and paperboard	I015	apapr	Paper
3241	Publishing of books, brochures, musical books and other publications	I016	apmt	Publishing, printing, recorded media
3242	Publishing of newspapers, journals and periodicals	I016	apmt	Publishing, printing, recorded media
3243; 3249	Publishing of recorded music; other publishing	I016	apmt	Publishing, printing, recorded media
3251	Printing	I016	apmt	Publishing, printing, recorded media
3252	Service activities related to printing	I016	apmt	Publishing, printing, recorded media
3260	Reproduction of recorded media	I016	apmt	Publishing, printing, recorded media
3310	Manufacture of coke oven products	I017	apetr	Coke oven, petroleum refineries
3321; 3322; 3323; 3324; 3325	Petrol, fuel, oils, lubricating oils and greases, primarily from crude oil; petrol, fuel oils, lubricating oils and greases, primarily from coal; petrol, fuel oils, lubricating oils and greases, primarily from natural gas; lubricating oils and greases, primarily from other organic products; compounded and blended lubricating oils and greases from purchased materials other than crude petroleum	I017	apetr	Coke oven, petroleum refineries
3329; 3330	Other petroleum/synthesised products n.e.c.; processing of nuclear fuel	I017	apetr	Coke oven, petroleum refineries
3341	Manufacture of basic chemicals, except fertilizers and nitrogen compounds	I018	abchm	Nuclear fuel, basic chemicals
3342	Manufacture of fertilizers and nitrogen compounds	I019	aochm	Other chemical products, man-made fibres
3343	Manufacture of plastics in primary forms and of synthetic rubber	I019	aochm	Other chemical products, man-made fibres
3351	Manufacture of pesticides and other agro-chemical products	I019	aochm	Other chemical products, man-made fibres
3352	Manufacture of paints, varnishes and similar coatings, printing ink and mastics	I019	aochm	Other chemical products, man-made fibres
3353	Manufacture of pharmaceuticals, medicinal chemicals and botanical products	I019	aochm	Other chemical products, man-made fibres
3354	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	I019	aochm	Other chemical products, man-made fibres
3359	Manufacture of other chemical products n.e.c.	I019	aochm	Other chemical products, man-made fibres
3371	Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres	I020	arubb	Rubber
3379	Manufacture of other rubber products	I020	arubb	Rubber
3380	Manufacture of plastic products	I021	aplas	Plastic
3411	Manufacture of glass and glass products	I022	aglss	Glass
3421	Manufacture of non-structural non-refractory ceramic ware	I023	anmmi	Non-metallic minerals
3422	Manufacture of refractory ceramic products	I023	anmmi	Non-metallic minerals
3423	Manufacture of structural non-refractory clay and ceramic products	I023	anmmi	Non-metallic minerals
3424	Manufacture of cement, lime and plaster	I023	anmmi	Non-metallic minerals
3425	Manufacture of articles of concrete, cement and plaster	I023	anmmi	Non-metallic minerals
3426	Cutting, shaping and finishing of stone	I023	anmmi	Non-metallic minerals
3429	Manufacture of other non-metallic mineral products n.e.c.	I023	anmmi	Non-metallic minerals
3510	Manufacture of basic iron and steel	I024	amets	Metal products (ferr, non-ferr & casting of metals)
3520	Manufacture of basic precious and non-ferrous metals	I024	amets	Metal products (ferr, non-ferr & casting of metals)
3531	Casting of iron and steel	I024	amets	Metal products (ferr, non-ferr & casting of metals)
3532	Casting of non-ferrous metals	I024	amets	Metal products (ferr, non-ferr & casting of metals)
3541	Manufacture of structural metal products	I025	afabm	Fabricated metal products
3542	Manufacture of tanks, reservoirs and similar containers of metal	I025	afabm	Fabricated metal products
3543	Manufacture of steam generators, except central heating hot water boilers	I025	afabm	Fabricated metal products

3551	Forging, pressing, stamping and roll-forming of metal; powder metallurgy	I025	afabm	Fabricated metal products
3552	Treatment and coating of metals; general mechanical engineering on a fee or contract basis	I025	afabm	Fabricated metal products
3553	Manufacture of cutlery, hand tools and general hardware	I025	afabm	Fabricated metal products
3559	Manufacture of other fabricated metal products n.e.c.	I025	afabm	Fabricated metal products
3561	Manufacture of engines and turbines, except aircraft, vehicle and motorcycle engines	I026	amach	Machinery and equipment
3562	Manufacture of pumps, compressors, taps and valves	I026	amach	Machinery and equipment
3563	Manufacture of bearings, gears, gearing and driving elements	I026	amach	Machinery and equipment
3564	Manufacture of ovens, furnaces and furnace burners	I026	amach	Machinery and equipment
3565	Manufacture of lifting and handling equipment	I026	amach	Machinery and equipment
3569	Manufacture of other general purpose machinery	I026	amach	Machinery and equipment
3571	Manufacture of agricultural and forestry machinery	I026	amach	Machinery and equipment
3572	Manufacture of machine tools	I026	amach	Machinery and equipment
3573; 3580	Manufacture of machinery for metallurgy; manufacture of household appliances n.e.c.	I026	amach	Machinery and equipment
3574	Manufacture of machinery for mining, quarrying and construction	I026	amach	Machinery and equipment
3575	Manufacture of machinery for food, beverage and tobacco processing	I026	amach	Machinery and equipment
3576	Manufacture of machinery for textile, apparel and leather production	I026	amach	Machinery and equipment
3577	Manufacture of weapons and ammunition	I026	amach	Machinery and equipment
3579	Manufacture of other special purpose machinery	I026	amach	Machinery and equipment
3590	Manufacture of office, accounting and computing machinery	I027	aemch	Electrical machinery and apparatus
3610	Manufacture of electric motors, generators and transformers	I027	aemch	Electrical machinery and apparatus
3620	Manufacture of electricity distribution and control apparatus	I027	aemch	Electrical machinery and apparatus
3630	Manufacture of insulated wire and cable	I027	aemch	Electrical machinery and apparatus
3640	Manufacture of accumulators, primary cells and primary batteries	I027	aemch	Electrical machinery and apparatus
3650	Manufacture of electric lamps and lighting equipment	I027	aemch	Electrical machinery and apparatus
3660	Manufacture of other electrical equipment n.e.c.	I027	aemch	Electrical machinery and apparatus
3710	Manufacture of electronic valves and tubes and other electronic components	I027	ardtv	Radio, television, communication equipment and apparatus
3720	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	I028	ardtv	Radio, television, communication equipment and apparatus
3730	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods	I028	ardtv	Radio, television, communication equipment and apparatus
3741	Manufacture of medical and surgical equipment and orthopaedic appliances	I029	amopt	Medical, precision, optical instruments, watches and clocks
3742	Manufacture of instruments and appliances for measuring, checking, testing, navigating and for other purposes, except industrial process control equipment	I029	amopt	Medical, precision, optical instruments, watches and clocks
3743	Manufacture of industrial process control equipment	I029	amopt	Medical, precision, optical instruments, watches and clocks
3750; 3760	Manufacture of optical instruments and photographic equipment; manufacture of watches and clocks	I029	amopt	Medical, precision, optical instruments, watches and clocks
3810	Manufacture of motor vehicles	I030	amtvp	Motor vehicles, trailers, parts
3820	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semitrailers	I030	amtvp	Motor vehicles, trailers, parts
3830	Manufacture of parts and accessories for motor vehicles and their engines	I030	amtvp	Motor vehicles, trailers, parts
3841	Building and repairing of ships	I031	aotrp	Other transport equipment
3842	Building and repairing of pleasure and sporting boats	I031	aotrp	Other transport equipment
3850	Manufacture of railway and tramway locomotives and rolling stock	I031	aotrp	Other transport equipment
3860	Manufacture of aircraft and spacecraft	I031	aotrp	Other transport equipment
3871	Manufacture of motorcycles	I031	aotrp	Other transport equipment
3872; 3879	Manufacture of bicycles and invalid carriages; manufacture of other transport equipment n.e.c.	I031	aotrp	Other transport equipment
3910	Manufacture of furniture	I032	afurn	Furniture
3921	Manufacture of jewellery and related articles	I033	aomnf	Manufacturing n.e.c, recycling
3922; 3929	Manufacture of musical instruments; other manufacturing n.e.c.	I033	aomnf	Manufacturing n.e.c, recycling
3923	Manufacture of sports goods	I033	aomnf	Manufacturing n.e.c, recycling
3924	Manufacture of games and toys	I033	aomnf	Manufacturing n.e.c, recycling
3951	Recycling of metal waste and scrap n.e.c.	I033	aomnf	Manufacturing n.e.c, recycling

3952	Recycling of non-metal waste and scrap n.e.c.	I033	aomnf	Manufacturing n.e.c, recycling
4111	Production, collection and distribution of electricity	I034	aelcg	Electricity, gas, steam and hot water supply
4120; 4130	Manufacture of gas; distribution of gaseous fuels through mains; steam and hot water supply	I034	aelcg	Electricity, gas, steam and hot water supply
4200	Collection, purification and distribution of water	I035	awatd	Collection, purification and distribution of water
5010	Site preparation	I036	acnst	Construction
5021	Construction of buildings	I036	acnst	Construction
5022	Construction of civil engineering structures	I036	acnst	Construction
5023	Construction of other structures	I036	acnst	Construction
5024	Construction by specialist trade contractors	I036	acnst	Construction
5031	Plumbing	I036	acnst	Construction
5032	Electrical contracting	I036	acnst	Construction
5033	Shopfitting	I036	acnst	Construction
5039	Other building installation n.e.c	I036	acnst	Construction
5041	Painting and decorating	I036	acnst	Construction
5049	Other building completion n.e.c	I036	acnst	Construction
5050	Renting of construction or demolition equipment with operators	I036	acnst	Construction
6110	Wholesale trade on a fee or contract basis	I037	awtrd	Wholesale trade, commission trade
6121	Wholesale trade of agricultural raw materials and livestock	I037	awtrd	Wholesale trade, commission trade
6122	Wholesale trade in food, beverages and tobacco	I037	awtrd	Wholesale trade, commission trade
6131	Wholesale trade in textiles, clothing and footwear	I037	awtrd	Wholesale trade, commission trade
6139	Wholesale trade in other household goods	I037	awtrd	Wholesale trade, commission trade
6141	Wholesale trade in solid, liquid and gaseous fuels and related products	I037	awtrd	Wholesale trade, commission trade
6142	Wholesale trade in metals and metal ores	I037	awtrd	Wholesale trade, commission trade
6143	Wholesale trade in construction materials, hardware, plumbing and heating equipment and supplies	I037	awtrd	Wholesale trade, commission trade
6149	Wholesale trade in other intermediate products, waste and scrap	I037	awtrd	Wholesale trade, commission trade
6150	Wholesale trade in machinery, equipment and supplies	I037	awtrd	Wholesale trade, commission trade
6190	Other wholesale trade	I037	awtrd	Wholesale trade, commission trade
6211	Retail trade in non-specialised stores with food, beverages and tobacco predominating	I038	artrd	Retail trade
6219	Other retail trade in non-specialised stores	I038	artrd	Retail trade
6220	Retail trade in food, beverages and tobacco in specialised stores	I038	artrd	Retail trade
6231	Retail trade in pharmaceutical and medical goods, cosmetic and toilet articles	I038	artrd	Retail trade
6232	Retail trade in textiles, clothing, footwear and leather goods	I038	artrd	Retail trade
6233	Retail trade in household furniture, appliances, articles and equipment	I038	artrd	Retail trade
6234	Retail trade in hardware, paints and glass	I038	artrd	Retail trade
6239	Other retail trade in specialised stores	I038	artrd	Retail trade
6240	Retail trade in second-hand goods in stores	I038	artrd	Retail trade
6251; 6252; 6259	Retail trade via mailorder houses; retail trade via stalls and markets; other retail trade not in stores	I038	artrd	Retail trade
6260	Repair of personal and household goods	I038	artrd	Retail trade
6311	Wholesale sale of motor vehicles	I039	amtvs	Sale, maintenance, repair of motor vehicles
6312	Retail sale of motor vehicles	I039	amtvs	Sale, maintenance, repair of motor vehicles
6320	Maintenance and repair of motor vehicles	I039	amtvs	Sale, maintenance, repair of motor vehicles
6331	Sale of new parts and accessories	I039	amtvs	Sale, maintenance, repair of motor vehicles
6332	Sale of used parts and accessories	I039	amtvs	Sale, maintenance, repair of motor vehicles
6340	Sale, maintenance and repair of motor cycles and related parts and accessories	I039	amtvs	Sale, maintenance, repair of motor vehicles
6350	Retail sale of automotive fuel	I039	amtvs	Sale, maintenance, repair of motor vehicles
6410	Hotels, camping sites and other provision of short-stay accommodation	I040	aacct	Hotels and restaurants
6420	Restaurants, bars and canteens	I040	aacct	Hotels and restaurants
7111	Railway transport	I041	altrp	Land transport, transport via pipe lines
7121	Other scheduled passenger land transport	I041	altrp	Land transport, transport via pipe lines

7122	Other non-scheduled passenger land transport	I041	altrp	Land transport, transport via pipe lines
7123; 7130	Freight transport by road; transport via pipelines	I041	altrp	Land transport, transport via pipe lines
72	Water transport	I042	awtrp	Water transport
73	Air transport	I043	aatrp	Air transport
7411	Cargo handling	I044	atrps	Auxiliary transport
7412	Storage and warehousing	I044	atrps	Auxiliary transport
7413	Other supporting transport activities	I044	atrps	Auxiliary transport
7414	Travel agency and related activities	I044	atrps	Auxiliary transport
7419	Activities of other transport agencies	I044	atrps	Auxiliary transport
7511; 7512	National postal activities; courier activities	I045	apost	Post and telecommunication
7520	Telecommunication	I045	apost	Post and telecommunication
8311	Administration of financial markets	I048	aofin	Activities to financial intermediation
8312	Security dealing activities	I048	aofin	Activities to financial intermediation
8319	Activities auxiliary to financial intermediation n.e.c.	I048	aofin	Activities to financial intermediation
8320	Activities auxiliary to insurance and pension funding	I048	aofin	Activities to financial intermediation
8411	Property owing and letting	I049	areal	Real estate activities
8412	Developing real estate; subdividing real estate into lots and residential development of own account	I049	areal	Real estate activities
8413	Owing and/or sale of own fixed property	I049	areal	Real estate activities
8421; 8422	Activities of estate agencies, rent collectors, appraisers and valuers; subletting of fixed property	I049	areal	Real estate activities
8511; 8512; 8513	Renting of land transport equipment; renting of water transport equipment; renting of air transport equipment	I050	arent	Renting of machinery and equipment
8521; 8529	Renting of agricultural machinery and equipment; renting of other machinery and equipment n.e.c.	I050	arent	Renting of machinery and equipment
8522	Renting of construction and civil engineering machinery and equipment	I050	arent	Renting of machinery and equipment
8523	Renting of office machinery and equipment (including computers)	I050	arent	Renting of machinery and equipment
8530	Renting of personal and household goods n.e.c.	I050	arent	Renting of machinery and equipment
861	Hardware consultancy	I051	acomp	Computer and related activities
862	Software consultancy and supply	I051	acomp	Computer and related activities
863	Data processing	I051	acomp	Computer and related activities
864	Database activities	I051	acomp	Computer and related activities
865	Maintenance and repair of office, accounting and computing machinery	I051	acomp	Computer and related activities
869	Other computer related activities	I051	acomp	Computer and related activities
8711	General research, e.g. CSIR	I052	arsea	Research and experimental development
8712	Agricultural and livestock research	I052	arsea	Research and experimental development
8713	Medical and veterinary research, e.g. SA Medical Research Council	I052	arsea	Research and experimental development
8714	Industrial research, e.g. fuel research	I052	arsea	Research and experimental development
8719	Other research n.e.c.	I052	arsea	Research and experimental development
8720	Research and experimental development on social sciences and humanities	I052	arsea	Research and experimental development
8811	Legal activities	I053	aobus	Other business activities
8812	Accounting, bookkeeping and auditing activities; tax consultancy	I053	aobus	Other business activities
8813	Marketing research and public opinion polling	I053	aobus	Other business activities
8814	Business and management consultancy activities	I053	aobus	Other business activities
8821	Architectural and engineering activities and related technical consultancy	I053	aobus	Other business activities
8822	Technical testing and analysis	I053	aobus	Other business activities
8831	Advertising	I053	aobus	Other business activities
8891	Labour recruitment and provision of staff	I053	aobus	Other business activities
8892	Investigation and security activities	I053	aobus	Other business activities
8893	Building and industrial plant cleaning activities	I053	aobus	Other business activities
8894	Photographic activities	I053	aobus	Other business activities
8895	Packaging activities	I053	aobus	Other business activities

93111	General hospitals	I056	ahéal	Health and social work
93112; 93115; 93119	Maternity homes; detached operation theatres; other hospitals	I056	ahéal	Health and social work
93114	Psychiatric hospitals	I056	ahéal	Health and social work
93121	Medical practitioner and specialist activities	I056	ahéal	Health and social work
93122	Dentist and specialist dentist activities	I056	ahéal	Health and social work
93191	Supplementary health services or paramedical staff (practitioners)	I056	ahéal	Health and social work
93192	Clinics and related health care services	I056	ahéal	Health and social work
93193	Nursing services	I056	ahéal	Health and social work
93194	Chiropractors and other associated health care services	I056	ahéal	Health and social work
93199	Other health services	I056	ahéal	Health and social work
932	Veterinary activities	I056	ahéal	Health and social work
933	Social work activities	I056	ahéal	Health and social work
940	Sewage and refuse disposal, sanitation and similar activities	I057	awast	Sewerage and refuse disposal
9511	Activities of business and employers' organisations	I058	amorg	Activities of membership organisations
9512	Activities of professional organisations	I058	amorg	Activities of membership organisations
9520	Activities of trade unions	I058	amorg	Activities of membership organisations
9591	Activities of religious organisations	I058	amorg	Activities of membership organisations
9592; 9599	Activities of political organisations; activities of other membership organisations n.e.c.	I058	amorg	Activities of membership organisations
9611	Motion picture and video production and distribution	I059	arecr	Recreational, cultural and sporting activities
9612	Motion picture projection	I059	arecr	Recreational, cultural and sporting activities
9613	Radio and television activities	I059	arecr	Recreational, cultural and sporting activities
9614	Dramatic arts, music and other arts activities	I059	arecr	Recreational, cultural and sporting activities
9619; 9620	Other entertainment activities n.e.c.; news agency activities	I059	arecr	Recreational, cultural and sporting activities
9631; 9632; 9633	Library and archives activities; museum activities and preservation of historical sites and buildings; botanical and zoological gardens and nature reserve activities	I059	arecr	Recreational, cultural and sporting activities
9641	Sporting activities	I059	arecr	Recreational, cultural and sporting activities
9649	Other recreational activities	I059	arecr	Recreational, cultural and sporting activities
9901	Washing and (dry-) cleaning of textiles and fur products	I060	aoact	Other activities
9902	Hairdressing and other beauty treatment	I060	aoact	Other activities
9903	Funeral and related activities	I060	aoact	Other activities
9909	Other service activities n.e.c.	I060	aoact	Other activities

Source: adapted from Stats SA (2020b).

Appendix B: Notes on allocating gross operating surplus to capital types

As indicated in the paper, we have allocated GOS to six different capital types according to their shares in total capital stock in 2019, using data from the AFS. We have taken this route largely because of data limitations and the amount of work involved in allocating them differently. This note discusses a more appropriate approach, to highlight the shortcomings of the route we have taken and to suggest a line of enquiry that might be taken in the future.

There is a large literature on this, going back to Jorgenson (Jorgenson 1963). The following exposition draws on United Nations (2009), OECD (2009), Oulton (2005), Oulton and Wallis (2016), Oulton and Rincon-Aznar (2009), and Knetsch (2012). We begin with a simplified exposition of the theory, before discussing empirical issues which have prevented us from adopting the more appropriate approach here.

GOS is payment for capital services. Since the quantity of capital services are non-observed, the common approach in the literature is to assume they are proportional to capital stock.

$$K_{k,j}^s = \beta_{k,j} \cdot K_{k,j} \quad (1)$$

where

$K_{k,j}^s$ is the flow of capital services from asset type k in industry j ;

$K_{k,j}$ is the stock of capital asset type k in industry j ;

$\beta_{k,j}$ is the ratio of capital services to capital stock k in industry j ;

Then the value of those services from capital type k in sector j is the quantity of the flow multiplied by its user cost:

$$w_{k,j} \cdot K_{k,j}^s = w_{k,j} \cdot \beta_{k,j} \cdot K_{k,j} \quad (2)$$

where $w_{k,j}$ is the user cost of capital services from capital type k in industry j .

Aggregating over all asset types in industry j gives the GOS in that industry:

$$GOS_j = \sum_{k=1}^n w_{k,j} \cdot K_{k,j}^s = \sum_{k=1}^n w_{k,j} \cdot \beta_{k,j} \cdot K_{k,j} \quad (3)$$

The user cost of capital is intended to measure the opportunity cost of tying up resources in that capital asset rather than using them elsewhere. It is the real rate of return on the asset plus the rate of depreciation less net capital revaluation:

$$w_{k,j} = r_{k,j} + \delta_{k,j} - \pi_{k,j} \quad (4)$$

where

$r_{k,j}$ is the real rate of return on asset k in industry j (assumed to be equal to the real rate of interest)

$\delta_{k,j}$ is the rate of depreciation of asset k in industry j

$\pi_{k,j}$ is the net rise in value of asset k in industry j $\left(= \frac{p_{k,t+1}}{p_{k,t}} - 1 \right)$

Substituting (4) into (3) gives:

$$GOS_j = \sum_{k=1}^n (r_{k,j} + \delta_{k,j} - \pi_{k,j}) \cdot \beta_{k,j} \cdot K_{k,j} \quad (5)$$

If we are able to measure the various elements of (5), we can derive ratios for each sector

$$\kappa_{k,j} = \frac{GOS_{k,j}}{GOS_j} = \frac{(r_{k,j} + \delta_{k,j} - \pi_{k,j}) \cdot \beta_{k,j} \cdot K_{k,j}}{\sum_{k=1}^n (r_{k,j} + \delta_{k,j} - \pi_{k,j}) \cdot \beta_{k,j} \cdot K_{k,j}} \quad (6)$$

which we can use to allocate the GOS in the UT to each capital type. We would use the ratio here, rather than the direct measurement (as given by the numerator in (6)), since the GOS in the SUT and NA will not match the GOS estimated from the AFS.

The question is how to measure these elements.

The most relevant source of data is the AFS (Stats SA 2020b). As already indicated, it does not cover the entire economy, omitting agriculture, hunting, financial intermediation, insurance, pension funding, other business services n.e.c., general government, and educational institutions. The AFS is used in the estimation of GDP and was also a major input into the revised ST and UT. It is carried out annually based on a sample of enterprises stratified by size. There are versions of the AFS available from 2001, but they only have data at the 1-digit level of sector disaggregation. More disaggregated data are available from 2006, although the disaggregation used in 2019 has been used only since 2015.

Gross operating surplus

The GOS in the UT has to be adjusted to exclude the wage element of mixed income. In the NA mixed income is identified as ‘the balancing item in generation of income accounts for the household sector.’ (Stats SA 2021c: 17). This might allow an estimate of total mixed income but does not allow estimations of mixed income in each sector.

Since GOS is itself a balancing item, it includes rents derived from monopoly power and imperfect competition and other ‘distortions’. Many studies assume these away by assuming perfect competition and imposing the zero profit condition. We discuss this further below.

Capital stocks, $K_{k,j}$

In the foregoing exposition, we have referred to ‘capital’ as if it is an unproblematic concept. The literature distinguishes between wealth capital and productive capital. The latter needs to be derived using a perpetual inventory approach to accumulate each asset type surviving from previous periods. The AFS does not have a sufficiently long time period to undertake this properly for the disaggregated sectors in the SAM. We therefore use the book value of carrying value of capital at the beginning of the year as our measure of capital stock.

It should be noted that the carrying value at the end of one year does not equal the carrying value at the beginning of the next year, as it would be expected to. This is because the survey sample changes, and there is no reconciliation of the differences between successive samples (see Stats SA 2020b: 69).

As reported in the text, we have aggregated the 21 capital types reported in the AFS into six components. The combinations are specified in Table A3. There are different groupings that might make more sense. For example, we could combine the intangibles ‘Computer software’ and ‘Databases’ with the tangible ‘Computers and other IT equipment’. There is also an argument in some of the literature that ‘Land’ outside agriculture should be combined with ‘Non-residential buildings’. We do not take these nuances into account.

Ratio of capital services to capital stock, $\beta_{k,j}$

One cannot measure the ratio of services to stock; this is the unobservable we are trying to infer.

The standard practice is to assume that $\beta_{k,j}$ is constant over time and then set it to unity.

Rates of return on capital, $r_{k,j}$

The literature distinguishes between ex ante (exogenous) and ex post (endogenous) rates of return. The former relates to investment decisions in which the entrepreneur forms expectations about future returns on the asset to assess whether an investment is desirable. They relate their decision to a target rate of return. The ex post concept evaluates returns after production has been undertaken. It is the rate of return that was actually realized looking back, rather than the one expected looking forward. In principle, the ex post rate of return can be generated endogenously from the production data.

It is the ex post concept which is relevant for our purposes, since we are trying to disaggregate accounts relating to past outcomes.

One cannot identify a rate of return for each asset separately within each sector. One therefore assumes that the capital structure within a given sector is such that the returns on all capital types are uniform within the sector. If a firm finds the return on computers to be higher than on motor vehicles, it will invest more in computers and less in vehicles. In standard neoclassical terms, the marginal revenue products for all capital types are equal.

Oulton and his co-authors (Oulton 2005; Oulton and Rincon-Aznar 2009; Oulton and Wallis 2016) and other authors (see for example Knetsch 2012) circumvent some of these problems by using firm level data, such as EU-KLEMS, to undertake micro-econometric estimates. In South

Africa it may be possible to use the tax administrative database from SARS to undertake similar estimates (see Kreuser and Newman 2016).

Depreciation rates $\delta_{k,j}$

The AFS provides data on depreciation. It is presumably the allowances for depreciation reported in company accounts, and is therefore influenced by tax considerations.

Revaluations $\pi_{k,j}$

The AFS also reports book values for revaluations.

Summary

To summarize, we can write the formula for the level of GOS in industry j that should be allocated to capital type k as:

$$GOS_{k,j} = (r_{k,j} + \bar{\delta}_{k,j} - \bar{\pi}_{k,j}) \cdot \beta_{k,j} \cdot \bar{K}_{k,j} \quad (7)$$

The overbars indicate elements that are in principle observable in the AFS data (after suitable cleaning). We are thus left with two unknowns, $\beta_{k,j}$ and $r_{k,j}$. We can follow the literature and assume away $\beta_{k,j}$. However, establishing a reasonable value for $r_{k,j}$ requires substantial work.

By allocating GOS according to shares of capital stocks, we are assuming the coefficient on $\bar{K}_{k,j}$ in (7) is equal to unity. The question is what biases that might introduce.

Since depreciation rates on short-lived capital types are higher than on longer-lived ones, we can see that the capital stock allocation method will allocate a smaller share of GOS to short-lived types than will the capital service method. This has implications for work on new technology, since much of the capital involved in it is short lived.

The same argument applies to capital types which have higher revaluation rates. However, that is not relevant for constructing the SAM, since revaluation refers to changes over time.

We can derive the $K_{k,j}$ required for the SAM disaggregation from a single year of the AFS. However, it would be preferable to create a consistent time series of the AFS data to estimate more robust parameters. A consistent time series would also be necessary for looking at trends in the adoption of new technology. Creating a consistent time series was not possible in the current project but should be considered moving forward.