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## A 2012 Social Accounting Matrix (SAM) for South Africa

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WIDER Working Paper 2016/26

## **A 2012 Social Accounting Matrix (SAM) for South Africa**

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**Abstract:** This paper documents the construction of a South African Social Accounting Matrix (SAM) for the year 2012. The SAM is built using a Statistics South Africa Supply Table and Use Table, National Accounts, and various household and labour market surveys. It provides a detailed representation of the South African economy and identifies 62 activities and 104 commodities; labour is disaggregated by education attainment level; and households by per capita expenditure deciles. Information on labour is drawn from the 2012 Labour Market Dynamics Survey of the Quarterly Labour Force Survey. Data on households is taken from the 2008/9 Living Conditions Survey. The SAM identifies government, investment, and foreign accounts. It is a useful database for conducting economy-wide impact assessments, including SAM-based multiplier analysis and computable general equilibrium modelling.

**Keywords:** social accounting matrix, national accounts, supply table, use table, cross-entropy SAM estimation

[Link to the 2012 National Social Accounting Matrix.](#)

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## **List of acronyms**

CGE	Computable General Equilibrium
GDP	Gross Domestic Product
LCS	Living Conditions Survey
LFS	Labour Force Survey
LMD	Labour Market Dynamics
Rbn	billion of Rands
SAM	Social Accounting Matrix
ST	Supply Table
SUTSAM	Supply-Use Social Accounting Matrix
UT	Use Table

## 1 Introduction

This paper outlines the construction of a 2012 Social Accounting Matrix (SAM) for South Africa. A SAM is a consistent data framework that captures the information contained in the National Income and Product Accounts, a Supply Table (ST) and a Use Table (UT), as well as the monetary flows between institutions. A SAM is an ex-post accounting framework since, within its square format, total receipts must equal total payments for each of its accounts. Since the required data is not drawn from a single source, information is manipulated in order to make it internally consistent. This process is valuable since it helps identify inconsistencies among statistical sources. For example, there are invariably differences between the incomes and expenditures reported in national household surveys and the National Accounts. SAMs are economy-wide databases that are used in conjunction with analytical techniques to strengthen the evidence underlying policy decisions.

Section 2 reviews the general structure of SAMs. The first step in constructing the South African SAM is compiling National Accounts (SARB, 2014) and Stats SA's ST and UT (2014) data sources into a consistent SAM framework. This results in what we label as the SUTSAM as it only identifies a single type of labour and a single household. The second step then draws on survey information to disaggregate labour and household accounts of the SUTSAM. Given the diversity and inaccuracy of the various data sources, the initial or prior SAM is unbalanced, as is invariably the case. Section 3 describes the data sources used to construct the unbalanced SAM. The balancing procedure of the SAM accounts is discussed in section 4.

This SAM was constructed in collaboration with the National Treasury of South Africa based on publically-available information provided by Statistics South Africa and the South African Reserve Bank.

## 2 General structure of SAMs

A SAM is an economy-wide data framework that usually represents the real economy of a single country.<sup>1</sup> More technically, a SAM is a square matrix in which each account is represented by a row and a matching column. Each cell shows the payment from the account of its column to the account of its row—the incomes of an account appear along its row, its expenditures down its column. The underlying principle of double-entry accounting requires that, for each account in the SAM, total revenue (row total) equals total expenditure (column total). Table 1 shows an aggregate SAM for South Africa (with verbal explanations in place of numbers).

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<sup>1</sup> For general discussions of SAMs and SAM-based modelling, see Pyatt and Round (1985), Reinert and Roland-Holst (1997), Pyatt (1988), Robinson and Roland-Holst (1988), and Breisinger et al. (2009).

Table 1: Basic structure of a 2012 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
Activities		Output of total domestic economy													Gross output
Commodities	Intermediate consumption					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								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: 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		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: authors' layout.

The SAM distinguishes 62 ‘activities’ (the entities that carry out production) and 104 ‘commodities’ (representing markets for goods and non-factor services). The activities and commodities are listed in Appendix A. SAM flows are valued at producers’ prices in the activity accounts and at market prices (including indirect commodity taxes and transactions costs) in the commodity accounts. The commodities are activity outputs, either exported or sold domestically, and imports. In the activity columns, payments are made to commodities (intermediate demand), and factors of production (value-added comprising of operating surplus and compensation of employees, the latter broken down by education attainment as discussed later). In the commodity columns, payments are made to domestic activities, the rest of the world, and various tax accounts (for domestic and import taxes). This treatment provides the data needed to model imports as perfect or imperfect substitutes vis-à-vis domestic production.

The government is disaggregated into a core government account and different tax collection accounts, one for each tax type. This disaggregation is necessary since otherwise the economic interpretation of some payments is ambiguous. In the SAM, direct payments between the enterprises, households, and government are reserved for transfers as reported in the national accounts. Finally, payments from the government to factors (for the labour services provided by public sector employees) are captured in a government services activity. Government consumption demand is a purchase of the output from this government services activity. The SAM contains a number of factors of production, which earn incomes from their use in the production process, and then pay their incomes to enterprises, households, government, and the rest of the world. Indirect capital earnings or enterprise profits are taxed according to average corporate tax rates and some profits may be repatriated abroad. The remaining capital earnings, together with labour earnings are paid to households. Households are broken down into 14 household expenditure groups, 9 deciles and a further 5 representing 2 per cent of household expenditure of the top decile. They use their incomes to pay taxes, make transfers, save, and consume domestically produced and imported commodities.

### **3 Constructing the prior social accounting matrix**

The initial task in building a SAM involves compiling data from various sources into the SAM framework. For South Africa, this information was drawn from National Accounts, STs, UTs, household and labour force surveys. These sources often use (1) different disaggregation of activities, production factors, and socioeconomic household groups; (2) different years and/or base-year prices; and (3) different data collection and compilation techniques. Consequently, the initial SAM inevitably includes imbalances between row and column account totals.

Table 2: A 2012 Macro SAM for South Africa (billions of Rands)

	Activi- ties	Commodi- ties	Labour	Capital	Enter- prises	House- holds	Govern- ment	Net activity taxes	Net product taxes	Import duties	Income taxes	Changes in invento- ries	Accumu- lation	Rest of the world	<b>Total</b>
Activities		6,344													<b>6,344</b>
Commodities	3,524					1,908	684					14	593	939	<b>7,662</b>
Labour	1,452													9	<b>1,460</b>
Capital	1,328													40	<b>1,367</b>
Enterprises				832	242	214	287								<b>1,576</b>
Households			1,450	360	527		307							11	<b>2,655</b>
Government				64	163	188	165	41	281	37	466			2	<b>1,407</b>
Net activity taxes	41														<b>41</b>
Net product taxes		281													<b>281</b>
Import duties		37													<b>37</b>
Income taxes					182	283									<b>466</b>
Changes in inventories													14		<b>14</b>
Accumulation					461	53	-70							165	<b>608</b>
Rest of the world		999	11	111		9	36								<b>1,165</b>
<b>Total</b>	<b>6,344</b>	<b>7,662</b>	<b>1,460</b>	<b>1,367</b>	<b>1,576</b>	<b>2,655</b>	<b>1,407</b>	<b>41</b>	<b>281</b>	<b>37</b>	<b>466</b>	<b>14</b>	<b>608</b>	<b>1,165</b>	

Source: authors' representation of South African National Accounts (SARB 2014).



The macro SAM shown in Table 2 is an aggregation of the more detailed micro SAM. This section explains how each macro SAM entry, expressed in billion of Rands (Rbn) is derived and broadly how, where necessary, it is disaggregated to arrive at the unbalanced micro SAM. Each entry in the SAM is discussed below. The notation for SAM entries is (row, column) and the values are in billions of 2012 South African Rand. KBP refers to the SARB (2014) series of National Accounts in their Quarterly Bulletin. The final disaggregated SAM is quite large and is included in the [accompanying spreadsheet file](#).

i (Commodities,Activities)...Rbn3,524

KBP6871J: Production account: intermediate consumption of total domestic economy. There is a slight difference with UT due to subsequent revisions in the National Accounts. Intermediate inputs are initially disaggregated across activities and commodities according to the shares of the latter in each of the former.

ii (Labour,Activities)...Rbn1,452

KBP6000J: Compensation of employees. There is a slight difference with the UT due to subsequent revisions in the National Accounts. Labour income is disaggregated across activities according to shares in the UT and subsequently split across four educational groups:

‘primary’ refers to workers with some or no primary schooling, i.e. grades 1–7

‘middle’ includes workers who have completed grade 10

‘secondary’ includes workers who have completed grade 12

‘tertiary’ includes workers who have at least some post-secondary or higher education.

Workers’ compensation is drawn from the 2012 Labour Force Survey (LFS) (Stats SA 2013). Not all activities are covered in the LFS. Appendix B reports the mapping from LFS to activities used in the SAM.

iii (Capital,Activities)...Rbn1,328

KBP6001J: Net operating surplus + KBP6002J: Consumption of fixed capital (Depreciation). There is a slight difference with the UT due to subsequent revisions in the National Accounts. Capital income is disaggregated across activities according to the activity shares in the UT.

iv (Net activity taxes,Activities)...Rbn41

KBP6600J: Other taxes on production in all industries— KBP6601J: Other subsidies on production in all industries. There is a slight difference with the UT due to subsequent revisions in the National Accounts. Net activity tax is disaggregated across activities according to the activity shares in the UT.

v (Activities,Commodities)...Rbn6,344

KBP6870J: Production account: output of total domestic economy. This is the same as in the ST. Total domestic production of each activity is disaggregated across the commodities that they make according to the shares in the ST

- vi (Net product taxes,Commodities)...Rbn281
- KBP6603J: Taxes on products—KBP6604J: Subsidies on products—KBP4590J: National government tax revenue: Taxes on international trade and transactions: Import duties. There are slight differences with ST due to subsequent revisions in the National Accounts. Domestic taxes less subsidies on products plus import duties is equal to taxes on products according to the National Accounts. Disaggregation of the control total (sum of taxes less subsidies on products less import duties) is based on ST shares corrected for import duties discussed below.
- vii (Import duties,Commodities)...Rbn37
- KBP4590J: National government tax revenue: Taxes on international trade and transactions: Import duties. Total Import duties are made consistent with the national government tax revenue as reported in the Public Finance Statistics of the SARB (2013) Quarterly Bulletin. Commodity level import duties collected were obtained as unpublished data from Stats SA for the years 2007-2012. Closer examination reveals that the distribution of import duties collected across commodities is identical.
- viii (Rest of the world,Commodities)...Rbn999
- KBP6014J: Imports of goods & services. Disaggregated to commodity level based on ST shares. Adjustments are made for purchases of residents abroad while benchmarking on National Accounts.
- ix (Households,Labour)...Rbn1,450
- KBP6240J: Compensation of residents. Disaggregated across types of labour and household income classes according to the Living Conditions Survey (LCS 2008/9)
- x (Rest of the world,Labour)...Rbn11
- KBP6207J: Compensation of non-residents working in South Africa. Disaggregated across types of labour according to total labour income received by households using LCS (2008/9) data, see ix above.
- xi (Enterprises,Capital)...Rbn832
- 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
- xii (Households,Capital)...Rbn360
- KBP6826J: Generation of income account: Gross operating surplus / mixed income of households and NPISHs. Distribution is based on the LCS for items 'Household self-employment and business' and 'Income from subsistence farming'.
- xiii (Government,Capital)...Rbn64
- KBP6786J: Generation of income account: Gross operating surplus of General

government.

xiv (Rest of the world,Capital)...Rbn111

KBP6901J: External account of primary incomes and current transfers: Property income received: ROW.

xv (Enterprises,Enterprises)...Rbn242

KBP6707: 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)...Rbn527

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 the LCS (2008/9). The following 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)...Rbn163

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)...Rbn182

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)...Rbn461

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 (Commodities,Households)...Rbn1,908

KBP6007J: Final consumption expenditure by households: Total (PCE). There is a slight difference with the UT due to subsequent revisions in the National Accounts. Disaggregated across products according to the expenditure shares in the UT and across household income classes using shares from the LCS (2008/9). Close to 800 expenditure items are identified. Due to limited space, the mapping is available on request.

xxi (Enterprises,Households)...Rbn214

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 LCS (2008/9) and consists of the following outlay items: 'interest on mortgage bonds', 'contribution to pension, provident and annuity funds' and 'employer contribution to pension, provident and annuity funds'.

xxii (Government,Households)...Rbn188

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 LCS (2008/9) for income tax payments (see next item for details).

xxiii (Income taxes,Households)...Rbn283

KBP6245J: Current taxes on income and wealth of households. Disaggregated across household income classes using shares from the LCS (2008/9) based on the distribution of outlays for income tax purposes and includes the following items: 'SITE - income tax', 'PAYE - income tax', 'According to assessment - income tax', 'Amnesty tax', 'Penalty late submission of tax'.

xxiv (Accumulation,Households)...Rbn53

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 LCS (2008/9) 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'.

xxv (Rest of the world,Households)...Rbn9

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 LCS (2008/9) and consists of the same items as used for transfers by households to enterprises (see item xxi above).

- xxvi (Commodities,Government)...Rbn684
- KBP6008J: Final consumption expenditure by general government. There is a slight difference with the UT due to subsequent revisions in the National Accounts. Disaggregated across products according to the expenditure shares in the UT.
- xxvii (Enterprises,Government)...Rbn287
- KBP6715J: Secondary distribution of income account: Social contributions received: Financial corporations+KBP6791J: Allocation of primary income account: Property income paid: General government.
- xxviii (Households,Government)...Rbn307
- 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 LCS (2008/9) and includes the following items: 'Old age pensions', 'Disability grants', 'Family and other allowances' and 'Workmen's compensation Funds'.
- xxix (Government,Government)...Rbn165
- KBP6794J: Secondary distribution of income account: Social contributions received: General government+KBP6798J: Secondary distribution of income account: Social benefits paid: General government.
- xxx (Accumulation,Government)...Rbn-070
- KBP6803J: Use of disposable income account: Gross saving of General government.
- xxxi (Rest of the world,Government)...Rbn36
- KBP6908J: External account of primary incomes and current transfers: Current international co-operation received: ROW.
- xxxii (Government,Net activity taxes)...Rbn41
- KBP6600J: Other taxes on production in all industries - KBP6601J: Other subsidies on production in all industries. There are slight difference with UT due to subsequent revisions in the National Accounts.
- xxxiii (Government,Net product taxes)...Rbn281
- KBP6603J: Taxes on products - KBP6604J: Subsidies on products-KBP4590J: National government tax revenue: Taxes on international trade and transactions: Import duties. There are slight differences with ST due to subsequent revisions in the National Accounts. Domestic taxes less subsidies on products. Together with import duties this is equal to taxes on products according to the National Accounts.
- xxxiv (Government,Import duties)...Rbn37

- KBP4590J: National government tax revenue: Taxes on international trade and transactions: Import duties.
- xxxv (Government,Income taxes)...Rbn466
- 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.
- xxxvi (Commodities,Changes in inventories)...Rbn14
- KBP6010J: Change in inventories+KBP6011J: Residual item. There is a slight difference with the UT due to subsequent revisions in the National Accounts. Disaggregated across products according to the expenditure shares in the UT.
- xxxvii (Commodities,Accumulation)...Rbn593
- KBP6009J: Gross fixed capital formation (Investment). There is a slight difference with the UT due to subsequent revisions in the National Accounts. Disaggregated across products according to the expenditure shares in the UT.
- xxxviii (Changes in inventories,Accumulation)...Rbn14
- KBP6010J: Change in inventories+KBP6011J: Residual item. There is a slight difference with the UT due to subsequent revisions in the National Accounts.
- xxxix (Commodities,Rest of the world)...Rbn939
- KBP6013J: Exports of goods & services. Commodity level adjustments are made for purchases of non-residents while benchmarking on National Accounts.
- xl (Labour,Rest of the world)...Rbn9
- KBP6208J: Compensation of South African residents in the rest of the world. Disaggregated across types of labour according to shares in total labour income using QLFS/LMD data
- xli (Capital,Rest of the world)...Rbn40
- KBP6904J: External account of primary incomes and current transfers: Property income paid: RoW.
- xlii (Households,Rest of the world)...Rbn11
- 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).
- xliii (Government,Rest of the world)...Rbn2
- KBP6911J: External account of primary incomes and current transfers: Current international co-operation paid: RoW.

KBP6913J: External account of primary incomes and current transfers: Current external balance: RoW.

#### 4 Balancing the prior SAM

The range of datasets used to construct the SAM described in the previous section implies that there will inevitably be imbalances (i.e., row and column totals are unequal). A cross-entropy estimation method is used to reconcile the micro SAM accounts (see Robinson et al. 2001). This approach begins with the construction of the unbalanced SAM which in our case for South Africa, as explained in the previous section, uses a variety of data from a number of sources of varying quality. This unbalanced SAM provided the initial ‘best guess’ for the estimation procedure of an unbalanced SAM. A balanced SAM is then estimated by minimizing the entropy ‘distance’ measure between the final SAM and the initial unbalanced SAM, taking into account additional information.

The balancing procedure takes place in two stages. First, a very detailed SAM was constructed using the supply-use table, national accounts, and additional data for import duties collected. At this stage, the SAM contains aggregate entries for factors and households and is balanced using cross-entropy to create a SUTSAM. In a second stage the labour and household accounts of the SUTSAM are expanded.

##### *Stage 1: Cross-entropy estimation to create the SUTSAM*

Starting from an initial estimate of the SAM, additional information is imposed in the form of constraints on the estimation. Various constraints were imposed on the cross-entropy estimation model according to the perceived reliability of the data. In our case, all the macroeconomic aggregates sourced from the National Accounts (as described earlier) were maintained in the balanced SUTSAM. Since the underlying ST and UT are constructed by Stats SA (2014) to support the process of creating the National Accounts and the latter are used as constraints, the Cross-Entropy estimation routine does not have to make large adjustments to the unbalanced SUTSAM. Any adjustments that were necessary are due to revisions that have been made to the National Accounts since the Stats SA (2014) 4<sup>th</sup> Qtr 2014 GDP release that contains the ST and UT.

##### *Stage 2: Expanding the balanced SUTSAM with additional labour and household detail*

After balancing the SUTSAM, it was then disaggregated across labour and households. Since the SUTSAM is balanced, this disaggregation can be set up such so that it results in imbalances for the household accounts only. We do this by first disaggregating wages and salaries for each activity by education attainment using the 2012 QLFS/LMD survey data. Summing across activities results in total labour income for each education attainment. We then disaggregate household expenditure for each commodity and for each of the other outlays across household income groups using the 2008/9 LCS survey data. Summing across all commodities and other types of outlays, yields total household outlays for each household income group. Total household outlays must equal total household income for each household income group. We use the former as our benchmark for the latter. Initial shares of household income by sources (wages & salaries by educational attainment, capital income, dividends and various transfers) are obtained from the 2008/9 LCS. These shares are then applied to the total outlays of each household income group. Finally, as was the case with the 2009 SAM, the household accounts were balanced using the biproportional scaling method, also known as RAS while holding all other non-household-related entries of the SUTSAM constant. The result is a fully disaggregated micro SAM with detailed labour and household categories which remains consistent with the National Accounts aggregates and as much as possible with the SSA SUT for 2012 as captured by the SUTSAM described above. While a full entropy application would have been possible at this stage, it would have

caused the non-labour and non-household accounts to deviate further from the SSA SUT. This was not considered to be desirable.

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Appendix A: Commodities and activities identified in a 2012 SAM for South Africa

Commodities		Activities		
1	cagri	Agriculture	aagri	Agriculture
2	clani	Live animal	afore	Forestry
3	cfore	Forestry	afish	Fishing
4	cfish	Fishing	acoal	Mining of coal and lignite
5	ccoal	Coal and lignite	agold	Mining of gold and uranium ore
6	cmore	Metal ores	amore	Mining of metal ores
7	comin	Other minerals	aomin	Other mining and quarrying
8	celcg	Electricity and gas	afood	Food
9	cwatr	Natural water	abevt	Beverages and tobacco
10	cmeat	Meat	aweav	Spinning, weaving and finishing of textiles
11	cpfis	Fish	aknit	Knitted, crouched fabrics, wearing apparel, fur articles
12	cvege	Vegetables	aleat	Tanning and dressing of leather
13	cfrii	Fruit and nuts	afoot	Footwear
14	cfats	Oils and fats	awood	Sawmilling, planing of wood, cork, straw
15	cdair	Dairy products	apapr	Paper
16	cgrai	Grain mill products	aprint	Publishing, printing, recorded media
17	cstar	Starches products	apetr	Coke oven, petroleum refineries
18	cafee	Animal feeding	abchm	Nuclear fuel, basic chemicals
19	cbake	Bakery products	aochm	Other chemical products, man-made fibres
20	csuga	Sugar	arubb	Rubber
21	cconf	Confectionary products	aplas	Plastic
22	cpast	Pasta products	agls	Glass
23	cofoo	Food n.e.c.	anmmi	Non-metallic minerals
24	calcb	Alcohol, beverages	abisc	Basic iron and steel, casting of metals
25	csftd	Soft drinks	anfme	Basic precious and non-ferrous metals
26	ctoba	Tobacco products	afabm	Fabricated metal products
27	ctexf	Textile fabrics	amach	Machinery and equipment
28	ctexm	Made-up textile, articles	aemch	Electrical machinery and apparatus
29	ccarp	Carpets	ardtv	Radio, television, communication equipment and apparatus
30	cotex	Textile n.e.c.	amopt	Medical, precision, optical instruments, watches and clocks
31	cknit	Knitting fabrics	amtvp	Motor vehicles, trailers, parts
32	cwear	Wearing apparel	aotrp	Other transport equipment
33	cleat	Leather products	afurn	Furniture
34	cfoot	Footwear	aomnf	Manufacturing n.e.c, recycling
35	cwood	Wood products	aelcg	Electricity, gas, steam and hot water supply
36	cpapp	Paper products	awatd	Collection, purification and distribution of water
37	cpnt	Printing	acnst	Construction
38	cpetr	Petroleum products	awtrd	Wholesale trade, commission trade
39	cbchm	Basic chemicals	artrd	Retail trade
40	cfert	Fertilizers, pesticides	amtv	Sale, maintenance, repair of motor vehicles
41	cpain	Paint, related products	aacct	Hotels and restaurants
42	cphar	Pharmaceutical products	altrp	Land transport, transport via pipe lines
43	csoap	Soap, cleaning, perfume	awtrp	Water transport
44	coche	Chemical products, n.e.c.	aatrp	Air transport
45	ctyre	Rubber tyres	atrps	Auxiliary transport
46	corub	Other rubber products	apost	Post and telecommunication
47	cplas	Plastic products	afins	Financial intermediation
48	cglas	Glass products	ainsp	Insurance and pension funding
49	ccera	Non-structural ceramic	aofin	Activities to financial intermediation
50	cclay	Structure non-refractory clay	areal	Real estate activities
51	cmnt	Plaster, cement	arent	Renting of machinery and equipment
52	cconc	Articles of concrete	acomp	Computer and related activities
53	conmp	Non-metallic products n.e.c.	arsea	Research and experimental development
54	cfurn	Furniture	aobus	Other business activities
55	cjewl	Jewellery	apuba	Government
56	comnf	Manufactured products n.e.c.	aeduc	Education
57	cwast	Wastes, scraps	aheal	Health and social work
58	cirst	Iron, steel products	awast	Sewerage and refuse disposal
59	cnfme	Non-ferrous metals	amorg	Activities of membership organisations
60	cstrm	Structural metal products	arecr	Recreational, cultural and sporting activities
61	ctank	Tanks, reservoirs	aoact	Other activities
62	cofbm	Other fabricated metal	anobs	Non-observed, informal, non-profit, households,
63	cegt	Engines, turbines		
64	cpump	Pumps, compressors		
65	cgear	Bearings, gears		
66	clift	Lifting equipment		
67	cgenm	General machinery		
68	cspcm	Special machinery		
69	cdoma	Domestic appliances		
70	coffm	Office machinery		
71	celem	Electrical machinery		
72	crdtv	Radio, television		
73	cmeda	Medical appliances		
74	cmtvp	Motor vehicles, parts		
75	cship	Ships and boats		
76	craill	Railway and trams		
77	cairc	Aircrafts		

Commodities		Activities
78	coteq	Other transport equipment
79	ccnst	Construction
80	ccsrv	Construction services
81	ctrad	Trade services
82	cacco	Accommodation
83	ccats	Catering services
84	cptrp	Passenger transport
85	cftrp	Freight transport
86	ctrps	Supporting transport services
87	cpost	Postal, courier services
88	celcd	Electricity distribution
89	cwatd	Water distribution
90	cfin	Financial services
91	cinsp	Insurance, pension
92	cofin	Other financial services
93	creal	Real estate services
94	crent	Leasing, Rental services
95	crsea	Research, development
96	clacc	Legal, accounting
97	cobus	Other business services
98	ctelc	Telecommunications
99	csupp	Support services
100	cmnfs	Manufactured services n.e.c.
101	cpuba	Public administration
102	ceduc	Education services
103	cheal	Health, social services
104	cosrv	Other services n.e.c.

Source: StatsSA (2014).

Appendix B: Matching SAM activities to LFS/LMD activities

LMD Industry Code	LMD Industry Description	SAM Activity #	SAM Activity Code	SAM Activity Description
111	Growing of crops	1aagri	1aagri	Agriculture
112	Farming of animals	1aagri	1aagri	Agriculture
113	Growing of crops combined with farming of animals(mixed farming)	1aagri	1aagri	Agriculture
114	Agricultural and animal husbandry services, except veterinary activities	1aagri	1aagri	Agriculture
115	Game hunting, trapping and game propagation, including related services	1aagri	1aagri	Agriculture
116	Production of organic fertilizer	1aagri	1aagri	Agriculture
121	Forestry and related services	2afore	2afore	Forestry
122	Logging and related services	2afore	2afore	Forestry
131	Ocean and coastal fishing	3afish	3afish	Fishing
132	Fish hatcheries and fish farms	3afish	3afish	Fishing
210	mining of coal and lignite	4acoal	4acoal	Mining of coal and lignite
230	Mining of gold and uranium ore	5agold	5agold	Mining of gold and uranium ore
241	Mining of iron ore	6amore	6amore	Mining of metal ores
242	Mining of non-ferrous metal ores	6amore	6amore	Mining of metal ores
221	Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction, excluding surveying	7aomin	7aomin	Other mining and quarrying
251	Stone quarrying, clay and sandpits	7aomin	7aomin	Other mining and quarrying
252	Mining of diamonds (including alluvial diamonds)	7aomin	7aomin	Other mining and quarrying
253	Mining and quarrying N.E.C.	7aomin	7aomin	Other mining and quarrying
290	Service activities incidental to mining of minerals	7aomin	7aomin	Other mining and quarrying
301	Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats	8afood	8afood	Food
302	Manufacture of dairy products	8afood	8afood	Food
303	Manufacture of grain mill products, starches and starch products and prepared animal feeds	8afood	8afood	Food
304	Manufacture of other food products	8afood	8afood	Food
305	Manufacture of beverages	9abevt	9abevt	Beverages and tobacco
306	Manufacture of tobacco products	9abevt	9abevt	Beverages and tobacco
311	Spinning, weaving and finishing of textiles	10aweav	10aweav	Spinning, weaving and finishing of textiles
312	Manufacture of other textiles	10aweav	10aweav	Spinning, weaving and finishing of textiles
313	Manufacture of knitted and crocheted fabrics and articles	11aknit	11aknit	Knitted, crouched fabrics, wearing apparel, fur articles
314	Manufacture of wearing apparel, except fur apparel	11aknit	11aknit	Knitted, crouched fabrics, wearing apparel, fur articles
316	Tanning and dressing of leather; manufacture of luggage, handbag,	12aleat	12aleat	Tanning and dressing of leather
317	Manufacture of footwear	13afoot	13afoot	Footwear
321	Sawmilling and planing of wood	14awood	14awood	Sawmilling, planing of wood, cork, straw
322	Manufacture of products of wood, cork, straw and plaiting material	14awood	14awood	Sawmilling, planing of wood, cork, straw
323	Manufacture of paper and paper products	15apapr	15apapr	Paper
324	Publishing	16aprnt	16aprnt	Publishing, printing, recorded media
325	Printing and service activities related to printing	16aprnt	16aprnt	Publishing, printing, recorded media
326	Reproduction of recorded media	16aprnt	16aprnt	Publishing, printing, recorded media
331	Manufacture of coke oven products	17apetr	17apetr	Coke oven, petroleum refineries
332	Petroleum refineries / synthesisers	17apetr	17apetr	Coke oven, petroleum refineries
333	Processing of nuclear fuel	18abchm	18abchm	Nuclear fuel, basic chemicals
334	Manufacture of basic chemicals	18abchm	18abchm	Nuclear fuel, basic chemicals
335	Manufacture of other chemical products	19aochm	19aochm	Other chemical products, man-made fibres
336	Manufacture of manmade fibers	19aochm	19aochm	Other chemical products, man-made fibres
337	Manufacture of rubber products	20arubb	20arubb	Rubber
338	Manufacture of plastic products	21aplas	21aplas	Plastic
341	Manufacture of glass and glass products	22aglss	22aglss	Glass
342	Manufacture of non-metallic mineral products N.E.C.	23anmmi	23anmmi	Non-metallic minerals
351	Manufacture of basic iron and steel	24abisc	24abisc	Basic iron and steel, casting of metals
353	Casting of metals	24abisc	24abisc	Basic iron and steel, casting of metals
352	Manufacture of basic precious and non-ferrous metals	25anfme	25anfme	Basic precious and non-ferrous metals
354	Manufacture of structural metal products, tanks, reservoirs and steam generators	26afabm	26afabm	Fabricated metal products
355	Manufacture of other fabricated metal products; metalwork service activities	26afabm	26afabm	Fabricated metal products
356	Manufacture of general purpose machinery	27amach	27amach	Machinery and equipment
357	Manufacture of special purpose machinery	27amach	27amach	Machinery and equipment
358	Manufacture of household appliances N.E.C.	27amach	27amach	Machinery and equipment
359	Manufacture of office, accounting and computing machinery	27amach	27amach	Machinery and equipment
361	Manufacture of electric motors, generators and transformers	28aemch	28aemch	Electrical machinery and apparatus
362	Manufacture of electricity distribution and control apparatus	28aemch	28aemch	Electrical machinery and apparatus
363	Manufacture of insulated wire and cable	28aemch	28aemch	Electrical machinery and apparatus
364	Manufacture of accumulators, primary cells and primary batteries	28aemch	28aemch	Electrical machinery and apparatus
365	Manufacture of electric lamps and lighting equipment	28aemch	28aemch	Electrical machinery and apparatus

LMD Industry Code	LMD Industry Description	SAM Activity #	SAM Activity Code	SAM Activity Description
366	Manufacture of other electrical equipment N.E.C.	28aemch		Electrical machinery and apparatus
371	Manufacture of electronic valves and tubes and other electronic components	29ardtv		Radio, television, communication equipment and apparatus
372	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	29ardtv		Radio, television, communication equipment and apparatus
373	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods	29ardtv		Radio, television, communication equipment and apparatus
374	Manufacture of medical appliances and instruments and appliances for measuring, checking, testing, navigating and for other purposes except optical instruments	30amopt		Medical, precision, optical instruments, watches and clocks
375	Manufacture of optical instruments and photographic equipment	30amopt		Medical, precision, optical instruments, watches and clocks
376	Manufacture of watches and clocks	30amopt		Medical, precision, optical instruments, watches and clocks
381	Manufacture of motor vehicles	31amtp		Motor vehicles, trailers, parts
382	Manufacture of bodies (coachwork) for motor vehicles;	31amtp		Motor vehicles, trailers, parts
383	Manufacture of parts and accessories for motor vehicles and their engines	31amtp		Motor vehicles, trailers, parts
384	Building and repairing of ships and boats	32aotrp		Other transport equipment
385	Manufacture of railway and tramway locomotives and rolling stock	32aotrp		Other transport equipment
386	Manufacture of aircraft and spacecraft	32aotrp		Other transport equipment
387	Manufacture of transport equipment N.E.C.	32aotrp		Other transport equipment
391	Manufacture of furniture	33afurn		Furniture
392	Manufacturing N.E.C...	34aomnf		Manufacturing n.e.c, recycling
411	Production, collection and distribution of electricity	35aelcg		Electricity, gas, steam and hot water supply
412	Manufacture of gas; distribution of gaseous fuels through mains	35aelcg		Electricity, gas, steam and hot water supply
413	Steam and hot water supply	35aelcg		Electricity, gas, steam and hot water supply
420	COLLECTION, PURIFICATION AND DISTRIBUTION OF WATER	36awatd		Collection, purification and distribution of water
501	Site preparation	37acnst		Construction
502	Building of complete constructions or parts thereof; civil engineering	37acnst		Construction
503	Building installation	37acnst		Construction
504	Building completion	37acnst		Construction
505	Renting of construction of demolition equipment with operators	37acnst		Construction
611	Wholesale trade on a fee or contract basis	38awtrd		Wholesale trade, commission trade
612	Wholesale trade in agricultural raw materials, livestock, food, beverages and tobacco	38awtrd		Wholesale trade, commission trade
613	Wholesale trade in house-hold goods	38awtrd		Wholesale trade, commission trade
614	Wholesale trade in non-agricultural intermediate products, waste and scrap	38awtrd		Wholesale trade, commission trade
615	Wholesale trade in machinery, equipment and supplies	38awtrd		Wholesale trade, commission trade
619	Other wholesale trade	38awtrd		Wholesale trade, commission trade
621	Non-specialized retail trade in stores	39artrd		Retail trade
622	Retail trade in food, beverages and tobacco in specialized stores	39artrd		Retail trade
623	Other retail trade in new goods in specialized stores	39artrd		Retail trade
624	Retail trade in second-hand goods in stores	39artrd		Retail trade
625	Retail trade not in stores	39artrd		Retail trade
626	Repair of personal and household goods	39artrd		Retail trade
631	Sale of motor vehicles	40amtv		Sale, maintenance, repair of motor vehicles
632	Maintenance and re-pair of motor vehicles	40amtv		Sale, maintenance, repair of motor vehicles
633	Sale of motor vehicle parts and accessories	40amtv		Sale, maintenance, repair of motor vehicles
634	Sale, maintenance and repair of motor cycles and related parts and accessories	40amtv		Sale, maintenance, repair of motor vehicles
635	Retail sale of automotive fuel	40amtv		Sale, maintenance, repair of motor vehicles
641	Hotels, camping sites and other provision of short stay accommodation	41aacct		Hotels and restaurants
642	Restaurants, bars and canteens	41aacct		Hotels and restaurants
643	Shebeen	41aacct		Hotels and restaurants
711	Railway transport	42altrp		Land transport, transport via pipe lines
712	Other land transport	42altrp		Land transport, transport via pipe lines
713	Transport via pipelines	42altrp		Land transport, transport via pipe lines
721	Sea and coastal water transport	43awtrp		Water transport
722	Inland water transport	43awtrp		Water transport
730	AIR TRANSPORT	44aatrp		Air transport
741	Supporting and auxiliary transport activities; activities of travel agencies	45atrps		Auxiliary transport
751	Postal and related courier activities	46apost		Post and telecommunication
752	Telecommunication	46apost		Post and telecommunication
811	Monetary intermediation	47afins		Financial intermediation
818	Cash loans	47afins		Financial intermediation

LMD Industry Code	LMD Industry Description	SAM Activity #	SAM Activity Code	SAM Activity Description
819	Other financial intermediation N.E.C.	47	afins	Financial intermediation
821	Insurance and pension funding, except compulsory social security	48	ainsp	Insurance and pension funding
832	Activities auxiliary to insurance and pension funding	48	ainsp	Insurance and pension funding
831	Activities auxiliary to financial intermediation, except insurance and pension funding	49	aofin	Activities to financial intermediation
841	Real estate activities with own or leased property	50	areal	Real estate activities
842	Real estate activities on a fee or contract basis	50	areal	Real estate activities
851	Renting of transport equipment	51	arent	Renting of machinery and equipment
852	Renting of other machinery and equipment	51	arent	Renting of machinery and equipment
853	Renting of personal and household goods N.E.C.	51	arent	Renting of machinery and equipment
861	hardware consultancy	52	acomp	Computer and related activities
862	Software consultancy and supply	52	acomp	Computer and related activities
863	Data processing	52	acomp	Computer and related activities
864	Data base activities	52	acomp	Computer and related activities
865	Maintenance and repair of office, accounting and computing machinery	52	acomp	Computer and related activities
869	Other computer related activities	52	acomp	Computer and related activities
871	Research and experimental development on natural sciences and engineering	53	arsea	Research and experimental development
872	Research and experimental development on social sciences and humanities	53	arsea	Research and experimental development
881	Legal, accounting, bookkeeping and auditing activities; tax consultancy; market research and public opinion research; business and management consultancy	54	aobus	Other business activities
882	Architectural, engineering and other technical activities	54	aobus	Other business activities
883	Advertising	54	aobus	Other business activities
889	Business activities N.E.C.	54	aobus	Other business activities
932	Veterinary activities	54	aobus	Other business activities
911	Central government activities	55	apuba	Government
912	Regional services council activities	55	apuba	Government
913	Local authority activities	55	apuba	Government
914	Provincial administrations	55	apuba	Government
915	S A Defense force	55	apuba	Government
916	S A Police service	55	apuba	Government
917	Correctional service	55	apuba	Government
920	EDUCATION	56	aeduc	Education
931	Human health activities	57	aheal	Health and social work
933	Social work activities	57	aheal	Health and social work
395	Recycling N.E.C.	58	awast	Sewerage and refuse disposal
951	Activities of business, employers and professional organizations	59	amorg	Activities of membership organisations
952	Activities of trade unions	59	amorg	Activities of membership organisations
959	Activities of other member-ship organizations	59	amorg	Activities of membership organisations
961	Motion picture, radio, television and other entertainment activities	60	arecr	Recreational, cultural and sporting activities
962	News agency activities	60	arecr	Recreational, cultural and sporting activities
963	Library, archives, museums and other cultural activities	60	arecr	Recreational, cultural and sporting activities
964	Sporting and other recreational activities	60	arecr	Recreational, cultural and sporting activities
940	OTHER COMMUNITY, SOCIAL AND PERSONAL SERVICE ACTIVITIES	61	aoact	Other activities
990	OTHER SERVICE ACTIVITIES	61	aoact	Other activities
10	PRIVATE HOUSEHOLDS WITH EMPLOYED PERSONS	62	anobs	Non-observed, informal, non-profit, households,

Source: authors' mappings.