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**Working Paper**

## A 2017 Social Accounting Matrix for Myanmar

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WIDER Working Paper 2020/66

## **A 2017 Social Accounting Matrix for Myanmar**

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**Abstract:** This paper documents the compilation of a 2017 Social Accounting Matrix for Myanmar. This is based on partial and unpublished National Accounts data and unpublished Supply and Use Table data, as well as Balance of Payment data and Government Finance Statistics data. It provides a detailed representation of the Myanmar economy and identifies 43 activities and 43 commodities. Labour is disaggregated by educational attainment level or by occupation group using a Labour Force Survey, while household income and expenditure detail is extracted from the Myanmar Living Conditions Survey. The Social Accounting Matrix features government, investment, and foreign accounts and is a key database for conducting economy-wide impact assessments to strengthen the evidence underpinning policy interventions.

**Key words:** Balance of Payment, income distribution, Labour Force Survey, National Accounts, Social Accounting Matrix, Supply Use Table

**JEL classification:** D31, D57, E16, J21

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The present working paper builds on previous work under this project, in particular the pre-prototype Social Accounting Matrix presented in the [WIDER Working Paper 2019/21](#) (van Seventer et al. 2019).

**Note:** The online appendix is accessible [here](https://www.wider.unu.edu/publication/2017-social-accounting-matrix-myanmar) (<https://www.wider.unu.edu/publication/2017-social-accounting-myanmar>).

List of acronyms at the end, before Appendix A.

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## 1 Introduction

This report discusses the development of (two versions of) a 2017 Social Accounting Matrix (SAM) for Myanmar. A SAM is a consistent data framework that captures data and information contained in national income accounts and industry and product accounts, as well as the monetary flows between the institutions of the economy. Since the SAM is a square accounting framework, total receipts (row totals) must equal total payments (column totals) for each matching account that it reports on. The data required to construct a SAM are available from various sources. It is therefore necessary to make a careful effort to ensure internal consistency. This process is valuable, since it helps with identifying discrepancies among the original statistical sources. For example, there are invariably differences between the imports and exports reported in trade data and in National Accounts. SAMs are economy-wide databases used in conjunction with analytical techniques to strengthen the evidence base for policy formulation processes and decision-making.

The SAM provides a detailed representation of the Myanmar economy for the year 2017, identifying 43 activities and 43 commodities. It disaggregates earnings from all employment by location (rural/urban) and by educational attainment level or by occupation, while household incomes and expenditures are broken down by per capita expenditure quintiles for urban and rural areas and engagement or not in farming activities. The SAM has accounts for government, its revenue streams, investment, and the rest of the world.

In the rest of this document, Section 2 discusses the general structure of SAMs. Section 3 describes the data sources used to construct the SAM from a macro perspective, while the finalization of the detailed SAM accounts is considered in Section 4. In Section 5, an attempt is made to derive matching employment data. Section 6 reports on key data issues noted during the compilation process, highlighting the need for further work on this SAM, and makes concluding remarks.

## 2 General structure of SAMs

A SAM is an economy-wide accounting framework that usually represents the real economy of a single country<sup>1</sup> reported as a square matrix with each account represented by a row and column. Each cell shows the payment from the account shown in the column heading to the account shown in the row heading. 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 (with written explanations instead of numbers) with reference to Myanmar-specific data.

The SAM makes a distinction between ‘activities’ (the entities that carry out production) and ‘commodities’ (representing markets for goods and non-factor services). 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 consist of output produced by local activities (which are either exported or sold domestically) and imports.

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<sup>1</sup> For general discussions of SAMs and SAM-based modelling, see Arndt et al. (2000), Breisinger et al. (2009), Pyatt (1988), Pyatt and Round (1985), and Tarp et al. (2002).

Payments by activities shown as entries down the columns in the SAM go to commodity accounts (comprising locally produced and imported goods and non-factor services, at market prices) for intermediate demand, and factors of production. Value added generated by the factors of production consists of operating surplus and income from employment, land, livestock, or fish stock. The commodity accounts make payments (shown again as columns) to domestic activities, the rest of the world, and tax accounts (on domestic and import products), as well as transaction costs.

Government consists of a core government account and different tax collection accounts, one for each tax type identified in the data. In the SAM, direct payments between enterprises, households, government, and the rest of the world reflect various transfers as reported in the Government Budget and Balance of Payment statistics.

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. Government taxes indirect capital earnings and enterprise profits according to the average corporate tax collection rates, and the SAM also reflects the repatriation to Myanmar of some profits made abroad and to other countries of profits made in Myanmar. The remaining capital earnings, together with income from employment, appear as payments to households. Households use their income to pay taxes, make transfers, save, and consume a combination of domestically produced and imported commodities.

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Table 1: The basic structure of a 2015 SAM for Myanmar

	Row number	Activities	Commodities	Factors	Enterprises	Households	Government	Taxes	Investment	Change in stocks	Rest of the world (RoW)	Total
<b>Column serial number</b>		<b>1 (43)*</b>	<b>2 (43)</b>	<b>3 (12 or 24)</b>	<b>4 (1)</b>	<b>5 (20)</b>	<b>6 (1)</b>	<b>7 (5)</b>	<b>8 (1)</b>	<b>9 (1)</b>	<b>10 (1)</b>	
<b>Activities</b>	<b>1</b>		Marketed output									<b>Activity income</b>
<b>Commodities</b>	<b>2</b>	Intermediate inputs				Marketed consumption of households	Marketed consumption of households		Investment	Change in stocks	Exports	<b>Total demand</b>
<b>Factors</b>	<b>3</b>	Value added									Remittances received by Myanmar factors from RoW	<b>Factor earnings</b>
<b>Enterprises</b>	<b>4</b>			Factor income to enterprises			Transfers to enterprises					<b>Enterprises earnings</b>
<b>Households</b>	<b>5</b>			Factor income to households	Indirect capital payments		Transfers to households				Net foreign remittances received	<b>Household income</b>

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<b>Government</b>	<b>6</b>				Transfers from enterprises to government	Transfers from households to government		Revenue from taxes			Net foreign transfers to government	<b>Government income</b>
<b>Taxes</b>	<b>7</b>	Activity taxes	Sales taxes and import duties		Corporate income taxes	Personal taxes						<b>Revenue from taxes</b>
<b>Savings</b>	<b>8</b>				Enterprises savings	Household savings	Government savings				Foreign savings	<b>Savings</b>
<b>Change in stocks</b>	<b>9</b>								Change in stocks			<b>Change in stocks</b>
<b>Rest of the world</b>	<b>10</b>		Imports	Gross payments to foreign-owned factors of production	Enterprise payments to RoW		Government transfers to RoW					<b>Foreign exchange outflow</b>
<b>Total</b>		<b>Gross output</b>	<b>Total supply</b>	<b>Factor income distribution</b>	<b>Enterprise expenditure</b>	<b>Household expenditure</b>	<b>Government expenditure</b>	<b>Revenue from taxes</b>	<b>Investment</b>	<b>Change in stock</b>	<b>Foreign exchange inflow</b>	

Note: \* number of accounts at highest level of detail.

Source: authors' compilation.

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### 3 Constructing the SAM

The main challenge of developing a SAM involves combining data from various sources into an internally coherent accounting framework. For Myanmar, the 2017 data are collected from the following sources:

1. An unpublished Supply and Use Table for year (March ending) 2015/16 compiled by the Planning Department with the support of the ADB (MoPFI 2019c).
2. An unpublished Supply and Use Table for year (March ending) 2014/15 compiled by the Planning Department with the support of the ADB, including documentation and Balance of Payment data (MoPFI 2016).
3. Unpublished expenditure GDP data collected and made available by Planning Department (MoPFI 2019c).
4. Government Finance Statistics (GFS) released by the Budget Department of the Ministry of Planning, Finance and Industry (MoPFI 2019b).
5. Published National Accounts data collected and made available by the Planning Department of the Ministry of Planning, Finance and Industry on GDP for 14 activities (MoPFI 2019a).
6. Balance of Payment data available from the Central Bank of Myanmar (2019).
7. Unpublished trade data collected and made available by the CSO (2019a).
8. World Development Indicators (World Bank n.d.).
9. Labour Force Survey data for 2017 from the Department of Labour.
10. Myanmar Living Conditions Survey 2016/17 data from the CSO (2019b).
11. Myanmar Poverty and Living Conditions Survey 2015 made available by the Planning Department of the Ministry of Planning, Finance and Industry (MoPFI 2017).

A number of steps are involved in constructing the SAM. The first step in developing a Myanmar SAM is compiling National Accounts and other official data sources into a consistent ‘Macro SAM’ framework. This is subsequently expanded with detailed industries and products using details from 20017/18 trade data, GDP for limited industries, and the 2015/16 SUT. In this ‘SUTSAM’, households and the production factor labour are presented as a single account.

The last step draws on survey information to disaggregate the labour and the household accounts. The breakdown of labour earnings (and associated employment) uses the 2017 LFS, while the 2016/17 MLCS is explored for the breakdown of household income and expenditure.

The Macro SAM shown in Table 2 is an aggregation of the more detailed Micro SAM. The rest of this section explains how each Macro SAM entry is derived and disaggregated. The notation for SAM entries is (row, column) and the values are in kyat (MMK).

- i. (Commodities, Activities) ... MMK94,401 billion  
Intermediate inputs. Total intermediate inputs is derived as the product of the ratio of total intermediate inputs to GDP at market prices from an unpublished Use Table for the (March ending) year 2015/16 and unpublished GDP expenditure data at market prices for the financial year 2017/18, both made available by the PD. Initial disaggregation is based on published 2017/18 GDP from the PD for 14 activities and expanded to 43 activities using shares of lower-level control totals from the unpublished 2015/16 PD Use Table. The results are combined with ratios of intermediate inputs to GDP from the same source to arrive at 2017 total intermediate inputs for 43 activities. Further disaggregation into a full Use Matrix is initially based on the unpublished PD Use Table for the year 2015/16.



The dimensions of disaggregation are 43 commodities  $\times$  43 activities. Intermediate inputs have been manually adjusted for the activities ‘Fruit, vegetables, and other crops’. Their intermediate input structures are absent from the unpublished 2015/16 PD Use Table. Replacement input structures are drawn from an unpublished PD 2014/15 Use Matrix. The final matrix of intermediate inputs (the Use Matrix) is derived by means of biproportional scaling.

- ii. (Labour, Activities) ... MMK40,868 billion  
 Income from employment. Income-side GDP data for 2017 are not available. Total income from employment is derived from the LFS report (DoL 2019) by multiplying total monthly wages and earnings of all employed persons by 12 and by total employment (excluding contributing family workers). This covers income from all employment (‘employees’, ‘own-account workers’, and ‘employer’). Disaggregation across 43 activities is derived from the LFS survey data. Biproportional scaling is used to ensure consistency with activity-level gross operating surplus and value added. The latter is based on published 2017/18 GDP for 14 activities from the PD expanded to 43 activities using shares of lower-level control totals from the unpublished 2015/16 PD Use Table. The dimensions of further disaggregation of income from employment are 4 labour types (no education/primary/secondary/tertiary education)  $\times$  43 activities or 10 labour types (single-digit ISCO occupations). The source of the disaggregation is the 2017 LFS survey data. These results are also benchmarked on total monthly wages and earnings of all employed persons by location (urban/rural) and broad economic sector (agriculture/industry/services) multiplied by 12 and associated employment from the LFS report (DoL 2019).
- iii. (Capital, Activities) ... MMK42,951 billion  
 Gross operating surplus. Income-side GDP data for 2017 are not available. Total gross operating surplus is derived as the residual of (i) and (ii) above. Disaggregation to 43 activities is based on unpublished 2017/18 GDP for 14 activities from the PD, expanded to 43 activities using shares of lower-level control totals from the unpublished 2015/16 PD Use Table. The results are combined with ratios of gross operating surplus to wage income from the same source to arrive at 2017/18 gross operating surplus for 43 activities. Negative gross operating surplus for air transportation services is replaced with a very small positive number. Consistency with activity-level GDP is achieved by means of biproportional scaling. Further disaggregation of capital identifies three additional types of capital stock, i.e., land for crop production, livestock, and fish stock; 80–90 per cent of gross operating surplus of crop production and 80 per cent of livestock activity and fisheries is allocated to the production factors land, livestock, and fish stock respectively. The residual is allocated to capital but is distributed directly to households; see (xii) below.
- iv. (Activity tax, Activities) ... MMK0 billion  
 Income-side GDP data for 2017 are not available. The Government Finance Statistics (GFS) do not report activity taxes.
- v. (Activities, Commodities) ... MMK178,219 billion  
 Domestic supply. Total domestic supply is derived as the sum of the activities’ total cost of production. The dimensions of disaggregation are 43 activities  $\times$  43 commodities. The source of the disaggregation is the unpublished 2015/16 PD Supply Table.
- vi. (Sales tax, Commodities) ... MMK3,658 billion  
 Sales taxes. Total sales tax is available from the GFS. It is the sum of ‘Taxes on goods and services’ (GFS, p. 10, line 114) and also includes ‘Taxes on properties’ (GFS, p. 10, line 113). The dimension of disaggregation is a row vector of 43 entries, one for each commodity identified in the SAM. Disaggregated tax (collection) rates are derived from the unpublished 2015/16 PD Supply Table, from which customs duties collected have been subtracted (see item (vii) below).

- vii. (Import tax, Commodities) ... MMK524 billion  
 Custom duties. Information on total customs duties collected is available from the 2019 GFS 'Taxes on international trade and transactions' (GFS, p. 10, line 115). The dimensions of disaggregation are 1 tax type  $\times$  43 commodities. Detailed import duty collection rates are sourced from the unpublished 2014/15 PD Supply Table. They have been adjusted so as to avoid negative domestic taxes on products; see item (vi) above.
- viii. (Rest of the world, Commodities) ... MMK25,316 billion  
 Imports. Information on total imports is available from unpublished PD GDP expenditure data. The dimensions of disaggregation are 1 foreign region  $\times$  43 commodities. The source of the disaggregation is unpublished CSO trade data that are aggregated up from HS6 to CPCv2.0 using UNStats mappings and to 43 commodities according to a mapping in Table 1 of the 2014/15 PD Supply and Use Table documentation. Service trade data is derived from a combination of Central Bank of Myanmar BoP data, World Development Indicators, and more detailed shares from the unpublished 2015/16 PD Supply Table.
- ix. (Households, Labour) ... MMK42,072 billion  
 Household income from wage earnings. Calculated as a residual. The dimensions of disaggregation are 20 household types (5 quintiles, urban/rural, and farm/nonfarm)  $\times$  4 educational attainment labour types or 10 occupations. The source of the disaggregation is the 2016/17 MLCS.
- x. (Rest of the world, Labour) ... MMK0 billion  
 Wage earnings paid to foreign (non-resident) workers. Information on total primary income payments to the rest of the world is available from the Central Bank of Myanmar BoP statistics. The unpublished 2014/15 Supply Table documentation (p. 33, table 7) allocates all payments to capital.
- xi. (Enterprises, Capital) ... MMK31,106 billion  
 Enterprise income from capital. Total gross operating surplus distributed to non-government institutions can be derived as the residual of the gross operating surplus account. All earnings are allocated to enterprises except those of land, livestock, and fish stock, which are based on shares explain in item (iii) above. The dimensions of disaggregation are 1 type of enterprise  $\times$  4 types of capital, as explained in item (iii) above.
- xii. (Households, Capital) ... MMK7,905 billion  
 Household income from gross operating surplus. Total gross operating surplus distributed to non-government institutions can be derived as the residual of the gross operating surplus account. All earnings from land, livestock, and fish stock, including the relevant shares allocated to capital as explained in item (iii) above, are allocated to farming households while the rest is transferred to enterprises. The dimensions of disaggregation are 4 types of capital  $\times$  10 types of farming households, 5 in rural and 5 in urban areas. The detailed transfers to households are based on the 2016/17 MLCS.
- xiii. (Rest of the world, Capital) ... MMK4,451 billion  
 Payments to the rest of the world of surpluses generated from ownership of capital. Information on total primary income payments is available from the Central Bank of Myanmar BoP and comprise of payments for labour as well as capital. The share of capital can be derived from the unpublished 2014/15 PD Supply and Use Table document (table 7, item D.4, property income). The dimensions of disaggregation are 4 types of capital as explained in iii above. No payments are allocated to land, livestock, and fish stock.
- xiv. (Households, Enterprises) ... MMK18,417 billion  
 Household income from enterprises (rents, dividends, interest payments). Calculated as the residual of the enterprise account. This income is only received by non-farming households. The dimensions of disaggregation are 10 household types, 5 non-farming

- rural households, and 5 non-farming urban households. Disaggregation is based on the 2016/17 MLCS, using the same distribution as in (xii) above.
- xv. (Government, Enterprises) ... MMK8,986 billion  
Includes government property income and sales of goods and services, available from the GFS (p. 10, lines 141 and 142).
- xvi. (Dir tax, Enterprises) ... MMK1,392 billion  
Corporate income tax is based on the share of non-unallocable taxes on income, profits, and capital gains payable by corporations and other enterprises, available from the GFS (p. 10, line 111).
- xvii. (Sav=Inv, Enterprises) ... MMK4,722 billion  
Retained earnings by enterprises, initially derived using a retained earnings share of 14 per cent.
- xviii. (Rest of the world, Enterprises) ... MMK9 billion  
Payments by enterprises to the rest of the world are assumed to be 10 per cent of non-government secondary income payments (remittances), available from the Central Bank of Myanmar BoP.
- xix. (Commodities, Households) ... MMK48,406 billion  
Household expenditure. Information on total expenditures is available from PD unpublished GDP expenditure data. The dimensions of disaggregation are 43 commodities × 20 household types. The source of the disaggregation is the unpublished PD 2015/16 Use Table and the 2016/17 MLCS. Missing observations in the MLCS are initially covered by expenditure distributions from the 2015 MPLC. If still not available, proxies are used as indicated in Appendix D. Detailed food expenditure patterns are not available from the MLCS for a couple of areas (Rakhine, Kayin) and are assumed to be that same as for the rest of the country.
- xx. (Government, Households) ... MMK89 billion  
Household social contributions payable, available from the GFS (p. 10, line 12). The dimensions of disaggregation are 20 household types. No direct distribution of such payments across households is available from the 2016/17 MLCS. The disaggregation is based on the distribution of receipts of social benefits as reported in the MLCS. The implicit assumption is that households make social contributions in the same proportion as what they receive in social benefits.
- xxi. (Dir tax, Households) ... MMK526 billion  
Individual income tax based on the share of non-unallocable taxes on income, profits, and capital gains payable by individuals, available from the GFS (p. 10, line 111). The dimensions of disaggregation are 20 household types. The disaggregation is based on the 2016/17 MLCS, using the shares of total household income from all sources as a proxy due to lack of tax-specific data.
- xxii. (Sav=Inv, Households) ... MMK22,162 billion  
Household savings. At the macro level this item is calculated as the balancing item of the savings-investment account. The dimensions of disaggregation are 20 household types. The disaggregation is based on the 2016/17 MLCS, using the distribution of total household outlays as a proxy due to lack of savings-specific data.
- xxiii. (Rest of the world, Households) ... MMK79 billion  
Payments by households to the rest of the world are assumed to be 90 per cent of non-government secondary income payments (remittances). The latter is available from the Central Bank of Myanmar BoP. The dimensions of disaggregation are 20 household types. The source of the disaggregation is the 2016/17 MLCS.
- xxiv. (Commodities, Government) ... MMK16,047 billion

- Government expenditure. Available from unpublished PD GDP expenditure data. The dimensions of disaggregation are 43 commodities. The source of the disaggregation is the unpublished PD 2015/16 Use Table.
- xxv. (Enterprises, Government) ... MMK996 billion  
Interest payments. Available from the GFS (p. 9, line 241).
- xxvi. (Households, Government) ... MMK732 billion  
Social benefit and state pension transfers from government to households. Available from the GFS (p. 9, line 27). The dimensions of disaggregation are 20 household types. The data source for the disaggregation is the 2016/17 MLCS.
- xxvii. (Sav=Inv, Government) ... MMK-2,635 billion
- xxviii. Deficit on the current account of the government. Calculated as the residual of the government account. The balance on the current account of the government in the SAM deviates from the GFS publication because the SAM uses expenditure GDP data from the National Accounts for government expenditure instead of GFS data. The latter would have yielded a surplus on the government's current account.
- xxix. (Rest of the world, Government) ... MMK254 billion  
Interest payments by the government to the rest of the world. Available from the GFS (p. 9, line 242).
- xxx. (Government, Activity tax) ... MMK0 billion  
Transfer from the Internal Revenue Department to government. See (iv) above.
- xxxi. (Government, Sales tax) ... MMK3,658 billion  
Transfer from Internal Revenue Department to government. See (vi) above.
- xxxii. (Government, Import tax) ... MMK524 billion  
Transfer from Internal Revenue Department to government. See (vii) above.
- xxxiii. (Government, Dir tax) ... MMK1,918 billion  
Transfer from Internal Revenue Department to government. See (xvi) and (xxi) above.
- xxxiv. (Commodities, Change in stocks) ... MMK1,178 billion  
Change in stocks. Available from unpublished PD GDP expenditure data. The dimensions of disaggregation are 43 commodities. The source of the disaggregation is the unpublished PD 2015/16 Use Table.
- xxxv. (Commodities, Sav=Inv) ... MMK29,628 billion  
Gross domestic fixed investment. Available from unpublished PD GDP expenditure data. The dimensions of disaggregation are 43 commodities. The source of the disaggregation is the unpublished PD 2015/16 Use Table.
- xxxvi. (Change in stocks, Sav=Inv) ... MMK1,178 billion  
Total of changes in stocks transferred to the savings-investment account. See (xxxiv) above.
- xxxvii. (Commodities, Rest of the world) ... MMK18,058 billion  
Exports. Available from unpublished PD GDP expenditure data. The dimensions of disaggregation are 43 commodities. The source of the disaggregation is unpublished CSO trade data that are aggregated up from HS6 to CPCv2.0 and to 43 commodities, with the latter mapped as in Table 1 of the 2014/15 PD Supply and Use Table documentation. Service trade data are derived from a combination of Central Bank of Myanmar BoP data, World Development Indicators, and more detailed shares from the 2015/16 PD Supply Matrix.
- xxxviii. (Labour, Rest of the world) ... MMK1,205 billion  
Primary income receipts by labour from abroad. Information on total primary income receipts is available from the Central Bank of Myanmar BoP accounts. The labour share is derived from the unpublished PD Supply and Use Table documentation (p. 33, table 7). The dimensions of the disaggregation are 4 education attainment labour types or 10 single-

- digit ISCO occupation groups. The disaggregation reflects the same shares as for total domestic labour.
- .xxix. (Capital, Rest of the world) ... MMK512 billion  
Primary income receipts by capital from abroad. Information on total primary income receipts is available from the Central Bank of Myanmar BoP. The capital share is derived from the unpublished PD Supply = and Use Table documentation (p. 33, table 7). No income is allocated to land, livestock, and fish stock.
  - xli. (Enterprises, Rest of the world) ... MMK1,423 billion  
Secondary income receipts by enterprises from abroad. Information on total secondary income receipts is available from the Central Bank of Myanmar BoP. The enterprise share in non-government receipts is assumed to be 60 per cent. The government share is discussed in item (xlii) below.
  - xli. (Households, Rest of the world) ... MMK2,135 billion  
Secondary income receipts by households from abroad. Information on total secondary income receipts is available from the Central Bank of Myanmar BoP. The household share in non-government receipts is assumed to be 40 per cent. The dimensions of disaggregation are 20 household types. The source of the disaggregation is the 2016/17 MLCS. The government share is discussed in item (xlii) below.
  - xlii. (Government, Rest of the world) ... MMK220 billion  
Secondary income receipts by government from abroad (grants). Information on total secondary income receipts is available from the GFS (p. 10, line 132).
  - xliii. (Sav=Inv, Rest of the world) ... MMK6,557 billion  
Foreign savings is the deficit on the current account of the BoP. Calculated as the residual of the rest of the world account.

Table 2: A 2017 Macro SAM for Myanmar (billions of kyat)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	mact	mcom	mlab	mcap	ment	mhhhd	mgov	matx	mstx	mmtx	mdtx	mstk	ms-i	mrow	mtot
1	mact	—	178,219	—	—	—	—	—	—	—	—	—	—	—	178,219
2	mcom	94,401	—	—	—	48,406	16,047	—	—	—	—	1,178	29,628	18,058	207,717
3	mlab	40,868	—	—	—	—	—	—	—	—	—	—	—	1,205	42,072
4	mcap	42,951	—	—	—	—	—	—	—	—	—	—	—	512	43,462
5	ment	—	—	—	31,106	—	996	—	—	—	—	—	—	1,423	33,525
6	mhhhd	—	—	42,072	7,905	18,417	732	—	—	—	—	—	—	2,135	71,261
7	mgov	—	—	—	8,986	89	—	—	3,658	524	1,918	—	—	220	15,394
8	matx	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9	mstx	—	3,658	—	—	—	—	—	—	—	—	—	—	—	3,658
10	mmtx	—	524	—	—	—	—	—	—	—	—	—	—	—	524
11	mdtx	—	—	—	1,392	526	—	—	—	—	—	—	—	—	1,918
12	mstk	—	—	—	—	—	—	—	—	—	—	—	1,178	—	1,178
13	ms-i	—	—	—	4,722	22,162	-2,635	—	—	—	—	—	—	6,557	30,805
14	mrow	—	25,316	—	4,451	9	79	254	—	—	—	—	—	—	30,109
15	mtot	178,219	207,717	42,072	43,462	33,525	71,261	15,394	—	3,658	524	1,918	1,178	30,805	30,109

Source: authors' calculations.

## 4 Finalizing the SAM

Final balancing of the detailed data described above is achieved in three broad steps.

1. Imbalances between demand and supply of commodities are absorbed by domestic supply of commodities. Demand consists of intermediate sales, recycled margins, household expenditure, government expenditure, changes in stocks, gross domestic fixed investment demand, and exports. Commodities are supplied by domestic activities to which margins, domestic sales tax, import duties, and imports are added. Any component of demand and supply can be changed manually if additional information is available.
2. Imbalances between activity supply and the cost of its production are distributed across the use and primary input matrices (before disaggregation of the latter) by means of biproportional scaling. The result is a balanced SUTSAM—one that identifies a **single** labour type, a **single** type of capital, and a **single** type of household.
3. Finally, the balancing of detailed household income and expenditure after disaggregation of the production factors and households is achieved by means of biproportional scaling of the income distribution submatrix. The following can be noted:
  - a. Income from employment is disaggregated using the 2017 LFS for both the educational attainment version and the occupation version.
  - b. All sources of household income and household expenditure were initially, and where possible, disaggregated across household types using the 2016/17 Household Survey data from the MLCS. Some household expenditures are not included in the MLCS. In these cases, shares are drawn from the 2015 MPLCS. Proxies from other expenditures are used as shown in Appendix D.
  - c. Food expenditure details were not available for the Kayin and Rakhine areas. Shares for the rest of the country are used as proxies.
  - d. Information on the payment of taxes and savings by individuals in households is not available in the 2016/17 MLCS or 2015 MPLCS. Total (macro) tax payments are distributed across households based on their share in total household income from all sources as reported in the MLCS. Total (macro) savings are distributed across households based on their share in total household outlays as reported in the MLCS.
  - e. On the income side, the 2016/17 MLCS offers earnings from employment for each household type by educational attainment group and urban/rural (as well as for occupations). The MLCS also records non-employment-related receipts by households, including for ‘income from dividends, ownerships, private pensions, etc.’, ‘social transfers from the government’, and those ‘received from the rest of the world’.

## 5 Employment

The 2017 LFS is used to extract income from employment for labour category by activity. From the same source it is possible to derive physical employment by activity and educational attainment and occupation for both rural and urban location. The other data source for employment is the LFS report. Although only offering headline data, the LFS report is considered to be the benchmark. The total number of people in employment in Myanmar is, according to the LFS report, 20,912,000. This includes

- i. Employees: permanent/regular
- ii. Employees: casual
- iii. Employee: paid apprentice
- iv. Working as employer (with regular employees)
- v. Working as own-account worker (without regular employees)
- vi. Helping without pay in a household/family business

The dimensions of the employment data match those of the incomes earned from employment reported in the SAM; 43 activities are identified and for each, the employment estimates are broken down by highest level of education attained or one-digit ISCO classified occupation. The employment estimates are derived from the survey data and biproportionally adjusted to be consistent with the following LFS report benchmarks:

- Total employment
- Employment shares for broad one-digit ISIC classified industries and one-digit ISCO classified occupations

Detailed results are available in the companion workbook (in the online appendix to this paper).

## 6 Conclusions and way forward

A 2017 SAM and an associated employment dataset has been constructed for Myanmar. While the SAM reflects its underlying data in a reasonable way, it would be possible to improve a number of aspects of the data sources used.

1. The unpublished 2015 SUT revealed several shortcomings:
  - a. Intermediate inputs for crop activities other than paddy is missing. The intermediate input structures from the 2014 SUT were used as a proxy.
  - b. No trade and transport margins are reported for crop activities other than paddy. The 2014 SUT reported that these margin rates were similar to those for paddy. For the 2017 SAM, the margin rates for paddy were applied to the other crop activities.
  - c. Recycled transport margins for air and water transport are missing in the 2015 SUT. A separate unpublished distribution of the recycled transport margins was made available by the PD and used for the 2017 SAM.
  - d. Negative Gross Operating Surplus (GOS) is reported for air transport. While this can be explained by the notion that the Myanmar air transport industry is making a loss, it creates problems for models based on a SAM with such a feature. GOS has been set manually to a very small positive value.
  - e. Similarly, negative sales taxes on travel agent services have been reset to be zero
2. A breakdown of macro GDP from the income side of the economy is not available. There is no detail on the share of labour and capital in GDP at factor costs. Related to this, no activity taxes are identified and the GFS data do not report activity taxes. The solution used here is as follows:
  - a. Income from employment as reported by the 2017 LFS is used. This includes income from all forms of employment, including wage earnings, income of own-account workers, and income from employment by employers.
  - b. GOS for each activity is derived to fit income from employment and GDP at basic prices. The latter can be derived from National Accounts data for 14 sectors,



expanded by means of the PD 2015/16 SUT while being matched to expenditure GDP less product taxes.

- c. The returns to land, livestock, and fish stock are currently based on assumptions; see item (iii) in Section 3. One option would be to consider using the share from SAMs for similar economies in the region, such as Vietnam. What is left as GOS—the return to capital in agriculture—is currently assumed to be all transferred directly to households which are engaged in farming.
3. In the 2017 National Accounts, government expenditure is reported to be more than 2.5 times higher than what is reported in the GFS as the sum of ‘Compensation of employees’ and ‘Use of goods and services’. Consequently, the GFS reports a surplus on the government’s current account while the 2017 SAM reports a deficit. This is also the case when comparing 2017 National Accounts government expenditure with the PD 2015/16 SUT. As a result, the supply of public administration, health, and education services reported in the latter falls well short of what is demanded. Consequently, there are considerable differences between the economic structures of the 2017 SAM and the PD 2015/16 SUT. In particular, income from employment in public administration, health, and education services will be much higher than what is reported in the 2017 LFS. In turn, employment estimates from the 2017 LFS will now be underestimates, while the opposite is the case for income per worker.
4. The sum of GDP for 14 sectors at factor costs is more than 5 per cent higher than expenditure-side GDP at market prices. After accounting for product taxes, the discrepancy rises to almost 11 per cent. Moreover, according to the 2017 LFS, income earned from employment in agriculture crops is higher than GDP according to the National Accounts, which would imply negative GOS. After scaling sector GDP to match expenditure GDP at factor costs, this anomaly also applies to several other sectors among the 14 sectors. This line of enquiry was therefore aborted and the ratios of GOS to GDP as reported in the 2015/16 SUT were used as a starting point instead.
5. The 2016/17 MLCS does not report income tax outlays by households. The shares of such outlays for the household types identified in the SAM are derived from the households’ shares in income from all sources as reported by the MLCS. When taking the ratios of the results to household expenditures on goods and services, this implies only a mild progressivity in the average tax rates. Note also that total tax collected, as reported in the GFS, as a share of household expenditure reported in the National Accounts is only 1.1 per cent.
6. Similarly, household savings are not reported in the 2016/17 MLCS. The distribution of savings across households is based on their shares in expenditure on goods and services.
7. Information on household social contributions payable is not covered by the 2016/17 MLCS, so no direct distribution of such payments across households is available. For the purposes of this SAM, the disaggregation is based on the distribution of receipts of social benefits as reported in the MLCS. The implicit assumption is that households make social contributions in the same proportion as what they receive from social benefits.
8. The 2016/17 MLCS shows missing data for detailed food expenditure shares in a couple of areas (Rakhine and Kayin). The expenditure shares for the rest of the country are applied to this part of the population.

It is clear that in some respects the SAM is based on imperfect underlying information. In particular this relates to inconsistencies inherent in the national accounting of GDP as well as compared with the 2017 LFS. In addition, the 2016/17 MLCS lacks information on some key variables such as savings, tax payments, and income from non-employment sources. We hope that through the use of this SAM for various modelling purposes, these and other gaps in

knowledge about the structure of the Myanmar economy will be highlighted. This knowledge may help to improve the SAM in future rounds of its development in Myanmar.

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## List of acronyms

ADB	Asian Development Bank
BoP	Balance of Payment
CBM	Central Bank of Myanmar
CSO	Central Statistical Organization
CPC	Central Product Classification
DoL	Department of Labour
GDP	Gross Domestic Product
GOS	Gross Operating Surplus
HS	Harmonised System Merchandise Trade Classification
ISCO	International Standard Classification of Occupations
ISIC	International Standard Industrial Classification
LFS	Labour Force Survey
MLCS	Myanmar Living Conditions Survey (2017)
MoPFI	Ministry of Planning, Finance and Industry
MPLCS	Myanmar Poverty and Living Conditions Survey (2015)
PD	Planning Department of the Ministry of Planning, Finance and Industry
SAM	Social Accounting Matrix
SUT	Supply and Use Table

## Appendix A: Macro SAM codes

Macro SAM	Description
mact	Activities
mcom	Commodities
mlab	Income from employment (including 'own-account workers' and 'employers')
mcap	Gross operating surplus
ment	Enterprises
mhhd	Households
mgov	Government
matx	Activity tax (on production)
mstx	Domestic tax on goods and services collected
mmtx	Import duties collected
mdtx	Direct tax on income earned by enterprises and households
mstk	Changes in stocks
ms-i	Savings-investment account
mrow	Rest of the world

Source: authors' compilation.

## Appendix B: SAM commodity mapping to CPC 2.0 and SAM activity mapping to ISICv4

	Product/industry	Product* (CPC 2.0)	Industry (ISIC 4)
1	Paddy	113	112
2	Vegetables	012 (except 01231, 0124), 015, 01801, 01803	113
3	Fruits	013, 0145 to 0149	0121–0126
4	Beans	0141	No ISIC code available
5	Other crops	01 (all others not in 1, 2, or 3 above), 8611	011–017 (all others), 0161, 0163, 0164, part of 015
6	Livestock	02, 34654, 3911, 86121	014, 0162, 017, part of 015
7	Forestry and logging	03, 8613, 8614	2
8	Fisheries	04, 8615	3
9	Fuel minerals (energy)	11 (except 11020, 11040), 12	05, 06
10	Other mining including support services to mining	13 to 16, 862	07, 08, 09
11	Manufacture of food, beverage, and tobacco products	21 to 25 (except 2411), 881	42714
12	Manufacture of wearing apparel and textiles	26 to 28 (except 2831), 8821, 8822,	13–14
13	Manufacture of printing and reproduction of recorded media	322 to 3269, 328, 8912	18
14	Manufacture of coke and refined petroleum products	11020, 11040, 33 (except 336), 3371, 8841	19
15	Manufacture of non-metallic mineral products	3456, 37, 38704, 46932, 8853	23
16	Other manufacturing	2411, 2831, 29 to 31, 321, 32512, 327, 336, 3371, 34 (except 3372, 3456, 34654), 35, 36, 38 (except 3621, 3894, 3895, 38962, 38963), 39 (except 3911), 38 to 49 (except 38704, 46932, 476, 478), 8711, 8712, 87149, 87152, 87154, 87156, 87159, 873 (except 87332), 8823, 883, 8842, 8843, 8851, 8852, 886 to 889, 892, 893	15–17, 20–22, 24–33
17	Electricity, gas, and steam	17, 3372, 691, 6922, 8631, 8632, 8634	35
18	Water supply, sewerage	18, 3621, 6921, 6923, 8633, 8635, 894, 941 to 944, 949	36–39
19	Construction	5, 87157	41–43
20	Sale of motor vehicles	61–62 (sale of motor vehicles only)	451
21	Maintenance and repair of motor vehicles	8714, 62281 (except sale of motor vehicles), 66282	452
22	Wholesale and retail trade	61–62 (all other goods)	46–47
23	Land transport	6411, 64131, 64132, 6421, 6422, 651, 6601	49
24	Water transport	6412, 64133, 6423, 652, 6602	50
25	Air transport	64134, 6424, 6425, 653, 6603	51
26	Warehousing and support activities for transportation	67	52
27	Postal and courier	68, 32690 (part), 38962	53
28	Telecommunication	841, 842	55
29	Hotels	631, 632	56
30	Restaurants	633, 634	58–60
31	Publishing, motion pictures, video, TV, and radio	322 to 324, 32511, 3252, 3253, 3254, 3262, 3263, 3895, 476, 478, 7331, 7332, 83143, 8363, 843, 846, 8911, 961	61
32	Computer programming, consultancy, and information service activities	8313, 83141, 83142, 8315, 8316, 844, 85991, 87332	62–63

<b>33</b>	Banking	32610 (part), 711, 712, 717	64
<b>34</b>	Insurance and other financial auxiliary services	713 to 716	65 and 66
<b>35</b>	Real estate	72	68
<b>36</b>	Owner occupied dwellings		
<b>37</b>	Professional, scientific, and technical activities	3255, 3894, 81, 82, 8311, 8312, 8319, 832 to 835, 8361, 8362, 837 to 839, 85999	69 to 75
<b>38</b>	Other administrative and support services	731, 732, 7333 to 7339, 851 to 854, 8591 to 8597, 945	77–78, 80–82
<b>39</b>	Travel agencies	8551 to 8556	79
<b>40</b>	Public administration and defence; compulsory social security	91	84
<b>41</b>	Education	92	85
<b>42</b>	Health	93	86–88
<b>43</b>	Domestic and other services	38961, 38963, 845, 8713, 87151, 87153, 87155, 872, 95, 962 to 979, 98, 99	90–97, 98, 99

Note: \* characteristics of products of corresponding industries.

Source: authors' compilation based on Table 1 of 2014/15 PD SUT documentation.

## Appendix C: Global set for a 2017 Myanmar SAM

	Codes	Codes
1. Labels	a_paddy	c_paddy
2. Paddy	a_veggy	c_veggy
3. Vegetables	a_fruit	c_fruit
4. Fruits	a_beans	c_benas
5. Beans	a_ocrop	c_ocrop
6. Other crops	a_livst	c_livst
7. Livestock	a_fores	c_fores
8. Forestry and logging	a_fishy	c_fishy
9. Fisheries	a_fuelm	c_fuelm
10. Fuel minerals	a_othmn	c_othmn
11. Other mining including support services	a_fobvt	c_fobvt
12. Food, beverage, and tobacco products	a_txclf	c_txclf
13. Wearing apparel and textiles	a_print	c_print
14. Printing and reproduction of recorded media	a_petr	c_petr
15. Coke and refined petroleum products	a_nonme	c_nonme
16. Non-metallic mineral products	a_omanf	c_omanf
17. Other manufacturing products	a_elctr	c_elctr
18. Electricity, gas, and steam	a_water	c_water
19. Water supply, sewerage	a_cnstr	c_cnstr
20. Construction	a_mvtrd	c_mvtrd
21. Sale Of motor vehicles	a_mvrep	c_mvrep
22. Maintenance and repair of motor vehicles	a_trade	c_trade
23. Wholesale and retail trade	a_ltrnp	c_ltrnp
24. Land transport	a_wtrnp	c_wtrnp
25. Water transport	a_atrnp	c_atrnp
26. Air transport	a_strnp	c_strnp
27. Warehousing and support activities for transportation	a_postc	c_postc
28. Postal and courier	a_telco	c_telco
29. Telecommunication	a_hotel	c_hotel
30. Hotels	a_resta	c_resta
31. Restaurants	a_pbltv	c_pbltv
32. Publishing, motion pictures, video, TV, and radio	a_itsrv	c_itsrv
33. Computer programming, consultancy, and information service activities	a_fnsrv	c_fnsrv
34. Banking	a_insur	c_insur
35. Insurance and other financial auxiliary services	a_reale	c_reale
36. Real estate	a_ownoc	c_ownoc
37. Owner occupied dwellings	a_prsrv	c_prsrv
38. Professional, scientific, and technical activities	a_oamin	c_oamin
39. Other administrative and support services	a_travl	c_travl
40. Travel agencies	a_padmn	c_padmn
41. Public administration and defence; compulsory social security	a_educa	c_educa
42. Education	a_healt	c_healt
43. Health	a_othsv	c_othsv
44. Domestic and other services	trc	
45. Trade and transport margins	f_noedu	
46. Income from employment no education	f_primed	
47. Income from employment primary education	f_seced	
48. Income from employment secondary education	f_terted	
49. Income from employment tertiary education	f_arm	
50. Income from employment armed forces occupations	f_man	
51. Income from employment managers	f_prof	
52. Income from employment professionals	f_tec	
53. Income from employment technicians and associate professionals	f_cle	
54. Income from employment clerical support workers	f_srv	
55. Income from employment service and sales workers	f_agr	
56. Income from employment skilled agricultural, forestry, and fishery workers	f_trd	
57. Income from employment craft and related trades workers	f_mch	
58. Income from employment plant and machine operators, and assemblers	f_elm	
59. Income from employment elementary occupations	f_cap	
60. Income from capital	f_landd	
61. Income from land	f_livst	
62. Income from livestock		



1. Labels	Codes	Codes
63. Income from fish stock	f_fsstk	
64. Enterprises	i_entpr	
65. Households rural farm 1q	i_hrfaq1	
66. Households rural farm 2q	i_hrfaq2	
67. Households rural farm 3q	i_hrfaq3	
68. Households rural farm 4q	i_hrfaq4	
69. Households rural farm 5q	i_hrfaq5	
70. Households rural nonfarm 1q	i_hrnfq1	
71. Households rural nonfarm 2q	i_hrnfq2	
72. Households rural nonfarm 3q	i_hrnfq3	
73. Households rural nonfarm 4q	i_hrnfq4	
74. Households rural nonfarm 5q	i_hrnfq5	
75. Households urban farm 1q	i_hufaq1	
76. Households urban farm 2q	i_hufaq2	
77. Households urban farm 3q	i_hufaq3	
78. Households urban farm 4q	i_hufaq4	
79. Households urban farm 5q	i_hufaq5	
80. Households urban nonfarm 1q	i_hunfq1	
81. Households urban nonfarm 2q	i_hunfq2	
82. Households urban nonfarm 3q	i_hunfq3	
83. Households urban nonfarm 4q	i_hunfq4	
84. Households urban nonfarm 5q	i_hunfq5	
85. Government	i_gov	
86. Activity tax	atx	
87. Factor tax	ftx	
88. Domestic tax on products	stx	
89. Custom duties	mtx	
90. Export tax	etx	
91. Direct tax on income earned by enterprises and households	dtx	
92. Change in stocks	stk	
93. Savings-investment	s-i	
94. Rest of the world	i_row	

Notes: Income from employment for occupation groups as shown in rows 50–59 are used in the SAM with occupational disaggregation of labour. Income from employment for education attainment groups as shown in rows 46–49 are used in the SAM with educational attainment disaggregation of labour.

Source: authors' compilation.

## Appendix D: Mapping of educational attainment categories in the 2017 LFS to SAM categories

Table D1: Mapping of educational attainment categories in the 2015 LFS to SAM categories

2017 LFS		Social Accounting Matrix	
1	Never attended	NoEdu	No education
2	Less than primary	NoEdu	No education
3	Primary	PrimEd	Primary education
4	Middle	SecEd	Secondary education
5	High school	SecEd	Secondary education
6	Undergraduate diploma	TerEd	Tertiary education
7	Bachelor degree and above	TerEd	Tertiary education

Source: Department of Labour (2017) LFS and authors' own mapping.

Table D2: Occupations in the SAM

1-digit ISCO		SAM code
0	Armed forces occupations	Arm
1	Managers	Man
2	Professionals	Prof
3	Technicians and associate professionals	Tec
4	Clerical support workers	Cle
5	Service and sales workers	Srv
6	Skilled agricultural, forestry, and fishery workers	Agr
7	Craft and related trades workers	Trd
8	Plant and machine operators, and assemblers	Mch
9	Elementary occupations	Elm

Source: Department of Labour (2016) and authors' own mapping.

## Appendix E: Sources and proxies used for missing 2016/17 MLCS expenditure and other outlay data

Label	Short label	Source	Proxy if 'Not available'	Short label
1 Paddy	c_paddy	MLCS_2017		
2 Vegetables	c_veggy	MLCS_2017		
3 Fruits	c_fruit	MLCS_2017		
4 Beans	c_beans	Not available	Other crops	c_ocrop
5 Other crops	c_ocrop	MLCS_2017		
6 Livestock	c_livst	MLCS_2017		
7 Forestry and logging	c_fores	Not available	Electricity, gas, and steam	c_elctr
8 Fisheries	c_fishy	MLCS_2017		
9 Fuel minerals	c_fuelm	Not available	Electricity, gas, and steam	c_elctr
10 Other mining including support services	c_othmn	Not available	Other manufacturing products	c_omanf
11 Food, beverage, and tobacco products	c_fobvt	MLCS_2017		
12 Wearing apparel and textiles	c_txclf	MLCS_2017		
13 Printing and reproduction of recorded media	c_print	Not available	Publishing, motion pictures, video, TV, and radio	c_pbltv
14 Coke and refined petroleum products	c_petr	MLCS_2017		
15 Non-metallic mineral products	c_nonme	Not available	Other manufacturing products	c_omanf
16 Other manufacturing products	c_omanf	MLCS_2017		
17 Electricity, gas, and steam	c_elctr	MLCS_2017		
18 Water supply, sewerage	c_water	MLCS_2017		
19 Construction	c_cnstr	MPLCS_2015		
20 Sale of motor vehicles	c_mvtrd	MLCS_2017		
21 Maintenance and repair of motor vehicles	c_mvrep	MPLCS_2015	Domestic services and other services	c_othsv
22 Wholesale and retail trade	c_trade	Not available		
23 Land transport	c_ltrnp	MLCS_2017		
24 Water transport	c_wtrnp	MLCS_2017		
25 Air transport	c_atrnp	MLCS_2017		
26 Warehousing and support activities for transportation	c_strnp	Not available	All transport	All Transport
27 Postal and courier	c_postc	Not available	All transport	All Transport
28 Telecommunication	c_telco	MLCS_2017		
29 Hotels	c_hotel	MLCS_2017		
30 Restaurants	c_resta	MLCS_2017		
31 Publishing, motion pictures, video, TV, and radio	c_pbltv	MLCS_2017		
32 Computer programming, consultancy, and information service activities	c_itsrv	Not available	Telecommunication	c_telco
33 Banking	c_fnsrv	Not available	Education	c_educ
34 Insurance and other financial auxiliary services	c_insur	Not available	Education	c_educ
35 Real estate	c_reale	MLCS_2017		
36 Owner occupied dwellings	c_owno	MPLCS_2015	Domestic services and other services	c_othsv
37 Professional, scientific, and technical activities	c_prsrv	Not available	Domestic services and other services	c_othsv
38 Other administrative and support services	c_oamin	Not available	Domestic services and other services	c_othsv
39 Travel agencies	c_travl	Not available	Air transport	c_atrnp
40 Public administration, and defence; compulsory social security	c_padmn	Not available	Domestic services and other services	c_othsv
41 Education	c_educ	MLCS_2017		
42 Health	c_healt	MLCS_2017		
43 Domestic services and other services	c_othsv	MLCS_2017		
44 Income tax		Not available	HH Total income from all sources	
45 Savings		Not available	HH Total MLCS17 outlays	
46 Transfers to RoW		MLCS_2017		

Source: authors' mapping.