

Revisiting the Informal Aspects of the Activity of Countries Studied through Social Accounting and Socio-Demographic Matrices, with an Application to Mozambique

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Mozambique.

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Abstract

Approaches based on Social Accounting Matrices (SAMs) and Socio-Demographic Matrices (SDMs) will be presented as a way of capturing relevant networks of linkages and the corresponding multiplier effects, which can subsequently be used for modelling the activity of the countries to be studied. Emphasis will be placed on the activity of household unincorporated enterprises that will be identified with the informal sector.

Based on methodological principles derived mainly from the works of Richard Stone, a proposal will be made to study the economic activity of Mozambique in 2016 in a matrix format, with special attention to the informal sector in general and, within this, forestry, and logging. Such a proposal includes, on the one hand, people – represented by a SDM – and, on the other hand, activities, products, factors of production and institutions – represented by a SAM.

The exposition will mostly be accompanied by an application to the above-mentioned reality. Scenarios, involving changes in functional and institutional distribution of income, will be presented and the macroeconomic effects of these changes, will be summarised in the form of changes in the macroeconomic aggregates, such as, Gross Domestic Product, Gross National Income and Disposable Income.

Keywords: Social Accounting Matrix; Socio-Demographic Matrices; Informal Economy. *JEL Classification*: E01; E16; J11

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Abbreviations, except those of the descriptions associated to Table 1

CAE.. Classificação das Actividades Económicas (revision 2)

CNBS .. Classificação Nacional de Bens e Serviços (revision 2)

CPC.. Central Product Classification (version 2.1)

GDP .. Gross Domestic Product

GNI.. Gross National Income

GNP.. Gross National Product

IEA.. Integrated Economic Accounts

INE .. Instituto Nacional de Estatística of Mozambique

ISIC.. International Standard Industrial Classification of All Economic Activities (revision 4)

NLB .. Net Lending or Borrowing

NPISH ... Non-Profit Institutions Serving Households

S.. Gross Saving

SAM.. Social Accounting Matrix

SNA or SNA2008.. System of National Accounts 2008 – ISWGNA (2009)

CONTENTS

1. Introduction 1
2. Approaches based on SAMs and SDMs 2
3. A SAM-based approach
3.1. Constructing and working with numerical versions of SAMs
3.1.1. The SAM's basic structure and its consistency with the whole system 4
3.1.2. Disaggregations and extensions
3.1.3. Aggregates and indicators
3.2. An algebraic version of the SAM: the accounting multipliers
4. Constructing numerical versions of SDMs
5. Studying the informal aspects of the activity of countries with SAMs and SDMs. The case of
forestry and logging in Mozambique in 2016 23
6. Summary and concluding remarks 27
References
Appendix

List of Tables

1.	The Basic SAM by blocks	5
2.	Basic SAM of Mozambique in 2016 (estimate)	8
3.	SAM of Mozambique in 2016, with disaggregated factors of production and the (domestic) institutions' current and accumulation accounts (estimate)	14
4.	Functional distribution of the income generated in Mozambique in 2016	17
5.	Institutional distribution of the income generated in Mozambique in 2016	18
6.	The SAM in endogenous and exogenous accounts	19
7.	The standard SDM	21
8.	SDM of Mozambique in 2016 with population by age group (estimate)	23
9.	Percentage changes in macroeconomic aggregates in the two scenarios of possible increases in the income generated in forestry and logging by informal labour of Mozambique in 2016	26

(Appendix)

A.1 Integrated Economic Accounts of Mozambique in 2016 (estimate)	
a. uses and changes in assets	33
b. resources and changes in liabilities and net worth	34
A.2. Disaggregation and description of the SAM accounts	35
A.3. Supply table of Mozambique in 2016 (estimate)	36
A.4. Use table of Mozambique in 2016 (estimate)	37
A.5. Demographic statistics of Mozambique in 2016 (estimate)	38
A.6. Inflows and outflows of population by age group for a SDM of Mozambique in 2016	39
A.7. SAM of Mozambique in 2016, for the study of the informal aspects of the forestry and log	gging
(estimate)	41

1. Introduction

The Social Accounting Matrix (SAM) and the Socio-Demographic Matrix (SDM) are tools that have specific features intended for studying the activity of countries. Both matrices cover movements in time and space, which are expressed by the former matrix in units of currency and by the latter matrix in human beings.

Such features allow for the reading and interpretation of the reality under study, leading to the production of an empirical work which is not only capable of highlighting specific aspects of that activity, but also offers the chance to experiment with different interventions with regard to its functioning.

Section 2 outlines the main features of the SAM and SDM-based approaches, adopting a methodological framework which is based on Richard Stone's works. According to this framework, SAMs and SDMs can describe the activity of countries either empirically or theoretically, depending on whether they are presented in a numerical or an algebraic version, respectively.

A proposal is made for the development both of a SAM and of a SDM in Sections 3 and 4. Together with an explanation of possible alternative taxonomies, these presentations show how these matrices can be used as an alternative support for studies being carried out in several areas, as well as for the work of those taking part in the policy decision process. Numerical and algebraic versions of SAMs are presented in a SAM-based approach, proposed in Section 3. An aggregate numerical version of a SDM is, in turn, presented in Section 4, being also mentioned further disaggregation, which could support the SAM but was not worked due to the lack of data.

Section 5 shows how those approaches can be used as an alternative support for studying the informal aspects of the activity of countries at a macroeconomic level.

The exposition will mostly be accompanied by an application to Mozambique in 2016, with special attention to the informal sector in general and, within this, forestry and logging. Scenarios, involving changes in functional and institutional distribution of income, will be presented and the macroeconomic effects of these changes, will be summarised in the form of changes in the macroeconomic aggregates, such as, Gross Domestic Product, Gross National Income and Disposable Income.

A summary and some concluding remarks will be made in Section 6, with some emphasis on how the study of an economy could be supported by demography, to overcome possible deficiencies in its measurement.

2. Approaches based on SAMs and SDMs

Richard Stone worked largely with SAMs and SDMs as matrix formats of the national and demographic accounts, either in numerical and algebraic versions. In keeping with that work, and due to their similarities, we will call the approach based on SAMs the SAM-based approach – the term that is normally adopted – and the approach based on SDMs the SDM-based approach – a term that is not normally adopted, but which will be used here.

Following the work of Richard Stone, both Graham Pyatt and Jeffrey Round played a key role in the study and dissemination of the SAM-based approach.

In the foreword to the book which can now be regarded as a pioneering work in terms of the SAMbased approach, "Social Accounting for Development Planning with special reference to Sri Lanka", Stone stated that the framework of the system of national accounts can be rearranged and "the entries in a set of accounts can be presented in a matrix in which, by convention (...), incomings are shown in the rows and outgoings are shown in the columns; and in which, reflecting the fact that accounts balance, each row sum is equal to the corresponding column sum". That matrix, with an equal number of rows and columns, is the SAM, in the construction of which "it may be possible to adopt a hierarchical approach, first adjusting the entries in a summary set of national accounts and then adjusting subsets of estimates to these controlling totals". (Pyatt and Roe, 1977: xix, xxiii).

In turn, in the abstract to his article "A SAM approach to modeling", Pyatt says: "Given that there is an accounting system corresponding to every economic model, it is useful to make the accounts explicit in the form of a SAM. Such a matrix can be used as the framework for a consistent dataset and for the representation of theory in what is called its transaction form". In that transaction form (or TV (transaction value) form), the SAM can be seen "(...) as a framework for theory" and its cells "(...) can be filled instead with algebraic expressions, which describe in conceptual terms how the corresponding transaction values might be determined". Thus, the SAM is used as "the basic framework for model presentation". (Pyatt, 1988: 327; 337).

Looking at the question from the perspectives outlined above, it can be said that a SAM can have two versions: a numerical version, which describes the activity of a country empirically; and an algebraic version, which describes that same activity theoretically. In the former version, each cell has a specific numerical value, with the sums of the rows being equal to the sums of the columns. In the latter version, each cell is filled with algebraic expressions that, together with those of all the other cells, form a SAM-based model, the calibration of which involves a replication of the numerical version. In the words of Pyatt, "the essence of (...) the SAM approach to modelling is to use the same SAM framework for both the empirical and the theoretical description of an economy". (Pyatt, 1988: 337).

The construction of algebraic versions (or SAM-based models) can be seen, among others, in Pyatt (2001; 1988), Pyatt and Roe (1977), Pyatt and Round (2012; 1985) and Santos (2012; 2009). A specific SAM-based approach will be examined in section 3.

Despite the potentialities of Stone's work on SDMs, the SDM-based approach has not been followed by other authors as much as the SAM-based approach has. Thus, the study of the SDM-based approach will be based only on Stone's work.

According to Stone, the population of a specific country in a specific year "flows in partly along time from last year, through survival, and partly along space from the outside world, through birth and immigration; and flows out, through death and emigration, and partly along time into next year, through survival" (Stone, 1986: 21). With the survivors from the preceding period constituting the opening stock of the population and the survivors into the succeeding period constituting the closing stock, the SDM can thus be considered a stock-flow matrix.

By connecting "the opening and closing stocks of year θ with flows during year θ " (Stone, 1982: 292), two types of versions will be identified for the SDM: numerical versions, in which each cell has a specific numerical value; and algebraic versions, in which each cell is filled with algebraic expressions that, together with those of all the other cells, form a SDM-based model.

Numerical versions of SDMs can thus be constructed from demographic statistics or they can be replicated by the running of SDM-based models. The former versions measure the reality under study and will be examined in section 4. The latter versions allow for the construction of scenarios resulting from experiments performed with those models, and can be seen in: Stone, 1966, 1971, 1973, 1975, 1981, 1982, 1985, 1986a.

Assuming that the core of the statistics representing the part of the activity of countries that can be expressed in currency units (covered by the SAM), and in human beings (covered by the SDM), are the national and the demographic accounts, respectively, at least as a starting point, their adoption is recommended for any study that is looking for empirical evidence about that activity. This will enable one to work with and gain a greater knowledge about the activity that is (supposedly) observed by the national and the demographic accounts, which, both in a SAM and a SDM framework, will benefit from the increased analytical content provided by the matrix format and the possibility of capturing and working with networks of linkages not captured or worked on otherwise.

3. A SAM-based approach

3.1. Constructing and working with numerical versions of SAMs

The latest versions of the SNA have devoted a number of paragraphs to discussing the question of SAMs. The last version, of 2008, mentions SAMs in Section D of its Chapter 28, entitled "Inputoutput and other matrix-based analysis" (ISWGNA, 2009: 519-522), in which a matrix representation of the sequence of (national) accounts is presented and identified within that system. This representation is not, however, to be identified with the SAM presented in this paper, although they both cover practically all the flows recorded by the national accounts, some differences exist regarding the organization and description of the information contained.

The SAM that will be presented below is supported by the methodological framework presented in Section 2, based especially on the works of Graham Pyatt and his associates (Pyatt, 1988 and 1991; Pyatt and Roe, 1977; Pyatt and Round, 1985 and 2012), as well as from the efforts made to reconcile that framework with what has been defined by (the successive versions of) the SNA (Pyatt, 1985 and 1991a; Round, 2003; Santos, 2009, 2021). Thus, a version of a SAM will be proposed that seeks to be as exhaustive as possible regarding the flows, defined as transactions, observed by the SNA and available for the case in study. Pyatt (1999) and Round (2003) also approach this same issue with the use of their own versions.

The following proposal will be accompanied by an application to Mozambique in 2016. In that year, Mozambique produced its own national accounts, following the recommendations of the two last versions of the SNA (1993 and 2008) and covering a part of the accounts defined in its central framework. That part corresponds to the non-financial transactions, although with gaps, mainly in the distribution and redistribution of income, that were filled with some estimates¹.

Thus, returning to the description provided in Section 2, our work will be developed with a square matrix with the sum of the rows equal to the corresponding sum of the columns. In keeping with what is conventionally accepted, and after some adjustments have been made to adapt our methodology of work to the SNA, on the one hand, the entries made in the rows will represent resources and changes in liabilities and net worth, and, on the other hand, the entries made in the columns will represent uses and changes in assets. Thus, each cell can have two meanings, depending on its row and its column. As usually recommended, the starting point for the construction of our numerical SAM was its classification or taxonomy of its accounts. The adopted taxonomy and the level of disaggregation were conditioned by the purpose for which the SAM was going to be used and by the way in which the available information was organized.

3.1.1. The SAM's basic structure and its consistency with the whole system

Adopting the working method recommended by Stone in the third paragraph of Section 2 of this paper, the basic structure for the SAM presented below will be a summary set of the national accounts and the controlling totals for the other levels of disaggregation, which will later be analysed in

¹ Described and justified in: Magaua, M. (2021) "Estudo da atividade económica em Moçambique com base numa Matriz de Contabilidade Social. O caso da actividade informal de exploração florestal." Phd Dissertation in Economics. ISEG

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Subsection 3.1.2. Thus, in keeping with the conventions and nomenclatures defined by the SNA, besides a rest of the world account, the proposed SAM will also include two great groups of accounts: "production" and "domestic institutions".

Table 1 shows the above-mentioned basic structure, with the cells representing the flows, or transactions "t", to which two indexes, indicative of its location, are associated - the first for the row and the second for the column accounts.

Each cell of this matrix will be converted into a submatrix, with the number of rows and columns corresponding to the level of disaggregation of the row and column accounts. This same table also identifies blocks, which are submatrices or sets of submatrices with common characteristics. The specification of these blocks will be made below and involves an identification of the flows of the National Accounts, which will continue to be the same even if some disaggregation is performed – thereby preserving the consistency of the whole system.

	р	а	f	dic	dia	rw	total
p – products	TTM (t _{p,p})	$\operatorname{IC}(\mathfrak{t}_{\mathfrak{p},a})$	0	FC (t _{p,dic})	GCF (t _{p,dia})	EX (t _{p,rw})	AD (t _p .)
a – activities	P $(t_{a,p})$	0	0	0	0	0	VPT (t _a .)
f – factors	0	$\frac{\text{CFP}_{\text{GAV}}}{(t_{\text{f},a})}$	0	0	0	CFP (t _{f,rw})	AFIR (t _f .)
dic – (domestic) institutions' current account	NTP (t _{dic,p})	NTA $(t_{dic,a})$	CFP_GNI (t _{dic,f})	CT (t _{dic,dic})	0	CT (t _{dic,rw})	AI (t _{dic} .)
dia – (domestic) institutions' accumulation account	0	0	0	S (t _{dia,dic})	KT (t _{dia,dia})	KT+NLB (t _{dia,rw})	INVF (t _{dia} .)
rw – rest of the world	IM&NTP (t _{rw,p})	NTA $(t_{rw,a})$	CFP (t _{rw,f})	CT (t _{rw,dic})	KT (t _{rw,dia})	0	TVRWP (t _{rw} .)
total	AS (t. _p)	VCT (t. <i>a</i>)	AFIP (t. _f)	AIP (t. _{dic})	AINV (t. _{dia})	TVRWR (t. _{rw})	\ge

Table 1. Basic SAM by blocks

Source: Own construction

Note: The first three accounts (p = products (or goods and services), a = activities (or industries) and f = factors (of production)) are the above-mentioned group of "production" accounts of the economy and the next two accounts (dic = current; dia = accumulation) are the, also above-mentioned, group of "domestic institutions" accounts, sometimes only mentioned "institutions". The last account (rw = rest of the world) represents the the transactions between the (domestic) economy - the resident institutions, and the rest of the world - the non-resident institutions.

Description of the blocks (included in the texts are letters followed by numbers between brackets, which are the flow codes of the National Accounts, in accordance with the 2008 SNA):

a) Production – P (cell: $t_{a,p}$; basic prices) – represents the output of goods and services (P1).

- b) Domestic Trade is represented by the value of domestically transacted products, which can be either domestically produced or imported.
 - b.1) Intermediate Consumption IC (cell: t_{p,a}; purchasers' prices) consists of the value of the goods and services consumed as inputs by a process of production, excluding those fixed assets whose consumption is recorded as consumption of fixed capital (P2).
 - b.2) Final Consumption FC (cell: t_{p,dic}; purchasers' prices) consists of the expenditure incurred by resident institutional units on goods or services that are used for the direct satisfaction of individual needs or wants, or the collective needs of members of the community (P3).
 - b.3) Gross Capital Formation GCF (cell: t_{p,dia}; purchasers' prices) includes gross fixed capital formation, changes in inventories, and acquisitions less disposals of valuables (P5).
- c) External Trade includes the transactions in goods and services from non-residents to residents, also known as imports (P7), or IM (cell: t_{rw,p}; purchasers' prices), and the transactions in goods and services from residents to non-residents, also known as exports (P6), or EX (cell: t_{p,rw}; purchasers' prices).
- d) Trade and Transport Margins TTM (cell: t_{p,p}) amounts to zero and, when it is disaggregated and takes the form of a submatrix, it allocates the output of the trade and transport services used in the domestic trade to the supplied products.
- e) Net taxes on production and imports
 - e.1) Net Taxes on Production NTA (cells: $t_{dic,a}$; $t_{rw,a}$) represents the (other) taxes on production (D29) minus the (other) subsidies to production (D39).
 - e.2) Net Taxes on Products NTP (cells: $t_{dic,p}$; $t_{rw,p}$) represents the taxes on products (D21) minus the subsidies on products (D31).
- f) Compensation of Factors of Production CFP (cells: $t_{f,a}$; $t_{dic,f}$; $t_{f,rw}$; $t_{rw,f}$) consists of the income of the institutional sectors originating from the compensation of employees (D1) and the compensation of employers and own-account (or self-employed) workers, and the compensation of capital, including property income (D4; B2g-B3g). The functional distribution is represented by the Gross Added Value GAV (cell: $t_{f,a}$), whereas the institutional distribution is represented by the Gross National Income GNI (cell: $t_{dic,f}$).
- g) Current Transactions CT (cells: t_{dic,dic}; t_{dic,rw}; t_{rw,dic}) includes: current taxes on income, wealth, etc. (D5); net social contributions (D61); social benefits other than social transfers in kind (D62); other current transfers (D7); and the adjustment made for the change in pension entitlements (D8).
- h) Accumulation
 - h.1) KT (cells: t_{dia,dia}; t_{dia,rw} (part); t_{rw,dia} (part)) includes: capital taxes (D91); investment grants (D92); other capital transfers (D99).
 - h.2) Net Borrowing/Lending NLB (cell: tdia,rw (part))

The net lending or borrowing of the total economy is the sum of the net lending or borrowing of the institutional sectors. It represents, respectively, the net resources that the total economy makes available to the rest of the world or the net resources that it receives from the rest of the world to finance the corresponding needs of investment funds (B9).

h.3) Acquisitions less disposals of non-produced non-financial assets (cell: t_{rw,dia} (part))

Includes transactions with the rest of the world that involve natural resources, contracts, leases and licences, and goodwill and marketing assets (NP).

 Gross Saving – S (cell: t_{dia,dic}) – measures the portion of aggregate income that is not used for final consumption expenditure and current transfers to domestic institutions or to the rest of the world (B9g).

The construction of a SAM is easier when it is performed by blocks.

The totals of each account represent the corresponding sums of the cells in rows and in columns, with the following description:

- I. Products account (p): Aggregate Demand AD, the row sum (cell: t_p.); Aggregate Supply AS, the column sum (cell: t._p).
- II. Activities account (*a*): Production Value VPT, the row sum (cell: t_{*a*}); Total Costs VCT, the column sum (cell: t_{*a*}).
- III. Factors of Production (f): Aggregate Factors Income (Received) AFIR, the row sum (cell: t_f.); Aggregate Factors Income (Paid) – AFIP, the column sum (cell: t.f).
- IV. Current account of (domestic) institutions (dic): Aggregate Income (received) AI, the row sum (cell: t_{dic}.); Aggregate Income (Paid) AIP, the column sum (cell: t_{dic}).
- V. Accumulation account of (domestic) institutions (dia): Investment Funds INVF, the row sum (cell: t_{dia}.); Aggregate Investment AINV, the column sum (cell: t_{dia}).
- VI. Rest of the world account (rw): Value of Transactions to the Rest of the World (Paid) TVRWP, the row sum (cell: t_{rw}); Value of Transactions from the Rest of the World (Received) – TVRWR, the column sum (cell: t_{rw}).

From the above description, two further features of the matrix presentation of the national accounts can be highlighted: each transaction represents a single entry and can be characterised by its position; each account is represented by a row and a column, whose balance is ensured by the equality of their sums.

The Integrated Economic Accounts (IEA) Table is equivalent to a summary of what is observed by the SNA. According to the 2008 SNA: "The integrated economic accounts use (...) three of the conceptual elements of the SNA (...) [institutional units and sectors, transactions, and assets and liabilities] together with the concept of the rest of the world to form a wide range of accounts. These include the full sequence of accounts for institutional sectors, separately or collectively, the rest of

the world and the total economy.... This table shows, simultaneously, the general accounting structure of the SNA and presents a set of data for the institutional sectors, the economy as a whole and the rest of the world" (ISWGNA, 2009: 23; 29). Table A.1 in the Appendix, is the version of the IEA estimated from the data produced by INE (*Instituto Nacional de Estatística*) of Mozambique that will be used here. Thus, from table and the previous description (adapted to the previous version of the SNA), it was possible to construct the basic SAM presented in Table 2, representing the highest possible level of aggregation of the activity of Mozambique observed by the national accounts in 2016.

(Unit: million metic							
	р	а	f	dic	dia	rw	total
p – products	0	548 956		683 389	261 917	252 788	1 747 048
a – activities	1 173 043						1 173 043
f – factors		628 295				6 583	634 878
dic – (domestic) institutions' current account	63 029	- 4 208	612 556	170 360		23 777	865 515
dia – (domestic) institutions' accumulation account				7 356	137	236 413	243 907
rw – rest of the world	510 976		22 322	4 410	- 18 147		519 561
total	1 747 048	1 173 043	634 878	865 515	243 907	519 561	

Table 2. Basic SAM of Mozambique in 2016 (estimate)

Source: Own construction, from Table A.1.(in Appendix)

Considering the description that followed Table 1 and based on the reading of the products account in Mozambique in 2016, represented in Table 2 – row and column p, the main components of the aggregate demand and supply of the goods and services transacted in the market and captured by the Mozambican National Accounts can be identified, in million *meticais*. Thus, reading in row, the total aggregate demand of 1 747 048 was composed of 548 956 of intermediate consumption, 683 389 of final consumption, 261 917 of gross capital formation and 252 788 of exports. Reading in columns, the total aggregate supply of 1 747 048 (equal to the total aggregate demand) was composed of 1 173 043 of output of goods and services, 63 029 of net taxes on products received by the Mozambican General Government and 510 976 of imports. A similar reading can be made for each of the other columns and rows of the same Table 2.

Therefore, as mentioned above, and again using the words of Stone, the basic SAM that has just been described can be considered as the most aggregate "summary set of national accounts", representing

a first level of the intended hierarchical method, with all the controlling totals for the next level of that hierarchy. From here the consistency of the whole (supposedly) observed system can be ensured.

3.1.2. Disaggregations and extensions

Since the national accounts cover all the details of the basic structure presented above, in accordance with the specific requirements of the exercise and the available information, some other levels of the above mentioned-hierarchical method can be identified, providing other controlling totals for greater levels of disaggregation. As will be seen below, this disaggregation can be made at the level of the production, institutions and rest of the world accounts. Reverse reasoning can be applied to the case of aggregation if, contrary to what we are doing here, we start with a disaggregated version. In both cases, the consistency of the underlying system can be maintained.

In the words of J. Round, in his Foreword to Santos (2009): "The key to constructing a useful SAM and developing an effective SAM-based model is the SAM design. A SAM need not be dimensionally large as long as it represents the most significant features of economy-wide interdependence. More precisely, this means designing the SAM so that the key sectors, markets and institutions are as fully represented as is practicable. Estimation of the transactions between accounts is obviously also important but this needs to go in tandem with the SAM design" (Santos, 2009: xiv).

It is also worth mentioning that, although the quarterly national accounts are not as complete as the annual ones, it will nonetheless be possible to make some further disaggregation from these accounts in terms of time.

Furthermore, disaggregation can be made in terms of space, since regional accounts are also considered. In that case, it is possible to work with regions and countries, either individually or as a group. Round (1991), for example, experimented with the case of Europe. It would even be possible to think in world terms if the SNA could be adopted worldwide or, at least in a significant sample of countries.

Extensions are also possible, either from the national accounts or from other sources of information, with the convenient adjustment to, or connection with, the whole system to maintain its consistency. The 2008 SNA dedicates its Chapter 29 to "Satellite accounts and other extensions" (ISWGNA, 2009: 523-544), where the main idea is to serve specific analytical purposes, in a way that is consistent with the central framework, although not fully integrated into it (ISWGNA, 2009: 37-38). In this respect, the authors would like to support Steven Keuning and Willem Ruijter's idea of a "complete data set" which "could be tentatively labelled: a System of Socio-economic Accounts" (Keuning and Ruijter, 1988: 73).

a) Production accounts

In the basic structure proposed above, the production accounts are the accounts of products, activities, and factors of production. These accounts correspond respectively to the SNA accounts of goods and services, production, and the primary distribution of income. Thus, within these accounts and depending on the available level of disaggregation, it can be seen how the available products are used, with some details being provided about the process of production and about the way in which the incomes resulting from that process and the ownership of assets are distributed among institutions and activities.

The SNA uses the Central Product Classification (CPC) to classify products (ISWGNA, 2009: 19), which last version (2.1), published in 2015, is organised into 10 sections and 71 divisions, with it being possible to go as far as the fifth level of disaggregation within each of these. The *Classificação Nacional de Bens e Serviços (CNBS) - Revisão 2* is the corresponding adaptation to Mozambique.

In turn, the International Standard Industrial Classification of All Economic Activities (ISIC) is used to classify activities (ISWGNA, 2009: 20), which last version (revision 4), published in 2008, is organised into 21 sections and 88 divisions, with it being possible to go as far as the fourth level of subdivision within each of these The *Classificação das Actividades Económicas* (*CAE*) - *Revisão2* is the corresponding adaptation to Mozambique.

The Supply and Use Table provides this information, usually at an intermediate level of disaggregation, for products and activities. Tables A.3 and A.4 (in Appendix) are versions of these tables estimated from the data produced by INE (*Instituto Nacional de Estatística*) of Mozambique that will be adopted in Section 5 - Table A.2 (in Appendix), describes the corresponding groups of products and activities.

As described above, in the characterisation of the block representing the compensation of the factors of production, the disaggregation that can be made from the already mentioned tables of the national accounts is between labour (or the compensation of employees) and what has been referred to as the compensation of other factors, which includes the compensation of employers and own-account (or self-employed) workers, and the compensation of capital, namely property income. Such information can only be derived from the Integrated Economic Accounts Table if the products and activities accounts are not disaggregated, or from the Supply and Use Table if those same accounts are disaggregated. From Table 2, Table 3 presents an intermediate level of disaggregation of the estimated SAM of Mozambique in 2016, in which production account have a disaggregation made from estimates of the IEA Table (A.1, in Appendix). In turn, Table A.7 (in Appendix), represents the estimated SAM of Mozambique in 2016 with the disaggregation that was possible for the study proposed in Section 5.

b) Institutions and rest of the world accounts

In the basic structure proposed in Subsection 3.1.1, the domestic institutions are divided into current, and accumulation accounts. These accounts correspond, respectively, to the following SNA accounts: secondary distribution of income, redistribution of income in kind and use of income; capital accounts. Within these accounts, depending on the level of available disaggregation, the current accounts show how the national income is transformed into disposable income through the receipt and payment of current transfers, and how the latter is distributed between final consumption and saving. In turn, the accumulation account records the transactions linked to acquisitions of non-financial assets and capital transfers involving the redistribution of wealth, between institutional units, and between these and the rest of the world. Due to the lack of information, it was not possible to include the transactions in financial assets and liabilities, that is, the financial account in the accumulation accounts.

All the linkages between the domestic economy and the rest of the world, that is, all the transactions between resident and non-resident units, are recorded both in the SAM and in the SNA through the rest of the world account.

Chapter 4 of the 2008 SNA specifies the institutional sectors, including the rest of the world, and their possible disaggregation, which in some cases can be taken as far as the third level (ISWGNA, 2009: 61-85), although normally it cannot be taken beyond the first level. In the case of the rest of the world, such disaggregation will certainly depend on the country, or group of countries, that adopt and adapt this system.

At the first level of disaggregation, the accounts of the institutions, as well as the rest of the world account, are part of the Integrated Economic Accounts Table. Higher levels of disaggregation, whenever these are possible, are usually published in the separate accounts of institutions. Even at the first level of disaggregation, any work conducted with the institutional sectors when there are transactions involving more than one row or column of the SAM also requires the so-called "from whom-to-whom matrices". These matrices make it possible to fill in the cells of the submatrices of transactions taking place within domestic institutions and between institutions and the rest of the world, recorded in the above-described blocks of current transactions and accumulation (Subsection 3.1.1. g and h).

Just as the matrix form of the production accounts may be easily worked on from the supply and use tables, it would also be possible to work on the matrix form of the institutional accounts if some kind of "from whom-to-whom tables" were made official. This would be a crucial factor for implementing the SAM-based approach, in which SAMs with production and institutional accounts, conveniently capturing the circular flow of income and the underlying network of linkages, would form the basis

for macroeconomic models capable of reproducing the multiplier processes implicit in the activity of countries.

As will be exemplified in Section 5, the disaggregation of specific institutional sectors makes it possible to analyse the most diverse aspects of the corresponding roles in the activity of countries (Santos (2004) and (2007) are examples of studies on institutional distribution of income, as well as, the role of the general government and its subsectors – central government, local government and social security funds).

As mentioned in the previous subsection, from Table 2, Table 3 presents an intermediate level of disaggregation of the estimated SAM of Mozambique in 2016, in which (now) the institutions accounts have a disaggregation made from estimates of the IEA Table (A.1, in Appendix) and the "from whom-to-whom matrices". Once again, Table A.7 (in Appendix) represents the estimated SAM of Mozambique in 2016 with the disaggregation that was possible for the study proposed in Section 5.

As in the case of the production accounts, the detailed study of the specific accounts of domestic institutions and their corresponding transactions also makes it possible to analyse specific aspects of that same activity, namely: the distribution and redistribution of income, using the current account (see, for example, Santos (2018) and Santos and Reich (2019)); the redistribution of wealth, investment, its financing, and the implicit levels of the financing requirements and availability of the institutional sectors and the whole economy, using the accumulation accounts.

In turn, the rest of the world account can provide many possibilities for studying the international economic relations of the domestic economy.

In addition to what it can be found from Table 2, we can discover from Table 3 a little more about the reality under study – Mozambique in 2016, in million *meticais*. This is the case of the aggregate factors income, the total of the row and column 3 (f) of Table 2, in the amount of 634 878, which now is decomposed in 206 409 of compensation of employees, the total of row and column 3 (labour) of Table 3, and 428 469 of compensation of other factors of production, namely employers and own-account workers, land and capital (including property income),the total of row and column 4 (other) of Table 3. From the reading of those rows and columns (of Table 3), details about the so-called primary distribution of income, can be found, both in functional and institutional terms, as will be seen below.

Through row 3 we can see that 203 100 represent the part of the gross added value, generated in the domestic economy by residents and non-residents that is attributed to the compensation of employees, to which is added 3 309 generated abroad by residents. In turn, row 4 shows that 425 195 represent the part of the gross added value, generated in the domestic economy by residents and non-residents, that is attributed to the above-mentioned other factors of production, to which is added 3 274

generated abroad by residents. These are aspects related with the functional distribution of income, from which structural indicators are calculated in next subsection.

Through column 3, we can see that 204 450 represent the part of the gross national income, generated in the domestic economy and abroad by residents, that is attributed to the compensation of employees, received by households, to which is added 1 959 generated in the domestic economy by non-residents and sent abroad. In turn, column 4, besides the part of the gross national income generated in the domestic economy by non-residents and sent abroad, in the amount of 20 363, shows that 408 107 is the part generated in the domestic economy and abroad by residents, that is attributed to the compensation of other factors, which is received by households (73 919), nonfinancial corporations (307 320), financial corporations (32 194), government (- 6 496), and NPISH (1 169). These are aspects related with the institutional distribution of income, which structural indicators are also calculated in next subsection.

Further details about the reality under study may continue to be discovered from Table 3 by reading the rows and columns of the institutions' current and accumulation accounts, by considering the descriptions in Subsection 3.1.1.

Table 3. SAM of Mozambique in 2016, with disaggregated factors of production and the (domestic) institutions' current and accumulation accounts (estimate)

(Unit: million *meticais*)

Outlays (expenditures)				PRODUCTION				INSTITUTIONS						
						FA	CTORS			1	CURRENT	ACCOUNT		
Inco	mes (receipts)		PRODUCTS	ACTIVITIES	Labour (employees)	Other	Total	Households	Nonfinancial corporations	Financial corporations	Government	NPISH	Total
			/	1	2	3	4		5	6	7	8	9	
	PRO	DUCTS	1	0	548 956	0	0	0	486 931	0	0	182 167	14 291	683 389
ON	ACT	TIVITIES	2	1 173 043	0	0	0	0	0	0	0	0	0	0
JCT	SS	Labour (employees)	3	0	203 100	0	0	0	0	0	0	0	0	0
ODI	TOF	Other	4	0	425 195	0	0	0	0	0	0	0	0	0
PR	FAC	Total		0	628 295	0	0	0	0	0	0	0	0	0
	E	Households	5	0	0	204 450	73 919	278 369	1 275	264	48 226	29 100	0	78 865
	IT ACCOUN	Nonfinancial corporations	6	0	0	0	307 320	307 320	0	0	0	0	0	0
		Financial corporations	7	0	0	0	32 194	32 194	1 979	0	0	0	0	1 979
		Government	8	63 029	- 4 208	0	- 6 496	- 6 496	52 264	36 672	579	0	0	89 516
SNC	IRREN	Non-profit institutions serving households (NPISH)	9	0	0	0	1 169	1 169	0	0	0	0	0	0
DITU	ರ ರ	Total		63 029	- 4 208	204 450	408 107	612 556	55 519	36 936	48 805	29 100	0	170 360
LITI		Households	10	0	0	0	0	0	- 165 847	0	0	0	0	- 165 847
INS	IN	Nonfinancial corporations	11	0	0	0	0	0	0	270 383	0	0	0	270 383
	COI	Financial corporations	12	0	0	0	0	0	0	0	- 14 632	0	0	- 14 632
	Y AC	Government	13	0	0	0	0	0	0	0	0	- 69 425	0	- 69 425
	CUM	Non-profit institutions serving households (NPISH)	14	0	0	0	0	0	0	0	0	0	- 13 123	- 13 123
	AC	Total		0	0	0	0	0	- 165 847	270 383	- 14 632	- 69 425	- 13 123	7 356
REST OF THE WORLD 15			15	510 976	0	1 959	20 363	22 322	4 410	0	0	0	0	4 410
TOTAL				1 747 048	1 173 043	206 409	428 469	634 878	381 013	307 319	34 174	141 841	1 168	865 515

(to be continued)

Table 3 (continuation). SAM of Mozambique in 2016, with disaggregated factors of production and the (domestic) institutions' current and accumulation accounts (estimate) (Unit: million meticais)

Outlays (expenditures)											
					A	CCUMULATIO	N ACCOUNT			REST OF THE	
		Households	Nonfinancial corporations	Financial corporations	Government	NPISH	Total	WORLD	TOTAL		
Inco	mes	(receipts)		10	11	12	13	14		15	
7	PRO	ODUCTS	1	3 492	227 000	13 997	17 428	0	261 917	252 788	1 747 048
IO I	AC	TIVITIES	2	0	0	0	0	0	0	0	1 173 043
n C D	RS	Labour (employees)	3	0	0	0	0	0	0	3 309	206 409
SOD	OTO	Other	4	0	0	0	0	0	0	3 274	428 469
	FAC	Total		0	0	0	0	0	0	6 583	634 878
	Ľ	Households 5	5	0	0	0	0	0	0	23 777	381 012
	NT ACCOUN	Nonfinancial corporations	6	0	0	0	0	0	0	0	307 320
		Financial corporations	7	0	0	0	0	0	0	0	34 173
		Government	8	0	0	0	0	0	0	0	141 841
SNC	JRRE	Non-profit institutions serving households (NPISH)	9	0	0	0	0	0	0	0	1 169
E	5	Total		0	0	0	0	0	0	23 777	865 515
	Ľ	Households	10	0	0	0	0	0	0	- 16 619	- 182 466
INS	IS I	Nonfinancial corporations	11	0	0	0	0	0	0	248 978	519 361
	CCC	Financial corporations	12	0	0	0	0	0	0	8 731	- 5 901
	I . A	Government	13	0	0	0	137	0	137	867	- 68 421
	CCUM	Non-profit institutions serving households (NPISH)	14	0	0	0	0	0	0	- 18 666	- 18 666
	A	Total		0	0	0	137	0	137	236 413	<u>243</u> 907
RES	ΤO	F THE WORLD	15	- 185 958	292 361	- 19 897	- 85 986	- 18 666	- 18 147		519 561
TOTAL			- 182 466	519 361	- 5 901	- 68 421	- 18 666	243 907	519 561		

Source: Own construction from Table A.1 (in Appendix) and from-whom-to-whom matrices for current and capital transfers, estimated from data provided by INE (*Instituto Nacional de Estatística*) - Mozambique.

3.1.3. Aggregates and indicators.

As was seen above, practically all the transactions of the national accounts are covered by the SAM, therefore, macroeconomic aggregates (some of which are also balancing items), as well as indicators can be identified or calculated from it.

For a better reading of what follows, see the description of cells or blocks in Table 1 and the application to Mozambique in Tables 2 and 3.

Gross Domestic Product (GDP), which is usually considered the main macroeconomic aggregate, can be calculated in the three known approaches:

- Production approach: $P IC + NTP = t_{a,p} t_{p,a} + t_{dic,p}$;
- Expenditure approach: $FC + GCF + Ex IM = t_{p,dic} + t_{p,dia} + t_{p,rw} t_{rw,p}$;
- Income approach: $GAV + NTP + NTA = t_{f,a} + t_{dic,p} + t_{dia,a}$.

The GDP of Mozambique in 2016 was 687 116 million *meticais*, which can be calculated from these three approaches as follows:

- Production approach: 1 173 043 548 956 + 63 029;
- Expenditure approach: 683 389 + 261 917 + 252 788 510 976;
- Income approach: 628 295 + 63 029 4 208.

Domestic Product can be converted into National Product by adding the compensation of factors received from the rest of the world and deducting the compensation of factors and the net taxes on products and production sent to the rest of the world, when these exist - what does not happen in our case study. Thus, from the described cells of the basic SAM, GDP can be converted into Gross National Product (GNP) or Gross National Income (GNI), as follows: GDP + $t_{f,rw} - t_{rw,f}$. On the other hand, as the SAM directly provides Gross National Income, this can also be calculated just by adding the net taxes on products and production received by domestic institutions: $t_{dic,f} + t_{dic,p} + t_{dic,a}$. The corresponding amount for Mozambique in 2016 is 671 377 million *meticais*, for which the underlying calculations are as follows: GNP = 687 116 + 6 583 - 22 322; GNI = 612 556 - 4 208 + 63 029.

(National) Disposable Income is also very important and can be calculated by adding to GNI the net current transactions received by domestic institutions: $GNI + ((received)t_{dic,dic} + t_{dic,rw}) - ((paid) t_{dic,dic} + t_{rw,dic})$. In our application to Mozambique: 671 377 + (170 360 + 23 777) – (170 360 + 4 410) = 690 744 million *meticais*.

In turn, gross aggregates can be converted into net aggregates by deducting the consumption of fixed capital, which lies outside the basic SAM but is part of the IEA.

Gross Saving (S) is given directly by the SAM, through $t_{dia,dic}$, which in the case of Mozambique in 2016 is 7 356 million *meticais*. In turn, Net Lending or Borrowing (NLB) is added to the capital

transfers from the rest of the world in $t_{dia,rw}$, as explained in Subsection 3.1.1 – h.2), in our case study: 236 413 (8 678 (capital transfers from the rest of the world) + 227 735 (net borrowing)) million *meticais*

As mentioned previously, it is also possible to calculate structural indicators of the functional and institutional distribution of generated income, therefore, providing additional information on the activity of the country in study.

In the functional distribution of generated income, the distribution of gross added value – GAV – among the factors of production is given by the structure of the submatrix in cell $t_{f,a}$ of the basic SAM, with its level of detail depending on the disaggregation of the activities (column account) and of the factors of production (row account). Table 4 shows the results for the applications to Mozambique, for the level of disaggregation presented in Table 3.

Table 4. Functional distribution of the income generated in Mozambique in 2016 (in percentage terms)

	%
Factors of Production	
(generated income = gross added value or gross domestic product)	
Labour	32.3
(employees)	
Other	67.7
(employers and own-account workers; capital)	
Total	100.0

Source: Own construction from Table 3

In the institutional distribution of generated income, the distribution of gross national income – GNI – is given by the structure of the submatrix in cell $t_{dic,f}$ of the basic structure. In this case, the level of detail will depend on the disaggregation of the factors of production (column account) and of the current account of the domestic institutions (row account). The corresponding results for the applications to Mozambique, for the level of disaggregation presented in Table 3, are now shown in Table 5.

		Factors of Production					
	Labour (employees)	Other (employers and own-account workers; capital)	Total				
Institutions (generated income = gross national inc	ome)						
Non-financial corporations		75.3	50.2				
Financial corporations		7.9	5.3				
General government		- 1.6	-1.1				
Households	100.0	18.1	45.4				
Non-profit institutions serving households		0.3	0.2				
Total	100.0	100.0	100.0				

Table 5. Institutional distribution of the income generated in Mozambique in 2016 (in percentage terms)

Source: Own construction from Table 3

The main items in the income and expenditure of the institutional sectors and of the rest of the world can be identified from the respective rows and columns of the SAM. In the case of institutional sectors, the total balancing item is the net lending/borrowing (NLB); the current balancing item is the respective gross saving (S); and the capital balancing item is the difference between the first and the second.

3.2. An algebraic version of the SAM: the accounting multipliers

A static and comparative static analysis will be made within a framework in which prices are not separated from quantities, with changes being identified only at the level of values at current prices. It will be assumed that the production technology and resource endowment are given, there is excess capacity in the economy and that the structural features of the numerical version are the relevant and do not change.

The base methodology that is to be followed is centred upon the use of multipliers. A systematic outline of this methodology is provided below, following Santos (2018), in keeping with the work of Pyatt and Roe (1977) and Pyatt and Round (1985).

As shown in Table 6, we will have both exogenous and endogenous accounts, so that consequently the transactions in each cell of the SAM will be considered exogenous or endogenous according to the corresponding row and column accounts. As the names suggest, the endogenous accounts' transactions are defined in the modelling process whereas the exogenous accounts' transactions are defined outside the modelling process.

	Endogenous	Exogeno	Tatal		
		Σ		Σ	Total
Endogenous	Ν	n	Х	x	yn
Exogenous	L	1	R	r	yx
Total	yn'		ух'		

Source: Pyatt and Round (1985).

Note: As stated above, adopting the terminology of the national accounts, rows represent receipts, or resources or changes in liabilities and net worth, and columns represent expenditures, or uses or changes in assets.

Key:

- N = matrix of transactions between endogenous accounts; n = vector of the (corresponding) row sums.
- X = matrix of transactions between exogenous and endogenous accounts (injections from first into second); x = vector of the (corresponding) row sums.
- L = matrix of transactions between endogenous and exogenous accounts (leakages from first into second); l = vector of the (corresponding) row sums.
- R = matrix of transactions between exogenous accounts; r = vector of the (corresponding) row sums.
- $y_n = \text{vector (column) of the total receipts of the endogenous accounts (<math>\hat{y}_n$: diagonal; \hat{y}_n -l: inverse); $y_n' = \text{vector (row) of the total expenditures of the same accounts.}$
- y_x = vector (column) of the total receipts of the exogenous accounts; y_x ' = vector (row) of the total expenditures of the same accounts.

From Table 6, it can be written that

$$\mathbf{y}_{\mathbf{n}} = \mathbf{n} + \mathbf{x} \tag{1}$$

$$\mathbf{y_n'} = \mathbf{n} + \mathbf{l} \tag{2}$$

The amount that the endogenous accounts receive (y_n) is equal to the amount they spend (y_n') , confirming the equality between row and column totals. In other words, in aggregate terms, total injections from the exogenous into the endogenous accounts (that is, the column sum of "x") are equal to total leakages from the endogenous into the exogenous accounts (that is, the column sum of "l"), i.e. considering i' to be the unitary vector (row):

$$i' * x = i' * 1.$$
 (3)

On the other hand, the amount that the exogenous accounts receive (y_x) is equal to the total leakages from the endogenous into the exogenous accounts (being "l" the row sums vector) plus the resources from transactions between exogenous accounts (being "r" the row sums vector):

$$y_x = 1 + r \tag{4}$$

In the structure of Table 6, if the entries in the N matrix are divided by the corresponding total expenditures, a corresponding (squared) matrix can be defined of the average expenditure propensities of the endogenous accounts within the endogenous accounts or of the use of resources within those accounts. Calling this matrix A_n , it can be written that:

$$A_n = N * \hat{y}_n^{-1} \tag{5}$$

$$\mathbf{N} = \mathbf{A}_{\mathbf{n}^*} \, \hat{\mathbf{y}}_{\mathbf{n}} \tag{6}$$

(7)

(12)

Considering equation (1), $y_n = A_{n*}y_n + x$

Therefore,
$$y_n = (I - A_n)^{-1} * x = M_a * x.$$
 (8)

We thus have the equation that gives the total receipts of the endogenous accounts (y_n) , by multiplying the injections "x" by the matrix of the accounting multipliers:

$$M_a = (I - A_n)^{-1}.$$
 (9)

On the other hand, if the entries in the L matrix are divided by the corresponding total expenditures, a corresponding (non-squared) matrix can be defined of the average expenditure propensities of the endogenous accounts into the exogenous accounts or of the use of resources from the endogenous accounts into the exogenous accounts. Calling this matrix A₁, it can be written that:

$$\mathbf{A}_{l} = \mathbf{L}_{*} \mathbf{\hat{y}}_{n}^{-1} \tag{10}$$

$$\mathbf{L} = \mathbf{A}_{l^*} \, \hat{\mathbf{y}}_n \tag{11}$$

Considering equation (4),
$$y_x = A_{l*}y_n + r$$

Thus,
$$l = A_l * y_n = A_l * (I - A_n)^{-1} * x = A_l * M_a * x.$$
 (13)

So, with the accounting multipliers, the impact of changes in exogenous receipts of the endogenous accounts is analysed at the moment they occur, assuming that the production technology and resource endowment are given, there is excess capacity in the economy and that the structural features of the numerical version are the relevant and do not change, as above-mentioned.

This will be applied for the study of the impact of changes associated to the informal aspects of the activity of Mozambique in 2016, as presented in Section 5.

4. Constructing numerical versions of SDMs

From what was stated in Section 2, just as in any SAM, time and space dimensions can also be identified in any SDM. With an equal number of rows and columns, in each SDM "in any period, the

equality of inflows and outflows implies that the difference between the opening and the closing stocks is equal to the net inflows from the outside world" (Stone, 1986: 21). Thus, the SDM connects the opening and the closing stocks of year θ with the flows during the year θ .

In the standard stock-flow SDM, presented in Table 7, the state at New Year θ or θ +1 refers to the position on the 1st of January each year.

(Unit: number of individuals)

Table 7. The standard SDM

			i muiviuuais)
State at New Year θ State at New Year θ +1	Outside World	Our Country: Opening States	Closing Stocks
Outside World	α	ď	
Our Country: Closing States	b	S	Λn
Opening Stocks		n'	

Source: Stone (1981, 1982, 1986)

Key:

- α (scalar) = individuals who both enter and leave our country during year θ and so are not recorded in either the opening or the closing stock of that year (babies born in our country during year θ who die in our country or emigrate before the end of it; immigrants into our country during year θ who died in our country or emigrate before the end of it).
- d' (row vector) = individuals who leave our country during year θ and so are recorded in the opening stock but are not included in the closing stock (deaths and emigrants of year θ).
- b (column vector) = individuals who enter our country during year θ and so are recorded in the closing stock but are not included in the opening stock (births and immigrants of year θ).
- S (square matrix) = individuals who survive in our country through year θ and so are recorded in both the opening and the closing stocks (classified by their opening states in the columns and by their closing states in the rows).
- An (column vector) = closing stock in each state.
- n' (row vector) = opening stock in each state.

The taxonomic framework, within which each study is developed, will depend not only on its purposes, but also on the available information. The whole population must, however, be included. There is no doubt about the complexity of this work and the difficulty of obtaining credible and adequate statistical data.

As seen above, besides the opening and closing stocks, the SDM also quantifies (for each year) the flows of individuals, which are recorded under "our country: (opening or closing) states", defined in accordance with the taxonomic framework adopted. As far as those flows are concerned, adopting the words of Stone, "each year individuals can enter a state in several ways: by survival in that same

state from last year, by moving into it from a different state in the course of the year, by birth or by immigration; and they may leave it by survival into the year, by moving into another state during the year, by emigration or by death" (Stone, 1986: 22).

Active or passive sequences can be adopted within this framework. In the case of active sequences, different population groups can be identified, including those who are learning – schoolchildren and students; those who are earning – members of the labour force, who participate in the market; and the rest – all the educationally and economically inactive (in the sense that they do not participate in the labour market and do not produce goods and services transacted in the market). Passive sequences cover socio-economic groups, which may include such considerations as income, social class, family size, etc.

The identification of different age groups can be regarded as the necessary step to be taken before working with an active or a passive sequence.

In the attempt to apply to Mozambique in 2016 that follows, in order to better deal with the abovementioned complexity and to study the so-called economic activity of the population, at least, two levels of disaggregation should be identified. At the first level of disaggregation, the population should be organised by age groups. At the second level of disaggregation, within each age group, the population should be classified as either active or inactive, in accordance with their economic activity, understood as their participation both in the labour market and in the supply side of the goods and services market. Thus, the hierarchical method, adopted in the previous section (for the construction of the SAM), according with which, each level of disaggregation has all the controlling totals for the next level of that hierarchy, also can be applied in the case of the SDM.

However, the consistency of the information available for our application did not allow us to go beyond an estimate for the first level of disaggregation of the SDM, which made it impossible to intend to use it as a complement to the SAM approach in the development of our study.

Because we believe that this type of approach is also a good way to study the activity of countries, especially those with characteristics like Mozambique, we decided to keep it here.

Thus, this section should only be understood as an introduction to what it is, how useful it can be, and how close an SDM-based approach can be to a SAM-based approach.

Thus, Table 8 shows an estimate for the above-mentioned level of disaggregation for Mozambique in 2016, which details on the sources and construction can be seen in Tables A.5 and A.6 (in Appendix).

						(Unit: 10 ³	individuals)
State	at 31/12/2015	Outside		Closing			
State at 31/12	2/2016	World	0-14	15-24	25-64	65 and over	Stock
Outside World			215	62	105	92	26 424
	0-14	881	10 936				11 817
Population	15-24	62	199	4 982			5 243
by age group	25-64	265		83	8 209		8 557
	65 and over	11			12	784	807
Opening Stock		25 678	11 349	5 127	8 325	876	

Table 8. SDM of Mozambique in 2016 with population by age group (estimate)

Source: Own construction from Tables A.5 and 6 (in Appendix).

In the first age group of the population in Mozambique in 2016, represented in Table 8 – column and row 0-14, we can see the stocks and the flows of children aged 0 to 14, measured in thousands of individuals. Thus, reading by columns, the opening stock of children was 11 349; of these, 215 died or emigrated, 10 936 remained in that age group throughout the year and 199 moved to the 15-24 age group. Reading by rows, the closing stock was 11 817, which is composed of 881 children surviving births and immigrants and 10 936 children who have not changed state. A similar reading can be made for each of the other columns and rows.

The next level of disaggregation would look, for example, at the economic activity (as described above) of the population in Mozambique in 2016, within each age group. However, the lack of data did not allow us to go further.

Therefore, as exemplified above, the work with population movements within a country, during a specific period captured by a SDM, can complement and improve the information that has been captured by a SAM regarding the production, consumption and income of the institutional sector of households – one of the five institutional sectors identified by the current System of National Accounts (2008 SNA), the others being: financial and non-financial corporations, government and non-profit institutions serving households.

5. Studying the informal aspects of the activity of countries with SAMs and SDMs. The case of forestry and logging in Mozambique in 2016.

Chapter 25 of the 2008 SNA (System of National Accounts) identifies in the activity of countries a part "that reflects the effort of people without formal jobs to engage in some form of monetary economic activity" (ISWGNA, 2009: 471), in which the household unincorporated enterprises,

operating within the production boundary of the SNA², sell or barter on the market most or all of their output; in other words, they have market output. Because they operate on a small scale, at a low level of organisation, with little or no division between factors of production, the income that is generated by their activity is the so-called mixed income. Thus, as is mentioned in Chapters 7 and 24 of the 2008 SNA, the mixed income is the (imputed) compensation of the owner(s) of an unincorporated enterprise or members of the same household that may contribute with unpaid labour inputs of a similar kind to those that could be provided by paid employees. Since the household unincorporated enterprises may operate with or without paid employees, the distinction can be established respectively between employers' mixed income and own-account workers' mixed income. Employees and own-account workers are often named self-employed.

Within the framework of the proposed SAM for Mozambique in 2016, due to the lack of information, the gross mixed income was calculated, within the scope of the Integrated Economic Accounts (see Table A.1 in Appendix), from the total balancing item of the generation of income account for households, that is, from the gross operating surplus plus gross mixed income (85 753 million *meticais*). Thus, in accordance with the Households Budget Survey for Mozambique in 2014/2015, 84,9% of population aged 15 and over is economically active. From Table 8, economically active population, was identified assuming the maintenance of that portion in 2016. Self-employed, as defined above, was estimated as representing approximately 75% of economically active population. That estimate was supported by the "First" (and unique so far) "National Survey to the Informal Sector" (INFOR-2004/2005, published in 2006 by the Instituto Nacional de Estatística de Moçambique), by considering the time lag, as well as target group (population aged 7 and over, with non-observed activities, including underground). The known low level of literacy and income of household unincorporated enterprises, lead us to assume that only 1% of the above mentioned total balancing item of the generation of income account for households was gross operating surplus, being the rest gross mixed income. The later was, thus, assumed as being the compensation of what we called "informal labour" and the main source of income of what we called "informal households". Due to the lack of information, we also assumed being only dealing with own-account workers, exclusively occupied in "informal" activities, that is, operating, on a small scale, at a low level of organisation, within the production boundary, selling or bartering on the market most or all of their output. Therefore, for the study of the informal aspects of the activity of Mozambique in 2016, in the SAM presented in Table 3, we disaggregated the factors of production and the households current accounts.

² As defined in Chapter 6 of the 2008 SNA (ISWGNA, 2008: 98-101).

In the factors of production accounts, "labour" was recalled "formal labour", to which are associated the compensation of employees. The "other" factors of production were disaggregated in "capital" and "informal labour", with the gross mixed income compensating the latter and the gross operating surplus and property income compensating the former.

The households' current account was then disaggregated according with the main source of income, that is, in "formal households", with the compensation of "formal labour" as main source of income, and in "informal households", with the compensation of "informal labour" as main source of income. In this respect, we bear in mind the two general principles recommended by Pyatt and Round regarding the taxonomy to be adopted in the SAMs' design: "the classifications adopted for factors, ..., and also for institutions need to be developed jointly"; and the "classification system should be designed in such a way that any underlying duality is apparent" (Pyatt and Round, 2012: 267). Respecting these principles avoids overlooking important parts (which may even be crucial) of the network of linkages underlying the activity of the country in study.

Within the above mentioned "informal" activities, a special interest was focused forestry and logging, whose practitioners, for survival purposes and due to ignorance, carry out the indiscriminate felling of trees, without any license or concern for respecting the officially established schedules, with the associated environmental consequences.

For that, as shown in Table A.2 (in Appendix) within the production accounts, activities and products were also disaggregated, this time in four groups, with the target in first place – forestry and logging, followed by other primary activities, secondary and tertiary activities. Once again, we had to adopt assumptions to disaggregate the "informal" part, whose totals were calculated following the above description, to which proportionally principles regarding total were usually adopted.

Therefore, due to the lack of information the above-mentioned assumptions could not be more flexible and realistic. The same reason prevented the disaggregation of the SDM presented above, which could have given a good contribution. However, we understand this exercise as a possible approach to the study of a so important issue, from our point of view, and, at the same time, a guideline for future production and treatment of data.

Table A.7 (in Appendix) shows the result of our work after the above description. In this SAM numerical version, the share of the other factors of production in the functional distribution of the generated income, 67.7%, shown in Table 4, was disaggregated in informal labour, 12.2%, and capital, 54.9%. In turn, the share of the households in the institutional distribution of generated income, 45.4%, shown in Table 5, was disaggregated in formal, 32.3%, and informal, 13.1%, households. The same matrix was then the base for the construction of two scenarios that, through the approach described in Subsection 3.2, completed our study.

In line with the above-mentioned purpose, for a better study of changes resulting from the increment of the informal aspects of the activity of Mozambique in 2016, two scenarios were constructed: scenario A, involving an increase of 50% in the part of forestry and logging in the compensation of the informal labour, in the scope of functional distribution of income, therefore, affecting the total amount of gross mixed income (the total compensation of the informal labour); scenario B, involving an increase in the part of the gross national income relating to the compensation of informal labour received by informal households, in the same amount of scenario A, this time, in the scope of institutional distribution of income.

The numerical SAM, presented in Table A.7 (in Appendix), enable the identification of those changes and is the base of the algebraic SAM, as described in Subsection 3.2, which enabled the quantification of the macroeconomic effects of those increases, summarised in the form of the changes occurring in the macroeconomic aggregates, as described in Subsection 3.1.3, as shown in Table 9.

Therefore, in scenario A, our attention was focused on cell (ft-i, a1; or 2,4) of the SAM, which represents the compensation of the informal labour in forestry and logging, amounting to 1 963 million *meticais* and increased in 50% (981 million *meticais*). In scenario B, that (absolute) increase was applied to the part of the gross national income relating to the compensation of informal labour, received by informal households, that is, to the cell (sicc-f-i, ft-i; or 16,2).

Following the Subsection 3.2 description and considering as exogenous the accounts whose outlays are affected by the increases in each scenario, as well as the accumulation and the rest of the world accounts, accounting multipliers were calculated from the SAM for Mozambique in 2016. The effects of such increases were materialized in "new" x vectors, after the X matrices have been recalculated with the new amounts of the above-mentioned cells. In each of the two scenarios, from equation (7), a "new" y_n vector was determined and the rest of the "new" SAM was calculated considering equations (5) and (10). As mentioned above, Table 9 shows the results, summarized by the changes in the macroeconomic aggregates.

		Scenario A	Scenario B
Gross Domestic Product (GDP)) - Total	0.18	0.17
Cases National Income (CNI)	Total	0.32	0.29
Gross National Income (GNI)	Informal Households	1.40	1.22
Disposable Income (DI)	Total	0.31	0.28
	Informal Households	1.35	1.18

Table 9. Percentage changes in macroeconomic aggregates in the two scenarios of possible increases

 in the income generated in forestry and logging by informal labour of Mozambique in 2016

Source: Own calculations.

Thus, the effects of an increase in gross mixed income were felt mainly at the level of the part of informal households in GNI and in DI. The totals of those aggregates, as well as that of GDP, felt much lower or very identical effects.

In turn, the effects of an increase in compensation of informal labour received by informal households (scenario B) were felt in an identical form as the previous, but with lower impacts.

As far as the algebraic version of SAM used in the construction of the above scenarios is concerned, the accounting multipliers are based on assumptions that limit the results and the subsequent analysis of the constructed scenarios, as shown by Santos (2012). However, this methodology is simple to apply, and it represents a good way of exemplifying the aspects that were aimed to be highlighted in this paper. On the other hand, some types of algebraic versions of the SDM could also have been adopted, together (or not) with the SAM, but that is left for the next opportunity.

Much work can be undertaken with SAM and SDM-based approaches in studies in this, and many other different areas.

Using a SAM-based approach, a study carried out with the current and accumulation accounts of informal households, for instance, would make it possible to conduct other studies in the area of microfinance, namely about the role played by microcredit in the activity of that group and in the generation of its income and that of the whole economy. Such a study could be complemented and improved by also using a SDM-based approach, from which the behaviour of the stocks and flows of the part of the population linked to the owners of household unincorporated enterprises could be introduced.

6. Summary and concluding remarks

The Social Accounting Matrix (SAM) and the Socio-Demographic Matrix (SDM) are tools that can be used for studying the activity of countries both empirically and theoretically, depending on whether they are presented in a numerical or algebraic version. These are the so-called SAM-based and SDMbased approaches for studying (measuring and modelling) the activity of countries.

Using the example of a numerical version, the analysis of the activity of Mozambique in 2016 was focussed on the study of the informal aspects of the activity of countries, namely, those related with forestry and logging. Using an algebraic version of the SAM, the performance of a number of experiments allowed for the analysis of two scenarios that resulted from changes in that same reality. In that example, our attention was focused on household unincorporated enterprises. In the case of that population group, identified in SDM, our attention was focused on the so called 'informally employed', who are the owners' household unincorporated enterprises, also known as employers and own-account workers, whether they operate with, or without, paid employees. In turn, in the SAM,

our attention was focused on one hand, on the flows of income generated by the informally employed, or the informal labour and, on the other hand, on the aggregate income that was received and expended by informal households – those whose main source of income is informal labour.

With our working tools, for the year being studied, it was possible to quantify the flows of the population of the country, by age groups although it was not possible to quantify the corresponding participation in the labour market and in the supply side of goods and services market.

From the two scenarios that were experimented some macroeconomic effects of possible increments of the informal aspects of the activity of Mozambique in 2016 were identified. Those increments were understood both to be an effort to correct a possible undervaluation of the informal aspects of the activity of the studied country, and as results of possible policy measures oriented to a better knowledge and way of leaving of the households unincorporated enterprises working in forestry and logging.

Our experiments involved an increase of 50% in the part of forestry and logging in the compensation of the informal labour in the corresponding generated income - scenario A, and in the part of the gross national income relating to the compensation of informal labour received by informal households - scenario B.

The effects of those increases were summarised outside the matrix format through the quantification of changes in the GDP, Gross National Income and Disposable Income. Greater changes, either in totals, or the parts corresponding to informal households, highlight the impact in scenario A. The benefits of scenarios A and B are greater for the parts corresponding to the informal households than for the total economy.

Criticisms can be made, not only of the way in which the above experiments were performed, but also of the constraints imposed by the accounting multipliers (SAM-based model). This was, however, just a simple example of what can be done with the working tools of the SAM and the SDM. The importance of the informal aspects of the activity of countries varies from country to country; however, such aspects should not be neglected in those countries where the market output and monetary economic activity are increasing, such as Mozambique, or in countries that are largely dependent on the market but have high rates of unemployment and high levels of taxation and bureaucracy for registered enterprises. The assessment of the importance of these informal aspects is only possible if they are included in the whole activity of those countries, using, for instance, both a SAM and a SDM. In such a case, the national statistics offices should pay special attention to these aspects, in order to produce meaningful information.

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APPENDIX

Table A.1a. Integrated Economic Accounts of Mozambique in 2016 (estimate)- uses and changes in assets

(Unit: million meticais)

Current accounts										•	
Uses										1	
Accounts	Total	Goods and Services Account (Resources)	S.2 Rest of the World Account	S.1 Total of the Economy	S.15 NPISHs	S.14 Households	S.13 General Government	S.12 Financial Corporations	S.11 Non-Financial Corporations	Code	Transactions and other flows, stocks and balancing item
	510 976	510 976								P.7	Imports of goods and services
	252 788		252 788		• •					P.6	Exports of goods and services
	1 173 043	1 173 043								P.1	Output of goods and services
	548 956	62 020		548 956	2 290	50 753	99 105	19 894	376 915	P.2	Intermediate consumption
Production /	03 029	03 029								D.21-D.51	Net taxes on products
external account of	624 088			624 088	6 147	89 103	93 276	47 899	387 663	B.1g	Gross added value
goods and services	687 116			687 116						B.1*g	Gross domestic product
	31 764			31 764	3 056	2 228	6 899	2 615	16 966	P.51c	Consumption of fixed capital
	392 324			655 352	3 091	80 8 / 3	80 3/0	45 284	5/0 09/	B.In B.1*n	Value added, net
			258 189	055 552						B.11	External balance of goods and services
											<u> </u>
	206 409		3 309	203 100	3 091	3 350	86 374	20 579	89 707	D.1	Compensation of employees
	- 4 208			- 4 208				- 288	- 3 921	D.2-D.3	Net taxes on production and imports
	4 168			4 168				285	3 883	D.2	Taxes on Production and Imports
										D.21	Taxes on Products
	4 168			4 168	å			285	3 883	D.29	Other Taxes on Production
Generation of	- 8 376			- 8 376				- 572	- 7 803	D.3	Subsidies
income account										D.31	Subsidies on Products
	- 8 376			- 8 376	2.056	05 752	6 001	- 572	- 7 803	D.39	Other Subsidies on Production
	423 195			425 195	3 0 3 0	83 /33	6 901	27 008	301 8//	B.2g+B3g	income
	289 703			289 703	3 056	- 49 739	6 901	27 608	301 877	B2g	Gross operating surplus
	135 492			135 492		135 492				B3g	Gross mixed income
	31 764			31 764	3 056	2 228	6 899	2 615	16 966	P.51c	Consumption of fixed capital
	393 431			393 431		83 526	2	24 993	284 911	B.2n+B3n	net operating surplus and Net mixed
	138 010		3 274	134 736	1 944	12 959	21 152	60 090	38 591	D.4	Property income
Allocation of	671 377			671 377	1 168	278 370	52 325	32 195	307 319	B.5g	Gross national income/ Gross balance of
primary income	620 614			620 614	1 000	276 142	15 126	20.570	200.254	DSa	primary incomes
account	039 014			039 014	- 1 000	2/0 143	45 420	29 319	290 334	D.JII	primary incomes
	63 887			63 887		26 636		579	36 672	D.5	Current taxes on income, wealth, etc
	23 458			23 458		23 458				D.61	Social contributions
Secondary	24 825			24 825			24 499	62	264	D.62	Social benefits other than social transfers
distribution income											in kind
account	86 377		23 777	62 600		9 835	4 601	48 164		D.7	Other current transfers
	690 744			690 744	1 168	321 084	112 741	- 14 632	270 383	B.6g	Gross disposable income
	10 511			008 981	- 1 888	318 800	105 842	- 1/ 24/	253 417	B.0n	Net disposable income
Redistribution of	600 744			600 744	14 291	330 505	4 220	14 632	270 383	D.03	Gross adjusted disposable income
account	658 981			658 981	- 16 179	337 367	103 521	- 17 052	253 417	B.75	Net adjusted disposable income
	690 744			690 744	1 168	321 084	112 741	- 14 632	270 383	B.6g	Gross disposable income
	658 981			658 981	- 1 888	318 856	105 842	- 17 247	253 417	B.6n	Net disposable income
	683 389			683 389	Q	505 442	177 947			P.4	Actual Final Consumption
	683 389			683 389	14 291	486 931	182 167			P.3	Final consumption expenditure
account								0		D.8	Adjustment for the change in the net equity of households in pension funds
											reserves
	7 356			7 356	- 13 123	- 165 847	- 69 425	- 14 632	270 383	B.8g	Gross saving
	- 24 408		261.661	- 24 408	- 16 179	- 168 074	- 76 325	- 17 247	253 417	B.8n	Net saving
Accumulation account	nte		234 301							B.1 2	Current external balance
Changes in Assets	mus										
eninges in rissets										B.8n	Net saving
										B.12	Current external balance
Change in net worth due to			•							D.9r	Capital transfers, receivable
saving and capital										D.9p	Capital transfers, payable (-)
transfers	230 153		245 883	- 15 730	- 16 179	- 161 188	- 74 533	- 17 247	253 417	B.10.1	Changes in net worth due to saving and capital transfers
	154 470			154 470		3 400	17 400	12 092	110 567	P 51g	Gross fixed capital formation
	- 31 764			- 31 764	- 3 056	- 2 228	- 6 899	- 2 615	- 16 966	P.51c	Consumption of fixed capital (-)
	107 447			107 447			0	14	107 433	P.52	Changes in inventories
Acquisitions of				0						P.53	Acquisitions less disposals of valuables
assets account			19147	10 147	19666	105.050	25.005	10 207	202.267	NP	Acquisitions less disposate of any
	0		10 14/	- 10 14/	- 10 000	- 103 938	- 00 980	- 19 09/	292 501		produced non-financial assets
	0		227 735	- 227 735	5 542	23 505	925	- 8 731	- 248 978	B.9	Net lending (+) /borrowing (-)

Source: INE (Instituto Nacional de Estatística) – Mozambique

Table A.1b. Integrated Economic Accounts of Mozambique in 2016 (estimate) - resources and changes in liabilities and net worth

(Unit: million meticais)

											Resources
		S.11	S.12	S.13	S.14	S.15	S.1	S.2	Goods and		
	Transactions and other flows, stocks and balancing item	Non-Financial Corporations	Financial Corporations	General Government	Households	NPISHs	Total of the Economy	Rest of the World	Services Account	Total	Accounts
Code								Account	(Uses)		1
P.7	Imports of goods and services							510 976	252 700	510 976	
P.0 P 1	Exports of goods and services	764 578	67 793	192 380	130 856	8 437	1 173 043		232 /88	1 173 043	Production / external
P.2	Intermediate consumption	104 570		172 500	100 000	0 457	11/5 045		548 956	548 956	account of goods
D.21-D.31	Net taxes on products						63 029			63 029	and services
							(21.000			(21.000	
B.1g	Gross added value						624 088			624 088	
B.1*g	Cross domestic product						08/110			08/110	
B.In	Value added. net	370 697	45 284	86 376	86 875	3 091	592 324		0	592 324	Generation of
B.1*n	Net domestic product						655 352				income account
B.11	External balance of goods and services							258 189	••••••		
								¢			
D.1	Compensation of employees				204 450		204 450	1 959		206 409	
D.2-D.3	Net taxes on production and imports			58 821			58 821			58 821	
D.2	Taxes on Production and Imports			67 201	G		67 201	0	9	67 201	
D.21	Taxes on Products			63 033			63 033			63 033	
D.29	Other Taxes on Production	}	0	4 168	••••••••••••••••••••••••••••••••••••••		4 168		•••••••	4 168	
D.3	Subsidies			- 8 380			- 8 380	0		- 8 380	1.11
D.31	Subsidies on Products			-4			- 4			- 4	primary income
D.39	Other Subsidies on Production	201.077	27.600	- 8 376	05 752	2.056	- 8 376			- 8 376	account
в.2g+вэg	income	301 8//	27 008	0 901	83 735	3 0 3 0	425 195			425 195	
B2g	Gross operating surplus	301 877	27 608	6 901	- 49 739	3 056	289 703		••••••	289 703	
B3g	Gross mixed income		0		135 492		135 492		0	135 492	
P.51c	Consumption of fixed capital	16 966	2 615	6 899	2 228	3 056	31 764			31 764	
B.2n+B3n	Net operating surplus and Net mixed	284 911	24 993	2	83 526		393 431			393 431	
D.4	Property income	44 034	64 677	7 755	1 126	56	117 647	20 363		138 010	
B.5g	Gross national income/ Gross balance of	307 319	32 195	52 325	278 370	1 168	671 377			671 377	
	primary incomes								•		
B.5n	Net national income/ Net balance of	290 354	29 579	45 426	276 143	- 1 888	639 614			639 614	
D.5	Current taxes on income, wealth, etc			63 887			63 887			63 887	Secondary
											distribution income
D.61	Social contributions			23 458			23 458	••••••		23 458	account
D.62	Social benefits other than social transfers				24 825		24 825			24 825	
D .7	Other current transfers		1 979	2 170	77 818		81 967	4 410		86 377	
B.6g	Gross disposable income	270 383	- 14 632	112 741	321 084	1 168	690 744			690 744	Redistribution of
B.6n	Net disposable income	253 417	- 17 247	105 842	318 856	- 1 888	658 981		0	658 981	income in kind
D.63	Social transfers in kind		0		18 511		18 511			18 511	account
B.7g	Gross adjusted disposable income	270 383	- 14 632	108 521	339 595	- 13 123	690 744			690 744	
B.7n	Net adjusted disposable income	253 417	- 17 247	101 622	3 37 36 7	- 16 179	658 981			658 981	
B.6g	Gross disposable income	270 383	- 14 632	112 741	321 084	1 168	690 744			690 744	
B.6n	Net disposable income	253 417	- 17 247	105 842	318 856	- 1 888	658 981			658 981	
P.4	Actual Final Consumption								683 389	683 389	Use of income
D.8	Adjustment for the change in the net equity of households in pension funds								083 389	083 389	account
B.8g	Gross saving							••••••			
B.8n	Net saving										
B.12	Current external balance										
									C	hanges in li	abilities and net worth
B.8n	Net saving	253 417	- 17 247	- 76 325	- 168 074	- 16 179	- 24 408			- 24 408	~
B.12	Current external balance							254 561			Change in net worth
D.9r	Capital transfers, receivable			1 929	6 886		8 815			8 815	capital transfers
D.9p	Capital transfers, payable (-)			- 137			- 137	- 8 678		- 8 815	
B.10.1	Changes in net worth due to saving and capital transfers	253 417	- 17 247	- 74 533	- 161 188	- 16 179	- 15 730	245 883		230 153	
P.51g	Gross fixed capital formation								154 470		
P.51c	Consumption of fixed capital (-)							*****			A consistions of non
P.52	Changes in inventories								107 447		financial assets
P.53	Acquisitions less disposals of valuables										account
NP B.9	Acquisitions less disposals of non- produced non-financial assets Net lending (+) /borrowing (-)										

Source: INE (Instituto Nacional de Estatística) – Mozambique

products of activity (p)	activities (a)	description	(national accounts) <i>CNBS/CAE</i> (rev.2) Division					
pl	al	forestry and logging	02					
p2	a2	other primary activities	01;03-09					
p3	a3	secondary activities	10-43					
p4	a4	tertiary activities	45-99					
(domestic) i	nstitutions (sic)							
current (sicc)	capital (sicaa)	-						
SI	nf	non-financial corporations						
s	f	financial corporations						
a	р	general government						
	f	households						
ff		households - formal						
fi		households - informal						
isf	lsf	non-profit institutions serving households (NPISH)						
factors (of pr	roduction) (f)							
t-f		labour - formal						
t-i		labour - informal						
с		capital						
r	m	Rest of the world						

Table. A.2. Disaggregation and description of the SAM accounts

Source: Own construction

A.3. Supply table of Mozambique in 2016 (estimate)

(Unit: million *meticais*)

Sumply of goods and			Output (P1)				Trade and	Taxes less subsidies	Total Supply
supply of goods and services (or products)	a01	a02	a03	a04	total by	Imports (P7)	transport	on Products	at purchasers'
services (or products)	a01	d02	a05	a04	product		margins	(D.21-D.31)	price
p01	15 441	0	0	0	15 441	408	2 756	0	18 605
p02	0	209 326	0	0	209 326	15 011	51 141	2 283	277 761
p03	0	48 972	247 025	0	295 997	318 768	115 342	51 876	781 983
p04	0	0	0	652 279	652 279	159 380	- 169 239	8 869	651 289
total by industry	15 441	441 258 298 247 025 652 279 1 173 043 493 566		0	63 029	1 729 638			
Direct purchases abroad						17 410			17.410
by residents						1/410			1/410
Cif/fob adjustments on						0			0
imports						0			0
Total	15 441	258 298	247 025	652 279	1 173 043	510 976	0	63 029	1 747 048

Source: INE (Instituto Nacional de Estatística) – Mozambique

A.4. Use table of Mozambique in 2016 (estimate)

(Unit: million *meticais*)

Use of goods and		Intermed	liate Consum	ption (P2)				Final Cons	umption (P3)		Gross Capital	E (Total Use at
Use of goods and	a01	a02	a02	a04	total by		Households	NPISH	Government	total	Formation -	Exports	purchasers'
services (or products)	a01	a02	a03	a04	product		(S14)	(S15)	(S13)	total	total (P5)	(F0)	price
p01	224	7	641	130	1 002		17 089	0	0 0	17 089	0	513	18 605
p02	0	67 596	18 961	6 785	93 342		100 679	0	0 0	100 679	1 749	81 992	277 761
p03	0	16 887	120 958	194 522	332 368		237 156	0	0 0	237 156	88 257	124 201	781 983
p04	0	4 082	68 968	49 194	122 244		114 938	14 291	182 167	311 396	171 910	45 739	651 289
total by industry	224	88 572	209 528	250 632	548 956		469 863	14 291	182 167	666 320	261 916	252 446	1 729 638
Direct purchases							17 410			17 410			17 410
abroad by residents (+)							1, 110			1, 110			1, 110
Purchases on the													
domestic territory by							- 342			- 342		342	0
non-residents (-)													
Cif/fob adjustments on												0	
imports						l						Ű	
Total	224	88 572	209 528	250 632	548 956	1	486 931	14 291	182 167	683 389	261 916	252 788	1 747 048
						_							
Gross Added Value	15 217	169 726	37 497	401 647	624 088								
(GDP)	15217	107 720	5/ 4//	401 047	024 000								
Compensation of	2 509	30 483	25 087	145 022	203 100								
Employees (D1)	2 3 0 9	50 105	25 007	115 022	205 100								
Other taxes less													
subsidies on production	- 55	- 927	- 886	- 2 340	- 4 208								
(D29-D39)						l							
			I			1							
Gross Operating	10.7.1	1.40.1.60	10.007	250 0.55	105 105								
Surplus and Gross	12/64	140 169	13/297	258 965	425 195								
Mixed Income						I							
Total Output (P1)	15 441	258 208	247 025	652 270	1 173 0/3	1							
	15441	230 290	24/023	052 219	1 1 / 5 045	I							

Source: INE (Instituto Nacional de Estatística) – Mozambique

Table A.5. Demographic statistics of Mozambique in 2016 (estimate)

(Unit: 10³ individuals)

Age group	Total Population	Deaths	Births (surviving)	Immigrants	Emigrants	
2015						
0-14	11 349					
15-24	5 127					
25-64	8 325					
65&more	876					
Total	25 678					
2016						
0-14	11 817	188	849	32	27	
15-24	5 243	14		62	48	
25-64	8 557	34		265	71	
65&more	807	81		11	11	
Total	26 424	317	849	371	157	

Source: INE (Instituto Nacional de Estatística) – Mozambique

Notes:

- 1. Estimates defined from Population projections for 2015 and 2016" and "Populations Census for 2007 and 2017".
- 2. Some structures of disaggregation were also based in the work done for 2007 in Santos (2014).

Table A.6. Inflows and outflows of population by age group for a SDM of Mozambique in 2016

	Age gro	oup 0-14				
Inflows		Outflows				
Survivors from last year (Opening Stock)	11 349	Deaths	188			
Births	849	Emigrants	27			
Immigrants	32	Movers to the age of 15	199			
		Survivors into next year (Closing Stock)	11 817			
Total	12 231	Total	12 231			
	Age gro	up 15-24				
Inflows	Age gro	up 15-24 Outflows				
Inflows Survivors from last year (Opening Stock)	Age gro 5 127	up 15-24 Outflows Deaths	14			
Inflows Survivors from last year (Opening Stock) Immigrants	Age gro 5 127 62	up 15-24 Outflows Deaths Emigrants	14 48			
Inflows Survivors from last year (Opening Stock) Immigrants Entrants from the age of 14	Age gro 5 127 62 199	up 15-24 Outflows Deaths Emigrants Movers to the age of 25	14 48 83			
Inflows Survivors from last year (Opening Stock) Immigrants Entrants from the age of 14	Age gro 5 127 62 199	up 15-24 Outflows Deaths Emigrants Movers to the age of 25 Survivors into next year (Closing Stock)	14 48 83 5 243			

(Unit: 10³ individuals)

	Age grou	up 25-64	
Inflows		Outflows	
Survivors from last year (Opening Stock)	8 325	Deaths	34
Immigrants	265	Emigrants	71
Entrants from the age of 24	83	Movers to the age of 65	12
		Survivors into next year (Closing Stock)	8 557
Total	8 673	Total	8 673

	Age group	65&more				
Inflows		Outflows				
Survivors from last year (Opening Stock)	876	Deaths	81			
Immigrants	11	Emigrants	11			
Entrants from the age of 64	12	Survivors into next year (Closing Stock)	807			
Total	899	Total	899			
	Outside	e World				
Inflows		Outflows				
Deaths	317	Births	849			
Emigrants	157	Immigrants	371			
Survivors into next year (Our Country's Closing Stock)	26 424	Survivors from the last year (Our Country's Opening Stock)	25 678			
Total	26 898	Total	26 898			

Source: Own construction from Table A.5

Notes:

1. Like in Santos (2014), the SDM presented in Table 8 was constructed from the inflows and outflows identified in Table A.6, constructed from Table A.5. In Table 8, inflows are represented in the rows and the outflows in the columns, the diagonal (represented in italic font) is calculated in the matrix itself through the difference between the closing stock and the other flows in a row or between the opening stock and the other flows in a column.

2. When information was missing or whenever inconsistencies were found, the following assumptions were adopted:

- the α (scalar), as described in Table 8, is zero;
- all emigrants aged 14 or less are inactive;
- those moving from one age group to another and those surviving in the same age group maintain the same situation regarding their economic activity;
- deaths by economic activity are proportional to the opening activity (inactivity) rates.

Table A.7. SAM of Mozambique in 2016, for the study of the informal aspects of the forestry and logging (estimate)

(Unit: million *meticais*)

		ft-f	ft-i	ft	fc	f(total)	al	a2	a3	a4	a(total)	p1	p2	p3	p4	p(total)
		1	2		3		4	5	6	7		8	9	10	11	
ft-f	1						2 509	30 483	25 087	145 022	203 100					
ft-i	2						1 963	21 891	4 836	51 803	80 492					
ft							4 471	52 374	29 923	196 825	283 592					
fc	3						10 801	118 279	8 461	207 162	344 703					
f(total)							15 272	170 652	38 384	403 987	628 295					
al	4											15 441	0	0	0	15 441
a2	5											0	209 326	48 972	0	258 298
a3	6											0	0	247 025	0	247 025
a4	7											0	0	0	652 279	652 279
a(total)												15 441	209 326	295 997	652 279	1 173 043
p1	8						224	7	641	130	1 002	2 7 5 6	0	0	- 2 756	0
p2	9						0	67 596	18 961	6 785	93 342	0	51 141	0	- 51 141	0
p3	10						0	16 887	120 958	194 522	332 368	0	0	115 342	- 115 342	0
P4	11						0	4 082	68 968	49 194	122 244	0	0	0	0	0
p(total)							224	88 572	209 528	250 632	548 956	2 756	51 141	115 342	- 169 239	0
sicc-snf	12	0	0	0	307 319	307 319										
sicc-sf	13	0	0	0	32 195	32 195										
sicc-ap	14	0	0	0	-6 496	-6 496	- 55	- 927	- 886	- 2 340	- 4 208	0	2 283	51 876	8 869	63 029
sicc-f-f	15	204 450	0	204 450	-6 571	197 878										
sicc-f-i	16	0	80 492	80 492	0	80 492										
sicc-f		204 450	80 492	284 942	-6 571	278 370										
sicc-isflsf	17	0	0	0	1 168	1 168										
sicc (total)		204 450	80 492	284 942	327 615	612 556	- 55	- 927	- 886	- 2 340	- 4 208	0	2 283	51 876	8 869	63 029
sica-snf	18															
sica-sf	19															
sica-ap	20															
sica-f	21															
sica-isflsf	22															
sica (total)																
rm	23	1 959	0	1 959	20 363	22 322						408	32 421	318 768	159 380	510 976
TOTAL		206 409	80492,19	286 901	347 977	634 878	15 441	258 298	247 025	652 279	1 173 043	18 605	295 171	781 983	651 289	1 747 048
															4 1	· 1)

(to be continued)

										(Ont: minor meteurs							
		sicc-snf	sicc-sf	sicc-ap	sicc-f-f	sicc-f-i	sicc-f	sicc-isflsf	sicc (total)	sica-snf	sica-sf	sica-ap	sica-f	sica-isflsf	sica (total)	rm	TOTAL
		12	13	14	15	16		17		18	19	20	21	22		23	
ft-f	1															3 309	206 409
ft-i	2	I														0	80 492
ft		I														3 309	286 901
fc	3															3 274	347 977
f(total)																6 583	634 878
al	4																15 441
a2	5	I															258 298
a3	6																247 025
a4	7	I															652 279
a(total)																	1 173 043
p1	8	0	0	0	12 939	4 150	17 089	0	17 089	0	0	0	0	0	0	513	18 605
p2	9	0	0	0	73 759	43 988	117 747	0	117 747	340	0	0	1 409	0	1 749	82 334	295 171
p3	10	0	0	0	216 408	20 749	237 156	0	237 156	86 174	0	0	2 083	0	88 257	124 201	781 983
P4	11	0	0	182 167	100 829	14 109	114 938	14 291	311 396	140 486	13 997	17 428	0	0	171 910	45 739	651 289
p(total)		0	0	182 167	403 935	82 996	486 931	14 291	683 389	227 000	13 997	17 428	3 492	0	261 917	252 788	1 747 048
sicc-snf	12	0	0	0	0	0	0	0	0							0	307 319
sicc-sf	13	0	0	0	1 979	0	1 979	0	1 979							0	34 174
sicc-ap	14	36 672	579	0	51 825	439	52 264	0	89 516							0	141 841
sicc-f-f	15	238	48 220	26 190	1 148	0	1 148	0	75 795							23 777	297 451
sicc-f-i	16	26	6	2 910	0	128	128	0	3 070							0	83 562
sicc-f		264	48 226	29 100	1 148	128	1 275	0	78 865							23 777	381 013
sicc-isflsf	17	0	0	0	0	0	0	0	0							0	1 168
sicc (total)		36 936	48 805	29 100	54 952	567	55 519	0	170 360							23 777	865 515
sica-snf	18	270 383	0	0	0	0	0	0	270 383	0	0	0	0	0	0	248 978	519 361
sica-sf	19	0	- 14 632	0	0	0	0	0	- 14 632	0	0	0	0	0	0	8 731	- 5 901
sica-ap	20	0	0	- 69 425	0	0	0	0	- 69 425	0	0	137	0	0	137	867	- 68 421
sica-f	21	0	0	0	- 165 847	0	- 165 847	0	- 165 847	0	0	0	0	0	0	- 16 619	- 182 466
sica-isflsf	22	0	0	0	0	0	0	- 13 123	- 13 123	0	0	0	0	0	0	- 5 542	- 18 666
sica (total)		270 383	- 14 632	- 69 425	- 165 847	0	- 165 847	- 13 123	7 356	0	0	137	0	0	137	236 413	243 907
rm	23	0	0	0	4 4 1 0	0	4 410	0	4 410	292 361	- 19 897	- 85 986	- 185 958	- 18 666	- 18 147		519 561
TOTAL	T	307 319	34 174	141 841	297 451	83 562	381 013	1 1 68	865 515	519 361	- 5 901	- 68 421	- 182 466	- 18 666	243 907	519 561	5 183 953

Table A.7(continuation): SAM of Mozambique in 2016, for the study of the informal aspects of the forestry and logging (estimate)

(Unit: million *meticais*)

Sources: Own construction, from: Integrated Economic Accounts, Supply Table and Use Table of Portugal – Tables A.2, A.3, and A.4; from-whom-to-whom matrices for current and capital transfers, provided by INE (*Instituto Nacional de Estatística*) – Mozambique.

Note: See the descriptions of the accounts in Table A.2.