

# Measuring the Activity of African Countries using Social Accounting Matrices

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Wealth, Poverty, and Inequality in African Countries**

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**Measuring the activity of African Countries using Social Accounting  
Matrices.**

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**Abstract:**

Economic models at the micro, meso and macro levels presuppose the existence of consistent databases that make it possible to quantify the activity of enterprises, sectors, regions, countries or continents. Such models can also be important aids in the policy decision process, since they permit the construction of scenarios resulting from the adoption of policy measures and the consequent changes that they introduce.

When consistent with the United Nations System of National Accounts (SNA), the Social Accounting Matrix (SAM) can include all the nominal flows of the measured part of the economy, at the level of both production and the institutions, and therefore satisfies these requirements. Thus, in its numerical version, a SAM constitutes a database and provides a snapshot of the measured reality at a certain moment, whereas its possible algebraic versions, i.e. models that are based upon it, permit the construction of the above-mentioned scenarios.

The possibility and usefulness of constructing SAMs for African countries consistent with the SNA will be examined and experimented. The SAM's basic structure and consistency within the whole system will be studied, as well as any possible disaggregations, extensions, aggregates, indicators and balances that can be calculated. Other aspects beyond that basic structure will also be examined in order to show to what extent the SAM is capable of covering parts of the economy that are not covered by the SNA.

*Key words:* Social Accounting Matrix; National Accounts; African Countries

*JEL classification:* C82; E01; E61.

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## **1. Introduction**

In this paper<sup>1</sup>, the Social Accounting Matrix (SAM) will be presented as a tool for measuring a society's activity, underlying which there are systems that can be worked upon in different ways. Thus, the SAM will be presented as an alternative support for studies being undertaken in several areas, as well as for those who intervene in the policy decision process, which can be directed towards different parts of those systems.

Adopting a conceptual framework based on the works of Graham Pyatt and his associates, Section 2 specifies the main features of the SAM-based approach, according to which the SAM can describe a society's activity either empirically or theoretically, depending on whether it is presented in a numerical or an algebraic version, respectively.

Based upon the above-mentioned conceptual framework, Section 3 proposes some guidelines for the construction of numerical versions of SAMs, adopting the national accounts based on the United Nations System of National Accounts (SNA) as the base source of information. Different possibilities of analysis, provided by aggregates, indicators and balances that can be calculated from such versions, will precede two examples of policy-type questions that can be addressed using the same tool. In order to provide some empirical evidence as to how that proposal can be adopted worldwide, the exposition will be accompanied by the applications of a SAM to both a European country (Portugal) and an African country (Mozambique).

Section 4 examines certain aspects that lie outside the basic structure, which were presented in the previous section.

A SAM, will therefore be proposed that can include practically all the nominal flows measured using the SNA and which also has room for at least some of those flows that until now have not been measured. The concluding remarks, presented in Section 5, systematise the main ideas of the other sections in order to show to what extent countries can use SAMs to study (socio-)economic systems and support policy decision processes and other studies.

## **2. The SAM-based approach**

Richard Stone and Graham Pyatt played a key role in the implementation of the SAM-based approach. Both worked on the conceptual details of that approach: the former worked more in numerical terms, within the framework of a system of national accounts, while the latter worked more in algebraic terms, mainly within the scope of input-output analysis. Their work has been decisive for understanding the importance of the SAM as a measurement tool.

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<sup>1</sup> Based on the paper presented to the 19th International Input-Output Conference, held in Alexandria - Virginia, USA, on 13-17/6/2011.

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In the foreword to the book that can now be regarded as a pioneering work in terms of the SAM-based approach, “Social Accounting for Development Planning with special reference to Sri Lanka”, Richard 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”, Graham 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 society 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 Graham 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).

In 1953, with the first and most fundamental contribution written by Richard Stone, the United Nations implemented the System of National Accounts (SNA), which continued to be published in successive versions until 2008 (ISWGA, 2008). This system establishes the rules for measuring the activity of countries or groups of countries, which, in turn, have been adopted and adapted to specific realities by the corresponding statistical offices.

The construction of algebraic versions can be seen, among others, in Pyatt (2001; 1988), Pyatt and Roe, (1977), Pyatt and Round (1985), Santos (2010; 2009).

Special attention has been paid by the author to the construction of numerical versions of SAMs from the SNA, a question which will be examined below.

### **3. Constructing numerical versions of SAMs from the SNA. Applications to Portugal and Mozambique.**

The latest versions of the SNA have devoted a number of paragraphs to discussing the question of SAMs. The 2008 version mentions SAMs in Section D of Chapter 28, entitled “Input-output and other matrix-based analysis” (ISWGA, 2008: 519-522), in which a matrix representation is presented of the accounts identified and described in the whole SNA. This representation is not to be identified with the SAM presented in this paper, although they both cover practically all the transactions recorded by those accounts. The SAM that will be presented below results from the work that the author has undertaken within a conceptual framework based on the works of Graham Pyatt and his associates (Pyatt, 1988 and 1991; Pyatt and Roe, 1977; Pyatt and Round, 1985) and 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). Thus, the author will propose a version of the SAM that, as will be seen, is representative of practically all the nominal flows measured by the SNA.

Working within the framework of the European System of National and Regional Accounts in the European Community of 1995 (the adaptation for Europe of the 1993 version of the SNA), Santos (2007) makes an application to Portugal at an aggregate level, explaining the main differences between the two matrices mentioned above – the matrix representation of the SNA accounts and the author’s own version of the SAM. Pyatt (1999) and Round (2003) also approach this same issue with their own versions.

Because the general differences between the accounts identified and described in the 1993 and 2008 versions of the SNA are not significant, this analysis still remains valid. It is also valid for the applications to Portugal and Mozambique in 2007, presented in the following subsections. In 2007, the Portuguese national accounts adopted the above-mentioned European System, based on the 1993 version of the SNA. In turn, as one of the 22 countries belonging to the project for Anglophone Africa of the General Data Dissemination System (GDDS), promoted by the International Monetary Fund (IMF), Mozambique produced its own national accounts following the

recommendations of that same version of the SNA<sup>2</sup>. The sources of information and methodological details of the application to Mozambique are described in Appendix B.

Thus, following on from what was said above, a square matrix will be worked upon, in which the sum of the rows is equal to the corresponding sum of the columns. In keeping with what is conventionally accepted, resources, incomes, receipts or changes in liabilities and net worth will be represented in the entries made in the rows, while uses, outlays, expenditures or changes in assets will be represented in the entries made in the columns. Each transaction will therefore be recorded only once, in a cell of its own.

The starting point for the construction of a numerical SAM should be its design, i.e. the classification of its accounts, which will depend on the purposes for which it is to be used. By adopting the SNA as the underlying base source of information, a basic structure is proposed and the consistency of the whole system is highlighted. The flexibility of that basic structure will be shown, together with the possibilities that it presents for characterising any problem and for achieving the purposes of any study.

### **3.1. The SAM's basic structure and its consistency with the whole system**

Adopting the working method recommended by Richard Stone in the second paragraph of Section 2 of this paper, the basic structure for the SAM presented here will be a summary set of the national accounts and the controlling totals for the other levels of disaggregation. Thus, in keeping with the conventions and nomenclature defined by the SNA, besides a rest of the world account, the proposed SAM will also include both production and trade accounts and institutional accounts.

Table 1 shows the above-mentioned basic structure, representing nominal transactions (“t”) with which two indexes are associated. The location of these transactions in the matrix framework is described by those indexes, the first of which represents the row account and the second the column account. 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.

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<sup>2</sup> More details of Mozambique's participation in this data system can be found on the website of the [GDDS Metadata by Country – Mozambique](http://dsbb.imf.org/Pages/GDDS/CtyCtgList.aspx?ctycode=MOZ) (<http://dsbb.imf.org/Pages/GDDS/CtyCtgList.aspx?ctycode=MOZ>)

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**Table 1.** The basic SAM

	p	a	f	dic	dik	dif	rw	total
p – products	$t_{p,p}$	$t_{p,a}$	0	$t_{p,dic}$	$t_{p,dik}$	0	$t_{p,rw}$	$t_p$
a – activities	$t_{a,p}$	0	0	0	0	0	0	$t_a$
f – factors	0	$t_{f,a}$	0	0	0	0	$t_{f,rw}$	$t_f$
dic – (domestic) institutions’ current account	$t_{dic,p}$	$t_{dic,a}$	$t_{dic,f}$	$t_{dic,dic}$	0	0	$t_{dic,rw}$	$t_{dic}$
dik – (domestic) institutions’ capital account	0	0	0	$t_{dik,dic}$	$t_{dik,dik}$	$t_{dik,dif}$	$t_{dik,rw}$	$t_{dik}$
dif – (domestic) institutions’ financial account	0	0	0	0	0	$t_{dif,dif}$	$t_{dif,rw}$	$t_{dif}$
rw – rest of the world	$t_{rw,p}$	$t_{rw,a}$	$t_{rw,f}$	$t_{rw,dic}$	$t_{rw,dik}$	$t_{rw,dif}$		$t_{rw}$
Total	$t_p$	$t_a$	$t_f$	$t_{dic}$	$t_{dik}$	$t_{dif}$	$t_{rw}$	

Sources: Santos (2010).

Note: The first three accounts (p = products, a = activities and f = factors (of production)) are the production and trade accounts of the economy and the next three accounts (dic = current; dik = capital; dif = financial) are the accounts of the (domestic) institutions. The last account (rw = rest of the world) represents the “outside” part of the (domestic) economy.

Table 2 shows the transactions of the National Accounts recorded in the cells of the basic SAM, which will continue to be the same if some disaggregation, or even extension, is performed – thereby preserving the consistency of the whole system.

**Table 2.** The National Accounts transactions in the cells of the basic SAM

SAM			National Accounts transactions	
row	column	Description (valuation <sup>3</sup> )	(SNA) code	Description (valuation <sup>3</sup> )
p	p	trade and transport margins	---	trade and transport margins
a	p	production (basic prices)	P1	output (basic prices)

<sup>3</sup> In the transactions represented by the cells whose rows and/or columns represent production accounts, as well as in the aggregates and balances that can be calculated from these, as will be seen in Section 3.3, the following types of valuation are identified (regardless of whether one is working with current or constant (price) values): factor cost; basic, cif (cost-insurance-freight included) and fob (free on board) prices; purchasers’ or market prices.

Factor cost represents the compensation of the factors (or the primary incomes due to labour and capital) used in the production process of the domestic economy, excluding taxes on production and imports (taxes on products and other taxes on production) and subsidies (subsidies on products and other subsidies on production). This type of valuation is considered in the SNA (Paragraph 265) to be complementary (ISWGNA, 2008: 22).

When other taxes on production, net of other subsidies on production, are added to the production value of the domestic economy at factor cost, we obtain the basic prices for the production that will be transacted in the domestic market and the fob price level of the part that will be exported. Imports, valued at cif prices, will be added at this level to the unexported part of domestic production to be transacted in the domestic market.

Purchasers’ or market prices relate to those products, either domestically produced or imported, that are transacted in the domestic market. Here, the basic/cif prices will be increased by adding to them the trade and transport margins and the taxes net of subsidies on products.

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SAM			National Accounts transactions	
row	column	Description (valuation <sup>3</sup> )	(SNA) code	Description (valuation <sup>3</sup> )
dic	p	net taxes on products (paid to domestic institutions – general government)	D21-	taxes on products
rw	p	net taxes on products (paid to the RW), when these exist	-D31	<i>minus</i> subsidies on products
		imports (cif prices)	P7	imports of goods and services (cif prices)
p	rw	exports (fob prices)	P6	exports of goods and services (fob prices)
p	a	intermediate consumption (purchasers' prices)	P2	intermediate consumption (purchasers' prices)
p	dic	final consumption (purchasers' prices)	P3	final consumption expenditure (purchasers' prices)
p	dik	gross capital formation (purchasers' prices)	P5	gross capital formation (purchasers' prices)
f	a	gross added value (factor cost)	D1 D4 B2g B3g	compensation of employees net property income gross operating surplus gross mixed income
dic	a	net taxes on production (paid to domestic institutions - general government)	D29-	other taxes on production
rw	a	net taxes on production (paid to the RW), when these exist	-D39	<i>minus</i> other subsidies on production
dic	f	gross national income	B5g	gross national income
rw	f	compensation of factors to the RW	D1	primary income paid to/received from the rest of the world
f	rw	compensation of factors from the RW	D4	compensation of employees net property income
dic	dic	current transfers within domestic institutions	D5	current taxes on income, wealth, etc.
rw	dic	current transfers to the RW	D6	social contributions and benefits
			D7	other current transfers
dic	rw	current transfers from the RW	D8	adjustment for the change in the net equity of households in pension fund reserves
dik	dic	gross saving	B8g	gross saving
dik	dik	capital transfers within domestic institutions	D9	capital transfers
dik	rw	capital transfers from the RW		
rw	dik	capital transfers to the RW		

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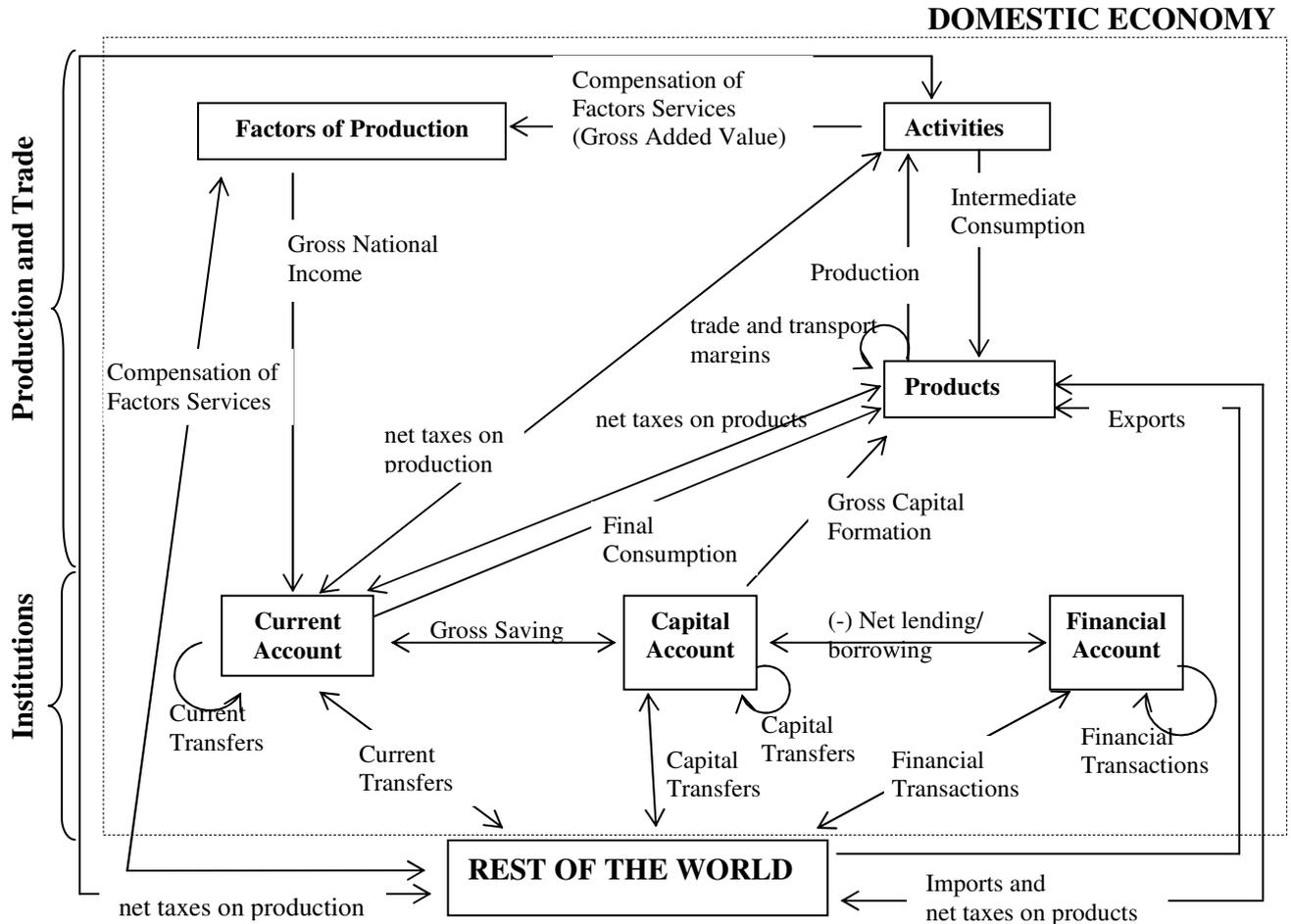
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SAM			National Accounts transactions	
row	column	Description (valuation <sup>3</sup> )	(SNA) code	Description (valuation <sup>3</sup> )
dik	dif	- net lending/borrowing (see k) in de description of the SAM blocks)	B9	net lending/borrowing
dif	dif	financial transactions within domestic institutions	F1	monetary gold and special drawing rights (SDRs)
rw	dif	financial transactions to the RW	F2	currency and deposits
			F3	securities other than shares
dif	rw	financial transactions from the RW	F4	loans
			F5	shares and other equity
			F6	insurance technical reserves
			F7	other accounts receivable/payable
p	total	aggregate demand	row sum of the p account's cells (see above)	
total	p	aggregate supply	column sum of the p account's cells (see above)	
a	total	production value	P1	output (basic prices)
total	a	total costs	column sum of the a account's cells (see above)	
f	total	aggregate factors income	row sum of the f account's cells (see above)	
total	f		column sum of the f account's cells (see above)	
dic	total	aggregate income	row sum of the dic account's cells (see above)	
total	dic		column sum of the dic account's cells (see above)	
dik	total	investment funds	row sum of the dik account's cells (see above)	
total	dik	aggregate investment	column sum of the dik account's cells (see above)	
dif	total	total financial transactions	row sum of the dif account's cells (see above)	
total	dif		column sum of the dif account's cells (see above)	
rw	total	value of transactions to the rest of the world	row sum of the rw account's cells (see above)	
total	rw	value of transactions from the rest of the world	column sum of the rw account's cells (see above)	

Source: Santos (2010).

Schematically, the flows between the described accounts represent the circular flows in the economy, which, using the SAM description, can be seen in Outline 1.

**Outline 1:** The nominal flows between the accounts of the basic SAM



Source: Santos (2009: 6)

The SAM blocks, identified in Table 3, are submatrices or sets of submatrices with common characteristics. The specification of these blocks will be made below and involves an identification of the transactions of the National Accounts.

**Table 3.** The basic SAM by blocks

	p	a	f	dic	dik	dif	rw
p – products	TTM ( $t_{p,p}$ )	IC ( $t_{p,a}$ )	0	FC ( $t_{p,dic}$ )	GCF ( $t_{p,dik}$ )	0	EX ( $t_{p,rw}$ )
a – activities	P ( $t_{a,p}$ )	0	0	0	0	0	0
f – factors	0	CFP_GAV ( $t_{f,a}$ )	0	0	0	0	CFP ( $t_{f,rw}$ )
dic – (domestic) institutions' current account	NTP ( $t_{dic,p}$ )	NTA ( $t_{dic,a}$ )	CFP_GNI ( $t_{dic,f}$ )	CT ( $t_{dic,dic}$ )	0	0	CT ( $t_{dic,rw}$ )
dik – (domestic) institutions' capital account	0	0	0	S ( $t_{dik,dic}$ )	KT ( $t_{dik,dik}$ )	NLB ( $t_{dik,dif}$ )	KT ( $t_{dik,rw}$ )
dif – (domestic) institutions' financial account	0	0	0	0	0	FT ( $t_{dif,dif}$ )	FT ( $t_{dif,rw}$ )
rw – rest of the world	IM&NTP ( $t_{rw,p}$ )	NTA ( $t_{rw,a}$ )	CFP ( $t_{rw,f}$ )	CT ( $t_{rw,dic}$ )	KT ( $t_{rw,dik}$ )	FT ( $t_{rw,dif}$ )	0

Source: Santos (2009; 2010)

Description:

- a) Production – P (cell:  $t_{a,p}$ ) represents the output of goods and services (transaction P1 of the National Accounts).
- 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:  $t_{p,a}$ ) consists of the value of the goods and services consumed as inputs through a process of production, excluding those fixed assets whose consumption is recorded as consumption of fixed capital (transaction P2 of the National Accounts).
  - b.2) Final Consumption – FC (cell:  $t_{p,dic}$ ) consists of the expenditure incurred by resident institutional units on those goods or services that are used for the direct satisfaction of individual needs or wants, or the collective needs of members of the community (transaction P3 of the National Accounts).
  - b.3) Gross Capital Formation – GCF (cell:  $t_{p,dik}$ ) includes: gross fixed capital formation (transaction P51 of the National Accounts), changes in inventories (transaction P52), and acquisitions minus disposals of valuables (transaction P53).
- c) External Trade – includes the transactions in goods and services from non-residents to residents, also known as imports (transaction P7 of the National Accounts), or IM (cell:  $t_{rw,p}$ ), and the

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transactions in goods and services from residents to non-residents, also known as exports (transaction P6 of the National Accounts), or EX (cell:  $t_{p,rw}$ ).

- d) Trade and Transport Margins – TTM (cell:  $t_{p,p}$ ) are realised on goods purchased for resale and are a part of the production of wholesale trade services, retail trade services and the repair services of motor vehicles, motorcycles and personal and household goods. They amount to zero, since they are negative in relation to the three above-mentioned activities (because the corresponding value has already been recorded in the production submatrix), but are positive and have the same amount in relation to all the other ones.
- e) Net indirect taxes or 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 (transaction D29 of the National Accounts) minus the (other) subsidies to production (transaction D39 of the National Accounts).
- e.2) Net Taxes on Products – NTP (cells:  $t_{dic,p}$ ;  $t_{rw,p}$ ) represents the taxes on products (transaction D21 of the National Accounts) minus the subsidies on products (transaction D31 of the National Accounts).
- 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 the services provided through their real and financial assets to the activities of production and to the rest of the world, namely the compensation of employees (transaction D1 of the National Accounts) and the compensation of own-account assets, including the compensation of employers and/or own-account workers, and of capital, namely property income (transaction D4, balances B2g and B3g of the National Accounts).
- g) Current Transfers – CT (cells:  $t_{dic,dic}$ ;  $t_{dic,rw}$ ;  $t_{rw,dic}$ ) includes: current taxes on income, wealth, etc. (transaction D5 of the National Accounts); social contributions (transaction D61); social benefits in cash (transaction D62); other current transfers (transaction D7); and the adjustment made for the change in the net equity of households in pension fund reserves (transaction D8).
- h) Capital Transfers – KT (cells:  $t_{dik,dik}$ ;  $t_{dik,rw}$ ;  $t_{rw,dik}$ ) includes: capital taxes (transaction D91 of the National Accounts), investment grants (transaction D92); other capital transfers (transaction D99); and acquisitions less disposals of non-financial non-produced assets (transaction K2)
- i) Financial Transactions – FT (cells:  $t_{dif,dif}$ ;  $t_{dif,rw}$ ;  $t_{rw,dif}$ ) represents the transactions in financial assets and liabilities between institutional units, and between these and the rest of the world. They are classified as monetary gold and special drawing rights; currency and deposits;

securities other than shares; loans; shares and other equity; insurance technical reserves; and other accounts receivable/payable (F1-7 of the National Accounts).

j) Gross Saving – S (cell:  $t_{dik,dic}$ ) 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.

k) Net borrowing/lending – NLB (cell:  $t_{dik,dif}$ ).

The net lending (+) or borrowing (-) of the total economy is the sum of the net lending or borrowing of the institutional sectors. It represents the net resources that the total economy makes available to the rest of the world (if it is positive) or receives from the rest of the world (if it is negative). The net lending (+) or borrowing (-) of the total economy is equal (but with an opposite mathematical sign) to the net borrowing (-) or lending (+) of the rest of the world.

Here, those amounts that fall short of (+) or exceed (-) the investment funds used to cover aggregate investment are recorded in the capital and financial accounts, since they are financial transactions either from the rest of the world (in the case of net borrowing) or to the rest of the world (in the case of net lending). This is why the mathematical signs defined in the first paragraph of this item have been exchanged.

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

The integrated economic accounts table is equivalent to a summary of everything that is measured by the SNA. According to paragraph 2.75 of 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.” (ISWGNA, 2008: 23). The table in Appendix A illustrates this situation for Portugal in 2007. Based on that table, and in view of the previous description, it can be said that (practically) all the transactions recorded by the national accounts are considered in the cells of the SAM. Table 4 illustrates its application to Portugal in 2007. No integrated economic accounts table was found for Mozambique and, from the information that was accessed, it was only possible to fill in the cells of the Basic SAM, as shown in Table 5.

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**Table 4.** Basic SAM of Portugal in 2007 (unit: 10<sup>6</sup> euros)

	p	a	f	dic	dik	dif	rw	total
p – products	0	171 360		141 615	38 634		54 514	406 123
a – activities	317 058							317 058
f – factors		146 564					13 056	159 620
dic – (domestic) institutions' current account	22 876	230	140 287	80 940			4 841	249 175
dik – (domestic) institutions' capital account				21 473	1 122	15 061	2 341	39 997
dif – (domestic) institutions' financial account						48 913	38 471	87 384
rw – rest of the world	66 188 <sup>(a)</sup>	-1 096	19 333	5 147	241	23 410		113 223
total	406 123	317 058	159 620	249 175	39 997	87 384	113 223	

Source: Integrated Economic Accounts Table for Portugal in 2007 (Appendix A).

Note: Since direct purchases abroad by residents ( $2\,019 * 10^6$  euros) are not expenditures within the domestic economy, they were considered as a current transfer to the rest of the world and were therefore deducted from the final consumption of the households and from imports.

<sup>(a)</sup>  $66\,188 = 66\,026$  (imports) + 163 (net taxes on products sent to the rest of the world)

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**Table 5.** Basic SAM of Mozambique in 2007 (unit: 10<sup>6</sup> meticaís)

	p	a	f	dic	dik	dif	rw	total
p – products	0	180 731		191 137	31 784		64 146	467 798
a – activities	371 384							371 384
f – factors		185 920					4 253	190 173
dic – (domestic) institutions' current account	16 991	4 732	172 925					
dik – (domestic) institutions' capital account				19 083			- 1 313	
dif – (domestic) institutions' financial account								
rw – rest of the world	79 423		17 248					
Total	467 798	371 384	190 173					

Sources: *Instituto Nacional de Estatística de Moçambique*; World Bank Databank by Country - Mozambique.

Notes: see the methodological details in Appendix B; the cells shaded in grey could not be filled in due to a lack of information.

Therefore, as mentioned above and again using the words of Richard Stone, the basic SAM that has just been described is the most aggregate “summary set of national accounts” and can represent a first level of the intended hierarchical method (approach), with all the controlling totals for the next level of that hierarchy. However, it should be noted that, while this is almost completely true for countries such as Portugal, whose national accounts adopt and are completely adapted to the SNA, it is not true for countries such as Mozambique, whose adoption/adaptation is less complete, so that the national accounts provide much fewer possibilities for work, particularly in the case of institutional sectors. This means that we are still confronted with the problem already identified by Lury in 1964, in his article “National Accounts in Africa”<sup>4</sup>, when he emphasised the usefulness of having, in addition to the estimation of “the value of the stream of goods and services available to the community...”, “.. extra tables of government revenue and expenditure, and details of sources of savings from which investment is financed” (Lury, 1964: 99-100).

### **3.2. Disaggregations and extensions**

Some other levels of the above-mentioned hierarchical method can be identified within the national accounts, providing other controlling totals for greater levels of disaggregation – with or without the use of national accounts. On the one hand, this will make it possible to maintain the consistency of the basic structure of the identified flows and the underlying network of linkages and interactions, and, on the other hand, it will allow us to analyse parts of that same structure in greater or lesser detail.

Thus, with the expected appearance of quarterly national accounts, although these will not be as complete as the annual ones, it will be possible to introduce some further disaggregation in terms of time.

Furthermore, disaggregations can be made in terms of space, since regional accounts are also considered. Here, with the same SNA, it is possible to work with regions and countries, either individually or as a group. Round (1994; 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.

Extensions are also possible, either from the national accounts or from other sources of information. The 2008 SNA dedicates its Chapter 28 to “Satellite accounts and other extensions” (ISWGNA, 2008: 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, 2008: 37-38).

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<sup>4</sup> Following on from a Conference held in January 1961, organised by the United Nations Economic Commission for Africa (UNECA) and the International Association for Research in Income and Wealth (IARIW), this article reviews the published papers and other relevant publications on “National Accounts in Africa”.

In this respect, the author would like to support Steven Keunung and Willem Ruijter's idea of a "complete data set" which "could be tentatively labelled: a System of Socio-economic Accounts" (Keunung and Ruijter, 1988: 73).

### **3.2.1. Production and trade accounts**

In the basic structure described above, the production and trade 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 how the incomes resulting from that process and the ownership of assets are distributed among institutions and activities (Santos, 2007).

The SNA uses the Central Product Classification (CPC) Version 2 (completed in December 2008) to classify products (ISWGNA, 2008: 19), which are organised into 10 sections, with it being possible to go to the 5th level of disaggregation within each of these.

In turn, the International Standard Industrial Classification of All Economic Activities (ISIC) Revision 4 (officially released in August 2008) is used to classify the activities (ISWGNA, 2008: 20), organised into 23 sections, the disaggregation of which is perfectly consonant with that of the product classification. The Supply and Use Table provides this information, usually at an intermediate level of disaggregation.

As described above, in the characterisation of the block representing the compensation of factors of production, the possible disaggregation from the tables of the national accounts is between labour (or the compensation of employees) and what the author called the compensation of own-account assets, which includes the compensation of employers and/or own-account 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 accounts are disaggregated. Table 6, which contains the above-mentioned application to Portugal, in which the products and activities accounts are not disaggregated, presents the possible disaggregation of the factors of production accounts based on the Integrated Economic Accounts Table (see Appendix A). In the case of Mozambique, where these accounts are not available, as explained above, everything that could be done is shown in Table 7.

The extensions for tourism and health are presented by the SNA as examples of satellite accounts (ISWGNA, 2008: 531-534; 538-542).

### **3.2.2. Institutions and Rest of the World accounts**

In the basic structure described above, the accounts of the domestic institutions are divided into current, capital and financial accounts. These accounts correspond respectively to the following SNA accounts: secondary distribution of income, redistribution of income in kind and use of income; capital; and financial accounts. Within these accounts, depending on the available level of 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 capital account records the transactions linked to acquisitions of non-financial assets and capital transfers involving the redistribution of wealth, whereas the financial account records the transactions in financial assets and liabilities between institutional units, and between these and the rest of the world (Santos, 2007).

All the linkages between the domestic economy and the rest of the world, i.e. 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 (Santos, 2007).

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, 2008: 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 requires, in addition to the Integrated Economic Accounts or the Accounts of the Institutions, the so-called “from whom to whom matrices”, which are not normally published, but can be acquired from the national statistical offices. These matrices make it possible to fill in the cells of the submatrices of transactions taking place within domestic institutions, recorded in the above-described blocks of current and capital transfers and financial transactions.

The disaggregation of specific institutional sectors makes it possible to analyse the most diverse aspects of a society’s activity: income distribution, with disaggregated households and factor of production accounts (Santos, 2009, is an example of this); the role of the government and its

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subsectors, with a disaggregated general government account (Santos, 2004 and 2007a, are other examples); the role of the non-profit institutions serving households, as well as of the non-financial and/or financial corporations, etc.

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; redistribution of wealth, using the capital account; investment, its financing, and the implicit levels of the financing requirements and availability of the institutional sectors and the whole economy, using the capital and financial accounts. For more information on this last issue, see Roe (2003).

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

Table 6 presents the possible disaggregation of the institutions' current and capital accounts, made from the Integrated Economic Accounts Table and the "from whom to whom matrices", for Portugal in 2007. Due to the unavailability of "from whom to whom matrices" for financial transactions, the financial account could not be disaggregated.

As can be seen in Table 7, it was almost completely impossible to make the same application for Mozambique, due to the already mentioned unavailability of integrated economic accounts tables, as well as the absence of "from whom to whom matrices".

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**Table 6.** SAM of Portugal in 2007, with disaggregated factors of production and the (domestic) institutions' current and capital accounts (unit: 10<sup>6</sup> euros)

		Outlays (expenditures)		PRODUCTION						INSTITUTIONS											REST OF THE WORLD	TOTAL	
				PRODUCTS	ACTIVITIES	FACTORS			CURRENT ACCOUNT					CAPITAL ACCOUNT					FINANCIAL ACCOUNT				
						Labour (employees)	Own Assets	Total	Households	Enterprises (nonfinancial corporations)	Financial corporations	Government	NonProfitInstitutionsServingHouseholds (NPISH)	Total	Households	Enterprises (nonfinancial corporations)	Financial corporations	Government		NonProfitInstitutionsServingHouseholds (NPISH)			Total
1	2	3	4		5	6	7	8	9		10	11	12	13	14		15	16					
PRODUCTION	PRODUCTS	1	0	171 360	0	0	0	105 201	0	0	32 999	3 415	141 615	9 287	23 003	1 683	4 113	547	38 634	0	54 514	406 123	
	ACTIVITIES	2	317 058	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	317 058	
	FACTORS																						
	Labour (employees)	3	0	82 876	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	247	83 123
	Own Assets	4	0	63 688	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12 809	76 498
	Total		0	146 564	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13 056	159 620	
INSTITUTIONS	CURRENT ACCOUNT	Households	5	0	0	82 871	34 809	117 680	792	1 715	5 093	25 060	64	32 725	0	0	0	0	0	0	0	4 162	154 567
		Enterprises (nonfinancial corporations)	6	0	0	0	15 972	15 972	1 711	0	705	141	0	2 557	0	0	0	0	0	0	0	88	18 617
		Financial corporations	7	0	0	0	5 918	5 918	5 143	627	133	24	29	5 957	0	0	0	0	0	0	0	73	11 948
		Government	8	22 876	230	0	- 230	- 230	29 427	6 423	1 429	21	27	37 328	0	0	0	0	0	0	0	518	60 723
		NonProfitInstitutionsServingHouseholds(NPISH)	9	0	0	0	946	946	521	149	44	1 660	0	2 374	0	0	0	0	0	0	0	0	3 320
		Total		22 876	230	82 871	57 416	140 287	37 594	8 914	7 405	26 905	121	80 940	0	0	0	0	0	0	0	4 841	249 175
	CAPITAL ACCOUNT	Households	10	0	0	0	0	8 551	0	0	0	0	8 551	0	0	2	75	0	77	- 2 265	3 048	9 411	
		Enterprises (nonfinancial corporations)	11	0	0	0	0	0	9 473	0	0	0	9 473	0	0	0	749	0	749	14 762	- 1 859	23 125	
		Financial corporations	12	0	0	0	0	0	0	4 432	0	0	4 432	0	0	2	1	0	3	- 2 692	- 55	1 688	
		Government	13	0	0	0	0	0	0	0	- 767	0	- 767	11	22	0	0	1	34	4 777	1 181	5 225	
		NonProfitInstitutionsServingHouseholds(NPISH)	14	0	0	0	0	0	0	0	0	0	- 216	- 216	0	0	259	0	259	479	26	549	
Total			0	0	0	0	0	8 551	9 473	4 432	- 767	- 216	21 473	11	22	4	1 084	1	1 122	15 061	2 341	39 997	
	FINANCIAL ACCOUNT	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48 913	38 471	87 384		
	REST OF THE WORLD	16	66 188	- 1 096	252	19 081	19 333	3 221	230	111	1 586	0	5 147	113	100	0	28	0	241	23 410	X	113 223	
	TOTAL		406 123	317 058	83 123	76 498	159 620	154 567	18 617	11 948	60 723	3 320	249 175	9 411	23 125	1 688	5 225	549	39 997	87 384	113 223	X	

Sources: Statistics Portugal (*INE*); Portuguese Central Bank (*Banco de Portugal*)  
(Integrated Economic Accounts Table (in Appendix); "from whom to whom matrices" for transactions D39 and D5-9 – see Table 2).

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**Table 7.** SAM of Mozambique in 2007, with disaggregated factors of production and a part of the (domestic) institutions' current account (unit: 10<sup>6</sup> meticais)

		Outlays (expenditures)	PRODUCTION					INSTITUTIONS										REST OF THE WORLD	TOTAL					
			PRODUCTS	ACTIVITIES	FACTORS			CURRENT ACCOUNT					CAPITAL ACCOUNT							FINANCIAL ACCOUNT				
					Labour (employees)	Own Assets	Total	Households	Enterprises (nonfinancial corporations)	Financial corporations	Government	NonProfitInstitutionsServingHouseholds (NPISH)	Total	Households	Enterprises (nonfinancial corporations)	Financial corporations	Government				NonProfitInstitutionsServingHouseholds (NPISH)	Total		
1	2	3	4		5	6	7	8	9		10	11	12	13	14		15	16						
PRODUCTION	INCOMES (RECEIPTS)																							
	PRODUCTS	1	0	180 731	0	0	0	166 398	0	0	24 738	0	0	191 137					31 784	0	64 146	467 798		
	ACTIVITIES	2	371 384	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	371 384		
	FACTORS																							
	Labour (employees)	3	0	49 820	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 505	51 325	
Own Assets	4	0	136 101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2 748	138 849		
Total		0	185 920	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4 253	190 173		
INSTITUTIONS	CURRENT ACCOUNT	Households	5	0	0	50 331		50 331							0	0	0	0	0	0				
		Enterprises (nonfinancial corporations)	6	0	0	0		0							0	0	0	0	0	0	0			
		Financial corporations	7	0	0	0		0							0	0	0	0	0	0	0			
		Government	8	16 991	4 732	0		0							0	0	0	0	0	0	0			
		NonProfitInstitutionsServingHouseholds(NPISH)	9	0	0	0		0							0	0	0	0	0	0	0			
		Total		16 991	4 732	50 331	122 595	172 925							0	0	0	0	0	0	0			
	CAPITAL ACCOUNT	Households	10	0	0	0		0																
		Enterprises (nonfinancial corporations)	11	0	0	0		0																
		Financial corporations	12	0	0	0		0																
		Government	13	0	0	0		0																
		NonProfitInstitutionsServingHouseholds(NPISH)	14	0	0	0		0																
		Total		0	0	0	0		0						19 083									
	FINANCIAL ACCOUNT	15	0	0	0		0							0	0	0	0	0	0	0				
	REST OF THE WORLD	16	79 423	0	994	16 254	17 248															X		
	TOTAL		467 798	371 384	51 325	138 849	190 173																X	

Sources: *Instituto Nacional de Estatística de Moçambique*; World Bank Databank by Country - Mozambique.

Notes: see the methodological details in Appendix B; the cells shaded in grey could not be filled in due to a lack of information.

### 3.3. Aggregates, indicators and balances

As was seen above, practically all the transactions of the national accounts are covered by the SAM, so that macroeconomic aggregates, indicators and balances can be identified from it (see: the description of the cells or blocks in Tables 1 or 3; Tables 4 and 6 for the application to Portugal and Tables 5 and 7 for the application to Mozambique).

Gross Domestic Product at market prices ( $GDP_{pm}$ ), which is usually considered the main macroeconomic aggregate, can be calculated in the three known approaches:

- Production approach:  $GDP_{pm} = P - IC + NTP = t_{a,p} - t_{p,a} + (t_{dic,p} + \text{(part of)} t_{rw,p}^5)$ ;
- Expenditure approach:  $GDP_{pm} = FC + GCF + Ex - IM = t_{p,dic} + t_{p,dik} + t_{p,rw} - \text{(part of)} t_{rw,p}^5$ ;
- Income approach:  $GDP_{pm} = GAV + NTP + NTA = t_{f,a} + (t_{dic,p} + \text{(part of)} t_{rw,p}^5) + (t_{dic,a} + t_{rw,a}^5)$ .

The Portuguese  $GDP_{pm}$  in 2007 was  $168\,737 * 10^6$  euros, which can be calculated from these three approaches as follows:

- Production approach:  $GDP_{pm} = 317\,058 - 171\,360 + (22\,876 + 163)$ ;
- Expenditure approach:  $GDP_{pm} = 141\,615 + 38\,634 + 54\,514 - 66\,026$ ;
- Income approach:  $GDP_{pm} = 146\,564 + (22\,876 + 163) + (230 - 1096)$ .

In turn, in that same year, the Mozambican  $GDP_{pm}$  was  $207\,644 * 10^6$  meticaís, which can be calculated from those same three approaches as follows:

- Production approach:  $GDP_{pm} = 371\,384 - 180\,731 + 16\,991$ ;
- Expenditure approach:  $GDP_{pm} = 191\,137 + 31\,784 + 64\,146 - 79\,423$ ;
- Income approach:  $GDP_{pm} = 185\,920 + 16\,991 + 4\,732$ .

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 indirect taxes (on both products and production) sent to the rest of the world, when these exist. Thus, from the described cells of the basic SAM,  $GDP_{pm}$  can be converted into Gross National Product at market prices ( $GNP_{pm}$ ) or Gross National Income ( $GNI_{pm}$ ), as follows:  $GDP_{pm} + t_{f,rw} - t_{rw,f} - t_{rw,a} - \text{(part of)} t_{rw,p}$ . On the other hand, as the SAM directly provides Gross National Income at factor cost, this can also be calculated just by adding the net indirect taxes (on both products and production) received by domestic institutions:  $t_{dic,f} + t_{dic,p} + t_{dic,a}$ . The corresponding amount for Portugal in 2007 is  $163\,394 * 10^6$  euros, for which the underlying calculations are as follows:  $GNP_{pm} = 168\,737 + 13\,056 - (19\,333 - 1096 + 163)$ ;  $GNI_{pm} = 140\,287 + 22\,876 + 230$ . In the case of Mozambique, the

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<sup>5</sup> Only for Portugal, in the case of our two applications.

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corresponding amount is  $194\,648 * 10^6$  meticaís, with the following corresponding calculations:  $GNP_{pm} = 207\,644 + 4\,253 - 17\,248$ ;  $GNI_{pm} = 172\,925 + 16\,991 + 4\,732$ .

In turn, Gross aggregates can be converted into Net aggregates (and balances) by deducting the consumption of the fixed capital (transaction K1 of the National Accounts, which lies outside the basic SAM, as will be seen in Section 3.4, but is part of the Integrated Economic Accounts)

Disposable Income (Domestic or National; Gross or Net) is also very important and can be calculated by adding to  $GNI_{pm}$  the net current transfers received by domestic institutions:  $GNI_{pm} + ((received)_{t_{dic,dic} + t_{dic,rw}}) - ((paid)_{t_{dic,dic} + t_{rw,dic}})$ . In our application to Portugal:  $163\,394 + (80\,940 + 4\,841) - (80\,940 + 3\,128^6) = 165\,107 * 10^6$  euros. In the case of Mozambique, although it was not possible to work on the current transfers block, since for this level of disaggregation the current transfers received by domestic institutions from domestic institutions  $((received)_{t_{dic,dic}})$  and the current transfers paid by domestic institutions to domestic institutions  $((paid)_{t_{dic,dic}})$  are equal, an approximate amount can be calculated using net current transfers  $(t_{dic,rw} - t_{rw,dic})$ :  $194\,648 + 15\,572 = 210\,220 * 10^6$  meticaís (see Appendix B).

Attention should be paid here to the fact that, especially in the case of Mozambique, where a considerable activity of all kinds is either not sold for cash or is not declared<sup>7</sup>, the above mentioned amounts of income “may tell us much less than it appears” – using the words of Seers (1952-1953: 160). Merely as an example in relation to this subject, an OECD study of the treatment of subsistence activities in national accounts concluded that “among the 48 developing countries covered, the share of non-monetary value added in total GDP ranges from over 40% for the poorer countries of Africa to 5% or less for the more advanced countries of Latin America and Southern Europe” (Blades, 1975: 391).

Gross Saving (S) and Net Lending or Borrowing (NLB) are given directly by the SAM, through  $t_{dik,dic}$  and  $t_{dik,dif}$ , respectively, which in the case of Portugal in 2007 are:  $21\,473$  and  $15\,061 * 10^6$  euros. As explained in Subsection 3.1- k), the latter amount represents net borrowing. Mozambican Gross Saving is  $19\,083 * 10^6$  meticaís, while Net Lending is  $1313 * 10^6$  meticaís (see Appendix B).

The application for Portugal of all the described aggregates can be checked in the Integrated Economic Accounts Table, in Appendix A.

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<sup>6</sup> In order to be completely consonant with the values of the national accounts, the direct purchases made abroad by the households are not considered here.

<sup>7</sup> A programme designed to measure the contribution of the informal sector to the National Accounts, beginning in July 2011, is available on the website of the *Instituto Nacional de Estatística de Moçambique*.

It is also possible to calculate structural indicators of the functional and institutional distribution of generated income, as well as indicators of the use of disposable income.

In the functional distribution of generated income, the distribution of gross added value (at factor cost, GAV) among factors of production is given by the structure of the submatrix in the cell ( $t_{f,a}$ ) of the basic structure, with its level of detail depending on the disaggregation of the activities (column account) and of the factors of production (row account). Table 8 shows the results for the applications to Portugal and Mozambique.

**Table 8.** Portuguese and Mozambican functional distribution of the income generated in 2007  
 (in percentage terms)

	Portugal	Mozambique
Factors of Production (generated income = gross added value, at factor cost)		
Labour (employees)	56.5	26.7
Own assets (employers and/or own-account workers; capital)	43.5	73.3
Total	100.0	100.0

Sources: Tables 6 and 7.

In the institutional distribution of generated income, the distribution of gross national income (at factor cost, GNI) is given by the structure of the submatrix in the 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). Table 9 shows the results of our application only for Portugal, since the required information for Mozambique is not available.

**Table 9.** Portuguese institutional distribution of the income generated in 2007  
 (in percentage terms)

	Factors of Production		
	Labour (employees)	Own assets (employers and/or own-account workers; capital)	Total
Institutions (generated income = gross national income)			
Households	100.0	60.6	83.9
Non-financial corporations		27.8	11.4
Financial corporations		10.3	4.2
General government		- 0.4	- 0.2
Non-profit institutions serving households		1.6	0.7
Total	100.0	100.0	100.0

Source: Table 6.

As described above for the whole economy, the disposable income of the institutional sectors can be calculated in the same way, and then its distribution and use can also be studied – see Table 10.

**Table 10.** Portuguese distribution and use of disposable income among institutions and Mozambican total use of disposable income in 2007 (in percentage terms).

		Distribution of Disposable Income	Use of Disposable Income	
			Final Consumption <sup>(*)</sup>	Saving
Portugal	Households	70.1	92.6	7.4
	Non-financial corporations	5.7	---	100.0
	Financial corporations	2.7	---	100.0
	General government	19.5	102.4	- 2.4
	Non-profit institutions serving households	1.9	106.7	- 6.7
	Total	100.0	87.0	13.0
Mozambique (Total)		100.0	90.9	9.1

Sources: Tables 6 and 7.

<sup>(\*)</sup> The expenditure (transaction P3 of the national accounts) and not the “actual” final consumption (transaction P4 of the national accounts), i.e. the amount really spent by each institution, although a part of the final consumption of the general government and all that of the NPISH will take the form of social transfers in kind (transaction D63 of the national accounts) and will include the “actual” final consumption of households.

Some additional data can allow for the study of other details, for instance *per capita* indicators with demographic information, despite the uncertainty of population estimates, especially for Mozambique, and the dangers of *per capita* estimates.

The main items in the balance sheets of the institutional sectors and of the rest of the world can be calculated from the respective rows and columns of the SAM. The former will be referred to as institutional balances and the latter as the balance of payments. In the former, the total balance is the net lending/borrowing (NLB) of the respective institution, with an opposite mathematical sign to the one registered in the SAM; the current balance is the respective gross saving (S); and the capital balance is the difference between the first and the second. Table 11 illustrates the institutional balances of the non-financial and financial corporations for Portugal in 2007. These balances cannot be calculated for Mozambique, due to a lack of information.

In turn, Tables 12 and 13 illustrate the balance of payments, for Portugal and Mozambique respectively in 2007.

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**Table 11.** Institutional balances of Portuguese Non-Financial and Financial Corporations in 2007 (unit: 10<sup>6</sup> euros)

	Resources or Receipts (SAM rows)		Uses or Expenditure (SAM columns)			Balance		
		Non-Financial Corporations	Financial Corporations		Non-Financial Corporations	Financial Corporations	Non-Financial Corporations	Financial Corporations
1. Current Account (a)		18 617	11 948		9 144	7 516	9 473	4 432
	Gross National Income at factor cost	15 972	5 918	Final Consumption	0	0		
	Net taxes on production	0	0	Current transfers to domestic institutions	8 914	7 405		
	Net taxes on products	0	0	Current transfers to the RW	230	111		
	Current transfers from domestic institutions	2 557	5 957					
	Current transfers from the RW	88	73					
2. Capital Account		- 1 110	- 52		23 125	1 688	- 24 235	- 1 739
	Capital transfers from domestic institutions	7 49	3	Gross Capital Formation	23 003	1 683		
	Capital transfers from the RW	- 1 859	- 55	Capital transfers to domestic institutions	22	4		
				Capital transfers to the RW	100	0		
3 = 1 + 2 (b)		17 507	11 896		32 269	9 204	- 14 762	2 692

Source: Table 6 (rows/columns 6, 7, 11 and 12)

(a) Balance = Gross saving

(b) Balance = - Net lending (+)/borrowing (-)

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*SSantos (August 2011)*

**Table 12.** Balance of Payments of Portugal in 2007 (unit: 10<sup>6</sup> euros)

	Resources (SAM row)		Uses (SAM column)		Balance
1. Current Account		72 411		89 573	-17 162
- Goods & Services	Exports	54 514	Imports	68 045	-13 531
- Income	Compensation of factors from the RW	13 056	Compensation of factors to the RW	19 333	-6 277
- Current Transfers	Current transfers from the RW	4 841	Current transfers to the RW + net taxes on production to the RW + net taxes on production to the RW	2 195	2 646
2. Capital Account	Capital transfers from the RW	2 341	Capital transfers to the RW	241	2 101
3 = 1 + 2 (Balance = Net borrowing)		74 752		89 813	- 15 061
4. Financial Account (Balance = - Net borrowing)	Financial transfers from the RW	38 471	Financial transfers to the RW	23 410	15 061
5 = 3 + 4 = Total		113 223		113 223	0

Source: Table 6 (row/column 16)

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*SSantos (August 2011)*

**Table 13.** Balance of Payments of Mozambique in 2007 (unit: 10<sup>6</sup> meticaís)

	Resources (SAM row)		Uses (SAM column)		Balance
1. Current Account					-12 700
- Goods & Services	Exports	64 146	Imports	79 423	-15 277
- Income	Compensation of factors from the RW	4 253	Compensation of factors to the RW	17 248	-12 995
- Current Transfers	Current transfers from the RW		Current transfers to the RW		15 572
2. Capital Account	Capital transfers from the RW		Capital transfers to the RW		14 013
3 = 1 + 2 (Balance = Net Lending)					1 313
4. Financial Account (Balance = - Net Lending)	Financial transfers from the RW		Financial transfers to the RW		-1 313
5 = 3 + 4 = Total					0

Sources: Table 7 (row/column 16); World Bank Databank by Country – Mozambique.

Notes: see the methodological details in Appendix B; the cells shaded in grey could not be filled in due to a lack of information.

### **3.4. Examples of policy-type questions that can be addressed using a SAM**

From what was seen above, by covering practically all the representative nominal flows of the measured part of a society's activity (if it is assumed that this is sufficiently representative), the SAM can be used to support the policy decision process in several ways, given the flexibility of the described basic structure and the possibilities of specification of various aspects of the underlying systems.

For example, under the scope of the social policy measures, we may want to work with specific flows in which government and households intervene directly, namely the current transfers between them both. Let us consider the case of the direct taxes on income, paid by the households to the government, and the case of the social benefits, paid by the government to the households. The identification of the absolute and relative importance of these flows in the corresponding institutional balances may be a first step. Tables 14 and 15 show the application to Portugal – the same will not be possible for Mozambique due to a lack of information by institutional sector. On the other hand, comparisons with macroeconomic aggregates and some SAM values can complement that knowledge. For instance, in our application to Portugal, the current taxes on income and wealth, etc., paid by households to the government represent 6.3% of the aggregate income of the former (the row/column total of its current account); or, alternatively, the benefits other than social transfers in kind, paid by the government to the households, represent 21.1% of the households' disposable income.

From here, different scenarios can be studied using SAM-based model(s). The distributional effects of social policy measures directed to specific flows (for example, the direct taxes on income or the social benefits) can be studied not only at the level of the institutional sectors involved, but also at the level of the part of a society's activity that is quantified by the SAM (Santos, 2010, performs related experiments).

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**Table 14.** Institutional Balance of Portuguese Government in 2007 and the relative importance of the current taxes on income, wealth, etc., (transactions D5) received from households and of the social benefits other than social transfers in kind (transaction D62) paid to the households.

	Resources or Receipts (SAM row)		Uses or Expenditure (SAM column)			Balance	
		10 <sup>6</sup> euros	Relative importance of D5 in.. (%)		10 <sup>6</sup> euros	Relative importance of D62 in.. (%)	10 <sup>6</sup> euros
1. Current Account (a)		60 723	16.0		61 490	39.8	- 767
	Gross National Income at factor cost	- 230		Final Consumption	32 999		
	Net taxes on production	230		Current transfers to domestic institutions - D62 paid to the households	26 905 24 469	90.9	
	Net taxes on products	22 876		Current transfers to the RW	1 586		
	Current transfers from domestic institutions - D5 received from the households	37 328 9 689	26.0				
	Current transfers from the RW	518					
2. Capital Account		1 215			5 225		- 4 010
	Capital transfers from domestic institutions	34		Gross Capital Formation	4 113		
	Capital transfers from the RW	1 181		Capital transfers to domestic institutions	1 084		
				Capital transfers to the RW	28		
3 = 1 + 2 (b)		61 938	15.6		66 715	36.7	- 4 777

Source: Table 6 (rows/columns 8 and 13) and “from whom to whom matrices”- Statistics Portugal (INE)

(a) Balance = Gross saving

(b) Balance = - Net lending (+)/borrowing (-)

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**Table 15.** Institutional Balance of Portuguese Households in 2007 and the relative importance of the current taxes on income, wealth, etc., (transactions D5) paid to the government and of the social benefits other than social transfers in kind (transaction D62) received from the government.

	Resources or Receipts (SAM row)			Uses or Expenditure (SAM column)			Balance
		10 <sup>6</sup> euros	Relative importance of D62 in.. (%)		10 <sup>6</sup> euros	Relative importance of D5 in.. (%)	10 <sup>6</sup> euros
1. Current Account (a)		154 567	15.8		146 015	6.6	8 551
	Gross National Income at factor cost	117 680		Final Consumption	105 201		
	Current transfers from domestic institutions - D62 received from the government	32 725 24 469	74.8	Current transfers to domestic institutions - D5 paid to the government	37 594 9 689	25.8	
	Current transfers from the RW	4 162		Current transfers to the RW	3 221		
2. Capital Account		3 125			9 411		- 6 286
	Capital transfers from domestic institutions	77		Gross Capital Formation	9 287		
	Capital transfers from the RW	3 048		Capital transfers to domestic institutions	11		
				Capital transfers to the RW	113		
3 = 1 + 2 (b)		157 691	15.5		155 426	6.2	2 265

Source: Table 6 (rows/columns 5, and 10) and “from whom to whom matrices”- Statistics Portugal (INE)

(a) Balance = Gross saving

(b) Balance = - Net lending (+)/borrowing (-)

#### **4. Going beyond the basic structure**

In order to improve the snapshot given by the SAM, as described above, some rearrangements could be made to the described cell contents and/or some zero cells could be filled in. This can be done either within and/or outside the scope of the SNA

- a) Within the scope of the SNA, the following topics are examples of rearrangements that could be made to the described cell contents (the described cells can be identified in Tables 1 or 3), in order to avoid the existence of negative cells in the SAM. This would help to improve its definition (incomings in rows and outgoings in columns) and facilitate the application of certain balancing methods, whenever necessary.
  - a.1) Instead of working with net indirect taxes, it is possible to work with taxes and subsidies separately. The taxes on products and on production could be recorded in the above-described NTP ( $t_{dic,p}$ ;  $t_{rw,p}$ ) and NTA ( $t_{dic,a}$ ;  $t_{rw,a}$ ) blocks, respectively. The subsidies on products could be recorded in cells  $t_{p,dic}$  and  $t_{p,rw}$ . The subsidies on production would then be recorded in cells  $t_{a,dic}$  and  $t_{a,rw}$ .
  - a.2) The net lending or borrowing (NLB), which, in the SAM's capital account, is considered as a component of investment funds, not required or required to cover aggregate investment, could be recorded in cells  $t_{dik,dif}$ , in the case of net borrowing, and in cells  $t_{dif,dik}$ , in the case of net lending. Thus, if there is net borrowing, we have a financing requirement that is covered by financial transactions (from the rest of the world, since the national funds are not sufficient), i.e. a resource of the capital account (row) and a use of the financial account (column). If there is net lending, we have a financing capacity that will be absorbed by financial transactions (to the rest of the world, since there is an excess of national funds), i.e. a resource of the financial account (row) and a use of the capital account (column).
- b) Still working within the scope of the SNA, some new data could be considered, either in addition to other data or as possible replacements for these figures.
  - b.1) The consumption of fixed capital could be included in  $t_{p,dik}$ .
  - b.2) The production of the institutional sectors could be included in  $t_{dic,p}$ . In the basic structure, production is recorded in cells  $t_{a,p}$ .
  - b.3) The intermediate consumption of the institutional sectors could be included in  $t_{p,dic}$ . In the basic structure, intermediate consumption is recorded in cells  $t_{p,a}$ .

- c) Outside the scope of the SNA, working either within or outside the framework of the satellite accounts, the inclusion of the following aspects could be considered<sup>8</sup>.
- c.1) The expansion of the production boundary, for example recording the services that households deliver to themselves, associated or not with a subsistence output (so common in African countries)<sup>9</sup>. The extension to unpaid household activity is presented by the SNA as an example of satellite accounts (ISWGNA, 2008: 542-543). On the other hand, the SNA dedicates its Chapter 25 to the consideration of informal aspects of the economy (ISWGNA, 2008: 471-482). In these cases, it is suggested that a possible distinction should be made between income in cash and in kind.
  - c.2) The (re)analysis of the imputations; the underlying methodologies and possible adjustments.
  - c.3) The rethinking of the way in which the factors of production are worked upon and the possible consideration of natural resources and their relationship with the society's activity. The extension to environmental accounting is presented by the SNA as an example of satellite accounts (ISWGNA, 2008: 534-538).
  - c.4) Stocks of capital and wealth.
  - c.5) Demography and the activity of the population of working age, their time use, skills, etc.

It is known that the implementation and study of some of these topics, especially those referred to in subsection c), could become valuable research projects, and that, in fact, some of them are already part of the SNA's research agenda. However, the aim here is to show that, although the SAM (especially when based on the SNA) can be a very complete and credible measurement tool, there is still much that can be done to improve it.

## **5. Concluding remarks**

Together, the United Nations System of National Accounts (SNA) is flexible enough and the Social Accounting Matrix (SAM)-based approach versatile enough to quantitatively represent the society's activity with some validity. From that representation, underlying systems can be identified and

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<sup>8</sup> Some of the aspects referred to in this paragraph were also referred to by Pyatt (1991a) when he argued in favour of a radical revision of the 1968 SNA, and by Round (2003) when he discussed the problematic compilation issues under the scope of the 1993 SNA.

<sup>9</sup> Following Seers (1952-1953), the treatment of the subsistence activities is identified, in Lury (1964), as a special problem which arises when the concepts and methods of national accounts calculation, as recommended by the United Nations, had to be used in Africa.

worked upon in order to support different studies in several areas, as well as the policy decision process.

It is proposed that the work on the sectors of production should be undertaken in conjunction with the institutional sectors, using the national accounts as the base source of information. This will make it possible to work simultaneously on the following items: some specificities and results of the production process; the distribution and redistribution of income; the redistribution of wealth; investment, its financing and the debt levels of the institutional sectors and the whole economy. It will also make it possible to work with a network of linkages and interactions, helping to identify interdependencies that cannot otherwise be detected.

The SNA and some countries and groups of countries have been undertaking important work in measuring a society's activity, as exhaustively and accurately as possible. Such information should be used in the best possible way. However, as far as the SNA is concerned, some related aspects should be considered and studied, namely those that were addressed in section 4.c). In turn, the performance of those countries or groups of countries that adopt/adapt the SNA has not been uniform, as is partly illustrated by our two applications.

The application to Portugal, a member of the European group, covers a significant part of what is defined by the SNA, although it almost completely ignores the financial accounts of institutional sectors, giving less importance to the "from whom to whom" transactions between institutional sectors, within the scope of their current and capital accounts.

The application to Mozambique shows that the institutional part is almost completely ignored, which therefore means that all the important aspects that the corresponding current, capital and financial accounts can quantify, namely the distribution, use and redistribution of income, are also ignored.

Thus, in both cases, the above-mentioned support that the SAM can provide to studies in several areas or to the policy decision process is open to question – as illustrated by section 3.4, in the area of social policy and in the case of Mozambique.

A SAM-based approach incorporates two versions of the SAM. A numerical version describes the activity of a society empirically, in which each cell has a specific numerical value, with the sums of the rows being equal to the sums of the columns. In turn, an algebraic version describes that same activity theoretically. Each cell of the latter version contains algebraic expressions that, together with those of all the other cells, make up a SAM-based model, the calibration of which involves a replication of the numerical version. References for the latter were given and the construction of the

former from the SNA was proposed. From that proposal the following possibilities were highlighted:

- Multi-period and dynamic analysis, since national accounts are published regularly.
- Identification of the network of nominal links existing within the (socio-)economic system, allowing for the particularisation of regions, products (goods and services), activities (industries), institutions or sets of institutions (households, enterprises, government), etc.
- Study of the processes of production and trade, as well as the distribution, redistribution and accumulation of income.
- Evaluation of the impacts of alternative policy measures and the consequent policy decision, i.e. the processes of decision-making and decision-taking.
- Better use of the quantitative information available, since the SNA has developed national accounts that are increasingly consistent and in harmony with all other statistics.

However, both within and outside the scope of the SNA, there are several important aspects that still need to be completed, especially when work has to be undertaken in countries such as the African ones where a substantial part of their activities is not marketed and/or not measured. Some rearrangements can be made to the described cell contents and/or some zero cells can be filled in. Coverage of those aspects would improve the numerical version of the SAM, proposed in this paper and the possible algebraic versions derived from it.

Our work here was carried out with the aim of producing a SAM, adapted to the SNA, that is not only capable of covering everything that can be measured according to its criteria, but also has room for the inclusion of aspects that have not yet been measured but may need to be measured in the future. As far as the latter question is concerned, we are thinking mainly about the non-marketed parts of a society's activity, which is why we suggest that the first approach to this subject should consist of making a distinction between income in cash and in kind.

By using a SAM-based approach, with a consistent and credible numerical version and a corresponding well-defined algebraic version of a SAM, it will be possible to cover important aspects of a society's activity and improve the knowledge of the underlying systems. A SAM that is suitably designed to address a specific problem or set of problems can result in a fully interlinked macro-model, which can play an invaluable role in providing quantitative support for several studies, as well as in the policy decision process.

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Appendix A. Integrated Economic Accounts Table for Portugal in 2007 (unit: 10<sup>6</sup> euros)

Current accounts												
Uses												
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	Transactions and other flows, stocks and balancing items		
										Code		
I. Production / external account of goods and services	68 045	68 045									P.7	Imports of goods and services
	54 514		54 514								P.6	Exports of goods and services
	317 058	317 058									P.1	Output of goods and services
	171 360			171 360	2 238	12 667	7 048	5 207	144 201		P.2	Intermediate consumption
	23 039	23 039		23 039							D.21-D.31	Net taxes on products
	<b>168 737</b>			<b>168 737</b>	<b>2 677</b>	<b>29 383</b>	<b>23 131</b>	<b>10 978</b>	<b>79 528</b>		B.1g/B.1'g	<b>Gross added value/gross domestic product</b>
	28 351			28 351	551	8 576	3 257	673	15 293		K.1	Consumption of fixed capital
	<b>140 386</b>			<b>140 386</b>	<b>2 125</b>	<b>20 808</b>	<b>19 874</b>	<b>10 305</b>	<b>64 235</b>		B.1n/B.1'n	<b>Value added, net/Net domestic product</b>
	<b>13 531</b>			<b>13 531</b>							B.11	<b>External balance of goods and services</b>
II.1 Primary distribution of income accounts	83 123		247	82 876	2 313	5 600	20 271	4 137	50 556		D.1	Compensation of employees
	24 982			24 982	4	635		30	652		D.2	Taxes on production and imports
	- 2 808			- 2 808	- 184	- 750	- 341	- 3	- 909		D.3	Subsidies
	<b>46 612</b>			<b>46 612</b>	<b>544</b>	<b>6 822</b>	<b>3 201</b>	<b>6 815</b>	<b>29 229</b>		B.2g	<b>Gross operating surplus</b>
	<b>17 076</b>			<b>17 076</b>		<b>17 076</b>					B.3g	<b>Gross mixed income</b>
	<b>20 618</b>			<b>20 618</b>	<b>- 8</b>	<b>604</b>	<b>- 56</b>	<b>6 142</b>	<b>13 936</b>		B.2n	<b>Net operating surplus</b>
	<b>14 719</b>			<b>14 719</b>		<b>14 719</b>					B.3n	<b>Net mixed income</b>
	76 011		12 809	63 201	165	8 101	4 821	26 645	23 469		D.4	Property income
	<b>163 394</b>			<b>163 394</b>	<b>946</b>	<b>117 680</b>	<b>22 877</b>	<b>5 918</b>	<b>15 972</b>		B.5g	<b>Gross national income/ Gross balance of primary incomes</b>
	<b>135 043</b>			<b>135 043</b>	<b>395</b>	<b>109 104</b>	<b>19 620</b>	<b>5 245</b>	<b>679</b>		B.5n	<b>Net national income/ Net balance of primary incomes</b>
II.2 Secondary distribution income account	16 112		21	16 092	6	9 717	21	1 399	4 949		D.5	Current taxes on income, wealth, etc
	25 264		71	25 193		25 193					D.61	Social contributions
	29 742		48	29 694	49	48	24 611	3 271	1 715		D.62	Social benefits other than social transfers in kind
	17 222		4 702	12 520	67	3 837	3 859	2 278	2 480		D.7	Other current transfers
	<b>165 107</b>			<b>165 107</b>	<b>3 199</b>	<b>115 202</b>	<b>32 232</b>	<b>5 000</b>	<b>9 473</b>		B.6g	<b>Gross disposable income</b>
	<b>136 756</b>			<b>136 756</b>	<b>2 648</b>	<b>106 627</b>	<b>28 975</b>	<b>4 327</b>	<b>- 5 821</b>		B.6n	<b>Net disposable income</b>
II.3 Redistribution of income in kind account	22 143			22 143	3 415		18 728				D.63	Social transfers in kind
	<b>165 107</b>			<b>165 107</b>	<b>- 216</b>	<b>137 345</b>	<b>13 504</b>	<b>5 000</b>	<b>9 473</b>		B.7g	<b>Gross adjusted disposable income</b>
	<b>136 756</b>			<b>136 756</b>	<b>- 767</b>	<b>128 769</b>	<b>10 247</b>	<b>4 327</b>	<b>- 5 821</b>		B.7n	<b>Net adjusted disposable income</b>
II.4 Use of income account	<b>165 107</b>			<b>165 107</b>	<b>3 199</b>	<b>115 202</b>	<b>32 232</b>	<b>5 000</b>	<b>9 473</b>		B.6g	<b>Gross disposable income</b>
	<b>136 756</b>			<b>136 756</b>	<b>2 648</b>	<b>106 627</b>	<b>28 975</b>	<b>4 327</b>	<b>- 5 821</b>		B.6n	<b>Net disposable income</b>
	143 634			143 634	3 415	107 220	32 999				P.4	Actual Final Consumption
	143 634			143 634		129 363	14 272				P.3	Final consumption expenditure
	569			569				569			D.8	Adjustment for the change in the net equity of households in pension funds reserves
	<b>21 473</b>			<b>21 473</b>	<b>- 216</b>	<b>8 551</b>	<b>- 767</b>	<b>4 432</b>	<b>9 473</b>		B.8g	<b>Gross saving</b>
	<b>- 6 878</b>			<b>- 6 878</b>	<b>- 767</b>	<b>- 25</b>	<b>- 4 024</b>	<b>3 759</b>	<b>- 5 821</b>		B.8n	<b>Net saving</b>
<b>17 162</b>			<b>17 162</b>							B.12	<b>Current external balance</b>	
<b>Accumulation accounts</b>												
<b>Changes in Assets</b>												
III.1 Capital accounts	III.1.1 Change in net worth due to saving and capital transfers account										B.8g	<b>Gross saving</b>
											B.8n	<b>Net saving</b>
											B.12	<b>Current external balance</b>
		<b>10 283</b>	<b>15 221</b>	<b>- 4 937</b>	<b>- 478</b>	<b>61</b>	<b>- 4 001</b>	<b>3 761</b>	<b>- 4 281</b>		D.9	Capital transfers, receivable
III.1.2 Acquisitions of non-financial assets account	38 634			38 634	547	9 287	4 113	1 683	23 003		P.5	Gross capital formation
	- 28 351			- 28 351	- 551	- 8 576	- 3 257	- 673	- 15 293		K.1	Consumption of fixed capital (-)
			160	- 160	5	- 2 915	- 79	59	2 771		K.2	Acquisitions less disposals of non-produced non-financial assets
			<b>15 061</b>	<b>- 15 061</b>	<b>- 479</b>	<b>2 265</b>	<b>- 4 777</b>	<b>2 692</b>	<b>- 14 762</b>		B.9	<b>Net lending (+) / borrowing (-)</b>
III.2 Financial account			S.2	S.1	S.15 + S.14	S.13	S.12	S.11				
	112 824		38 471	74 353	15 972	- 688	45 717	13 352				Net acquisition of financial assets
			1	- 1				- 1			F.1	Net incurrence of liabilities
	29 818		13 983	15 835	10 117	- 401	6 408	- 289			F.2	Monetary gold and SDRs
	28 663		17 792	10 871	1 821	- 76	9 147	- 21			F.3	Currency and deposits
	34 712		3 306	31 406	1 588	- 2 047	26 687	5 178			F.4	Securities other than shares
	5 406		2 677	2 729	- 1 576	1 502	2 776	27			F.5	Loans
	5 929		10	5 919	5 787	1	- 1	132			F.6	Shares and other equity
	8 296		702	7 594	- 1 765	333	701	8 325			F.7	Insurance technical reserves
											B.9 F	<b>Net lending (+) / borrowing (-)</b>

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Appendix A. Integrated Economic Accounts Table for Portugal in 2007 (unit: 10<sup>6</sup> euros)  
(continued)

										Current accounts							
										Resources							
Code	Transactions and other flows, stocks and balancing items	S.11	S.12	S.13	S.14	S.15	S.1	S.2	Goods and Services Account (Uses)	Total	Accounts						
		Non-Financial Corporations	Financial Corporations	General Government	Households	NPISHs	Total of the Economy	Rest of the World Account									
P.7	Imports of goods and services							68 045		68 045	I. Production / external account of goods and services						
P.6	Exports of goods and services								54 514	54 514							
P.1	Output of goods and services	223 729	16 185	30 179	42 050	4 915	317 058			317 058							
P.2	Intermediate consumption								171 360	171 360							
D.21-D.31	Net taxes on products						23 039			23 039							
B.1g/B.1'g	<b>Gross added value/gross domestic product</b>	<b>79 528</b>	<b>10 978</b>	<b>23 131</b>	<b>29 383</b>	<b>2 677</b>	<b>168 737</b>			<b>168 737</b>	II.1. Primary distribution of income accounts						
K.1	Consumption of fixed capital											II.1.1. Generation of income account					
B.1n/B.1'n	<b>Value added, net/Net domestic product</b>	<b>64 235</b>	<b>10 305</b>	<b>19 874</b>	<b>20 808</b>	<b>2 125</b>	<b>140 386</b>			<b>140 386</b>							
B.1l	<b>External balance of goods and services</b>							13 531		13 531							
D.1	Compensation of employees				82 871		82 871	252		83 123							
D.2	Taxes on production and imports			24 527			24 527	454		24 982							
D.3	Subsidies			- 1 421			- 1 421	- 1 388		- 2 808		II.1.2. Allocation of primary income account					
B.2g	<b>Gross operating surplus</b>	<b>29 229</b>	<b>6 815</b>	<b>3 201</b>	<b>6 822</b>	<b>544</b>	<b>46 612</b>			<b>46 612</b>							
B.3g	<b>Gross mixed income</b>				<b>17 076</b>		<b>17 076</b>			<b>17 076</b>							
B.2n	<b>Net operating surplus</b>	<b>13 936</b>	<b>6 142</b>	<b>- 56</b>	<b>604</b>	<b>- 8</b>	<b>20 618</b>			<b>20 618</b>							
B.3n	<b>Net mixed income</b>				<b>14 719</b>		<b>14 719</b>			<b>14 719</b>							
D.4	Property income	10 212	25 749	1 390	19 011	568	56 929	19 081		76 011							
B.5g	<b>Gross national income/ Gross balance of primary incomes</b>	<b>15 972</b>	<b>5 918</b>	<b>22 877</b>	<b>117 680</b>	<b>946</b>	<b>163 394</b>			<b>163 394</b>	II.2. Secondary distribution income account						
B.5n	<b>Net national income/ Net balance of primary incomes</b>	<b>679</b>	<b>5 245</b>	<b>19 620</b>	<b>109 104</b>	<b>395</b>	<b>135 043</b>			<b>135 043</b>							
D.5	Current taxes on income, wealth, etc			16 084			16 084	28		16 112							
D.61	Social contributions	1 711	3 773	19 621	50	49	25 204	60		25 264							
D.62	Social benefits other than social transfers in kind				29 600		29 600	142		29 742							
D.7	Other current transfers	934	2 257	2 141	6 667	2 325	14 324	2 899		17 222							
B.6g	<b>Gross disposable income</b>	<b>9 473</b>	<b>5 000</b>	<b>32 232</b>	<b>115 202</b>	<b>3 199</b>	<b>165 107</b>			<b>165 107</b>							
B.6n	<b>Net disposable income</b>	<b>- 5 821</b>	<b>4 327</b>	<b>28 975</b>	<b>106 627</b>	<b>2 648</b>	<b>136 756</b>			<b>136 756</b>							
D.63	Social transfers in kind				22 143		22 143			22 143							
B.7g	<b>Gross adjusted disposable income</b>	<b>9 473</b>	<b>5 000</b>	<b>13 504</b>	<b>137 345</b>	<b>- 216</b>	<b>165 107</b>			<b>165 107</b>							
B.7n	<b>Net adjusted disposable income</b>	<b>- 5 821</b>	<b>4 327</b>	<b>10 247</b>	<b>128 769</b>	<b>- 767</b>	<b>136 756</b>			<b>136 756</b>							
B.6g	<b>Gross disposable income</b>	<b>9 473</b>	<b>5 000</b>	<b>32 232</b>	<b>115 202</b>	<b>3 199</b>	<b>165 107</b>			<b>165 107</b>	II.3. Redistribution of income in kind account						
B.6n	<b>Net disposable income</b>	<b>- 5 821</b>	<b>4 327</b>	<b>28 975</b>	<b>106 627</b>	<b>2 648</b>	<b>136 756</b>			<b>136 756</b>							
P.4	Actual Final Consumption							143 634		143 634							
P.3	Final consumption expenditure							143 634		143 634							
D.8	Adjustment for the change in the net equity of households in pension funds reserves				569		569			569							
B.8g	<b>Gross saving</b>																
B.8n	<b>Net saving</b>																
B.12	<b>Current external balance</b>																
										Accumulation accounts							
										Changes in liabilities and net worth							
B.8g	<b>Gross saving</b>	<b>9 473</b>	<b>4 432</b>	<b>- 767</b>	<b>8 551</b>	<b>- 216</b>	<b>21 473</b>			<b>21 473</b>	III.1. Change in net worth due to saving and capital transfers account						
B.8n	<b>Net saving</b>	<b>- 5 821</b>	<b>3 759</b>	<b>- 4 024</b>	<b>- 25</b>	<b>- 767</b>	<b>- 6 878</b>			<b>- 6 878</b>							
B.12	<b>Current external balance</b>							17 162		<b>17 162</b>							
D.9	Capital transfers, receivable	1 661	7	1 135	209	290	3 303	241		3 544							
D.9	Capital transfers, payable (-)	- 122	- 4	- 1 112	- 124	- 1	- 1 362	- 2 181		- 3 544							
B.10.1	<b>Changes in net worth due to saving and capital transfers</b>	<b>- 4 281</b>	<b>3 761</b>	<b>- 4 001</b>	<b>61</b>	<b>- 478</b>	<b>- 4 937</b>	<b>15 221</b>		<b>10 283</b>	III.1.2. Acquisitions of non-financial assets account						
P.5	Gross capital formation							38 634		38 634							
K.1	Consumption of fixed capital (-)																
K.2	Acquisitions less disposals of non-produced non-financial assets																
B.9	<b>Net lending (+) /borrowing (-)</b>																
										S.11	S.12	S.13	S.14 + S.15	S.1	S.2		
	Net acquisition of financial assets																
	Net incurrence of liabilities	25 278	43 609	3 636	14 861		87 384	25 440		112 824							
F.1	Monetary gold and SDRs																
F.2	Currency and deposits		19 770	928			20 698	9 120		29 818							
F.3	Securities other than shares	6 050	16 124	1 107	20		23 301	5 362		28 663							
F.4	Loans	16 097	477	979	12 090		29 643	5 068		34 711							
F.5	Shares and other equity	1 929	- 1 478				451	4 956		5 407							
F.6	Insurance technical reserves	431	5 499				5 930	- 1		5 929							
F.7	Other accounts receivable/payable	771	3 217	622	2 751		7 361	935		8 296							
B.9 F	<b>Net lending (+) /borrowing (-)</b>	<b>- 11 926</b>	<b>2 108</b>	<b>- 4 324</b>	<b>1 111</b>		<b>- 13 031</b>	<b>13 031</b>									
	Statistical discrepancy	<b>2 836</b>	<b>- 584</b>	<b>453</b>	<b>- 675</b>		<b>2 030</b>	<b>- 2 030</b>									

Sources: Statistics Portugal (INE); Portuguese Central Bank (Banco de Portugal)

**Appendix B. Sources of information and methodological details of the SAM of Mozambique in 2007 (Tables: 5, 7 and 13).**

All the work undertaken for the application to Mozambique was centred around the data of the national accounts provided by the following two main sources of information:

1. [Instituto Nacional de Estatística de Moçambique](http://www.ine.gov.mz/indicadores_macro_economicos/cn/)  
([http://www.ine.gov.mz/indicadores\\_macro\\_economicos/cn/](http://www.ine.gov.mz/indicadores_macro_economicos/cn/));
2. [World Bank Databank by Country – Mozambique](http://data.worldbank.org/country/mozambique)  
(<http://data.worldbank.org/country/mozambique>).

The former was used as the main source, while the latter provided complementary information. Thus, the information from the World Bank Databank was used only when the Statistical Office did not have the required information available, although in many cases both sources contained information about the same transactions (usually different).

Only the information available online (see the links after the names of the sources) was worked on, since the various personal attempts that were made to enter into contact with the main source did not receive any reply. Therefore, from the main source of information, it was only possible to work with the items relating to GDP, calculated using the three known approaches (production, expenditure and income).

All the data that were worked upon were collected in September and October 2010.

SAMs for Mozambique in 1994 and 1995 were constructed by the Trade and Macroeconomics Division of the International Food Policy Research Institute (IFPRI) under the scope of the research project entitled “Macroeconomic Reforms and Regional Integration in Southern Africa”, which comprised six countries including Mozambique (Arndt et al., 1998)<sup>10</sup>. Those SAMs were constructed as databases for the modelling approach used, namely computable general equilibrium (CGE) modelling. Their underlying conceptual framework was the same as the one that is used in this paper. However the National Accounts were not their main source of information and they were designed in accordance with the modelling purposes that they were intended to serve, even including an attempt to cover a part of production and consumption that was not measured by the National Accounts. When the work on the SAM for Mozambique in 2007 (which is the one presented in this paper) was started in June 2009, contact was made with one of the members of the team involved in that project in order to know if any updates had been made in the meantime, and

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<sup>10</sup> This was a project “specially designed to examine a variety of macroeconomic and trade policy reform packages for their ability to enhance agricultural performance and contribute to economic growth and poverty reduction” (Tarp et al., 2002: ix).

an aggregated version for 2001 was then provided. Due to its characteristics and the year to which it refers, it was only considered once, as described below (b.1).

The description below will deal with the SAM blocks, as described in Section 3.1. The sources of information will be referred to using the numbers that were associated with these items above and the SAM cells will be referred to using the description contained in Table 2.

- a) Production – P (cell:  $t_{a,p}$ ) was calculated by adding to the Gross Added Value at factors cost ( $t_{f,a}$ ) the Intermediate Consumption ( $t_{p,a}$ ) and the Net Taxes on Production ( $t_{dic,a}$ ).
- b) Domestic Trade.
  - b.1) Intermediate Consumption – IC (cell:  $t_{p,a}$ ) was calculated by applying the weight of the IC in the  $GDP_{pm}$  (calculated through the production approach) of the SAM for 2001, provided by the above-mentioned team of the IFPRI, to the  $GDP_{pm}$  for 2007 (calculated through the expenditure or income approach and given by source 1).
  - b.2) Final Consumption – FC (cell:  $t_{p,dic}$ ) was given directly by source 1. No information was found on the final consumption of non-profit institutions serving households.
  - b.3) Gross Capital Formation – GCF (cell:  $t_{p,dik}$ ) was given directly by source 1.
- c) External Trade
  - c.1) Imports – IM (cell:  $t_{rw,p}$ ) was given directly by source 1.
  - c.2) Exports – EX (cell:  $t_{p,rw}$ ) was given directly by source 1.
- d) Trade and Transport Margins – TTM (cell:  $t_{p,p}$ ) at this level of aggregation amounted to zero.
- e) Net indirect taxes or net taxes on production and imports
  - e.1) Net Taxes on Production – NTA (cell:  $t_{dic,a}$ ) were calculated from source 1 by subtracting the subsidies paid from taxes on production.
  - e.2) Net Taxes on Products – NTP (cell:  $t_{dic,p}$ ) were given directly by source 1.
- f) Compensation of factors of production – CFP
  - f.1) Gross Added Value – CFP-GAV (cell:  $t_{f,a}$ ). The total was calculated from source 1 by subtracting the net taxes on production from the gross added value at basic prices. The breakdown by labour and own assets was calculated from the difference between the corresponding column totals and the part received from the rest of the world ( $t_{f,rw}$ ).

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f.2) Gross National Income – CFP-GNI (cell:  $t_{dic,f}$ ). The total was calculated from source 1 by subtracting the net indirect taxes from the gross national product (at market prices). The compensation of labour was given directly by source 1, with the total compensation of own assets being calculated from the difference between the total (GNI) and the compensation of labour.

f.3) Compensation of factors from and to the Rest of the World – CFP (cells:  $t_{f,rw}$ ;  $t_{rw,f}$ ). The difference (or balance) between the total compensation of factors from and to the rest of the world, which corresponds to the income balance in Table 13, is the difference between the gross domestic product and the gross national product, given by source 1. Each cell was calculated by applying to that balance the structure of receipts and payments of the net income, or income balance (of the balance of payments), given by source 2. In the conversion from United States dollars (US\$) to meticaís the rate that was adopted was the one used by that same source in the imports and exports of goods and services (1 US\$  $\cong$  25.858 meticaís).

### g) Current Transfers – CT

g.1) CT within domestic institutions (cell:  $t_{dic,dic}$ ), was unavailable.

g.2) CT from and to the Rest of the World (cells:  $t_{dic,rw}$ ;  $t_{rw,dic}$ ). To measure the difference (or balance) between the total CT from and to the rest of the world, which corresponds to the current transfers balance in Table 13, the net current transfers or current transfers balance (of the balance of payments), given by source 2, was adopted, since this was the only available information. In the conversion of currencies, exactly the same procedure as the one described in f.3 was adopted.

### h) Capital Transfers – KT

h.1) KT within domestic institutions (cell:  $t_{dik,dik}$ ) was unavailable.

h.2) KT from and to the Rest of the World (cells:  $t_{dik,rw}$ ;  $t_{rw,dik}$ ). To measure the difference (or balance) between the total KT from and to the rest of the world, which corresponds to the capital account balance in Table 13, the net capital account (of the balance of payments), given by source 2, was adopted, since this was the only available information. In the conversion of currencies, exactly the same procedure as the one described in f.3 was adopted.

i) Financial Transactions – FT

i.1) FT within domestic institutions (cell:  $t_{dif,dif}$ ) was unavailable.

i.2) FT from and to the Rest of the World (cells:  $t_{dif,rw}$ ;  $t_{rw,dif}$ ) The difference (or balance) between the total FT from and to the rest of the world, which corresponds to the financial account balance in Table 13, is the amount referred to in h.2) with an opposite mathematical sign.

j) Gross Saving – S (cell:  $t_{dik,dic}$ ) is the part of the disposable income, calculated in Section 3.3 that was not spent in final consumption (FC).

k) Net borrowing/lending – NLB (cell:  $t_{dik,dif}$ ), NL in our application – is the balance of the financial account in Table 14, referred to in i.2).