C O N T R I B U T I   D I   R I C E R C A   C R E N O S

CONSTRUCTING A SOCIAL ACCOUNTING MATRIX FOR SARDINIA

Guido Ferrari
Giorgio Garau
Patrizio Lecca

WORKING PAPERS

2 0 0 9 / 0 2

CENTRO RICERCHE ECONOMICHE NORD SUD
(CRENoS)
UNIVERSITÀ DI CAGLIARI
UNIVERSITÀ DI SASSARI

Il CRENoS è un centro di ricerca istituito nel 1993 che fa capo alle Università di Cagliari e Sassari ed è attualmente diretto da Stefano Usai. Il CRENoS si propone di contribuire a migliorare le conoscenze sul divario economico tra aree integrate e di fornire utili indicazioni di intervento. Particolare attenzione è dedicata al ruolo svolto dalle istituzioni, dal progresso tecnologico e dalla diffusione dell'innovazione nel processo di convergenza o divergenza tra aree economiche. Il CRENoS si propone inoltre di studiare la compatibilità fra tali processi e la salvaguardia delle risorse ambientali, sia globali sia locali.
Per svolgere la sua attività di ricerca, il CRENoS collabora con centri di ricerca e università nazionali ed internazionali; è attivo nell'organizzare conferenze ad alto contenuto scientifico, seminari e altre attività di natura formativa; tiene aggiornate una serie di banche dati e ha una sua collana di pubblicazioni.

www.crenos.it
info@crenos.it

CRENoS – CAGLIARI
VIA SAN GIORGIO 12, I-09100 CAGLIARI, ITALIA
TEL. +39-070-6756406; FAX +39-070- 6756402

CRENoS - SASSARI
VIA TORRE TONDA 34, I-07100 SASSARI, ITALIA
TEL. +39-079-2017301; FAX +39-079-2017312

Titolo: CONSTRUCTING A SOCIAL ACCOUNTING MATRIX FOR SARDINIA

ISBN: **978-88-8467-505-7**

Prima Edizione: Marzo 2009

Via Is Mirrionis, 1
09123 Cagliari
Tel./Fax 070291201
www.cuec.it

Constructing a Social Accounting Matrix for Sardinia

Guido Ferrari*

Giorgio Garau
University of Sassari and CRENoS

Patrizio Lecca*

Abstract

Recently, the Social Accounting Matrix (SAM) has been resurrected as a policy analysis tool and, in the last decade, attention has been paid to SAM multipliers, as well as to the use of the SAM as a benchmark for computable general equilibrium models. This paper constructs a SAM for the regional economy of Sardinia that can be used for policy evaluation and impact analysis.
A mixture of approaches is used from simple compilation and decomposition methods to procedures for matrix estimations and matrix balancing.

Keywords: Social Accounting Matrix, Input-Output, Doubly Constrained Minimum Information (MI) Model, Cross Entropy, Regional Account System.
JEL Classification: C16, C67, E01.

1. Introduction

This paper illustrates the mains steps used to build a Social Accounting Matrix (SAM) for Sardinia for the year 2001. The starting point is the Regional Input Output (RIO) Table for Sardinia built by IRPET[1] covering the year 2001 (see Table A1in Appendix). Data from the following sources were used to fill the sub-matrices of the SAM: System of Regional Economic Account, SRA (ISTAT[2], 2006), Disposal Income Account (ISTAT, 2005), Italian Household Expenditure Survey (ISTAT, 2001) and the Survey on Household Income and Wealth (Bank of Italy,

*Respectively: Department of Statistics, University of Florence (ferrari@unifi.ds.it); Department of Economics, University of Cagliari and Strathclyde Business School.

1 Istituto Regionale per la Programmazione Economica della Toscana.

2 National Statistics Office (Istituto Nazionale di Statistica).

2002). However, these sources are insufficient to obtain a well detailed SAM; a lack of data on the secondary distribution processes inhibits a proper compilation of the sub matrix of transfers between institutions. The latter is estimated by means of a doubly constrained minimum information (MI) model (Plane, 1982 and Schneider and Zenios, 1989) with the introduction of measurement errors. Furthermore, because of the mixture of sources we have employed, the resulting SAM is inconsistent, i.e., column totals differ from row totals. In addition, some figures of the RIO table are slightly different to those reported in the SRA. We can identify at least two reasons for this: regional account data published by ISTAT in 2004 may be slightly different from that published in 2006 because ISTAT revises the series every two years; secondly, there could be problems caused by an adjustment process used to balance the RIO.

As a result, it is necessary to incorporate and reconcile the information derived from different sources to produce a consistent and well-defined SAM. To this end, the Cross-Entropy method (Robinson, Cattaneo and El-Said, 2001) is used to readjust the data.

The rest of the paper is organized as follows. Section 2 describes the structure of the SAM. Section 3 presents the main data sources, and section 4 describes the adjustment operations carried out on the RIO table so that it can be incorporated as part of the SAM. The analytical SAM is then developed. In section 5 we focus on the allocation of primary income to institutional sectors and the distributional transfers amongst institutions. Section 6 explains how Households are separated into 14 income groups whilst section 7 is dedicated to the balance of payments. Finally, section 8 is devoted to the balancing method, and, in the last section, concluding remarks are offered.

2. The structure of a regional SAM

The SAM is a system of national/regional accounts (or even sub-regional accounts) in a matrix format. It includes the inter-industry linkages through transactions typically found in the IO accounts and the transactions and transfers of income between different types of economic agents, such as Households, Government, Firms and external institutional sectors (Rest of the World, ROW and the Rest of the Country, ROC). It has the following characteristics:

- it should be a square matrix, in the sense that each account has its own row and a corresponding column;

- for each account, the row total and the column total should be equal.

The architecture of a stylized SAM is shown in Table 1. The first column is the total supply of commodities, given by gross domestic output (cell [1, 1], cell [2, 1] and [4, 1]), plus imports from the external sector[3] (cell [5, 1]). The first row is demand for commodities for intermediate consumption in the production process (cell [1, 1]), for final consumption by the households and government ([1, 3]), investment (cell [1, 4]) and export (cell [1, 5]).

The second column reflects payments or distributions of factor incomes: factor remuneration of capital and labour to domestic institutions (cell [3, 2]) and foreign factor imports (cell [5, 2]). The second row gives the net value added (cell [2, 1]) which reflects the value newly created in the production process by the use of labour and capital and the factor income from the external sector (cell [2, 5]).

The third column represents payments by institutions for commodity consumption or transfers of income to other institutions. That is, the total institutional expenditure in terms of final consumption (cell [1, 3]), transfers between institutions (cell [3, 3]) and savings (cell [4, 3]). The corresponding row represents receipts of income by institutions in terms of factor payment (cell [3, 2]), transfers from domestic sectors (cell [3, 3]) and from abroad (cell [3, 5]).

The fourth row contains depreciation (cell [4, 1]), domestic savings (cell [4, 3]) and foreign and interregional savings (cell [4, 5]), and the column contains investment demand (cell [1, 4]) and government net debt (cell [3, 4]).

Finally, the external sector account (ROC/ROW) shows the imports of commodities (cell [5, 1]), factor incomes to the external sector (cell [5, 2]) and transfers of firms and government (cell [5, 3]). The column contains the export sales to ROC and ROW (cell [1, 5]), factor income transfers from abroad (cell [2, 5]) and foreign and interregional savings (cell [4, 5]).

The SAM can also be seen as a general equilibrium framework where equality between production column and the row confirms that demand equals supply for all commodities; moreover the institutional row total is

[3] As in this schematic representation of the SAM provided in table 1, the taxes and fees are not reported, the domestic output is valued at factor cost whilst the imports are valued free on board. Furthermore the external sector includes both the Rest of the Country and the Rest of the World.

equal to the corresponding column total, showing that income is equal to revenue so that all domestic agents have demands that satisfy their budget constraints. Equality between ROC/ROW row and column provide the current-account balance.

Table 1 - *Stylized SAM*

		Production (1)	Factors (2)	Institutions (3)	Accumulation (4)	ROC/ROW (5)
Production	(1)	*Intermediate inputs*		*Consumption*	*Investment*	*Export to ROC/ROW*
Factors	(2)	*Factors Payment*				*Factor Income from* ROC/ ROW
Institutions	(3)		*Income to institutional sectors*	*Transfer*	*Government net Debt*	*Transfer from ROC/ROW*
Accumulation	(4)	*Depreciation*		*Institutional saving*		*Foreign and interregional Saving*
ROC/ROW	(5)	*Imports from ROC/ROW*	*Factor Income to ROC/ROW*	*Transfer*		

3. Data Sources and dimension of the SAM

Several different sources of information are needed to construct the SAM and the level of disaggregation is directly dependent on the data available. The smaller the benchmark economic system, the greater the difficult in finding data to fill up every single cell, resulting in an inevitable reduction in the disaggregation level. Indeed, the regional accounts released by ISTAT do not have the degree of detail needed for building a well disaggregated regional SAM. The SRA, as set by ESA95 (which is the EU version of the 1993 SNA), is limited to:

1. regional industry aggregates on production activities:
    - gross value added;
    - compensation of employees;
    - employment;
    - employees;

- gross fixed capital formation.

2. gross domestic product per region (GDPR);
3. Regional Income accounts .

There have been some improvements to Regional Income accounts between ESA70 and ESA95. There is now a detailed compilation of Household Disposal Income, although the accounts are limited to:

1. the Allocation of Primary Income;
2. Secondary Income Distribution of Income.

Accordingly, the SRA does not contain detailed information about interregional and international trade, or income distribution to institutional sectors. As a result, the use of additional information is necessary. The other main sources can be summarized as follows:

- Regional Input Output Table, RIO
- Households Expenditure Survey
- Households Income Survey
- National or Consolidated Disposal Income account
- Financial Budget of the Autonomous Region of Sardinia.

The RIO table (shown in Table A1 in appendix) is composed of 30 sectors, three domestic institutions (Households, Firms and Government) and two external institutions: Rest of Italy (ROI) and Rest of the World (ROW). The RIO table also includes a column vector of Financial Intermediary Services Indirectly Measured (FISIM) and a row vector of Transfers of the Secondary Production. Using the economic activities classification scheme presently used by ISTAT for the classification of the regional account, the RIO table is aggregated to 23 sectors.

In order to obtain a more disaggregated SAM, including a classification of Households split into 14 income groups, we use the 2001 Italian Households Expenditure Survey (hereafter HES) and the 2001 Survey on Household Income and Wealth (hereafter SHIW). Furthermore, to identify receipts and payments between institutions, the Secondary Income Distribution Account at regional level is required. However, as we have seen above, this account is released by ISTAT only for Households, so a regionalization of some entries of the Consolidated (National) Disposal Income Account is necessary in order to identify total receipts and payments for each institution.

On the basis of the sources collected, the disaggregated structure of the final SAM (RSAM) is presented in Table 2. Economic activities are classified into 23 sectors, and value added at factor cost is shared between labour income and operating surpluses. The latter is non-labour value added of GDP at factor cost that includes rent, profit and other capital income. Households are split into 14 income groups whilst external relationships are divided into interregional (the Rest of Italy) and international (the Rest of the World).

4. Adjusting the RIO Table.

The RIO table constitutes the basis of the RSAM. In this table we find the intermediate inputs, the composition of the final demand, and interregional and international trade. The first operations to be carried out involved adjustment of the RIO table so that it can be included as part of the RSAM:

1. Allocation of FISIM among user sectors
2. The treatment of secondary products
3. Consolidation of the Gross Investment (GI) and Inventory change (IC).

4.1. Allocation of FISIM. ESA95 does not require FISIM to be allocated between users because, in practice, there are uncertainties about how to do this. In fact, the RIO Table ascribes the total value of FISIM to the Monetary and Financial Intermediation sector. As this is inconsistent with the SAM approach, the FISIM is allocated along the row entries of the Monetary and Financial Intermediation sector according to the following share, s_j , defined as:

$$s_j = \frac{VA_j^f}{\sum_j VA_j^f}$$

Table 2 – *Structure of the final SAM*

Economic activities	**Value added**			Income Groups (euros)
Agricolture, hunting, forestry and logging	Wages and Salaries		**1**	3718.49
Fishing and aquaculture	Employers' Social Contributions		**2**	3718.49 - 6197.48
Mining and Quarrying	Operating Surplus		**3**	6197.48 - 9296.22
Manufacture of food products, beverages and tabacco	Subsidies on production		**4**	9296.22 - 12394.97
Manufacture of textiles and wearing appareal	**Taxes**		**5**	1032.91 - 15493.71
Manufacture of leather and related products	Value added Tax		**6**	15493.71 - 18592.45
Manufacture of paper and paper products ; manufacture of articles of straw and plaiting materials	Other Indirect taxes		**7**	18592.45 - 24789.93
Manufacture of coke, refined petroleum products, chemicals and pharmaceutical	Indirect tax on Import		**8**	24789.93 - 30987.41
Manufacture of other non-metallic mineral products			**9**	30987.41 - 37184.90
Manufacture of fabricated metal products, except machinery and equipment	**Domestic Institutions**		**10**	37184.90 - 43382.38
Manufacture of computer, electronic and optical products , machinery and equipment , transport equipı	Government		**11**	43382.38 - 49579.86
Manufacture of wood, rubber, plastic products and other manufacturing	Household (14 income groups)		**12**	49579.86 - 61974.83
Electricity, Gas and water supply			**13**	61974.83 - 74369.79
Construction			**14**	- 74369.79
Wholesale and Retail trade; Repair of Motor vehicles and motorcycles	**Foreign Instituriou**			
Accomodation and food sevice activities	Rest of Italy	*Import/Export*		
Transportation and Storage	Rest of the World	*Import/Export*		
Financial and Insurance activities				
Real estate activities, Professional, Scientific and Technical activities	Capital Formation	*Investment/saving*		
Public administration and defence; Compulsory social security				
Education				
Human Health and social work activities				
Other service activities				

where VA_j^f stand for Value Added and the apex f means that we are dealing with the value added at factor cost. Once FISIM is spread along the Monetary and Financial Intermediation sector, the VA_j^f is reduced by the same amount in order to rebalance the RIO table.

4.2. Secondary production. Let $\hat{\mathbf{v}}$, be the vector of secondary production and **A** the technical coefficients matrix. We can find the matrix of secondary production flows **S**, as follows:

$$\mathbf{S} = \mathbf{A} \cdot \hat{\mathbf{v}}$$

where the hat indicates the diagonal matrix. Now, we are able to determine a new matrix, **G,** by the difference between the inter-industry matrix **M** and **S**:

$$\mathbf{G} = \mathbf{M} - \mathbf{S}$$

and we obtain the new technical coefficient matrix $\mathbf{A}^*$as:

$$\mathbf{A}^* = \mathbf{G} \cdot \widehat{\mathbf{X}}^{-1}$$

where $\widehat{\mathbf{X}}^{-1}$ is the diagonal matrix of total production. Now, we can re-define the final demand **Y** in order to obtain a balanced RIO table:

$$\mathbf{Y}^* = (\mathbf{I} - \mathbf{A}^*)\mathbf{X}$$

where **I** is the identity matrix. With this approach, the vector of secondary production has been allocated to the economic activities while preserving the original total of production.

4.3. Consolidation of Gross fixed capital formation and Inventory change. Gross capital formation, **GFK**, is measured by the total value of the gross fixed capital formation, **GFKF,** and changes in inventories, **IC**. In the RIO table, the capital formation account contains both **GFKF** and **IC** but does not provide the whole measure of **GFK**. So we need to consolidate the **GFKF** and **IC** vectors in order to have a measure of **GKF**. The new vector of consolidated investment is **GKF=GFKF+IC**. As the **IC** vector contains some negative values, a single element of **GKF** could be less than zero. In this case, the single elements of **GFK** take the value zero and, to re-balance the RIO, Household consumption is reduced.

5. From the RIO to the RSAM

The aim so far has been to make the data supplied by the RIO table consistent with that in the RSAM. In this section we focus on the construction of the SAM for Sardinia, based on the adjusted RIO and focusing on the sub-matrices that mainly differentiate the SAM from an Input-Output, that is:

- The primary income formation
- The allocation of primary income to institutional sectors
- The transfer among institutions

Essentially, we are introducing the distributional process of income. IO focuses on production and it is therefore inadequate for capturing the complexity of the interrelations between production, on the one hand, and consumption and distribution on the other.

5.1. Primary income formation: value added decomposition. Most of the information we need is already supplied by the RIO table which provides total value added at factor cost, indirect taxes on production, value added tax (VAT) and subsidies on product distributed amongst sectors. As noted above, some aggregates of the RIO table do not match the figures reported in the SRA. In fact, VA at factor cost (both its total amount and its distribution among sectors) is slightly different from that in the SRA, and so the total amount of indirect net taxes[4] also differs. Therefore, the following operations will be based on VA supplied by the SRA and inconsistency with indirect net taxes is solved in section 8 by imposing a control aggregate variable in the CE model.

VA at factor cost is split into its principal components: Labour Income (LI), or compensation of employees, and Gross Operating Surplus (GOS). LI is shared between Wages and Salaries (W&S) and Employers' Social Contributions (ESC). W&S also includes the value of any social contributions and income taxes payable by the employees[5]. The SRA give us the W&S and ESC amongst sectors and the total amount of the GOS (not spread by sectors). As a result we can easily obtain the GOS for each sector as a residual. Unfortunately, at this stage we are not able

[4] We cannot compare the distribution of indirect taxes amongst sectors because the SRA only lists totals.

[5] Unfortunately we do not have enough information to separate ESC into Employers' Actual Social Contribution and Employers' Imputed Social Contribution.

to distinguish between gross and net VA, due to a lack of data on the consumption of fixed capital at regional level.

5.2. *The allocation of Primary Income to institutional sectors.* The only information we have from ISTAT is the Household Disposal Income account; from this we get the information for Households concerning W&S (8277.3), ESC (2826.2) and GOS (9375.7) which give a total primary income of 20479.2. SRA provides total GOS (13239.18) which must be allocated between Firms and Government (equal to 3863.48 = 13239.18 - 9375.7). This figure is split according to the shares obtained by GOS in the National Primary Income Distribution Account, available in the National Disposal Income account. That is: 0.04% for Government and 0.96 for Firms.

Table 3. - *Allocation of primary income*

	W&S	ESC	GOS
Households	8277.30	2826.20	9375.7
Firms	-	-	3708.94
Government	-	-	154.53
Total	8277.30	2826.20	13239.18

5.3. *Transfers among Institutions.* The compilation of the sub-matrix of transfers (see Table 4) requires information about receipts and payments of current transfers between institutions. This data may be found in the Secondary Income Distribution (SID) account. However, it is only available for Households so we proceed as follows: first we obtain a macro regional SID account to determine total receipts and total payments for each institution, then, with a non linear optimization model, all the cells $T_{I,J}$ as represented in Table 4 are estimated.

The regional Households SID account, reported in Table 5, gives total Household receipts $T_{H,\blacksquare}$ and total Households payments $T_{\blacksquare,H}$ that amounts to 5956.3 and 6920.5 (in millions of euros) respectively. In fact, total resources, less BPI (Balance of Primary Income) give total receipts, whilst total uses less Gross Disposal Income gives the total payments. As for total receipts, Households receive a total amount of 5541 given by SB (5493) and OTC (48 = 381.30-330.30) from Government, and 333 for OCT and 82 for SC (46) and SB (36) from Firms. Total household payment is given by the payments for CT (2710), SC (3784), SB (36) and OCT (391).

Table 4. – *Transfer matrix*

	Households	Firms	Government	ROW	Total receipts
Households	T_{HH}	$T_{H,F}$	$T_{H,G}$	$T_{H,ROW}$	$T_{H,\blacksquare}$
Firms	$T_{F,H}$	$T_{F,F}$	$T_{F,G}$	$T_{F,ROW}$	$T_{F,\blacksquare}$
Government	$T_{G,H}$	$T_{G,F}$	$T_{G,G}$	$T_{G,ROW}$	$T_{G,\blacksquare}$
ROW	$T_{ROW,H}$	$T_{ROW,F}$	$T_{ROW,G}$	$T_{ROW,ROW}$	$T_{ROW,\blacksquare}$
Total payments	$T_{\blacksquare,H}$	$T_{\blacksquare,F}$	$T_{\blacksquare,G}$	$T_{\blacksquare,ROW}$	$T_{\blacksquare,\blacksquare}$

Now we need to get some regional values concerning the BPI, Gross Regional Disposal Income (GRDI), total resources and total uses for the total regional economy as well as for non-Households institutions: Firms, Government and Rest of the Italy/World (ROI/W).

The values of BPI for each institution are found in section 5.3; other information is found by regionalizing some entries of the National SID account. Specifically, the total Sardinian sources is a share of the national one found proportionally to the ratio of regional to national gross domestic product. Then the result is distributed amongst non-Household institutions in proportion to the distribution of shares found in the National SID. GRDI is determined by maintaining the ratio between Gross National Disposal Income (GNDI) and BPI as in the National SID, where the GNDI is less than the primary income (BPI), indicating an appropriation of the primary income operated by the secondary distribution process.

Now it would be quite easy to obtain the total uses. Since the ROI/W can be the only unbalanced institution, its value has been obtained as a residual in order to get total receipts equal to total payments. The resulting Macro SID accounts for Sardinia, along with the receipts and payments are reported in table 6.

Table 5 – *Secondary Income Distribution account for Households (millions of euro)*

	Resource	Uses
Balance of primary income	20479,20	-
Current taxes on income, wealth, etc. (CT)	0,00	2710,00
.Current taxes on income	0,00	0,00
.Other current taxes	0,00	0,00
Social contributions (SC)	46,00	3784,00
.. Actual social contributions	34,00	3535,00
... Actual social contribution (employer)	34,00	2537,00
... Actual social contribution (employee)	0,00	648,00
… Actual social contribution (self-employed and unemployed)	0,00	350,00
.. Imputed social contribution	12,00	249,00
Social benefit (SB)	5529,00	36,00
Other current transfer (OCT)	381,30	390,50
.. From Government	0,00	0,00
.. From other institutions	333,30	344,50
. Net non-life insurance premiums	0,00	190,00
. Non-life insurance claims	231,00	0,00
. Current transfer within general Government	0,00	-
. International current aid	0,00	0,00
.. From EU	0,00	0,00
. Miscellaneous current transfer	150,30	200,50
.. From Government	0,00	0,00
.. From other institutions	0,00	0,00
… 4° resource based on GDP	0,00	0,00
Gross disposal income		19515,00
Total	26435,50	26435,50

Source: ISTAT, 2005

Table 6. – *Sardinian Macro SID Account and Total Receipts and Payments*

	Total Sardinia	Households	Firms	Government	ROI/W
Balance of Primary Income (BPI)	27187,98	20479,20	3708,94	2999,84	0,00
Total sources (TS)	44403,55	26435,50	4373,05	13194,31	400,68
Gross Regional Disposal Income (GRDI)	27071,32	19515,00	2263,73	5292,59	0,00
Total Using (TU)	44286,89	26435,50	4373,05	13194,31	284,02
	$T_{\blacksquare,\blacksquare}$	$T_{H,\blacksquare}$	$T_{F,\blacksquare}$	$T_{G,\blacksquare}$	$T_{ROW,\blacksquare}$
Receipts (TS-BPI)	17215,57	5956,30	664,11	10194,47	400,68
	$T_{\blacksquare,\blacksquare}$	$T_{\blacksquare,H}$	$T_{\blacksquare,F}$	$T_{\blacksquare,G}$	$T_{\blacksquare,ROW}$
Payments (TU-GRDI)	17215,57	6920,50	2109,32	7901,73	284,02

With total receipts and payments available for each institution, we are able to estimate the transfer matrix by means of a Doubly Constrained Minimum Information (MI) model (Schneider and Zenios, 1990). Let *T* denote total payment or receipts (which correspond to $T_{\blacksquare,\blacksquare}$ in Table 4) and for each *I* = *H*, *F*, *G*, *ROI/W*, let R_I =[$T_{H,\blacksquare}$, $T_{F,\blacksquare}$, $T_{G,\blacksquare}$, $T_{ROW,\blacksquare}$] and P_I=[$T_{\blacksquare,H}$, $T_{\blacksquare,F}$, $T_{\blacksquare,G}$, $T_{\blacksquare,ROW}$] be respectively the receipts and payments for institutions *I*. Considering $t_{I,J}$ the model estimated probabilities that any institution receive from *J* and pay to *I* where *I* = *J* and some prior probabilities $\bar{t}_{I,J}$, the model can be formalized as follow:

$$\min \sum_I \sum_J t_{I,J} \left[ln\left(\frac{t_{I,J}}{\bar{t}_{I,J}}\right) - 1 \right]$$

subject to

$$\sum_I t_{I,J} = \frac{P_I}{T}; \ \sum_J t_{I,J} = \frac{R_J}{T};$$

As we do not have a previous transfer matrix for Sardinia, the prior probabilities $\bar{t}_{I,J}$are derived from the Italian transfer matrix built by IRPET for the year 1998. Since the vectors R_I and P_I are derived from the regionalization process described above, they may contain some measurement error. Therefore the MI model can be written in the following way:

$$\text{Min} \sum_I \sum_J t_{I,J} \left[ln\left(\frac{t_{I,J}}{\bar{t}_{I,J}}\right) - 1 \right] + \sum_I \sum_h \left[ln\left(\frac{w^P_{I,h}}{\bar{w}^P_{I,h}}\right) - 1 \right] + \sum_J \sum_h \left[ln\left(\frac{w^R_{J,h}}{\bar{w}^R_{J,h}}\right) - 1 \right] \quad (1)$$

where $w^{P,R}_{I,h}$ and $\bar{w}^{P,R}_{J,h}$ are respectively the model estimated weights of the error *e* and their prior distribution.

The constraint equations are the following:

$$\sum_I t_{I,J} = \frac{(P_I + e^P_I)}{T}; \ \sum_J t_{I,J} = \frac{(R_J + e^R_J)}{T}; \quad (2)$$

$$T = \sum_I P_I + e^P_I = \sum_J R_J + e^R_J \quad (3)$$

$$e^P_I = \sum_h w^P_{I,h}\ v^P_h; \ e^R_J = \sum_h w^R_{J,h}\ v^R_h \quad (4)$$

$$\sum_h w^P_{I,h} = 1 \text{ and } \sum_h w^R_{J,h} = 1; \quad (5)$$

Introduction of the error terms in this MI model follows Robinson, Cattaneo and El Said (2001) which introduced error terms in a CE model in order to balance a macro SAM for Mozambique.

In the formulation of the problem specified above [(1), (2), (3) ,(4), (5)] two noise variables are identified: e^P_I and e^R_J. The former is related to *P* while the latter is associated to *R*. So, unlike the previous MI model, receipts and payments contain some possible measurement errors that matter for the estimated probabilities $t_{I,J}$ as can be seen in equation (2). Furthermore such errors are reproduced in the total receipts (or payments) *T* as in equation (3). The error terms are seen as a weighted average of a constant term *v* as in equation (4), where the weights *w* must respect the constraints specified in (5), as is usual in this kind of formulation. The set *h* defines the dimension of the support set for the error distribution and the number of weights that must be estimated for each error. The prior variance of the error term can be specified as $\sigma^2 = \sum_h \bar{w}_{i,h}\ \bar{v}^2_h$, whilst we define a domain for the support set of

± 3 standard errors (see Golan, Judge, and Miller, 1996 and Robinson, Cattaneo and El-Said, 2001).

Thus the transfer matrix is derived by minimizing equation (1) subject to the constraints equation (2), (3), (4) and (5). The resulting matrix is presented in table 7.

Table 7. – *Transfers among Institutions*

	Households	Firms	Government	ROW	Total receipts
Households	164,57	1577,69	4012,70	201,33	5956,29
Firms	175,40	117,49	337,86	33,46	664,21
Government	6463,07	356,60	3323,21	49,23	10192,11
ROW	117,45	58,04	225,22	0,00	400,71
Total payments	6920,49	2109,82	7898,99	284,02	17213,34

6. Splitting Households in 14 income groups.

In this section, Households are split into 14 income groups (see table 2). Not only are the vectors of income and consumption split, but also payments and receipts for every single household group. The disaggregation is achieved by means of information contained in HES and in SHIW. HES is primarily a survey of household expenditure on goods and services. It collects detailed information on expenditures and on the characteristics of a sample of households resident throughout Italy and classifies them into 14 income groups. SHIW mainly gathers data on the incomes and savings of Italian households, plus some other aspects of households' economic and financial behaviour. In both surveys we can identify the Sardinian sample.

6.1. Households income. The total income earned by households, (Y_I^H), and its components given by labour income (Y_L^H), capital income (Y_K^H) and transfers (Y_T^H) from the other institutions (determined in the previous sections 5.2 and 5.3) are split in 14 income groups through a system of weights $W_{h,I}$ obtained from SHIW. Also from SHIW, we find the average labour income, $Y_{h,L}^A$, the average capital income, $Y_{h,K}^A$, and the average transfer income, $Y_{h,T}^A$, for each group. Given N_h the number of households for each group h (from HES), the total average income, $Y_{h,I}^{Total}$ is determined as follows:

$$Y_{h,I}^{Total} = Y_{h,I}^{A} \cdot N_h \qquad \text{where } I = L,K,T$$

Now, we can find a system of weights $W_{h,I}$ such that the income for h Households and for the I category is given by:

$$Y_{h,I}^{*} = Y_{I}^{H} \cdot W_{h,I}$$

where

$$W_{h,I} = \frac{Y_{h,I}^{Total}}{\sum_h Y_{h,I}^{Total}}$$ [6].

6.3. Household consumption. In order to split Household consumption into 14 income groups, we first construct a share $h \times s$ matrix **G**, obtained from HES, where h is the 14 income groups, and s the 12 categories of expenditure. Now, using the Household total consumption for expenditure category supplied by SRA, **g,** we can find a $h \times s$ matrix $\mathbf{C} = [c_{h,s}]$ as follows:

$$\mathbf{C} = \mathbf{G} \cdot \hat{\mathbf{g}}$$

The next step is to translate **C** into a matrix with 14 household and 23 sectors. To this end, we use the bridge coefficients $i \times s$ matrix, $\mathbf{B} = [b_{i,s}]$, that allow us to convert an expenditure category configuration s (as in **C**) to a sector configuration i. So the matrix **H** of Household consumption $i \times h$ is obtained as follows (see Table 8)**:**

$$\mathbf{H} = \mathbf{B} \times \mathbf{C}'$$

The Sardinian bridge coefficient matrix **B** is derived from a doubly constrained minimum information (MI) model as explained for estimating the transfer matrix. However, at this time, we are not

---

[6] As SHIW does not contain sufficient data to split the transfer of Household from Government, Firms, External Institutions and the same Households, the same weight, $W_{h,t}$ is applied in this case. Moreover the transfers of income between h, are considered to be made within the same group of Households.

considering errors terms. The prior information is given by the Italian bridge matrix for the year 1992[7], whereas the vector of household consumption for 23 sectors is contained in the RIO table. In Table A2 in the Appendix we report the Sardinia Bridge flow matrix.

6.4. Transfer of Households to other institutions. Previously, we have dealt with the transfers of income received by households as payment from other institutions. Now we turn to payments made by the *h* households to other institutions. The vector of Households' payments reported in Table 6 (175 to Firms, 6494 to Government and 117 to ROW) must be spread between *h* groups. The main difficulty is due to the fact that SHIW does not specify any variables relating to the transfer of income from households to other institutions. Thus we have made the assumption that each *h* Household transfers part of its income proportionally to its total income.

7. Sector Financial Balance

The sectoral financial balance requires that: $(S - I) + (T - G) = E - M - TR$, where the private sector portfolio (saving, S, less investment, I) plus the government deficit/surplus (total resources, T, less expenditure, G) equals the current account imbalance (export, E, less import, M, less net transfer, TR).

Households' and Firms' savings are calculated as balanced items: total income less expenditure. The Government deficit is obtained from the 2001 Financial Budget of the Region of Sardinia (Consiglio Regionale della Sardegna XIII Legislatura, 2001). The capital inflow/outflow to and from the ROI and the ROW is determined by imputing the trade deficit (M-E) as capital inflows: 1719 for ROI and 2788 for ROW.

[7] The Italian bridge matrix built by ISTAT for the year 1992 links 57 expenditure categories to 110 sector. It is aggregated in order to reduce the number of categories to 12 and sectors to 23.

Table 8- *Households consumption matrix*

	Income groups														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
Agricolture, hunting, forestry and logging	3.38	16.40	36.08	66.65	61.47	29.33	62.67	25.90	7.13	3.95	5.59	0.20	0.00	1.56	320.30
Fishing and aquaculture	0.46	3.23	6.35	12.51	10.20	6.88	9.05	4.05	1.92	0.82	0.57	0.02	0.00	0.25	56.31
Mining and Quarrying	0.01	0.04	0.08	0.15	0.13	0.08	0.11	0.05	0.02	0.01	0.01	0.00	0.00	0.00	0.69
Manufacture of food products, beverages and tabacco	15.93	108.55	215.52	422.19	348.49	227.79	313.89	139.28	62.84	27.36	20.60	0.67	0.00	8.54	1911.64
Manufacture of textiles and wearing appareal	6.31	44.80	88.00	173.46	141.45	95.36	125.45	56.18	26.57	11.34	7.84	0.25	0.00	3.45	780.46
Manufacture of leather and related products	2.06	14.59	28.66	56.50	46.08	31.06	40.87	18.30	8.65	3.69	2.55	0.08	0.00	1.12	254.22
Manufacture of paper and paper products ; manufacture of articles of straw and plaiting materials	1.15	4.48	10.54	30.55	36.79	40.93	39.52	22.57	6.96	9.31	2.93	0.09	0.00	2.78	208.60
Manufacture of coke, refined petroleum products, chemicals and pharmaceutical	3.06	27.96	50.11	122.29	128.53	98.46	142.10	84.91	31.09	20.91	8.81	0.29	0.00	6.30	724.83
Manufacture of other non-metallic mineral products	0.21	2.20	4.55	15.33	13.20	8.12	11.95	10.09	3.32	1.23	0.94	0.00	0.00	0.85	72.00
Manufacture of fabricated metal products, except machinery and equipment	0.23	1.38	2.76	6.16	6.26	5.12	7.03	3.47	1.26	1.05	0.47	0.01	0.00	0.28	35.48
Manufacture of computer, electronic and optical products , machinery and equipment , transport equipment	4.50	33.08	72.30	157.41	167.51	110.56	150.47	95.38	30.87	20.66	7.66	0.15	0.00	8.01	858.57
Manufacture of wood, rubber, plastic products and other manufacturing	2.15	11.20	25.29	64.24	74.89	74.89	80.88	44.99	15.59	15.50	5.31	0.14	0.00	4.22	419.29
Electricity, Gas and water supply	4.59	43.65	76.06	130.76	138.51	75.79	113.55	70.63	24.52	11.50	8.97	1.00	0.00	5.02	704.56
Construction	0.17	1.58	2.76	4.73	5.02	2.73	4.11	2.57	0.89	0.42	0.33	0.04	0.00	0.18	25.52
Wholesale and Retail trade; Repair of Motor vehicles and motorcycles	14.79	113.47	288.71	767.96	775.65	649.73	744.14	450.99	193.19	75.45	57.55	0.02	0.00	17.86	4149.50
Accomodation and food sevice activities	2.54	44.88	87.28	366.57	292.70	219.51	374.51	196.03	104.67	46.06	28.52	1.28	0.00	7.94	1772.49
Transportation and Storage	6.48	42.46	106.53	237.26	264.14	217.22	238.76	131.52	54.74	29.71	13.35	0.63	0.00	5.23	1348.03
Financial and Insurance activities	1.39	11.75	19.90	52.11	59.25	55.96	79.86	40.92	16.15	13.73	4.36	0.06	0.00	2.85	358.30
Real estate activities, Professional, Scientific and Technical activities	17.42	165.23	287.93	501.15	534.34	301.67	448.51	276.87	96.54	47.67	34.83	3.75	0.00	19.69	2735.58
Public administration and defence; Compulsory social security	0.21	1.43	2.72	6.01	6.05	4.73	7.16	3.46	1.33	0.99	0.45	0.01	0.00	0.23	34.78
Education	0.49	6.16	12.69	33.74	62.57	34.48	49.38	29.84	7.14	2.65	3.60	0.02	0.00	0.90	243.66
Human Health and social work activities	1.62	13.92	26.85	56.21	62.33	44.46	69.00	36.95	13.79	9.72	3.09	0.05	0.00	2.37	340.37
Other service activities	3.21	30.00	56.36	155.26	151.50	109.45	156.88	104.93	37.19	21.09	10.78	0.23	0.00	8.16	845.03
Total	92.36	742.46	1508.00	3439.22	3387.06	2444.32	3269.83	1849.87	746.36	374.82	229.09	8.99	0.00	107.82	18200.20

We know from the SRA that the total net import (both ROI and ROW) for the year 2001 is positive and equal to 4809.3, slightly greater than the one obtained as a residual, namely 4507 = 1719+2788. At this stage we are not able to re-determine the new level of current account balance, but it will be sorted out in the next section where the adjusting and balancing problems are treated.

8. New information and balancing

Operations carried out thus far use a mixture of different sources which, in some cases, are not linked to each other. For instance, HES has been carried out independently of SHIW, furthermore, in the RIO table some macro-variables, such as GDP and total households consumptions, are not consistent with the data reported in SRA. Therefore, the unbalanced SAM reported in the appendix is adjusted using the Cross-Entropy model (Robinson, Cattaneo and El-Said, 2001[8]). Looking at the unbalanced SAM, we can see that the main discrepancies occur in sectoral production and in the sector financial balance.

8.1. The CE model. The unbalanced SAM $t_{i,j}$, provides the prior distribution $\bar{a}_{i,j}$ and data on column sum x_j that we hypothesis to be measured with error. Then, according to Robinson, Cattaneo and El-Said (2001) the CE problem can be formalized as an equations system with variables measured with noises:

$$y_i = x_j + e_j \qquad (6)$$

where y_i is the sum in row and e_j is the errors terms. We know also that:

$$\sum_i a_{i,j}\ x_j = y_j \qquad (7)$$

[8] The CE model derives from the information theory developed by Shannon (1948) and from Theil's work (1967) which transposed Shannon's approach into economic problems. For more detail about the CE approach see Robinson, Cattaneo and El-Said (2000). They used a CE approach to estimate a consistent Macro-SAM for Mozambique, starting from inconsistent data estimated with error.

and $\sum_i a_{i,j} = 1$ with $0 < a_{i,j} \leq 1$ (8)

The error term e_j can be also seen as a weighted average of known constants v :

$$\sum_h w_{i,h} \ v_h = e_i \qquad (9)$$

where $w_{i,h}$ is an *h*-dimensional vector of weights treated as probability to be estimated. It means that $w_{i,h}$ has to satisfy the following constraints:

$$\sum_h w_{i,h} = 1 \text{ and } 0 < w_{i,h} \leq 1; \qquad (10)$$

the constant v_h is the *support set* for the error and is always selected to produce a symmetrical distribution around zero.

Now we can define a model in which the optimization problem is to find a set of **A**'s and **W**'s that minimize the following cross entropy equation:

$$H(A, W; \bar{A}, \bar{W}) = \left[\sum_i \sum_j a_{i,j} \ ln\left(\frac{a_{i,j}}{\bar{a}_{i,j}}\right)\right] + \left[\sum_i \sum_h w_{i,h} \ ln\left(\frac{w_{i,h}}{\bar{w}_{i,h}}\right)\right] \qquad (11)$$

subject to equations (6), (7), (8), (9) and (10).

In equation (11), $\bar{a}_{i,j}$ and $\bar{w}_{i,h}$ are the prior probabilities, whereas $a_{i,j}$ and $w_{i,h}$ are treated as probabilities to be estimated (posterior distribution). The object is to minimize the joint entropy distance *H* in order to get the matrix **A** and **W** close to their priors $\overline{A}$ and $\overline{W}$. It is worth remembering that in this CE model specification, we are assuming an error term in a variable (the error term is attached to the variable x_j) and not in an equation. In other words, the error in this model is due to the hypothesis that the sum in column x_j has been measured with noise rather than assuming a model that includes random noise through an error term in its equations (for an application see Golan and Vogel, 2000).

Considering *k* aggregate constraints and an n-by-n aggregator matrix *G*, we can include in the constraints set some information about the new SAM. We can write:

$$\sum_i \sum_j g_{i,j}^k \; t_{i,j} = \gamma^{\mathrm{k}} \tag{12}$$

where $t_{i,j}$ is the SAM transaction matrix and γ^{k} is the value of the aggregate constraints, that is, the new information we are adding to the CE. The aggregate macro data introduced in the model via equation (7) does not preserve the same values as those of the initial SAM (unbalanced). Basically we introduce new constraints into the model in order to adjust the figures to be consistent with the regional account data. This means that the explicit application of the CE approach on the Sardinia SAM is not only used as a simple balancing method, but is also an adjustment procedure to incorporate new information in order to produce a well defined scheme of data as close as possible to the official data.

The set of additional restrictions that constrain some sub-matrices of the SAM are reported in the table below. On the production side, the total GDP at factor cost and valued at market price, is constrained to the figures reported in SRA. On the demand side the total Household consumption, government consumption and investment demand are also restricted. The overall trade deficit (interregional and international) is constraint to the net import entry reported in SRA.

Table 9 - Macro Variable constraints

Value added at factor cost	24342.68
Net Indirect Taxes	3204.91
Gross regional product (market price)	27547.59
Household Consumption	18200.2
Government consumption	7662.10
Investment Demand	6403.50
Overall trade deficit	4809.28

In developing the CE model specified above, it is assumed that totals in the rows and columns, and the macro aggregates are inexact due to measurement errors. The error term in equation (4) is a weighted sum of a constant *v* where the set *h* defines the dimension of the support set for the error distribution and the number of weights that must be estimated for each error. As in Golan, Judge, and Miller (1996) and Robinson, Cattaneo and El-Said (2001), given the prior variance on the error term $\sigma^2 = \sum_h \bar{w}_{i,h}\ \bar{v}_h^2$ we define a domain for the support set of □□3 standard errors. By considering variance, skewness, and kurtosis the moments of the error distribution, in order to get a symmetric distribution around zero, both the vector of the prior weight and the vector of the support set should contains 5 elements (see, Golan, Judge, and Miller, 1996 and Robinson, Cattaneo and El-Said, 2001).

Once the prior distribution is determined, the CE is solved by minimizing equation (11) subject to equations (6), (7), (8), (9) and (10). The optimization problem yields the following posterior distributions:

$$a_{i,j} = \frac{\bar{a}_{i,j}\exp(\lambda_i y_j)}{\sum_i a_{i,j}\exp(\lambda_i y_j)}$$

and

$$w_{i,h} = \frac{\bar{w}_{i,h}\exp\ (\lambda_i v_h)}{\sum_{i,h} w_{i,h}\exp\ (\lambda_i v_h)}$$

where λ_i is the Lagrange multiplier and the denominator in both equations is a normalization factor (see Golan, Judge, and Miller, 1996 and Robinson, Cattaneo and El-Said, 2001).

9. Concluding remarks

An increasing number of countries have found the SAM framework useful for designing socio-economic policy. However there is still some resistance to the use of this useful integrated data framework at regional level.

This paper has detailed a process for constructing the SAM for Sardinia. We have combined different sources, including country specific features, describing how the different data might be integrated and adjusted. We faced a number of snags in the compilation of some specific sub-matrices since the actual system of regional accounts is still inadequate, especially the regional income accounts. We have endeavoured to produce a satisfactory solution for this which, however, is still not enough. Obviously, there is opportunity for improvement and further developments are needed.

Table A1- *The Input-Output Table of Sardinia (2001)*

ESA95 NACE rev.1 code (Millions of euros)

	Agricolture and forestry	Fishing and fishing activities	Mining and Quarrying	Mining and Quarrying n.e.c.	Manufacture of food products, beverages and tabacco	Manufacture of textiles and wearing appareal	Manufacture of leather and related products	Manufacture of wood and wood products	Manufacture of paper and paper products	Manufacture of coke and refined petroelum products	Manufacture of chemicals and pharmaceutical	Manufacture of rubber and plastic products	Manufacture of other non-metallic mineral products	Manufacture of fabricated metal products, except machinery and equipment	Manufacture of machinery and equipment	Manufacture of eletrical equipment
Agricolture and forestry	186.8	0.0	0.0	0.0	459.2	8.4	0.2	4.9	1.3	0.1	5.1	1.2	1.3	0.3	0.1	0.1
Fishing and fishing activities	0.0	0.2	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Mining and Quarrying	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	1010.1	0.4	0.0	3.1	1.5	0.0	0.0
Mining and Quarrying n.e.c.	0.1	0.0	0.0	22.6	1.0	0.0	0.0	0.1	0.9	2.9	13.0	0.0	44.5	12.7	0.0	0.6
Manufacture of food products, beverages and tabacco	129.7	1.4	0.0	0.0	353.1	0.1	2.7	0.1	0.2	0.0	27.7	0.1	0.0	0.0	0.0	0.0
Manufacture of textiles and wearing appareal	0.7	1.7	0.0	0.0	2.7	146.6	0.4	0.2	1.6	0.1	1.7	2.7	0.8	1.2	0.3	0.5
Manufacture of leather and related products	0.3	0.0	0.0	0.0	0.5	1.7	3.7	0.1	0.1	0.0	0.5	0.3	0.0	0.2	0.1	0.2
Manufacture of wood and wood products	0.3	0.2	0.0	0.6	4.6	0.8	0.1	180.2	0.5	0.0	2.6	0.8	5.5	3.9	0.9	1.4
Manufacture of paper and paper products	0.5	0.2	0.0	0.9	28.3	1.8	0.3	3.1	102.5	0.6	34.6	3.4	12.8	8.4	4.3	5.2
Manufacture of coke and refined petroelum products	19.6	2.1	0.0	7.1	3.7	1.4	0.1	2.2	0.5	225.7	39.0	0.7	9.2	25.0	1.1	0.9
Manufacture of chemicals and pharmaceutical	51.6	0.4	0.0	8.6	7.8	22.8	0.8	10.7	14.3	19.1	430.9	50.3	22.5	29.8	5.3	11.7
Manufacture of rubber and plastic products	1.9	0.4	0.0	1.5	23.6	2.4	1.3	4.2	2.3	0.4	26.0	17.5	6.3	6.6	14.4	17.8
Manufacture of other non-metallic mineral products	2.8	0.1	0.0	20.4	29.6	0.1	0.0	4.7	0.4	2.1	36.6	1.0	105.9	24.8	1.9	7.7
Manufacture of fabricated metal products, except machinery and equipment	2.0	1.2	0.0	1.2	14.6	1.4	0.7	12.3	2.0	7.4	13.2	5.4	16.1	269.4	108.5	60.9
Manufacture of machinery and equipment	1.4	0.0	0.0	5.3	8.1	1.6	0.1	2.4	2.0	6.1	7.6	1.1	6.1	11.0	61.6	6.8
Manufacture of eletrical equipment	0.3	0.9	0.0	1.7	2.9	0.8	0.0	1.0	0.9	3.8	6.2	1.2	3.4	8.4	26.5	108.5
Manufacture of transport equipment	1.3	1.3	0.0	2.2	1.7	0.1	0.0	0.2	0.1	0.2	0.3	0.2	0.7	0.7	1.7	0.3
Other manufacturing	0.0	0.0	0.0	0.1	0.6	2.6	0.0	2.1	1.5	0.4	1.1	0.5	3.5	33.6	0.9	1.1
Electricity, Gas and water supply	32.4	2.6	0.0	19.3	39.4	21.5	0.4	16.1	11.7	38.7	71.9	11.6	59.5	70.4	8.3	8.2
Construction	0.5	0.0	0.0	0.6	2.4	0.8	0.0	2.3	1.0	3.4	4.2	0.7	4.7	7.5	1.2	2.2
Wholesale and Retail trade; Repair of Motor vehicles and motorcycles	65.4	1.7	0.0	13.6	185.7	22.5	2.4	19.7	22.3	53.0	77.3	7.2	39.4	69.4	19.4	24.3
Accomodation and food sevice activities	0.2	0.0	0.0	0.5	2.1	0.6	0.0	1.0	0.6	5.3	11.1	0.5	3.7	5.1	2.5	4.0
Transporation and storage	21.1	1.2	0.0	10.6	82.7	11.1	0.7	15.9	12.4	48.8	82.8	9.1	35.7	69.5	27.9	23.7
Financial and Insurance activities	34.3	1.1	0.0	2.4	19.6	6.5	0.3	12.6	3.9	14.4	14.3	1.8	8.0	23.3	9.4	8.5
Scientific research and development	3.1	0.3	0.0	17.3	63.7	20.7	1.2	20.1	21.4	16.1	87.0	7.7	36.6	62.8	32.7	41.8
Public administration and defence; Compulsory social security	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Education	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Human healt services	1.4	0.0	0.0	0.1	0.4	0.1	0.0	0.1	0.1	0.1	0.3	0.1	0.1	0.3	0.1	0.1
Other service activities	4.3	0.0	0.0	0.7	18.3	4.2	0.2	1.5	2.8	2.1	16.1	0.9	2.6	5.8	2.6	2.5
Real estate activity	0.2	0.1	0.0	7.8	6.9	4.6	0.1	2.6	6.0	3.2	13.0	1.9	7.1	8.1	5.1	5.9
Total intermediates	562.2	17.1	0.0	145.1	1364.5	285.3	15.7	320.4	213.3	1464.1	1024.7	127.9	439.1	759.7	336.8	344.9
Value added at factor cost	1052.4	62.7	0.8	128.6	441.4	135.2	5.0	178.9	109.8	163.8	426.7	61.1	260.2	261.5	155.6	179.0
Indirect taxes on production	0.0	6.5	0.0	3.4	290.7	0.8	0.0	1.2	0.9	643.5	3.9	0.3	1.7	0.0	1.4	1.6
Production subsidies	-96.8	-6.3	0.0	-2.9	-40.8	-0.7	0.0	-1.0	-1.0	0.0	-2.4	-0.3	-1.4	-4.2	-1.6	-1.2
Value added tax	12.7	2.5	0.4	0.1	128.4	53.1	22.2	4.5	29.8	81.0	53.2	9.8	5.3	13.2	24.8	20.2
Secondary production	-106.1	0.0	0.0	-0.1	62.2	-0.1	0.0	-0.1	-0.4	-4.3	-0.1	0.4	-0.4	-4.1	-0.8	-2.3
Interregional import	198.6	5.6	200.0	5.8	1159.9	575.8	145.6	105.9	483.7	287.8	494.9	156.7	327.7	545.5	383.1	548.8
International import	151.9	13.7	1024.3	31.1	384.6	171.4	76.7	56.9	68.7	163.8	488.6	92.7	50.5	316.2	329.7	600.5
Indirect taxes on international imports	3.4	0.1	0.4	0.0	13.7	7.9	3.0	0.2	0.3	16.1	5.7	1.3	0.8	1.1	3.3	20.3
Total	1778.3	101.9	1225.9	311.1	3804.6	1228.7	268.2	666.9	905.1	2815.8	2495.2	449.9	1083.5	1888.9	1232.3	1711.8

	Manufacture of transport equipment	Other manufacturing	Electricity, Gas and water supply	Construction	Wholesale and Retail trade; Repair of Motor vehicles and motorcycles	Accomodation and food sevice activities	Transporation and storage	Financial and Insurance activities	Scientific research and development	Public administration and defence; Compulsory social security	Education	Human healt services	Other service activities	Real estate activity	Total Intermediate	Households consumption	Government consumption	Gross fixed capital formation	Financial Intermediary Services Indirectly Measured	Changes in inventories and valuables	Interregional Export	International Export	Total
Agricolture and forestry	0.1	0.3	0.2	0.6	0.5	43.9	1.4	0.0	0.2	0.9	2.8	6.2	2.0	0.2	728.3	293.9	0.5	4.4	0.0	-6.5	752.5	5.1	1778.2
Fishing and fishing activities	0.0	0.1	0.0	0.0	0.0	2.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	4.0	52.2	0.0	0.5	0.0	0.0	44.3	1.1	102.1
Mining and Quarrying	0.0	0.0	196.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	1211.6	0.0	0.0	0.0	0.0	13.7	0.0	0.0	1225.3
Mining and Quarrying n.e.c.	0.0	1.3	0.1	25.2	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	125.6	0.4	0.0	0.0	0.0	0.0	167.1	17.7	310.8
Manufacture of food products, beverages and tabacco	0.0	0.0	0.0	0.0	0.0	361.7	4.9	0.0	0.4	3.0	8.0	18.4	3.7	0.0	915.2	1803.3	4.5	0.0	0.0	-8.7	945.0	145.2	3804.5
Manufacture of textiles and wearing appareal	0.4	1.9	0.1	2.7	4.0	3.4	3.4	0.2	3.8	1.9	0.7	6.7	3.8	0.2	194.4	778.3	0.0	6.9	0.0	-19.8	250.6	18.1	1228.5
Manufacture of leather and related products	0.0	0.9	0.0	0.3	2.8	0.0	0.2	0.2	0.1	1.7	0.1	0.3	0.4	0.0	14.7	252.3	0.0	3.1	0.0	-3.3	0.0	1.4	268.2
Manufacture of wood and wood products	0.8	25.2	0.0	68.8	4.4	3.6	1.7	0.0	0.4	3.2	0.9	0.2	2.7	1.5	315.8	44.4	0.0	5.8	0.0	-1.8	272.7	29.6	666.5
Manufacture of paper and paper products	0.5	1.5	2.3	14.4	97.1	13.4	39.0	23.4	57.1	42.6	7.1	8.7	16.1	4.5	534.6	202.5	0.0	3.1	0.0	-1.7	160.0	6.4	904.9
Manufacture of coke and refined petroelum products	0.2	0.4	83.6	21.8	129.9	11.6	193.7	6.5	34.2	20.1	3.3	20.3	9.0	9.0	881.9	431.2	0.0	0.0	0.0	-22.4	294.7	1230.3	2815.7
Manufacture of chemicals and pharmaceutical	1.4	7.7	36.9	33.4	21.0	9.8	5.6	2.1	14.6	14.0	4.5	390.6	21.4	2.1	1251.7	288.6	0.0	0.0	0.0	-17.8	672.8	300.4	2495.7
Manufacture of rubber and plastic products	3.5	2.6	2.1	42.4	25.0	2.5	46.0	6.1	16.2	2.8	1.6	5.9	6.1	1.9	291.3	57.9	0.0	3.5	0.0	-3.4	81.0	19.7	450.0
Manufacture of other non-metallic mineral products	0.8	1.7	2.7	503.9	1.9	7.4	1.7	0.0	0.7	1.5	1.8	1.3	5.6	2.4	771.5	70.4	0.0	15.4	0.0	0.1	210.4	15.8	1083.6
Manufacture of fabricated metal products, except machinery and equipment	13.4	22.3	9.1	279.5	31.0	1.7	7.7	1.2	2.9	12.8	3.8	5.0	3.5	9.2	919.4	32.8	0.0	182.0	0.0	0.5	543.8	210.6	1889.1
Manufacture of machinery and equipment	4.2	1.0	9.7	30.7	22.8	3.7	16.4	1.2	7.0	21.0	2.6	3.8	7.4	3.4	256.1	125.1	0.0	684.0	0.0	-23.8	138.0	52.8	1232.2
Manufacture of eletrical equipment	5.3	1.2	15.2	101.2	59.2	3.5	46.1	2.6	37.5	8.2	5.1	38.2	7.4	1.6	498.8	213.1	0.0	702.6	0.0	-5.1	285.4	16.6	1711.4
Manufacture of transport equipment	14.8	0.0	0.1	0.0	76.1	0.0	93.3	0.0	3.8	69.7	0.3	0.1	5.6	1.7	276.5	512.5	0.0	640.9	0.0	-3.6	36.1	8.8	1471.2
Other manufacturing	0.2	9.9	0.2	1.8	14.6	0.8	1.5	2.6	3.3	4.1	2.6	3.9	1.2	0.3	95.0	306.1	0.0	122.1	0.0	-25.5	40.9	3.6	542.2
Electricity, Gas and water supply	1.1	5.1	266.2	24.7	133.7	61.6	48.1	12.9	27.8	57.1	23.5	42.5	24.8	19.8	1160.9	664.5	5.1	0.0	0.0	0.0	39.5	0.0	1870.0
Construction	0.5	0.2	121.0	414.8	19.1	6.6	36.2	6.2	26.7	53.2	9.2	29.2	6.4	116.8	877.6	25.2	0.0	2845.4	0.0	0.0	21.1	0.4	3769.7
Wholesale and Retail trade; Repair of Motor vehicles and motorcycles	4.6	8.9	23.0	66.6	174.5	94.3	92.8	11.9	23.9	38.1	12.6	75.1	17.7	11.2	1278.5	4061.9	0.0	382.7	0.0	0.0	44.0	180.2	5947.3
Accomodation and food sevice activities	0.6	0.6	5.4	18.6	25.7	2.9	44.1	8.5	58.6	12.8	1.5	17.4	7.2	2.1	243.2	1676.5	2.3	0.0	0.0	0.0	2.6	0.0	1924.6
Transporation and storage	3.7	7.0	17.6	107.4	209.5	38.4	473.2	91.2	153.9	98.0	15.7	51.7	43.3	13.2	1777.0	1244.2	24.9	111.4	0.0	0.0	210.7	413.9	3782.1
Financial and Insurance activities	0.7	11.4	5.2	48.6	170.0	5.2	78.0	377.2	86.0	44.4	3.1	14.8	21.1	56.4	1082.5	354.8	0.0	0.0	969.6	0.0	74.1	15.6	2496.6
Scientific research and development	6.3	8.4	26.9	176.0	706.9	71.9	194.9	347.0	585.0	203.8	30.4	199.0	166.7	158.2	3313.9	122.0	152.6	334.9	0.0	0.0	109.1	8.1	4040.6
Public administration and defence; Compulsory social security	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.8	2822.9	0.0	0.0	0.0	287.8	0.0	3140.5
Education	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	220.2	1905.4	0.0	0.0	0.0	3.9	0.0	2129.5
Human healt services	0.0	0.0	0.0	1.5	3.2	0.5	0.5	1.4	0.8	3.7	0.0	509.8	2.0	0.1	526.8	313.3	2220.4	0.0	0.0	0.0	4.8	0.0	3065.3
Other service activities	0.5	0.6	9.0	11.3	59.6	13.5	17.3	17.8	148.4	110.9	22.5	91.1	231.6	27.8	826.5	783.8	250.7	20.7	0.0	-0.1	12.2	0.7	1894.5
Real estate activity	0.6	2.0	6.4	23.7	302.0	30.5	78.0	62.2	172.0	21.4	16.6	52.7	58.4	19.3	918.4	2578.6	0.0	103.3	0.0	0.0	2.1	53.8	3656.2
Total intermediates	64.2	122.2	839.3	2019.9	2294.9	794.5	1525.8	982.4	1465.3	850.9	180.3	1593.1	675.1	463.0	21291.7	17539.8	7389.3	6172.7	969.6	-129.2	5707.2	2755.9	61697.0
Value added at factor cost	26.8	63.8	794.8	1483.3	3327.4	1002.2	1752.8	1030.8	2047.4	2153.4	1944.2	1465.7	904.4	2961.4	24581.1								
Indirect taxes on production	1.7	0.5	109.2	42.1	0.0	1.6	0.0	72.3	121.4	0.0	2.6	0.0	212.1	0.3	1519.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3039.4
Production subsidies	-1.5	-0.3	-20.9	0.0	-70.3	0.0	-121.4	0.0	0.0	0.0	0.0	-2.4	0.0	0.0	-377.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-754.8
Value added tax	22.9	40.1	83.5	192.5	397.3	123.8	135.7	39.7	94.8	0.0	0.3	4.6	81.5	25.1	1703.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3406.0
Secondary production	-0.1	0.0	13.0	-1.1	-99.4	0.0	-3.5	-5.0	46.0	-7.2	-1.9	-0.6	-0.6	116.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Interregional import	500.9	242.0	32.7	21.2	74.1	2.5	205.8	343.8	210.4	143.2	4.0	5.1	12.3	2.9	7426.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14852.6
International import	813.4	71.2	17.5	12.0	23.5	0.0	287.0	32.5	54.8	0.0	0.0	0.0	9.8	87.8	5430.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10861.6
Indirect taxes on international imports	42.8	2.8	0.4	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	123.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	247.8
Total	1471.1	542.3	1869.5	3769.9	5947.5	1924.6	3782.2	2496.7	4040.2	3140.3	2129.5	3065.5	1894.6	3657.2	61699.2	17539.8	7389.3	6172.7	969.6	-129.2	5707.2	2755.9	

Table A2. - *Sardinia Bridge Matrix for the year 2001*

	Generi alimentari e bevande non alcolich	Bevande Alcoliche tabacco e narcotici	Vestiario e calzature	Abitazione energia e combustibili	Mobili ed elettrodomestici	Salute	Trasporti	Comunicazioni	Ricreazione e cultura	Istruzione	Ristoranti e Alberghi	Altri beni e servizi	Totals
Agricolture, hunting, forestry and logging	27.23	293.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	320.30
Fishing and aquaculture	56.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	56.31
Mining and Quarrying	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69
Manufacture of food products, beverages and tabacco	1738.61	173.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1911.64
Manufacture of textiles and wearing appareal	780.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	780.46
Manufacture of leather and related products	254.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	254.22
Manufacture of paper and paper products ; manufacture of articles of straw and plaiting materials	0.00	0.00	0.00	0.96	0.00	0.00	0.00	0.00	207.64	0.00	0.00	0.00	208.60
Manufacture of coke, refined petroleum products, chemicals and pharmaceutical	0.00	0.00	0.00	151.64	145.19	23.06	0.00	0.00	16.73	0.00	0.00	388.20	724.83
Manufacture of other non-metallic mineral products	0.00	0.00	0.00	0.00	66.96	0.00	0.00	0.00	0.00	0.00	0.00	5.04	72.00
Manufacture of fabricated metal products, except machinery and equipment	7.50	7.49	0.00	0.00	0.00	0.00	0.00	0.00	7.58	0.00	0.00	12.91	35.48
Manufacture of computer, electronic and optical products , machinery and equipment , transport equipment	0.00	0.00	0.00	0.00	162.84	338.75	0.00	0.00	342.59	0.00	0.00	14.39	858.57
Manufacture of wood, rubber, plastic products and other manufacturing	7.35	7.33	0.00	8.90	0.00	13.50	58.29	0.00	250.55	0.00	0.00	73.38	419.29
Electricity, Gas and water supply	7.28	0.00	0.00	695.11	0.00	0.00	2.16	0.00	0.00	0.00	0.00	0.00	704.56
Construction	0.00	0.00	0.00	25.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.52
Wholesale and Retail trade; Repair of Motor vehicles and motorcycles	7.45	7.43	1446.29	0.00	924.92	0.00	1738.80	5.09	12.85	0.00	0.00	6.67	4149.50
Accomodation and food sevice activities	45.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1727.30	0.00	1772.49
Transportation and Storage	7.34	7.33	0.00	0.00	0.00	0.00	658.64	479.71	195.01	0.00	0.00	0.00	1348.03
Financial and Insurance activities	7.35	7.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	343.62	358.30
Real estate activities, Professional, Scientific and Technical activities	0.00	0.00	0.00	2591.01	0.00	0.00	20.00	0.00	15.65	0.00	0.00	108.92	2735.58
Public administration and defence; Compulsory social security	7.34	7.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.12	34.78
Education	7.31	7.30	0.00	0.00	0.00	0.00	34.81	0.00	39.94	154.30	0.00	0.00	243.66
Human Health and social work activities	7.48	7.47	0.00	0.00	0.00	103.72	0.00	0.00	18.48	0.00	0.00	203.22	340.37
Other service activities	0.00	0.00	22.11	117.96	370.09	10.27	0.00	0.00	19.97	0.00	0.00	304.63	845.03
Totals	2969.10	525.10	1468.40	3591.10	1670.00	489.30	2512.70	484.80	1127.00	154.30	1727.30	1481.10	18200.20

Table A3 – *Unbalanced SAM*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1.0 Agricolture, hunting, forestry and logging	174.5	0.0	0.0	475.0	8.4	0.2	1.3	5.2	1.3	0.3	0.3	6.4	0.2	0.6	0.5	43.9	1.4	0.0	0.4	0.9	2.8	6.2	2.0
2.0 Fishing and aquaculture	0.0	0.2	0.0	1.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	2.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0
3.0 Mining and Quarrying	0.1	0.0	22.6	1.0	0.1	0.0	0.9	1023.7	47.6	14.1	0.6	1.4	198.0	25.2	0.4	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0
4.0 Manufacture of food products, beverages and tabacco	121.2	1.4	0.0	365.3	0.1	2.7	0.2	27.7	0.0	0.0	0.0	0.2	0.0	0.0	0.0	361.7	4.9	0.0	0.4	3.0	8.0	18.4	3.7
5.0 Manufacture of textiles and wearing appareal	0.7	1.7	0.0	2.8	146.6	0.4	1.6	1.8	0.8	1.2	1.2	4.8	0.1	2.7	3.9	3.4	3.4	0.2	4.1	1.9	0.7	6.7	3.8
6.0 Manufacture of leather and related products	0.3	0.0	0.0	0.5	1.7	3.7	0.1	0.5	0.0	0.2	0.3	1.3	0.0	0.3	2.8	0.0	0.2	0.2	0.1	1.7	0.1	0.3	0.4
7.0 Manufacture of paper and paper products ; manufacture of articles of straw and plaiting materials	0.5	0.2	0.9	29.3	1.8	0.3	102.4	35.2	12.8	8.4	10.0	8.0	2.3	14.4	95.4	13.4	39.0	23.3	62.5	42.5	7.1	8.7	16.1
8.0 Manufacture of coke, refined petroleum products, chemicals and pharmaceutical	66.5	2.5	15.7	11.9	24.2	0.9	14.8	714.0	31.7	54.6	20.5	72.1	121.5	55.2	148.2	21.4	199.1	8.6	60.9	34.0	7.8	410.8	30.4
9.0 Manufacture of other non-metallic mineral products	2.6	0.1	20.4	30.6	0.1	0.0	0.4	38.7	105.8	24.7	10.4	7.4	2.7	503.7	1.9	7.4	1.7	0.0	3.2	1.5	1.8	1.3	5.6
10.0 Manufacture of fabricated metal products, except machinery and equipment	1.9	1.2	1.2	15.1	1.4	0.7	2.0	20.6	16.1	268.3	182.3	40.0	9.2	279.4	30.5	1.7	7.7	1.2	12.5	12.8	3.8	5.0	3.5
11.0 Manufacture of computer, electronic and optical products , machinery and equipment , transport equipment	2.8	2.2	9.2	13.1	2.5	0.1	3.0	24.2	10.2	20.0	229.0	8.3	25.2	131.9	155.3	7.2	155.6	3.8	55.9	98.7	8.0	42.1	20.4
12.0 Manufacture of wood, rubber, plastic products and other manufacturing	2.1	0.6	2.2	29.8	5.8	1.4	4.3	30.5	15.3	43.9	40.9	243.0	2.3	113.0	43.2	6.9	49.1	8.7	24.0	10.1	5.1	10.0	10.0
13.0 Electricity, Gas and water supply	30.3	2.6	19.3	40.8	21.5	0.4	11.7	110.5	59.5	70.1	17.5	32.8	268.3	24.7	131.3	61.6	48.0	12.9	48.6	57.0	23.5	42.5	24.8
14.0 Construction	0.5	0.0	0.6	2.5	0.8	0.0	1.0	7.6	4.7	7.5	3.9	3.2	122.0	414.7	18.8	6.6	36.2	6.2	147.8	53.1	9.2	29.2	6.4
15.0 Wholesale and Retail trade; Repair of Motor vehicles and motorcycles	61.1	1.7	13.6	192.1	22.5	2.4	22.3	130.2	39.4	69.1	48.2	35.8	23.2	66.6	171.4	94.3	92.7	11.9	35.8	38.0	12.6	75.1	17.7
16.0 Accomodation and food sevice activities	0.2	0.0	0.5	2.2	0.6	0.0	0.6	16.4	3.7	5.1	7.1	2.1	5.4	18.6	25.2	2.9	44.1	8.5	61.5	12.8	1.5	17.4	7.2
17.0 Transportation and Storage	19.7	1.2	10.6	85.5	11.1	0.7	12.4	131.5	35.7	69.2	55.1	32.0	17.7	107.4	205.8	38.4	472.7	91.0	169.6	97.8	15.7	51.7	43.3
18.0 Financial and Insurance activities	70.8	3.6	7.5	38.3	11.8	0.5	8.2	51.9	18.3	33.5	32.8	37.8	36.8	107.1	295.9	44.7	147.0	416.8	348.1	129.0	79.7	72.6	56.8
19.0 Real estate activities, Professional, Scientific and Technical activities	3.1	0.4	25.1	73.0	25.3	1.3	27.4	119.2	43.7	70.6	92.1	42.7	33.6	199.6	991.1	102.4	272.6	408.2	950.5	224.7	47.0	251.7	225.0
20.0 Public administration and defence; Compulsory social security	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21.0 Education	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22.0 Human Health and social work activities	1.3	0.0	0.1	0.4	0.1	0.0	0.1	0.4	0.1	0.3	0.2	0.2	0.0	1.5	3.1	0.5	0.5	1.4	0.9	3.7	0.0	509.7	2.0
23.0 Other service activities	4.0	0.0	0.7	18.9	4.2	0.2	2.8	18.2	2.6	5.8	5.6	3.0	9.1	11.3	58.5	13.5	17.3	17.8	179.1	110.6	22.5	91.1	231.5
24.0 Wages and Salaries	224.9	39.3	58.1	125.3	48.0	2.2	34.3	169.6	75.4	150.7	156.2	88.6	171.3	509.4	754.8	449.0	756.9	309.7	643.0	1061.6	1057.4	901.1	490.5
25.0 Employers' Social Contributions	49.0	8.6	26.3	49.0	12.9	0.5	14.6	62.5	30.2	60.8	57.7	28.5	68.9	178.2	209.5	72.2	221.1	137.9	156.2	494.4	493.4	303.2	90.6
26.0 Operating Surplus	707.1	16.9	48.4	302.3	50.8	6.1	48.8	168.0	96.7	124.6	138.0	139.8	567.1	759.2	2283.8	645.4	955.4	336.1	3752.8	985.3	255.7	578.9	271.9
27.0 Indirect tax on production	0.0	6.5	3.4	290.7	0.8	0.0	0.9	647.4	1.7	0.0	4.7	2.0	109.2	42.1	0.0	1.6	0.0	72.3	121.7	0.0	2.6	0.0	212.1
28.0 Subsidies on production	-96.8	-6.3	-2.9	-40.8	-0.7	0.0	-1.0	-2.4	-1.4	-4.2	-4.3	-1.6	-20.9	0.0	-70.3	0.0	-121.4	0.0	0.0	0.0	0.0	-2.4	0.0
29.0 Iva	12.7	2.5	0.5	128.4	53.1	22.2	29.8	134.2	5.3	13.2	67.9	54.4	83.5	192.5	397.3	123.8	135.7	39.7	119.9	0.0	0.3	4.6	81.5
30A H1																							
30B H2																							
30C H3																							
30D H4																							
30E H5																							
30F H6																							
30G H7																							
30H H8																							
30I H9																							
30L H10																							
30M H11																							
30N H12																							
30O H13																							
30P H14																							
31.0 Firms																							
32.0 Government																							
33.0 Capital Formation																							
34.0 Indirect tax on imports	3.4	0.1	0.4	13.7	7.9	3.0	0.3	21.8	0.8	1.1	66.4	4.3	0.4	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0
35.0 ROC	198.6	5.6	205.8	1159.9	575.8	145.6	483.7	782.7	327.7	545.5	1432.8	504.6	32.7	21.2	74.1	2.5	205.8	343.8	213.3	143.2	4.0	5.1	12.3
36.0 ROW	151.9	13.7	1055.4	384.6	171.4	76.7	68.7	652.4	50.5	316.2	1743.6	220.8	17.5	12.0	23.5	0.0	287.0	32.5	142.6	0.0	0.0	0.0	9.8
Total columns	1814.8	106.5	1545.5	3842.6	1210.6	272.2	897.5	5144.4	1036.0	1974.9	4421.0	1624.1	1907.3	3792.4	6055.9	2128.5	4033.7	2292.7	7315.4	3618.1	2070.2	3441.1	1879.2
Total rows	1807.8	106.1	1537.3	3923.8	1243.6	270.3	910.9	5355.0	1085.2	1891.5	4422.2	1669.8	1909.3	3770.3	6034.1	2020.9	3885.2	2498.0	7729.1	3145.3	2153.0	3092.5	1957.0
Differences (column-row)	7.1	0.4	8.2	-81.2	-33.0	1.9	-13.5	-210.6	-49.2	83.3	-1.1	-45.7	-2.1	22.1	21.8	107.6	148.6	-205.4	-413.7	472.8	-82.8	348.6	-77.8

	24	25	26	27	28	29	H_1	H_2	H_3	H_4	H_5	H_6	H_7	H_8	H_9	H_10	H_11	H_12	H_13	H_14	31	32	33	34	35	36	Total
1.0 Agricolture, hunting, forestry and logging							3.4	16.4	36.1	66.7	61.5	29.3	62.7	25.9	7.1	3.9	5.6	0.2	0.0	1.6		0.5	0.0		750.0	5.1	1807.8
2.0 Fishing and aquaculture							0.5	3.2	6.3	12.5	10.2	6.9	9.1	4.1	1.9	0.8	0.6	0.0	0.0	0.2		0.0	0.5		44.2	1.1	106.1
3.0 Mining and Quarrying							0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	15.4		167.4	17.7	1537.3
4.0 Manufacture of food products, beverages and tabacco							15.9	108.5	215.5	422.2	348.5	227.8	313.9	139.3	62.8	27.4	20.6	0.7	0.0	8.5		4.5	0.0		943.8	145.0	3923.8
5.0 Manufacture of textiles and wearing appareal							6.3	44.8	88.0	173.5	141.5	95.4	125.5	56.2	26.6	11.3	7.8	0.3	0.0	3.5		0.0	0.0		250.7	18.1	1243.6
6.0 Manufacture of leather and related products							2.1	14.6	28.7	56.5	46.1	31.1	40.9	18.3	8.7	3.7	2.6	0.1	0.0	1.1		0.0	0.0		0.0	1.4	270.3
7.0 Manufacture of paper and paper products ; manufacture of articles of straw and plaiting materials							1.2	4.5	10.5	30.5	36.8	40.9	39.5	22.6	7.0	9.3	2.9	0.1	0.0	2.8		0.0	1.4		160.2	6.4	910.9
8.0 Manufacture of coke, refined petroleum products, chemicals and pharmaceutical							3.1	28.0	50.1	122.3	128.5	98.5	142.1	84.9	31.1	20.9	8.8	0.3	0.0	6.3		0.0	0.0		969.5	1533.4	5355.0
9.0 Manufacture of other non-metallic mineral products							0.2	2.2	4.5	15.3	13.2	8.1	11.9	10.1	3.3	1.2	0.9	0.0	0.0	0.9		0.0	15.5		210.0	15.8	1085.2
10.0 Manufacture of fabricated metal products, except machinery and equipment							0.2	1.4	2.8	6.2	6.3	5.1	7.0	3.5	1.3	1.0	0.5	0.0	0.0	0.3		0.0	182.7		544.5	210.9	1891.5
11.0 Manufacture of computer, electronic and optical products , machinery and equipment , transport equipment							4.5	33.1	72.3	157.4	167.5	110.6	150.5	95.4	30.9	20.7	7.7	0.2	0.0	8.0		0.0	1996.8		459.9	78.2	4422.2
12.0 Manufacture of wood, rubber, plastic products and other manufacturing							2.1	11.2	25.3	64.2	74.9	74.9	80.9	45.0	15.6	15.5	5.3	0.1	0.0	4.2		0.0	100.8		394.7	52.9	1669.8
13.0 Electricity, Gas and water supply							4.6	43.6	76.1	130.8	138.5	75.8	113.6	70.6	24.5	11.5	9.0	1.0	0.0	5.0		5.1	0.0		39.5	0.0	1909.3
14.0 Construction							0.2	1.6	2.8	4.7	5.0	2.7	4.1	2.6	0.9	0.4	0.3	0.0	0.0	0.2		0.0	2841.0		21.1	0.4	3770.3
15.0 Wholesale and Retail trade; Repair of Motor vehicles and motorcycles							14.8	113.5	288.7	768.0	775.6	649.7	744.1	451.0	193.2	75.4	57.5	0.0	0.0	17.9		0.0	382.8		44.0	180.2	6034.1
16.0 Accomodation and food sevice activities							2.5	44.9	87.3	366.6	292.7	219.5	374.5	196.0	104.7	46.1	28.5	1.3	0.0	7.9		2.3	0.0		2.6	0.0	2020.9
17.0 Transportation and Storage							6.5	42.5	106.5	237.3	264.1	217.2	238.8	131.5	54.7	29.7	13.3	0.6	0.0	5.2		24.9	111.5		210.8	414.2	3885.2
18.0 Financial and Insurance activities							1.4	11.8	19.9	52.1	59.2	56.0	79.9	40.9	16.2	13.7	4.4	0.1	0.0	2.9		0.0	0.0		74.6	15.7	2498.0
19.0 Real estate activities, Professional, Scientific and Technical activities							17.4	165.2	287.9	501.2	534.3	301.7	448.5	276.9	96.5	47.7	34.8	3.8	0.0	19.7		152.4	438.0		111.1	62.0	7729.1
20.0 Public administration and defence; Compulsory social security							0.2	1.4	2.7	6.0	6.1	4.7	7.2	3.5	1.3	1.0	0.4	0.0	0.0	0.2		2822.7	0.0		287.8	0.0	3145.3
21.0 Education							0.5	6.2	12.7	33.7	62.6	34.5	49.4	29.8	7.1	2.7	3.6	0.0	0.0	0.9		1905.4	0.0		3.9	0.0	2153.0
22.0 Human Health and social work activities							1.6	13.9	26.8	56.2	62.3	44.5	69.0	36.9	13.8	9.7	3.1	0.0	0.0	2.4		2220.8	0.0		4.8	0.0	3092.5
23.0 Other service activities							3.2	30.0	56.4	155.3	151.5	109.5	156.9	104.9	37.2	21.1	10.8	0.2	0.0	8.2		250.3	20.6		12.2	0.7	1957.0
24.0 Wages and Salaries																											8277.3
25.0 Employers' Social Contributions																											2826.2
26.0 Operating Surplus																											13239.2
27.0 Indirect tax on production																											1519.7
28.0 Subsidies on production																											-377.4
29.0 Iva																											1703.0
30A H1	12.7	36.2	4.3				0.0														0.5	1.1				0.1	54.9
30B H2	325.8	365.9	111.3					3.8													36.2	92.1				4.6	939.8
30C H3	554.6	605.4	189.4						23.8												228.3	580.7				29.1	2211.2
30D H4	888.7	1844.5	303.4							36.8											353.1	898.0				45.1	4369.7
30E H5	906.2	1202.2	309.4								28.0										268.3	682.4				34.2	3430.9
30F H6	1283.9	1040.0	438.4									17.5									167.8	426.8				21.4	3395.8
30G H7	1760.1	1849.9	601.0										30.0								287.2	730.4				36.6	5295.2
30H H8	1080.6	991.3	368.9											14.1							135.5	344.6				17.3	2952.4
30I H9	759.7	410.4	259.4												4.3						41.4	105.2				5.3	1585.7
30L H10	365.9	335.7	124.9													2.8					26.4	67.3				3.4	926.4
30M H11	228.3	337.3	78.0														1.7				16.3	41.4				2.1	705.2
30N H12	59.9	47.5	20.5															0.5			4.7	11.9				0.6	145.6
30O H13	0.0	0.0	0.0																0.0		0.0	0.0				0.0	0.0
30P H14	50.8	309.3	17.3																	1.3	12.0	30.5				1.5	422.8
31.0 Firms			3708.9				0.3	5.8	16.6	30.9	24.0	21.8	34.5	18.7	9.4	5.6	4.2	0.9	0.0	2.6	117.5	337.9	0.0	0.0	0.0	33.5	4373.2
32.0 Government			154.5	1519.7	-377.4	1703.0	11.5	215.2	610.9	1140.1	886.2	802.6	1272.8	690.9	346.4	205.0	154.0	32.6	0.0	95.0	356.6	3323.2		123.9	0.0	49.2	13315.8
33.0 Capital Formation							-49.5	-31.4	40.8	-298.2	-910.5	95.0	665.0	366.2	472.9	334.5	313.4	102.1	0.0	214.4	2263.3	-2979.0	0.0	0.0	1719.0	2788.3	5106.5
34.0 Indirect tax on imports																					0.0	0.0	0.0	0.0	0.0	0.0	123.9
35.0 ROC																					0.0	0.0	0.0	0.0	0.0	0.0	7426.3
36.0 ROW							0.2	3.9	11.1	20.7	16.1	14.6	23.1	12.6	6.3	3.7	2.8	0.6	0.0	1.7	58.0	225.2	0.0	0.0	0.0	0.0	5831.5
Total columns	8277.3	9375.7	6689.7	1519.7	-377.4	1703.0	54.9	939.8	2211.2	4369.7	3430.9	3395.8	5295.2	2952.4	1585.7	926.4	705.2	145.6	0.0	422.8	4373.2	12308.9	6107.0	123.9	7426.3	5831.5	
Total rows	8277.3	2826.2	13239.2	1519.7	-377.4	1703.0	54.9	939.8	2211.2	4369.7	3430.9	3395.8	5295.2	2952.4	1585.7	926.4	705.2	145.6	0.0	422.8	4373.2	13315.8	3791.7	123.9	7426.3	5831.5	
Differences (column-row)	0.0	6549.5	-6549.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1006.9	2315.3	0.0	0.0	0.0	

Table A4 – *Balanced SAM*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1 Agriculture, hunting, forestry and logging	180.5			485.0	8.5	0.2	1.3	5.3	1.3	0.3	0.3	6.5	0.2	0.6	0.6	44.0	1.4		0.6	0.8	2.6	5.6	2.1
2 Fishing and aquaculture		0.2		1.4				0.2				0.1				2.0	0.1					0.1	
3 Mining and Quarrying	0.1		22.2	1.1	0.1		0.9	1027.8	48.7	13.7	0.6	1.4	202.5	25.1	0.5	0.1			0.2			0.1	
4 Manufacture of food products, beverages and tabacco	124.6	1.4		368.8	0.1	2.7	0.2	27.7				0.2				360.1	4.7		0.6	2.6	7.3	16.5	3.8
5 Manufacture of textiles and wearing appareal	0.7	1.7		2.8	148.0	0.4	1.6	1.8	0.8	1.2	1.2	4.9	0.1	2.7	4.1	3.4	3.3	0.2	4.8	1.6	0.7	6.0	3.9
6 Manufacture of leather and related products	0.3			0.6	1.7	3.7	0.1	0.5		0.2	0.3	1.3		0.3	2.9		0.2	0.2	0.2	1.5	0.1	0.3	0.4
7 Manufacture of paper and paper products ; manufacture of articles of straw and plaiting materials	0.5	0.2	0.9	29.3	1.8	0.3	102.8	34.7	13.1	8.1	9.6	8.1	2.4	14.2	98.6	13.3	37.1	24.1	72.9	36.2	6.4	7.7	16.3
8 Manufacture of coke, refined petroleum products, chemicals and pharmaceutical	68.9	2.5	15.5	12.2	24.6	0.9	14.9	728.2	32.5	53.2	20.3	73.6	125.0	55.6	159.4	21.5	194.6	9.0	74.6	29.6	7.2	371.3	31.1
9 Manufacture of other non-metallic mineral products	2.7	0.1	19.9	30.6	0.1		0.4	38.1	107.9	23.7	9.9	7.5	2.8	493.5	2.0	7.3	1.7		3.8	1.3	1.6	1.2	5.7
10 Manufacture of fabricated metal products, except machinery and equipment	2.0	1.2	1.2	15.7	1.4	0.7	2.0	21.4	16.6	262.8	182.2	41.0	9.5	284.6	33.4	1.7	7.7	1.3	15.7	11.3	3.5	4.6	3.6
11 Manufacture of computer, electronic and optical products , machinery and equipment , transport equipment	2.9	2.2	8.9	12.9	2.5	0.1	3.0	23.3	10.4	19.1	214.7	8.3	25.4	127.2	155.9	7.1	145.3	3.9	62.9	82.7	7.2	36.7	20.5
12 Manufacture of wood, rubber, plastic products and other manufacturing	2.1	0.6	2.2	29.8	5.9	1.4	4.3	30.1	15.6	42.2	39.2	245.3	2.4	111.0	44.7	6.9	46.8	9.0	28.0	8.6	4.6	8.9	10.1
13 Electricity, Gas and water supply	31.1	2.6	18.9	41.0	21.7	0.4	11.8	109.7	60.7	67.6	16.9	33.2	273.3	24.4	136.8	61.2	46.0	13.3	57.3	48.7	21.3	37.8	25.2
14 Construction	0.5		0.6	2.4	0.8		1.0	7.2	4.8	7.1	3.6	3.2	121.8	393.5	18.4	6.4	33.2	6.3	161.0	43.8	8.2	25.1	6.4
15 Wholesale and Retail trade; Repair of Motor vehicles and motorcycles	62.6	1.7	13.3	192.6	22.7	2.4	22.4	128.9	40.2	66.6	46.3	36.2	23.6	65.6	178.1	93.5	88.6	12.3	42.1	32.5	11.4	66.7	17.9
16 Accomodation and food sevice activities	0.2		0.5	2.3	0.6		0.6	16.8	3.8	5.0	7.0	2.2	5.6	18.8	27.3	2.9	43.2	8.9	75.7	11.2	1.4	15.8	7.4
17 Transportation and Storage	20.5	1.2	10.5	88.2	11.3	0.7	12.5	135.0	36.7	67.6	54.7	32.8	18.3	108.6	223.1	38.7	464.4	95.4	209.6	85.5	14.4	46.9	44.5
18 Financial and Insurance activities	70.8	3.6	7.2	36.5	11.8	0.5	8.2	48.0	18.4	31.4	29.7	37.4	36.6	100.3	283.2	43.2	132.9	416.4	369.2	105.3	70.2	61.7	56.1
19 Real estate activities, Professional, Scientific and Technical activities	3.1	0.4	24.2	70.6	25.3	1.3	27.3	112.5	44.2	66.8	85.0	42.5	33.6	190.0	972.9	99.7	250.7	411.8	1040.0	186.0	41.7	216.7	224.0
20 Public administration and defence; Compulsory social security																							
21 Education																							
22 Human Health and social work activities	1.4		0.1	0.5	0.1		0.1	0.5	0.1	0.3	0.2	0.2		1.6	3.7	0.5	0.5	1.5	1.3	3.4		475.5	2.1
23 Other service activities	4.1		0.7	18.9	4.2	0.2	2.8	18.0	2.7	5.6	5.4	3.0	9.2	11.1	60.5	13.4	16.5	18.3	208.7	94.2	20.3	80.6	234.2
24 Wages and Salaries	234.2	39.2	57.6	129.9	49.0	2.2	34.8	175.5	77.7	147.5	155.8	90.8	177.2	518.1	825.4	453.2	748.1	326.0	803.6	932.6	974.2	821.9	505.0
25 Employers' Social Contributions	75.5	8.8	35.8	113.5	16.9	0.5	17.8	189.8	38.7	88.5	142.6	41.0	105.8	393.4	802.1	111.5	504.2	237.1	912.0	868.5	700.7	540.3	138.2
26 Operating Surplus	638.1	16.8	42.7	233.3	47.3	5.9	46.2	117.3	92.0	105.5	98.8	126.7	507.5	581.4	1578.1	557.5	695.1	295.5	2666.1	671.5	201.1	413.1	242.4
27 Indirect tax on production		6.5	3.3	286.3	0.8		0.9	625.9	1.7		4.5	2.0	110.2	40.8		1.6		73.8	138.1		2.3		213.0
28 Subsidies on production	-96.8	-6.3	-2.9	-40.8	-0.7	0.0	-1.0	-2.4	-1.4	-4.2	-4.3	-1.6	-20.9	0.0	-70.2	0.0	-121.5	0.0	0.0	0.0	0.0	-2.4	0.0
29 Iva	12.9	2.5	0.5	126.2	53.3	22.1	29.8	129.3	5.4	12.6	63.8	54.5	84.1	186.0	399.8	121.5	126.9	40.5	135.3		0.3	4.0	81.8
30A H1																							
30B H2																							
30C H3																							
30D H4																							
30E H5																							
30F H6																							
30G H7																							
30H H8																							
30I H9																							
30L H10																							
30M H11																							
30N H12																							
30O H13																							
30P H14																							
31 Firms																							
32 Government																							
33 Capital Formation																							
34 Indirect tax on imports	3.5	0.1	0.4	14.0	8.0	3.0	0.3	22.2	0.8	1.1	65.2	4.4	0.4					0.2	0.2				
35 ROC	204.2	5.6	202.0	1170.8	582.8	145.0	487.0	782.1	335.1	527.1	1387.7	511.6	33.4	21.1	77.9	2.5	198.0	356.1	253.6	123.0	3.7	4.6	12.5
36 ROW	159.8	13.7	1055.1	407.0	176.1	76.6	69.9	694.4	52.3	312.7	1781.0	228.4	18.3	12.5	26.6		290.0	34.7	185.6				10.2
Total columns	1811.1	106.3	1541.5	3883.4	1227.1	271.2	904.2	5249.9	1060.7	1933.2	4422.4	1647.0	1908.3	3782.1	6046.0	2074.6	3959.8	2395.7	7523.8	3382.5	2112.2	3267.2	1918.2
Total rows	1811.1	106.3	1541.5	3883.4	1227.1	271.2	904.2	5249.9	1060.7	1933.2	4422.4	1647.0	1908.3	3782.1	6046.0	2074.6	3959.8	2395.7	7523.8	3382.5	2112.2	3267.2	1918.2
Differences (column-row)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	24	25	26	27	28	29	H_1	H_2	H_3	H_4	H_5	H_6	H_7	H_8	H_9	H_10	H_11	H_12	H_13	H_14
1							3.4	16.5	36.6	68.4	62.9	29.9	63.7	26.2	7.1	3.9	5.6	0.2	0.0	1.6
2							0.5	3.3	6.4	12.8	10.5	7.0	9.2	4.1	1.9	0.8	0.6	0.0	0.0	0.3
3							0.0	0.0	0.1	0.2	0.2	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
4							15.9	108.9	216.9	427.2	352.3	229.4	314.1	139.5	62.6	27.3	20.5	0.7	0.0	8.5
5							6.3	44.8	88.1	173.7	141.7	95.3	124.1	55.9	26.4	11.3	7.8	0.3	0.0	3.4
6							2.1	14.6	28.8	56.9	46.4	31.2	40.7	18.3	8.6	3.7	2.5	0.1	0.0	1.1
7							1.2	4.5	10.6	30.6	36.8	40.9	39.0	22.4	6.9	9.3	2.9	0.1	0.0	2.8
8							3.1	28.2	50.9	126.0	132.1	100.5	145.2	86.0	31.1	20.9	8.8	0.3	0.0	6.3
9							0.2	2.2	4.6	15.3	13.2	8.1	11.8	10.0	3.3	1.2	0.9	0.0	0.0	0.9
10							0.2	1.4	2.8	6.5	6.6	5.3	7.4	3.6	1.3	1.1	0.5	0.0	0.0	0.3
11							4.5	33.0	71.6	153.9	164.0	108.6	144.8	93.4	30.4	20.5	7.6	0.2	0.0	8.0
12							2.1	11.2	25.3	64.2	74.9	74.8	79.9	44.7	15.5	15.4	5.3	0.1	0.0	4.2
13							4.6	43.7	76.3	131.5	139.2	76.0	112.9	70.5	24.4	11.5	8.9	1.0	0.0	5.0
14							0.2	1.6	2.7	4.6	4.9	2.7	3.9	2.5	0.9	0.4	0.3	0.0	0.0	0.2
15							14.8	113.6	289.4	770.4	777.9	650.1	737.5	449.1	191.7	75.0	57.2	0.0	0.0	17.8
16							2.5	45.2	88.7	378.7	301.6	224.4	383.7	198.8	104.9	46.1	28.5	1.3	0.0	7.9
17							6.5	42.8	108.4	245.9	273.0	222.5	245.5	133.7	54.9	29.7	13.3	0.6	0.0	5.2
18							1.4	11.6	19.4	49.2	56.1	53.5	73.8	39.2	15.7	13.5	4.3	0.1	0.0	2.8
19							17.4	164.0	282.8	481.6	514.8	292.5	423.3	268.3	94.4	47.0	34.4	3.7	0.0	19.5
20							0.2	1.5	2.8	6.5	6.5	5.0	7.7	3.6	1.4	1.0	0.5	0.0	0.0	0.2
21							0.5	6.2	13.0	35.3	65.2	35.6	51.3	30.5	7.2	2.7	3.6	0.0	0.0	0.9
22							1.6	14.2	27.9	60.6	66.9	46.9	74.2	38.5	14.0	9.8	3.1	0.0	0.0	2.4
23							3.2	30.0	56.4	155.2	151.4	109.2	154.8	104.2	36.9	21.0	10.7	0.2	0.0	8.1
24																				
25																				
26																				
27																				
28																				
29																				
30A H1	15.1	26.2	10.8				0.0													
30B H2	330.5	236.4	228.2					3.8												
30C H3	547.5	383.4	375.8						23.9											
30D H4	944.8	1233.7	658.5							38.8										
30E H5	945.9	793.3	656.7								29.1									
30F H6	1245.7	650.4	851.9									17.5								
30G H7	1754.4	1180.0	1206.5										30.1							
30H H8	1063.0	626.3	729.1											14.1						
30I H9	707.0	248.9	479.5												4.3					
30L H10	361.1	212.6	247.9													2.8				
30M H11	241.1	224.5	167.8														1.7			
30N H12	58.0	29.7	39.7															0.5		
30O H13	0.0	0.0	0.0																0.0	
30P H14	65.4	237.9	47.5																	1.3
31			3981.9				0.3	5.5	14.6	23.4	18.6	17.8	24.9	15.6	8.5	5.2	4.0	0.9	0.0	2.5
32			298.1	1511.8	-377.4	1693.1	11.5	215.1	609.9	1134.2	881.8	798.2	1249.5	684.3	342.8	203.5	152.9	32.5	0.0	94.6
33							-49.6	-26.4	42.6	-263.8	-787.9	101.1	725.4	384.7	483.0	338.3	315.8	102.2	0.0	215.3
34																				
35																				
36							0.2	3.7	9.8	15.7	12.5	11.9	16.7	10.5	5.7	3.5	2.7	0.6	0.0	1.7
Total columns	8279.5	6083.3	9979.9	1511.8	-377.4	1693.1	54.8	944.8	2211.2	4403.4	3553.1	3395.9	5295.2	2952.4	1585.8	926.4	705.2	145.6	0.0	422.8
Total rows	8279.5	6083.3	9979.9	1511.8	-377.4	1693.1	54.8	944.8	2211.2	4403.4	3553.1	3395.9	5295.2	2952.4	1585.8	926.4	705.2	145.6	0.0	422.8
Differences (column-row)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	31	32	33	34	35	36	Total
1		0.6			732.0	4.8	1811.1
2			0.7		42.9	1.1	106.3
3			17.8		161.1	16.3	1541.5
4		4.1			901.9	132.4	3883.4
5					235.7	16.4	1227.1
6					1.3		271.2
7			1.7		150.2	5.8	904.2
8					953.2	1431.0	5249.9
9			17.2		195.8	14.2	1060.7
10			223.1		547.7	200.4	1933.2
11			2114.8		415.9	68.4	4422.4
12			112.0		369.9	47.6	1647.0
13		4.5			37.4		1908.3
14			2883.1		18.5	0.4	3782.1
15			428.7		41.6	162.8	6046.0
16		2.3			2.6		2074.6
17		23.7	133.8		209.3	389.5	3959.8
18					63.7	13.2	2395.7
19		111.2	447.6		97.8	53.1	7523.8
20		3042.3			303.2		3382.5
21		1856.3			4.0		2112.2
22		2408.2			5.1		3267.2
23		209.0	22.9		11.5	0.7	1918.2
24							8279.5
25							6083.3
26							9979.9
27							1511.8
28							-377.4
29							1693.1
30A H1	0.5	2.0				0.2	54.8
30B H2	35.6	103.6				6.7	944.8
30C H3	220.8	618.8				40.9	2211.2
30D H4	355.1	1106.1				66.6	4403.4
30E H5	267.2	810.9				50.0	3553.1
30F H6	160.8	439.8				29.7	3395.9
30G H7	279.1	793.3				51.8	5295.2
30H H8	130.8	364.8				24.2	2952.4
30I H9	38.8	100.1				7.2	1585.8
30L H10	25.6	71.8				4.8	926.4
30M H11	16.4	50.5				3.1	705.2
30N H12	4.5	12.4				0.9	145.6
30O H13	0.0	0.0					0.0
30P H14	13.4	54.7				2.7	422.8
31	86.8	133.1				32.8	4376.5
32	340.5	3379.7		123.9		67.9	13448.3
33	2357.7	-2344.2			1925.9	2883.3	6403.5
34							123.9
35							7427.2
36	42.9	88.9					5831.9
Total columns	4376.5	13448.3	6403.5	123.9	7427.2	5831.9	
Total rows	4376.5	13448.3	6403.5	123.9	7427.2	5831.9	#N/A
Differences (column-row)	0.00	0.00	0.00	0.00	0.00	0.00	

References

Accardo B. M. and G. Ferrari (2000),"La Costruzione di una SAM per l'Italia: una Procedura per la Stima della Matrice dei Consumi delle Famiglie per Classi di Reddito Famigliare e Branche", *Working Paper* n. 84, Dipartimento di Statistica, Università degli Studi di Firenze.

Accardo B. M. and G. Ferrari (2002),"Una SAM per la Toscana", *Working Paper* Dipartimento di Statistica, Università degli Studi di Firenze.

Bank of Italy (2002), Survey on Household Income and Wealth.

Carbonaro G.,F. Tenna and R. Zelli (2001), "I conti Economici Territoriali: alcune possibili estensioni", Rapporto di Ricerca; Commissione per la garanzia dell'informazione statistica, Presidenza del Consiglio dei Ministri.

Ferrari G. (1999), Introduzione ai sistemi di contabilità nazionale, Centro 2P edizioni, Firenze.

Ferrari G. (1998), "Alla ricerca della matrice perduta", *Working Paper*. n. 73, Dipartimento di Statistica, Università degli Studi di Firenze.

Golan A. and S. J. Vogel (2000), "Estimation of Non-Stationary Social Accounting Matrix Coefficients with Supply Side Information". *Economic System Research*, Vol. 12, No. 4.

Golan A., G. Judge and D. Miller (1996), "Maximum Entropy Econometrics, Robust Estimation with Limited Data". John Wiley & Sons.

Golan A., G. Judge and S. Robinson (1994), "Recovering Information from Incomplete or Partial Multisectoral Economic Data". *Review of Economic and Statistic* 76, 541-9.

ISTAT, (2006), Conti Economici Territoriali. www.istat.it

- (2005), Reddito Disponibile nelle Regioni Italiane. Anni 1995-2003.

- (2001), Household Expenditure Survey.

Ministero dell'Economia e delle Finanze (2004). Stime della Spesa Pubblica Regionalizzata. Conti Pubblici Territoriali.

Plane D. A. (1982), "An Information Theoretic Approach to the Estimation of Migration Flows". *Journal of Regional Science*, V. 22.

Pyatt G. and E. Thorbecke (1976), Planning Techniques for a Better Future, ILO, Geneva.

Robinson S., A. Cattaneo and M. El-Said (2000), "Updating and Estimating a Social Accounting Matrix Using Cross Entropy Method. *Economic System Research*…

Round J. (2003), "Constructing SAMs for Development Policy Analysis: Lessons Learned and Challenges Ahead", *Economic Systems Research* 15(2).

Schneider M. H. and S. A. Zenios (1990), "A Comparative Study of Algorithms for Matrix Balancing". *Operations Research*, Vol. 38, No. 3.

Siesto V. (1996),"La contabilità nazionale italiana", Il Mulino, Bologna.

Socci C. (2004), "Una SAM bi-regionale per le Marche," in Matrici Regionali di Contabilità Sociale e Analisi di Politiche Economiche, a cura di A. Fossati, R. T. Lenti, F. Angeli, Milano.

Stone R. (1951-1952) "Simple Transactions Models, Information and Computing," *The Review of Economics Studies*, V. XIX (2), n. 49.

Stone R. (1962) A Social Accounting Matrix for 1960 Chapman and Hall, Cambridge.

Ultimi Contributi di Ricerca CRENoS

I Paper sono disponibili in: http://www.crenos.it

- **09/01** *Giorgio Garau, Patrizio Lecca and Lucia Schirru* " Does Deflation Method Matter for Productivity Measures?"
- **08/23** *Barbara Dettori, Emanuela Marrocu and Raffaele Paci* "Total factor productivity, intangible assets and spatial dependence in the European regions"
- **08/22** *Fabio Cerina, Sauveur Giannoni* "Pollution Adverse Tourists and Growth"
- **08/21** *Carina Hirsch,Giovanni Sulis* "Schooling, Production Structure and Growth: An Empirical Analysis on Italian Regions"
- **08/20** *Fabio Cerina, Francesco Mureddu* "Agglomeration and Growth with Endogenous Expediture Shares"
- **08/19** *Dimitri Paolini* "Screening and short – term contracts"
- **08/18** *Massimo Del Gatto, Adriana Di Liberto and Carmelo Petraglia* "Measuring Productivity"
- **08/17** *Edoardo Otranto* "Identifying Financial Time Series with Similar Dynamic Conditional Correlation"
- **08/16** *Rinaldo Brau, Raffaele Doronzo, Carlo V. Fiorio and Massimo Florio* "Gas Industry Reforms and Consumers' Prices in the European Union: an Empirical Analysis"
- **08/15** *Oliviero A. Carboni* "The Effect of R&D Subsidies on Private R&D:Evidence from Italian Manufacturing Data"
- **08/15** *Oliviero A. Carboni* "The Effects of G *arletto* "Getting out of the car. An institutional/evolutionary approach to sustainable transport policies"
- **08/14** *Gerardo Marletto* "Getting out of the car. An institutional/evolutionary approach to sustainable transport policies"
- **08/13** *Francesco Lisi, Edoardo Otranto,* "Clustering Mutual Funds by Return and Risk Levels"
- **08/12** *Adriana Di Liberto, Francesco Pigliaru, Piergiorgio Chelucci,* "International TFP Dynamics and Human Capital Stocks: a Panel Data Analysis, 1960-2003"
- **08/11** *Giorgio Garau, Patrizio Lecca,* "Impact Analysis of Regional Knowledge Subsidy: a CGE Approach"
- **08/10** *Edoardo Otranto,* "Asset Allocation Using Flexible Dynamic Correlation Models with Regime Switching"
- **08/09** *Concetta Mendolicchio, Dimitri Paolini, Tito Pietra,* "Investments In Education In A Two-Sector, Random Matching Economy"
- **08/08** *Stefano Usai,* "Innovative Performance of Oecd Regions"
- **08/07** *Concetta Mendolicchio, Tito Pietra, Dimitri Paolini,* "Human Capital Policies in a Static, Two-Sector Economy with Imperfect Markets"
- **08/06** *Vania Statzu, Elisabetta Strazzera,* "A panel data analysis of electric consumptions in the residential sector"
- **08/05** *Marco Pitzalis, Isabella Sulis, Mariano Porcu,* "Differences of Cultural Capital among Students in Transition to University. Some First Survey Evidences"
- **08/04** *Isabella Sulis, Mariano Porcu,* "Assessing the Effectiveness of a Stochastic Regression Imputation Method for Ordered Categorical Data"
- **08/03** *Manuele Bicego, Enrico Grosso, Edoardo Otranto,* "Recognizing and Forecasting the Sign of Financial Local Trends Using Hidden Markov Models"

Finito di stampare nel mese di Marzo 2009
Presso **Editoria&Stampa**
Zona Industriale Predda Niedda str. n. 10 – Tel. 079.262236 – Fax 079.262221
07100 Sassari