



## JRC TECHNICAL REPORTS

# *Social Accounting Matrices for the EU-27 in 2010*

*Building a new database for RHOMOLO*

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## Table of contents

Acknowledgements.....	3
Abstract.....	4
1. Introduction .....	5
2. Available datasets: WIOD and Eurostat.....	7
3. The National SAMs for the EU-27 in 2010 .....	12
3.1 Intermediate consumption .....	16
3.2 Value added and taxes .....	18
3.3 Redistribution of income and transactions .....	20
3.4 Final demand .....	24
3.5 The foreign sector: imports and re-exports .....	25
4. Conclusion .....	27
References .....	28
List of abbreviations and definitions.....	29
List of figures.....	30
List of tables.....	31
Appendix: An aggregated version of the Social accounting matrix for Austria 2010.....	32

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## Abstract

This paper describes the construction process of a new set of national social accounting matrices (SAMs) for the EU-27 in 2010 that will be regionalized and used in RHOMOLO, the regional computable general equilibrium (CGE) model developed by the European Commission to evaluate the impact of cohesion policies. After a careful analysis of the input-output frameworks available in Eurostat and the World input-output database (WIOD), the latter has been used as the main data source, which is completed with information from national accounts in Eurostat. The structure of the SAM is determined by the sectoral disaggregation in WIOD. It includes a useful disaggregation of labour by skill levels and a disaggregation of the foreign sector in the EU and rest of the world. In the paper it is clearly described how to elaborate a symmetric input-output table product by product at purchasers' prices using supply and use tables and applying the industry technology. It is also described the reallocation of social contributions needed to properly assign tax revenues to government and avoid the problems generated by the second redistribution of income in national accounts. The description of the SAMs and their availability for the EU-27 can be very useful to researchers in applied economics and it may help to better understand the structure of RHOMOLO.

*Keywords:* social accounting matrices, national accounts, EU-27.

*JEL Codes:* D57, E16.

## 1. Introduction

A SAM is a balanced square matrix that captures the circular flow of income for an economy in a specific period of time. These matrices summarize the information included in national and regional accounts and in input-output tables. Figures in SAMs are included in such a way that rows account for incomes accruing from all accounts in the system and columns for expenditures. These matrices are very useful to describe the structure of any economy and also for evaluating the effects of external shocks and public policies using a SAM model or computable general equilibrium (CGE) models. These models capture the effect of shocks both in quantities and prices and they use flexible functional forms that allow for a higher degree of substitution among intermediate inputs and productive factors.

The SAMs at hand have been designed to be used as a database in RHOMOLO, a regional holistic model that covers the EU-27 at NUTS-2 level<sup>1</sup>. This is a dynamic spatial general equilibrium model developed by the Directorate General Joint Research Centre (DG JRC) for the Directorate General for Regional and Urban Policy (DG REGIO) at the European Commission. RHOMOLO has been designed to evaluate the effects of cohesion policies on economic growth for all regions in the Union. For this reason, the model should include the appropriate regional and sectoral disaggregation and other interregional and spatial connections.

The main contribution of this paper is to describe a standard procedure to elaborate national SAMs with the available information for 27 European countries<sup>2</sup>. The main data sources have been WIOD<sup>3</sup> and Eurostat. In the paper, we detail the disposable information in both sources and the advantages and disadvantages embedded in each of them. The selection of one or other is justified and the associated limitations are also discussed. In general, the information from input-output tables was taken from WIOD, since this is the only database where the trade flows among EU countries are balanced. On the other hand, data on income distribution have been directly taken from national accounts, Eurostat. On this regard, it has been made a strong effort in the reconciliation of both data sources. Figures in SAMs are not always the same registered in Eurostat since some numbers in WIOD have been estimated and, therefore, they do not always match those in Eurostat. This is specially the case for exports, imports and the foreign current balance. In the matrices, there is a great detail in transfers and tax revenues allocation. The allocation of employers' social security contributions to households first and to other agents in a second stage (second redistribution of income) included in national accounts has been avoided by allocating these revenues just once to the appropriate agent. In order to do this, we have combined and adjusted all the information available in national accounts and estimated missing data. On the other hand, the disaggregation of labour income by skill levels raises the utility of this database that results in a convenient source for the analysis of income generation and distribution of different public policies and human capital accumulation policies.

The structure of the paper is as follows. Section 2 presents the main characteristics of the data sources used in the construction process, focusing on their advantages and drawbacks that lead to a decision on the data used to build the SAMs. In Section 3 the structure of the SAM and the adjustments corresponding to the inter-industry

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<sup>1</sup> The Nomenclature of Territorial Units for Statistics (NUTS) classification is a hierarchical classification system to divide the EU territory for the purpose of collection, development and harmonisation of EU regional statistics, and socio-economic analyses of the regions and for the framing of EU regional policies. NUTS 2 levels correspond to regions for the application of regional policies, Eurostat [1].

<sup>2</sup> Croatia has not been included due to the lack of data.

<sup>3</sup> WIOD database is a project funded by the European Commission, Research Directorate General as part of the 7th Framework Programme, Theme 8: Socio-Economic Sciences and Humanities. Grant Agreement no: 225 281.

relationships included in input-output tables are detailed. Finally, Section 4 presents some conclusions and the potential uses of the database.

## 2. Available datasets: WIOD and Eurostat

This section compares the information on the input-output framework displayed in WIOD and in Eurostat. It justifies the use of WIOD as the starting point for the construction of the EU-27 SAMs despite the fact that Eurostat provides information directly obtained from official national statistics offices. In the elaboration of National SAMs, we have combined the information from WIOD with data from national accounts, Eurostat. WIOD is the first database that contains homogenized input-output information for the EU-27 and 13 other countries in the world<sup>4</sup> (Australia, Brazil, Canada, China, India, Indonesia, Japan, Korea, Mexico, Russia, Taiwan, Turkey and the United States). This database has information on:

- World tables (supply and use tables (SUT), world input-output tables (IOT), and interregional input-output tables);
- National tables (SUT and national input-output tables (NIOT));
- Socio economic accounts (industry output, value added, capital stock, investment and wages and employment by skill type (high, medium and low));
- Environmental accounts (gross energy use, emissions, land use and material and water used by sector).

This is available for the period 1995-2011 and the SAMs for 2010 have been elaborated using this information. A previous version of RHOMOLO has been calibrated using more aggregated SAMs for 2007, Brandsma et al. [2]. Most of the tables are at purchasers' prices and at previous year prices and National input-output tables are valued in million US dollars. The applicable exchange rates for each country are also available in the database. The information is disposable for 35 industries (ISIC<sup>5</sup> Rev. 3 or NACE<sup>6</sup> Rev. 1) and 59 products/commodities (CPA<sup>7</sup> 1996). The database was originally elaborated for the time period 1995-2009 and further updates and revisions of national SUTs were released in 2013, using updated national accounts data on expenditure for 2010-2011 and applying growth rates to 2009 figures, Timmer [3]. This explains why some macroeconomic variables, like value added at basic prices and GDP, are slightly different to the numbers provided by national accounts.

In Eurostat, there are more detailed data on SUTs and symmetric I-O tables than in WIOD regarding sectoral disaggregation and value added components. However, Eurostat obtains information directly from national statistics offices and matrices are not always available for the same year in all countries. Additionally, symmetric tables are elaborated for some countries using the assumption of fixed sales structure (industry-by-industry) and in some others using the technology assumption (product-by-product). According to Eurostat Manual of supply, use and input-output tables [4], p. 301, "a product-by-product table describes [...] the amount of products that were used to produce this product, irrespectively of the producing industry", while "an industry-by-industry table describes inter-industry relations. The intermediate part of the table describes for each industry the use of products in production". The tables available in Eurostat for 2010 are presented in [Table 1](#). The sectoral classification is based on NACE Rev. 2. There is information for 17 out of the 28 EU countries for 2010 and there are no data for Croatia, as in WIOD. Tables for 2005 are available for Denmark, Spain, Luxembourg, Poland and Portugal and there are none for Bulgaria, Cyprus, Latvia, Malta and Croatia. Unlike WIOD, symmetric tables in Eurostat are basically product-by-product with the exception of Netherlands and Finland.

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<sup>4</sup> There are no data for Croatia.

<sup>5</sup> International standard industrial classification of all economic activities.

<sup>6</sup> Statistical classification of economic activities in the European Community.

<sup>7</sup> Statistical classification of products by activity in the European Economic Community.



Finally, national accounts<sup>8</sup> provide very useful and detailed information on income distribution and government accounts, although for some countries there are minor inconsistencies and/or missing data. The disaggregation of compensation of employees between wages and salaries and employer's social security contributions for the foreign sector is not available for 14 countries and the disaggregation of foreign sectors into EU and rest of the world (RoW) is not available for nine of the 28 EU countries, see [Table 2](#).

**Table 1. Available input-output framework**

	Country	SIOT 2010	Supply table 2010	Use table 2010
BE	Belgium	✓	✓	✓
BG	Bulgaria	-	✓	✓
CZ	Czech Republic	✓	✓	✓
DK	Denmark	-	-	-
DE	Germany	✓	✓	✓
EE	Estonia	✓	✓	✓
IE	Ireland	✓	✓	✓
EL	Greece	✓	✓	✓
ES	Spain	-	-	-
FR	France	✓	✓	✓
HR	Croatia	-	-	-
IT	Italy	✓	✓	✓
CY	Cyprus	-	-	-
LV	Latvia	-	✓	✓
LT	Lithuania	✓	✓	✓
LU	Luxembourg	-	✓	✓
HU	Hungary	✓	✓	✓
MT	Malta	-	-	-
NL	Netherlands	✓	✓	✓
AT	Austria	✓	✓	✓
PL	Poland	-	-	-
PT	Portugal	-	✓	✓
RO	Romania	✓	✓	✓
SI	Slovenia	✓	✓	✓
SK	Slovakia	✓	✓	✓
FI	Finland	✓	✓	✓
SE	Sweden	✓	✓	✓
UK	United Kingdom	✓	✓	✓

Source: own elaboration based on availability in Eurostat.

<sup>8</sup> Eurostat (2014). National accounts (ESA95). Annual sector accounts 2010 (nasa\_nf\_tr) [Data file]. Downloaded on 2014 November 14 (last update: 2014-08-22). Available from <http://ec.europa.eu/eurostat/data/database>.

The main advantage of using input-output tables from Eurostat instead of WIOD is that all numbers match with national accounts and few adjustments are needed. The data provided by the national statistical offices are balanced and there is consistency among SUT, SIOT and national accounts. However, on the other hand, the lack of information for several countries and the different criteria used in symmetric I-O tables, industry-by-industry in some countries and product-by-product in others, represent a limitation.

**Table 2. Availability of foreign sectors data (EU and RoW) in national accounts, 2010**

Country		Disaggregation of the foreign sector	
		Available information on EU and RoW	Disaggregation of Compensation of employees in WS + SCE
BE	Belgium	✓	✓
BG	Bulgaria	-	-
CZ	Czech Republic	✓	✓
DK	Denmark	✓	✓
DE	Germany	✓	-
EE	Estonia	✓	-
IE	Ireland	✓	-
EL	Greece	-	-
ES	Spain	✓	✓
FR	France	✓	✓
HR	Croatia	-	-
IT	Italy	-	✓
CY	Cyprus	-	✓
LV	Latvia	✓	-
LT	Lithuania	✓	-
LU	Luxembourg	-	✓
HU	Hungary	✓	✓
MT	Malta	✓	-
NL	Netherlands	✓	✓
AT	Austria	✓	✓
PL	Poland	✓	-
PT	Portugal	✓	✓
RO	Romania	✓	-
SI	Slovenia	✓	-
SK	Slovakia	✓	✓
FI	Finland	-	✓
SE	Sweden	-	-
UK	United Kingdom	-	-

Source: own elaboration based on availability in Eurostat: Non-Financial transactions (nasa\_nf\_tr).

Hence, as a result of the analysis of data availability described before, data of input-output tables have been directly obtained from WIOD while figures on primary and secondary distribution of income have been collected from Eurostat. In re-conciliating numbers in both data sources and balance the SAMs, we have adjusted transfers and we have calculated savings as a residual. In the SAMs, gross savings from the EU and the RoW are the result of trade flows, tax revenues and productive factors incomes between national economies and the foreign sectors. The resulting numbers are very different to

those registered for the same variables in national accounts due to the huge difference of trade flow data between Eurostat and WIOD. The latter displays balanced trade flows among all the EU countries distinguishing by imports, exports, re-exports and international trade and transport margins. Eurostat data on value added and taxes have also been used as an auxiliary source for estimations, as explained in section 3.2. In what follows, the details on the construction of the national SAMs are described.

### 3. The National SAMs for the EU-27 in 2010

The SAMs elaborated for the 27 EU countries are balanced square matrices of 85-by-85. In these economies there are four agents: households, corporations, the government, and the foreign sector, which is divided into the EU and the RoW. There are 59 productive sectors<sup>9</sup>, wages and employers' social contributions by level of skill (high, medium and low), social contributions paid by employees, self-employed and unemployed and an account for capital. There are three accounts of taxes: direct taxes (households' income tax and corporate income tax), taxes net of subsidies on products and other taxes net of subsidies on production. Additionally, there are four types of transfers: property income, other current transfers, adjustments due to the participation of households in pension funds reserves and welfare benefits. Finally, there are two more accounts for gross fixed capital formation and stock variations, one for savings and three for trade and transport margins, international trade margins and re-exports, correspondingly. The last three accounts are explicitly included in WIOD in order to match the trade flows between countries, which make the flows inside the EU and with the RoW consistent.

The SAMs can be divided into different sub-matrices: the intermediate consumption matrix, which captures intermediate consumption from industries to produce their corresponding homogeneous good. The sub-matrices of value added, with labour and capital income; taxes paid by industries; imports; and the final demand matrix, which details the amount of goods demanded per product by households, government, investment, stock variations and exports. Finally, there are other sub-matrices that account for the redistribution of income, tax revenues and transfers. Figure 1 summarizes these sub-matrices in the SAMs EU-27.

**Figure 1. Main structure of SAMs EU-27**

	<b>Industries (59)</b>	<b>Primary factors (4)</b>	<b>Auxiliary accounts (12)</b>	<b>Agents*(10)</b>
<b>Industries</b>	Intermediate consumption			Final demand
<b>Primary factors</b>	Labour and capital income			Labour and capital income from EU and RoW
<b>Auxiliary accounts</b>	SS. Contributions and net taxes paid			Transfers and net taxes paid
<b>Agents*</b>	Imports and re-exports	Redistribution of income	Redistribution of taxes and transfers	

Source: own elaboration.

\* Other accounts that are not agents in the economy are also included in these sub-matrices.

Note: numbers in brackets account for the number of accounts (rows/columns) in the SAM.

In the row/column of agents, we are including additional accounts that are not really considered as agents in the economy. This is the case of: gross fixed capital formation, stock variations, trade and transport margins, re-exports and international trade and transport margins. In [Figure 1](#), these accounts are included among agents in order to capture all the components of final demand, including investment and stock variations. The accounts of re-exports and international trade and transport margins are only

<sup>9</sup> We have elaborated a symmetric input-output table (59-by-59) using data from supply and use tables.

included in WIOD and they do not appear in other data sources like national accounts and/or input-output tables. The number of accounts (rows/columns) in each block is detailed in parenthesis. These block components are displayed in [Table 3](#).

**Table 3. Accounts in the SAMs EU-27**

Acronym	Name
<b>Industries (59)</b>	
<b>I1-I59</b>	59 industries / products (see <a href="#">Table 4</a> )
<b>Primary Factors (4)</b>	
<b>WS_h</b>	Gross wages and salaries (high skill)
<b>WS_m</b>	Gross wages and salaries (medium skill)
<b>WS_l</b>	Gross wages and salaries (low skill)
<b>GOS</b>	Gross operating surplus / Gross mixed income
<b>Auxiliary Accounts (12)</b>	
<b>SCE_h</b>	Employers' social contributions (high skill)
<b>SCE_m</b>	Employers' social contributions (medium skill)
<b>SCE_l</b>	Employers' social contributions (low skill)
<b>SCHSU</b>	Social contributions paid by employees, self-employed and unemployed
<b>NTP</b>	Other net taxes on production
<b>NTPR</b>	Net taxes on products
<b>PI</b>	Property income
<b>DTX</b>	Current taxes on income, wealth, etc.
<b>TR</b>	Other current transfers (which include unemployment benefits)
<b>AJ</b>	Adjustment for the change in net equity of households in pension funds reserves
<b>WFB</b>	Social benefits other than social transfers in kind
<b>SA</b>	Gross savings
<b>Agents (10)*</b>	
<b>H</b>	Households and Non-Profit Institutions Serving Households
<b>CORP</b>	Corporate sector
<b>GOV</b>	Government
<b>EU</b>	European Union
<b>RoW</b>	Rest of the world
*	
<b>GFCF</b>	Gross fixed capital formation
<b>SV</b>	Stock variations
<b>TTM</b>	Trade and transport margins
<b>REX</b>	Re-exports
<b>ITM</b>	International trade margins
* Other accounts that are not agents in the economy are also included in these sub-matrices. Source: own elaboration	

The list of homogeneous products is detailed in [Table 4](#). Products in WIOD are classified according to CPA, which is aligned with the Statistical classification of economic activities in the European Community (NACE). Thus, the CPA shows the main product elaborated

by each NACE industry. Sectors can be aggregated depending on the interests of the study in which they are used. In what follows, we present the content of the sub-matrices outlined in [Figure 1](#) and the adjustments implemented to match numbers.

**Table 4. Productive sectors in the SAMs for EU-27 in 2010**

SAMs	CPA	Name
I1	1	Agriculture, hunting and related service activities
I2	2	Forestry, logging and related service activities
I3	5	Fishing, operating of fish hatcheries and fish farms; service activities incidental to fishing
I4	10	Mining of coal and lignite; extraction of peat
I5	11	Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction excluding surveying
I6	12	Mining of uranium and thorium ores
I7	13	Mining of metal ores
I8	14	Other mining and quarrying
I9	15	Manufacture of food products and beverages
I10	16	Manufacture of tobacco products
I11	17	Manufacture of textiles
I12	18	Manufacture of wearing apparel; dressing and dyeing of fur
I13	19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
I14	20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
I15	21	Manufacture of pulp, paper and paper products
I16	22	Publishing, printing and reproduction of recorded media
I17	23	Manufacture of coke, refined petroleum products and nuclear fuels
I18	24	Manufacture of chemicals and chemical products
I19	25	Manufacture of rubber and plastic products
I20	26	Manufacture of other non-metallic mineral products
I21	27	Manufacture of basic metals
I22	28	Manufacture of fabricated metal products, except machinery and equipment
I23	29	Manufacture of machinery and equipment n.e.c.
I24	30	Manufacture of office machinery and computers
I25	31	Manufacture of electrical machinery and apparatus n.e.c.
I26	32	Manufacture of radio, television and communication equipment and apparatus
I27	33	Manufacture of medical, precision and optical instruments, watches and clocks
I28	34	Manufacture of motor vehicles, trailers and semi-trailers
I29	35	Manufacture of other transport equipment
I30	36	Manufacture of furniture; manufacturing n.e.c.
I31	37	Recycling

<b>SAMs</b>	<b>CPA</b>	<b>Name</b>
<b>I32</b>	<b>40</b>	Electricity, gas, steam and hot water supply
<b>I33</b>	<b>41</b>	Collection, purification and distribution of water
<b>I34</b>	<b>45</b>	Construction
<b>I35</b>	<b>50</b>	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale services of automotive fuel
<b>I36</b>	<b>51</b>	Wholesale trade and commission trade, except of motor vehicles and motorcycles
<b>I37</b>	<b>52</b>	Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods
<b>I38</b>	<b>55</b>	Hotels and restaurants
<b>I39</b>	<b>60</b>	Land transport; transport via pipelines
<b>I40</b>	<b>61</b>	Water transport
<b>I41</b>	<b>62</b>	Air transport
<b>I42</b>	<b>63</b>	Supporting and auxiliary transport activities; activities of travel agencies
<b>I43</b>	<b>64</b>	Post and telecommunications
<b>I44</b>	<b>65</b>	Financial intermediation, except insurance and pension funding
<b>I45</b>	<b>66</b>	Insurance and pension funding, except compulsory social security
<b>I46</b>	<b>67</b>	Activities auxiliary to financial intermediates
<b>I47</b>	<b>70</b>	Real estate activities
<b>I48</b>	<b>71</b>	Renting of machinery and equipment without operator and of personal and household goods
<b>I49</b>	<b>72</b>	Computer and related activities
<b>I50</b>	<b>73</b>	Research and development
<b>I51</b>	<b>74</b>	Other business activities
<b>I52</b>	<b>75</b>	Public administration and defence; compulsory social security
<b>I53</b>	<b>80</b>	Education
<b>I54</b>	<b>85</b>	Health and social work
<b>I55</b>	<b>90</b>	Sewage and refuse disposal, sanitation and similar activities
<b>I56</b>	<b>91</b>	Activities of membership organisation n.e.c.
<b>I57</b>	<b>92</b>	Recreational, cultural and sporting activities
<b>I58</b>	<b>93</b>	Other service activities
<b>I59</b>	<b>95</b>	Private households with employed persons
Source: World input-output database.		



### 3.1 Intermediate consumption

The intermediate symmetric I-O table is a 59-by-59 homogeneous square matrix at purchasers' prices elaborated with data from supply and use tables in WIOD. A symmetric I-O table can be defined as a table where the same definition for products/industries is used both in columns and rows (Eurostat, 2008). Supply and use tables are non-square matrices where columns reflect industries and rows products. Usually, the disaggregation of products is more detailed than industries and all industries may produce more than one good, depending on their primary and secondary production, respectively. Symmetric tables summarize the information included in supply and use tables. They are matrices elaborated at basic prices that result from the transformation of SUTs using a technology assumption -which result in product-by-product symmetric tables that relate products (rows) with homogeneous units of production (columns)- or a fixed sales structure -industry-by-industry symmetric tables-. Under the technology assumption, two approaches can be applied: product technology or industry technology. Product technology conversion implies to re-allocate secondary production embedded in supply tables to the industries where their main production good is that specific product. Consequently, rows and columns are reorganized in such a way that every industry produces only one homogeneous good mix. The industry-technology assumption captures the idea that all products elaborated by one specific industry are elaborated using always the same technology, irrespectively of the specific product combination made. The intermediate part captures inter-industries relations about how industries use products in production. ESA-95 is more in favour of product-by-product tables (technology assumption) rather than in industry-by-industry (fixed sales structure) since it is considered that the former are theoretically more homogeneous. Industry-by-industry tables may capture the production of goods that are also produced by other industries. Additionally, product-by-product tables are more suitable for productivity analysis and for the analysis of new technologies in the economy, while industry-by-industry are better suited for evaluating an economic impact of a major tax reform on the basis of input-output data and this is out of the scope of RHOMOLO.

Symmetric tables provided by WIOD are industry-by-industry and they are valued at basic prices. Consequently, they cannot be combined with information of final demand in use tables by products at purchasers' prices. On the other hand, since the SAMs EU-27 are going to be used as a database to evaluate the impact of different public policies implemented by the European Commission, it seems more reasonable to construct new product-by-product symmetric tables at purchasers' prices for all countries. The product-by-product transformation process applied here is based on the industry technology assumption detailed in Eurostat [4], see [Figure 2](#), which eludes the problem of negatives, Ten Raa and Rueda-Cantuche [5]. In measuring and reallocating secondary production, it may happen that negative numbers can result in symmetric tables. These numbers can be the consequence of different reasons: the product technology assumption can be incorrect; the economic transactions are recorded rather than technological relations, errors in data, etc. In using this procedure we avoid these problems [4].

In this process symmetric I-O tables are compiled by post-multiplying the use and value added matrices, correspondingly, with a transformation matrix  $T$  that reflects the industry-technology. The construction process is as follows. First a transformation matrix ( $T$ ) is elaborated multiplying the inverse of a the diagonal matrix of total production obtained from supply tables ( $\text{inv}(\text{diag}(g))$ ) by the supply matrix ( $V$ ). This transformation matrix is used in the construction of the input coefficients for intermediate demands ( $A$ ) and for the input coefficients of value added ( $E$ ). These coefficient matrices are used to calculate intermediate demand values and also to disaggregate value added from 35 industries to 59 homogeneous industries/products. In building this product-by-product matrix we are adjusting secondary production from the industries where they are really produced to the industries where they should be produced and that commodity is the

principal product. Columns are transformed and in the new matrix they can be considered homogeneous industries that produce one homogeneous good mix.

**Figure 2. Product-by-product transformation based on industry-technology assumption**

T: Transformation matrix	$T = inv(diag(g)) \cdot V$
A: Input coefficients intermediates	$A = U \cdot T \cdot inv(diag(q))$
E: value added	$E = W \cdot T$

where:

V is the supply matrix-transpose (industry-by-product)

U is the use matrix for intermediates (product-by-industry)

W is the value added matrix (components-by-industry)

g is a column vector of industry output

q is a column vector of product output.

Source: Eurostat, model B: product-by-product input-output tables based on industry technology assumption.

**Table 5. Exchange rates national currency/euros**

	Country	€ per unit of national currency
<b>BG</b>	Bulgaria	0.512
<b>CZ</b>	Czech Republic	0.040
<b>DK</b>	Denmark	0.134
<b>EE</b>	Estonia	1.002
<b>LV</b>	Latvia	1.425
<b>LT</b>	Lithuania	0.290
<b>HU</b>	Hungary	0.004
<b>PL</b>	Poland	0.251
<b>RO</b>	Romania	0.238
<b>SE</b>	Sweden	0.105
<b>UK</b>	United Kingdom	1.166

Source: own elaboration and WIOD.

The transformation of the symmetric table from basic prices to purchasers' prices implies to include net taxes on products associated with intermediate consumption and also trade and transport margins, which are adjusted using a cross-entropy program, Robinson, Cattaneo and El-Said [6]. Hence, taxes and trade and transport margins are redistributed across columns and included as a part of intermediate demand. Nevertheless, trade and transport margins associated with final demand are not included in the intermediate consumption in the new matrix, exactly as it happens with net taxes on products. For this reason, domestic trade and transport margins from the supply table need to be included in an additional row in the same way that net taxes on products are also registered as payments that industries do to this specific account. One

of the reasons why these adjustments are needed is because margins affecting final demand are not included in the intermediate matrix. On the other hand, the amount of margins (taxes) paid by the demand of each commodity does not need to be equal to the amount of margins collected by the sale of that commodity, consequently total supply does not match total demand. Therefore it is needed to add an additional row with the trade and transport margins column included in the supply table.

Supply and use tables in WIOD are expressed in national currency. Table 5 displays the countries that did not belong to the euro area in 2010 and the exchange rates that have been applied<sup>10</sup>.

### 3.2 Value added and taxes

The disaggregation of value added components (rows) by industries (columns) composes another important sub-matrix in the SAMs. Value added is usually disaggregated into wages and salaries, employer's social contributions, gross operating surplus and other net taxes on production (NTP). The value added components that are available in the Socio economic accounts (SEA), in WIOD, are capital compensation, labour compensation and compensation of employees. The figures of value added are disaggregated for 35 industries and total figures match the sum of labour compensation and capital compensation. Hence, NTP are not disentangled from previous accounts and they are merged with capital compensation. The difference between compensation of employees and labour compensation is that the later includes wages received by self-employed. These rents are usually accounted as mixed income in national accounts and they appear merged with capital compensation. In our SAMs, we have allocated the difference between labour compensation and compensation of employees to capital compensation or gross operating surplus, we have disaggregated compensation of employees into wages and salaries and employers' social contributions and, finally, we have subtracted NTP from capital compensation. The accounts of wages and salaries and employers' social contributions have been disaggregated by skill level using the information available in WIOD for 2009. The definition of skills used in WIOD is detailed in Table 6.

**Table 6. Skill level definition based on education level attained**

Skill level	1997 ISCED level	1997 ISCED level description
Low	1	Primary education or first stage of basic education
	2	Lower secondary or second stage of basic education
Medium	3	(Upper) secondary education
	4	Post-secondary non-tertiary education
High	5	First stage of tertiary education
	6	Second stage of tertiary education

Source: WIOD

The disaggregation of value added from WIOD has been completed using more detailed data available in Eurostat. This is the case for NTP and the disaggregation of compensation of employees into wages and salaries and employers' social contributions. First, data on other net taxes on production, NTP, by industry (NACE Rev. 1.1) have

<sup>10</sup> The actual rates applied have been computed up to 15 decimals.

been collected from national accounts and supply and use input-output tables (SUIOT) in Eurostat. These sources offer data of value added components, but generally for years prior to 2010 - only for two countries data refer to 2010; most countries are referred to 2009 or 2008, and even 2007 and before for six countries-. After the analysis of both sources, we conclude that the first dataset provides more recent and better information for 17 countries while for 9 countries it is better to use SUIOT - there is no disaggregation of NTP by industry for Cyprus in any dataset-. Once we have selected the data source for each country (Table 7), total NTP is calculated applying the share of NTP over GVA in this source to total GVA from WIOD. Then we compute the shares by industry for NTP in Eurostat and apply them to the NTP calculated. In doing this, the distribution by branch of NTP for 2010 is calculated using the sectoral distribution known from another source and generally from previous years. In the case of Cyprus, we approximate the distribution of NTP using data from Malta since there is no data from Eurostat: first, to get the total NTP we use the value provided by Eurostat for 2010<sup>11</sup>, which is not available by branch according to NACE Rev. 1.1; second, the share of NTP over GVA in this source is applied to the Total GVA from WIOD; third, the distribution of NTP by branches is obtained by applying the shares observed in Malta. The disaggregation of these taxes by industries is more complicated than the disaggregation of other variables due to the fact that net taxes may be positive or negative depending on the year and the industry. Thus, in order to avoid arbitrary results, the disaggregation of NTP by industry has been made respecting the positive or negative sign of the last observed data (Eurostat).

**Table 7. Data source of additional information used to disaggregate value added components**

		Data source	Year
BE	Belgium	1	2007
BG	Bulgaria	1	2005
CZ	Czech Republic	2	2009
DK	Denmark	2	2009
DE	Germany	2	2008
EE	Estonia	2	2009
IE	Ireland	1	2007
EL	Greece	1	2009
ES	Spain	1	2007
FR	France	2	2008
IT	Italy	2	2008
CY	Cyprus	-	-
LV	Latvia	2	2009
LT	Lithuania	2	2008
LU	Luxembourg	2	2010
HU	Hungary	2	2009
MT	Malta	2	2010
NL	Netherlands	2	2009

<sup>11</sup> Annual national accounts: national accounts aggregates and employment by branch 2010 (NACE Rev. 2) (nama\_nace64\_c) [Data file]. Downloaded on 2014 July 8. Available from <http://ec.europa.eu/eurostat/data/database>

AT	Austria	2	2009
PL	Poland	1	2007
PT	Portugal	1	2006
RO	Romania	2	2008
SI	Slovenia	2	2009
SK	Slovakia	2	2009
FI	Finland	2	2009
SE	Sweden	1	2008
UK	United Kingdom	1	2008

(1) ESA 95 Supply, use and input-output tables: use table at purchasers' prices (NACE Rev. 1). [Data file]. Downloaded on 2014 July 15. Available from: <http://ec.europa.eu/eurostat/web/esa-supply-use-input-tables/data/workbooks>

(2) Annual national accounts: national accounts aggregates and employment by branch 2010 (NACE Rev. 1.1) (nama\_nace60\_c) [Data file]. Downloaded on 2014 July 17. Available from <http://ec.europa.eu/eurostat/data/database>

Similarly, the disaggregation of compensation of employees (COMP) into wages and salaries (WS) and employers' social contributions (SCE) comes from applying to the former the shares obtained from national accounts and SUIOT, Eurostat. WS and SCE are disaggregated by industry (NACE Rev. 1.1) in Eurostat. These shares of WS and SCE over COMP from Eurostat are later applied to the values of COMP per branch from the WIOD-SEA.

The disaggregation of WS and SCE by skill level has been derived using WIOD data for 2009. Labour skills are divided into high, medium and low -according to the education level attained- and the information is provided in form of shares. These shares available for 2009 are applied to the compensation of employees in 2010. In doing this, it is assumed that:

- a) The shares by skill levels for compensation of employees are the same as those for labour compensation. To have an idea of the accuracy of this assumption, we have to take into account the possible different distribution of skill level between the two groups composing labour compensation, namely COMP and mixed income of self-employed. If self-employed would have different levels of education than employees, we would be altering the composition of this group. However, the impact of this assumption is limited since most of the labour compensation figures rely on the compensation of employees: an average of 87% of labour compensation is due to COMP in WIOD.
- b) The shares for 2010 are the same as those for 2009. Actually, it is unlikely that these shares vary widely from year to year.

Finally, a bi-proportional RAS adjustment program was used to match total values by rows and columns for all industries.

### 3.3 Redistribution of income and transactions

This matrix is the cross-tabulation of all auxiliary accounts included in the SAMs in order to capture the primary and second redistribution of income among institutional sectors. Primary factors income is redistributed among the representative household, the corporate sector, the government and the foreign sector, divided into EU and RoW. Tax revenues and current transfers are also allocated following available data on national accounts. The main problem has been to find information with this high level of disaggregation for all countries in the EU. In some cases this information is missing, e.g.

Malta, where most information is missing, or the accounts of the foreign sectors, which are not divided into the EU and the RoW for nine countries, or the compensation of employees is not disaggregated between wages and salaries and employers' social contributions, which happens in another nine countries (see [Table 2](#)). On the other hand, there are discrepancies in the national accounts in the foreign sector, where totals do not match the aggregation of the figures provided for the EU and the rest of the world. This is the case of savings in Malta, Netherlands and Poland, and property income in Netherlands. Also, for Romania, there are data only for EU, and therefore data for RoW has been obtained by subtraction of EU data from the total of the foreign sector.

The primary and second distribution displayed in national accounts present some trouble for SAM builders. The main problem is that social security contributions paid by employers and employees are first allocated to households and later on are transferred from households to other agents. This would be a straightforward issue if all revenues from contributions were allocated to government, however, according to national accounts these revenues are allocated to households, corporations and government. On the other hand, because all contributions paid by employers and employees are transferred to households it is difficult to disentangle the allocation of contributions of employers and contributions of employees.

According to the European system of accounts 1995, Eurostat [7], social contributions are structured as shown in [Figure 3](#).

**Figure 3. Disaggregation of Social contributions**

<b>Social Contributions (D.61)</b>
Actual social contributions (D.611) paid by:
Employers (D.6111)
Employees (D.6112) + self-employed and unemployed (D.6113)
Imputed social contributions (D.612) paid by employers
Source: own elaboration based ESA 95. Note: ESA 95 codes are in brackets.

However, the main interest in a SAM is to see how employers' social contributions paid by firms, which are detailed in input-output tables by industries, and the foreign sector, are redistributed among the institutional agents in the economy. That is, we are interested in social contributions from the perspective of distributive transactions ([Figure 4](#)).

**Figure 4. Social contributions as distributive transactions**

<b>Social Contributions (D.61)</b>
Employers' social contributions (D.12 = D.6111 + D.612)
Employees, self-employed, unemployed social contributions (D.6112+D.6113)
Note: ESA 95 codes are in brackets

The available information in national accounts with respect to social contributions paid and received by the different agents in the economy is detailed in [Table 8](#). There are data for employers' social contributions (SC) (D.12) and total SC (D.61) but not for employees, self-employed and unemployed (D.6112+D6.113). On the other hand, total SC (D.61) are disaggregated into actual (D.611) and imputed (D.612). Taking into account this information, and that imputed contributions can only be due to Employers'

SC, then Actual Employers' SC received (D6.111) can be calculated as the difference between Employers' SC received (D.12(R)) and Imputed SC paid (D.612(P)), [Table 9](#).

**Table 8. Social Contributions. Austria 2010**

Sector	Paid	Received	Paid - Received
Employers' social contributions (D.12)			
<b>Total economy + Rest of the world</b>	<b>27,431</b>	<b>27,431</b>	0
<b>Total economy</b>	<b>27,275</b>	<b>27,173</b>	102
Corporations	16,388	0	
General government	7,141	0	
Households; NPISH	3,746	27,173	
<b>Rest of the world</b>	<b>156</b>	<b>258</b>	<b>-102</b>
European Union	85	217	-132
Third countries	71	41	30
Social contributions (D.61)			
<b>Total economy + Rest of the world</b>	<b>50,847</b>	<b>50,847</b>	0
<b>Total economy</b>	<b>50,371</b>	<b>50,559</b>	-188
Corporations	0	3,871	
General government	0	46,588	
Households; NPISH	50,371	100	
<b>Rest of the world</b>	<b>476</b>	<b>288</b>	<b>188</b>
European Union	408	140	268
Third countries	67	147	-80
Actual social contributions (D.611)			
<b>Total economy + Rest of the world</b>	<b>44,387</b>	<b>44,575</b>	-188
<b>Total economy</b>	<b>44,387</b>	<b>44,575</b>	-188
Corporations	0	2,488	
General government	0	42,088	
Households; NPISH	44,387	0	
<b>Rest of the world</b>	<b>0</b>	<b>0</b>	<b>0</b>
European Union	0	0	0
Third countries	0	0	0
Imputed social contributions (D.612)			
<b>Total economy + Rest of the world</b>	<b>5,984</b>	<b>5,984</b>	0
<b>Total economy</b>	<b>5,984</b>	<b>5,984</b>	0
Corporations	0	1,383	
General government	0	4,500	
Households; NPISH	5,984	100	
<b>Rest of the world</b>	<b>0</b>	<b>0</b>	<b>0</b>
European Union	0	0	0
Third countries	0	0	0

Source: own elaboration based on national accounts (Eurostat).



**Table 9. Actual Employers' social contributions (D.6111). Austria 2010**

Sector	Paid	Received	Formula
<b>Total economy</b>		<b>21,189</b>	<b>D.12(R) – D.612(P)</b>
Corporations		0	
General government		0	
Households; NPISH		21,189	
<b>Rest of the world</b>		<b>258</b>	
European Union		217	
Third countries		41	

Source: own elaboration.

Following the structure from Figure 4, in order to disentangle social contributions of employers and employees and their redistribution, we have reordered some of the cells in Table 8 and calculated some additional figures in Table 10. The row corresponding to SC by employees, self-employed and unemployed (D.6112+D6.113) is computed deducting from total contributions (D.61) those corresponding to employers (D.6111 + D.612).

**Table 10. Allocation of social contributions. Austria 2010**

	Contributions Total economy					
	Households (1)		Corporations (2)		Government (3)	
	Paid	Received	Paid	Received	Paid	Received
Social Contributions (D61)	<b>50,371</b>	<b>100</b>		<b>3,871</b>		<b>46,588</b>
Employers (D12)	27,173	100		2,069		24,902
Employees, self-employed and unemployed (D6112+D6113)	23,300			1,802		21,686
(D61) - (D12) - (D6112+D6113)	<b>-102</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
	Contributions Rest of the World				(1)+(2)+(3)+ (4)+(5)	
	EU (4)		RoW (5)		Total Paid	Total Received
	Paid	Received	Paid	Received		
Social Contributions (D61)	493	357	138	188	51,003	51,105
Employers (D12)	85	217	71	41	27,329	27,329
Employees, self-employed and unemployed (D6112+D6113)	408	140	67	147	23,776	23,776
(D61) - (D12) - (D6112+D6113)	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-102</b>	<b>0</b>

Source: own elaboration based on national accounts (Eurostat).

Contributions paid by households other than employers' SC are calculated as a balance. We know the value of actual (44,387) and imputed (5,984) SC paid by households. Subtracting from the aggregation of previous figures the amount of employers' SC received by households (27,173), which are paid by branches, and the difference in total contributions due to the RoW (-102), we may approximate the amount of contributions of employees, self-employed and unemployed paid by households. The SC of employees



paid by industries and that employees do not receive, since they are directly discounted from their payrolls, are included in wages and salaries in national accounts. On the other hand, unemployment benefits are included as a transfer in current transfers and because unemployed also paid contributions they should be implicitly included in these transfers in national accounts. Later, households pay all these transfers. The SC retained by households are due to imputed contributions; consequently they have been allocated to employers' social contributions. In relation to the corporate sector and the Government, total contributions received by these agents are available from national accounts. This ratio of contributions received by corporations and by government is used to distribute employer's SC between these two agents. Then around 7.7% of the revenues of employer's SC go to corporations and 92.3% go to the government in Austria. These shares have been applied to the resulting number of net employers' SC paid by households (27,173-100) plus net contributions received by the EU (85-217) and the RoW (71-41). The figures in SC of employees, self-employees and unemployed are calculated as a balance.

As can be observed in [Table 10](#), there is an imbalance in total SC of -102, which does not appear in the disentangle figures of the contributions where total paid figures are equal to total revenues. If we aggregate the value of SC of employers and SC of employees paid by households (27,173+23,300) there resulting figure is 102 million euros bigger than the figure provided by national accounts (D.61) included in the table. The reason is we are correcting this difference when estimating the value of SC of employees paid by households. According to the available information, the sum of contributions of employers paid by the production branches is equal to the figure of SC of employers later redistributed to domestic agents, without including the positive/negative balance derived from the foreign sector. This issue has been observed for all countries in the EU.

Other net taxes on production are allocated to government and other net taxes on products are redistributed between the government and the EU using the information from national accounts. Value added and taxes on imports are included in other net taxes on products and there is a part of revenues that always goes to the EU authorities. This is reflected in the SAMs.

### **3.4 Final demand**

The final demand matrix captures the amount of total resources demanded by different agents in the economy (households, government, corporations and the foreign sector) and investment (gross fixed capital formation and stock variations). The corporate sector is an intermediate agent that pays and receives taxes and transfers. It does not consume and in some cases it is merged together with households. The figures corresponding to these transactions are directly taken from the national use tables in WIOD at purchasers' prices. The aggregation of final demand by product and the intermediate demand from the symmetric I-O table is equal to total demand and it matches total supply by product.

The institutional sectors in the SAMs have revenues from different sources (factor incomes, transfers, tax revenues etc.) that they use for paying taxes -the representative household and the corporate sector pay direct taxes- and transfers. Net revenues are used to pay for consumption, and savings are calculated as a residual. The aggregation of domestic (households, corporations and government) and foreign savings (the current balance account from the EU and the RoW) are used to fund gross fixed capital formation and stock variations.

Exports constitute the final demand of the foreign sector. These data on exports to the EU-27 and the RoW are not directly available from WIOD because national SUTs do not provide any distinction by origin and destination. The data in the SAMs come from WIOD's international supply and use tables (ISUT). Exports in ISUT can be calculated

reversing the viewpoint of imports. In the measurement of imports the reporter country in the use table is the importer country – which consumes products domestically produced as well as imported-, but it can be also seen as the country of destination of all the goods exported by the country of origin. In this way, we can only measure exports for the 40 countries specified in WIOD, and not for any other. There is not any specific use table for the regions not included in the 40 countries of WIOD. Hence, the commodities sent to these territories cannot be directly observed. For this reason, we have combined the information on exports in national use tables with the value of exports reported for 40 countries in ISUT. For each EU-27 country we have the total exports by product from national SUTs, and we take the total of exports by product to the EU-27 region from the ISUT. The difference between these two figures corresponds to exports to the RoW. Both in national and international use tables, exports are valued at FOB (free on board).

### **3.5 The foreign sector: imports and re-exports**

Imports from the EU and the RoW together with value added and intermediate consumption add total supply by product. The data on imports have been obtained from the information included in the ISUT. They are at FOB values and international trade and transport margins (ITM) are included in a different account. The FOB valuation has been used in WIOD in order to have coherent numbers of bilateral trade flows since any import is also an export for another country. Unlike the usual account of national trade and transport margins included in national supply tables, the sum of the ITM included in the SAMs are not equal to zero. According to WIOD, Timmer et al. [8], these figures have been elaborated using data from UN COMTRADE and the national data in the margins sectors of transport and trade in WIOD. As mentioned, there is an account of re-exports that is part of total supply. The valuation of this variable is not clear in WIOD, but since they are defined as "total use minus imports in CIF in cases if the latter are larger than the former", it can be assumed that they are valued at FOB.

Re-exports are assumed not to be part of domestic production and their value has been subtracted from total imports in CIF. The corresponding bilateral flows have been adjusted proportionally. All foreign trade flows are valued in FOB, what requires the introduction of a new account in our SAMs already estimated in WIOD named International trade and transport margins. This account captures the bilateral trade and transport margins by product category. The logic of this account is that there are services which are produced in different countries, and consequently reported in supply tables, but are not actually consumed in the same country where they are produced and they are registered in use tables of other countries in form of commodities valued at CIF.

These margins have been obtained from combining national SUTs with information from the bilateral trade database that was constructed within the WIOD project. In the ISUT the use table for each country is broken down by origin, being the latter one of the 40 countries reported in WIOD or the rest of the world. Hence, we can deduct imports by origin and aggregate them into two categories, EU-27 and RoW. Since there are no specific data for Croatia, the trade information for this country is included in the account of the RoW.

Usually, re-exports are not included in such specific way in national SAMs as they are in the present way. However, WIOD includes information on these figures in order to balance international trade flows. On this regard, there is a brief discussion in Timmer et al. [8] on the role of processing trade, re-exports and transit-trade. In the document, there is not a precise distinction between "goods that are sent abroad for processing" and "re-exports". That is, in the world input-output tables re-exports are not only affecting trade flows (imports and exports) but also the production technology through national intermediate matrices since the main idea is to capture the underlying industry technologies and not only the value added generated. This is a particular important issue

for countries like China and the US. However, the main problem arise when we want to adjust trade flows to properly capture the value of imports and exports excluding not processing trade but *pure re-exports*, that is the flow of commodities that goes from country A to C through country B without suffering any minor or major change, also called *transit trade*. On this regard, if the figures included in ISUT under the name *re-exports* includes also *processing trade* the amount of this *pure re-exports* is not available and consequently it will be very difficult to know how they are allocated in intermediate consumption. In the present case, where the SAMs are elaborated for the purpose of being used as databases in a CGE model, it would have been better to remove the row/column corresponding to the *pure re-exports* and properly register them as trade flows among the effective countries avoiding any intermediate step. However, the lack of information makes difficult this adjustment in the practice.

Regarding other transfers and income flow data for the foreign sector, for some countries they are not disaggregated into the EU and the RoW. In some cases even compensation of employees is not disaggregated into wages and salaries and employer's social contributions. In the first case, we have applied the average weights of EU and RoW from all the other EU countries where this information was available. For the second, we also calculate the corresponding average weights of salaries and contributions from all the other EU countries where this information was available and have applied the shares to split the compensation of employees. The countries where these data were estimated are displayed in [Table 2](#).

Non-residents consumption is registered by a transfer from the foreign sectors to households and residents consumption abroad are included in the SAM as a transfer from the representative household to the foreign sectors. These data have been taken from WIOD-SUT. Hence, the column vector consumption accounts for commodity consumption in the territory made by residents and non-residents.

## 4. Conclusion

This paper describes the main data sources used in the construction of a Social Accounting Matrix for 27 EU countries, Croatia has not been included. In this set of matrices, the second redistribution of income has been adjustment in order to facilitate the elaboration of a more realistic computable general equilibrium model. A special effort has been made in the disaggregation of Social Contributions of employers and employees, and the appropriate allocation to Government and other institutional sectors avoiding the initial allocation of SC of employers to households and later on to other agents of the economy, mainly the Government.

The starting point is the set of supply and use tables at basic and purchasers' prices for all EU-27 countries in WIOD. This information was used to elaborate a 59-by-59 symmetric national input-output table at purchasers' prices using a bi-proportional adjustment method. The symmetric matrices have been completed using data from national accounts, Eurostat, to close the circular flow of income. These matrices follow a close resemble of national accounts and all numbers can be compared with official figures available in public data sources as WIOD and Eurostat such all readers may replicate the construction process and arise to the same figures.

The dataset of matrices presented in this paper constitute an important contribution for those researchers interested in the evaluation of public policies at national level and/or for all EU-27 countries. In particular, these SAMs have been elaborated for the case of RHOMOLO, the Regional CGE model developed by the EC to analyse the likely effects of Cohesion policies. The current matrices are at national level but they will be used as reference and constraint in the construction of Regional Social Accounting matrices, López-Cobo [9].

Although this is the most up-to-date national matrices that can be elaborated using public available data there are other issues that should be further evaluated in the future. One issue is related to trade flows and the concept of re-exports included in WIOD. As mentioned before, it is unclear the definition used for this variable in WIOD and how re-exports and/or processing trade may affect the production technology and trade flows among the EU countries and the rest of the world. In the SAMs at hand we have distinguish these two trade areas, and the reallocation of trade flows may arise to significant changes in foreign trade balances. On the other hand, in the current version of the SAMs taxes net of subsidies on production are not disaggregated into value added tax, taxes on imports and other net taxes on products. Additionally, it will be also interesting for fiscal analysis to disaggregate taxes from subsidies. A common feature in many recent SAMs is to present only one representative household. The SAMs presented in the document do also have one single representative household at national level; however, labour income is disaggregated by skill levels. A natural extension would be to divide the representative household by main sources of income. This issue would be an important feature for those researchers interested in the analysis of inequality but this is a hard and time consuming task rarely done for national economies and even more difficult to carry on for 27 EU countries. All these aspirations are interesting but difficult to implement. We leave the option to extend the current database to all researchers with particular interests in any of these areas.

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## List of abbreviations and definitions

SAM	Social accounting matrix
CGE	Computable general equilibrium
WIOD	World input-output database
EU	European Union
RoW	Rest of the world
SUT	Supply and use table
IOT	Input-output table
NIOT	National input-output table
NACE	Statistical classification of economic activities in the European Community
NUTS	Nomenclature of Territorial Units for Statistics
CPA	Statistical classification of products by activity in the European Economic Community
ISIC	International standard industrial classification of all economic activities
SIOT	Symmetric input-output table
WS	Wages and salaries
SCE	Employer's social contributions
ESA	European System of Accounts
SEA	Socio economic accounts
NTP	Net taxes on production
SUIOT	Supply and use input-output tables
GVA	Gross value added
COMP	Compensation of employees
SC	Social contributions
I-O	Input-output
ISUT	International supply and use table
FOB	Free on board
ITM	International trade and transport margins
CIF	Cost, insurance and freight

## List of figures

Figure 1. Main structure of SAMs EU-27 .....	12
Figure 2. Product-by-product transformation based on industry-technology assumption	17
Figure 3. Disaggregation of Social contributions .....	21
Figure 4. Social contributions as distributive transactions .....	21

## List of tables

Table 1. Available input-output framework .....	8
Table 2. Availability of foreign sectors data (EU and RoW) in national accounts, 2010 ..	10
Table 3. Accounts in the SAMs EU-27.....	13
Table 4. Productive sectors in the SAMs for EU-27 in 2010 .....	14
Table 5. Exchange rates national currency/euros.....	17
Table 6. Skill level definition based on education level attained .....	18
Table 7. Data source of additional information used to disaggregate value added components.....	19
Table 8. Social Contributions. Austria 2010.....	22
Table 9. Actual Employers' social contributions (D.6111). Austria 2010 .....	23
Table 10. Allocation of social contributions. Austria 2010.....	23



## Appendix: An aggregated version of the Social accounting matrix for Austria 2010

SAM for Austria, 2010 (million euros)												
	Agri- culture	Manu- facture	Cons- truction	Transport	Business services	Other services	WS_h	SSCE_h	WS_m	SSCE_m	WS_I	SSCE_I
<b>Agriculture</b>	2397.341	5599.696	73.920	766.968	80.402	49.575						
<b>Manufacture</b>	1757.424	98284.421	14560.169	18095.641	9168.436	10603.040						
<b>Construction</b>	118.996	2272.829	4946.365	2652.267	5236.920	1785.649						
<b>Transport</b>	83.254	6979.162	918.025	16054.929	3223.931	1712.582						
<b>Business services</b>	284.990	12551.742	3870.234	16750.802	28724.155	8690.964						
<b>Other services</b>	125.996	1722.681	155.590	1144.321	3361.186	3586.324						
<b>WS_h</b>	76.168	5374.224	1236.212	5260.734	8044.783	14538.929						
<b>SSCE_h</b>	18.899	1137.871	244.915	1078.434	1716.355	4362.864						
<b>WS_m</b>	282.901	17271.710	5410.880	20131.139	9864.530	16585.544						
<b>SSCE_m</b>	70.194	3568.940	1066.876	4079.600	2265.294	5000.041						
<b>WS_I</b>	72.556	2788.708	912.319	3306.095	1097.706	2270.671						
<b>SSCE_I</b>	18.003	556.476	179.186	649.254	227.540	656.826						
<b>SSCHSU</b>												
<b>GOS</b>	4555.174	20366.306	7723.186	26131.560	42465.672	9717.964						
<b>NTP</b>	-1520.770	757.257	446.559	817.230	1506.065	1414.455						
<b>NTPR</b>	302.013	19171.510	1952.555	3669.116	4763.678	-2707.949						
<b>PI</b>												
<b>DTX</b>												
<b>TR</b>												
<b>AJ</b>												
<b>TTM</b>	2654.310	49788.210	0.000	-52442.520	0.000	0.000						
<b>SA</b>												
<b>H</b>							34552.458	69589.818		10454.531		
<b>CORP</b>												
<b>GOV</b>								8526.879		15990.077		2278.610
<b>WFB</b>												
<b>GFCF</b>												
<b>SV</b>												
<b>EU</b>	2117.178	76573.597	54.936	5764.193	2749.217	976.611	328.046	69.054	660.697	129.493	99.257	18.453
<b>ROW</b>	518.648	20003.522	836.394	7559.225	6248.288	1282.726	73.569	13.047	148.171	24.466	22.260	3.487
<b>REX</b>	0.000	7455.937	0.000	405.772	0.000	0.000						
<b>ITM</b>	144.082	5108.451	0.000	0.000	0.000	0.000						

Source: own elaboration.

**SAM for Austria, 2010 (million euros) (continued)**

	SSCHSU	GOS	NTP	NTPR	PI	DTX	TR	AJ	TTM	SA
Agriculture										
Manufacture										
Construction										
Transport										
Business services										
Other services										
WS_h										
SSCE_h										
WS_m										
SSCE_m										
WS_I										
SSCE_I										
SSCHSU										
GOS										
NTP										
NTPR										
PI										
DTX										
TR										
AJ										
TTM										
SA										
H		43685.000			19919.000		8623.000	919.000		
CORP	1801.900	63876.862			52068.000		7907.000			
GOV	21686.100	3398.000	9204.796	31840.922	3525.000	36393.000	3932.000			
WFB										
GFCF										59631.340
SV										3061.053
EU	140.000			636.000	16619.000	6.000	2783.000			
ROW	147.000				10850.000	3.000	887.000			
REX										
ITM										

Source: own elaboration.

<b>SAM for Austria, 2010 (million euros) (continued)</b>										
	<b>H</b>	<b>CORP</b>	<b>GOV</b>	<b>WFB</b>	<b>GFCF</b>	<b>SV</b>	<b>EU</b>	<b>ROW</b>	<b>REX</b>	<b>ITM</b>
<b>Agriculture</b>	3825.606		214.394		166.398	81.804	625.881	195.370		
<b>Manufacture</b>	67807.156		3139.901		26843.242	2171.320	66335.972	38566.527		
<b>Construction</b>	1803.169		0.000		24699.389	0.000	104.920	967.816		
<b>Transport</b>	33770.321		472.361		95.564	0.000	6035.845	12528.784		
<b>Business services</b>	34664.614		259.598		7585.966	513.458	3931.825	12915.810		
<b>Other services</b>	18016.870		51118.124		240.781	294.471	350.074	410.399		
<b>WS_h</b>							114.274	308.750		
<b>SSCE_h</b>							27.049	22.594		
<b>WS_m</b>							230.151	621.832		
<b>SSCE_m</b>							50.723	42.369		
<b>WS_l</b>							34.576	93.418		
<b>SSCE_l</b>							7.228	6.038		
<b>SSCHSU</b>	23300.000						408.000	67.000		
<b>GOS</b>										
<b>NTP</b>			4641.000				1143.000	0.000		
<b>NTPR</b>			5271.000				55.000	0.000		
<b>PI</b>	2963.000	65304.000	7569.000				16111.000	11034.000		
<b>DTX</b>	30457.000	5825.000					107.000	13.000		
<b>TR</b>	7958.000	8068.000	7040.000				858.000	208.000		
<b>AJ</b>		919.000								
<b>TTM</b>										
<b>SA</b>	28362.180	43492.761	685.006				10306.372	-33268.169	7861.709	5252.533
<b>H</b>				58422.000			6791.642	5756.010		
<b>CORP</b>										
<b>GOV</b>										
<b>WFB</b>	100.000	2045.000	56365.000				434.000	192.000		
<b>GFCF</b>										
<b>SV</b>										
<b>EU</b>	4022.800			315.000						
<b>ROW</b>	1661.744			399.000						
<b>REX</b>										
<b>ITM</b>										

Source: own elaboration.



## JRC Mission

As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

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Stimulating innovation  
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