

Europe

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1. Introduction

Individual Social Accounting Matrices (SAM) for the 27 European Union Member States¹ (EU27) have been contributed to the GTAP Data Base as a result of the AgroSAM project initiated by DG TRADE hosted at the Institute for Prospective Technological Studies of the European Commission (IPTS).

GTAP 7 released in November 2008 includes 13 updated input-output tables for Austria, Czech Republic, Denmark, Estonia, France, Germany, Greece, Ireland, Netherlands, Poland, Spain, Sweden and United Kingdom. GTAP 7.1 from December 2009 incorporates updated input-output tables for all EU27 member countries, including refined versions of the 13 tables already included in GTAP v7.

This document describes the method used to transform these SAMs, which are in Supply and Use format, into an input-output format that is compatible with the GTAP format as described in (Huff, McDougall, & Walmsley, 2000).

2. Source Data

The method used to construct Social Accounting Matrices for the EU27 is fully documented in (Mueller, Pérez Domínguez, & Gay, 2009)². The SAMs were constructed by combining national Supply and (total) Use Tables from EUROSTAT with disaggregated information on the agricultural sector from the CAPRI model database (Britz, 2005) using cross-entropy techniques that bring together the different databases and other missing information. The resulting SAMs are complete and consistent databases that require transformation into a format that is compatible with the GTAP database.

The reference year of the original data is 2000. Table 1 in the Appendix provides detailed information about the original sectoral classification (54 sectors) and the correspondence with GTAP sectors.

3. Converting the SAMs to GTAP IO table format

The changes undertaken to convert the SAMs into the GTAP IO table format follow the UN guidelines for producing input-output tables, valued in basic prices, from SNA (United Nations, 1993) compliant SAMs, valued in purchaser and basic prices. First, the total Use matrices were

¹Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom

² Available at <http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=2679>

revalued to account for trade and transport margins. Second, the revalued total use matrices were: split into domestic and imported Use matrices. Third, tax matrices for commodity taxes on purchases of domestic and imported commodities were developed. And fourth, commodity by commodity input-output tables were generated using the industry technology assumption required by GTAP. Finally, some negative entries in the tables had to be resolved.

Estimation of Margin Matrices

The column entries in the combined Use matrices were revalued to account for trade and transport margins so that the value of total inputs for each activity, in basic prices, remained constant. For the prior, best estimate, matrices of margins it was assumed that recorded trade and transport margins were distributed equally across all purchasing agents in the Use matrix; but while this process preserved the row totals the column totals contained small differences from zero. Accordingly an entropy estimation procedure was used to estimate the final margin matrices; the estimation procedure was an adaptation of sambal utility developed by (Robinson, 2005).

Split between Domestic and Imported Uses

The GTAP format requires the split of total demand (intermediate consumption, private and government spending and investment) into demand for domestic and imported commodities. Our treatment follows the method outlined in (Huff, McDougall, & Walmsley, 2000). The vectors of total imports by commodity were used to create import matrices using pro-rata allocations based on the total use matrices. Finally, the domestic use matrices are obtained as the differences between the total use and import matrices.

Building commodity tax matrices

The original SAMs distinguish between different types of direct and indirect tax accounts. More specifically, the contributed data includes commodity specific information on value added type taxes (VAT), taxes on products other than VAT (excise and consumption taxes, stamp taxes, general sales taxes etc.) and taxes and duties on imports and activity specific taxes. Our assumptions are the following: taxes on commodities other than VAT are levied on intermediate uses and private consumption. VAT is levied on sales tax inclusive prices on private consumption. Based on the available information we construct tax matrices that serve as the basis for distinguishing between Use matrices valued pre- and post-commodity-tax.

Symmetric Input-Output Tables

The Supply and Use matrices, all now valued in basic prices, together with commodity-tax matrices and margin matrices are then used to generate the input-output tables. The account totals are from the commodity accounts, i.e., the tables are commodity by commodity tables, and the technology assumption is a pure industry technology assumption; i.e., all outputs produced by an industry are produced using industry specific technologies. The method is described in (United Nations, 1999) and (Miller & Blair, 1985).

Negatives

Although negative entries in an IO table can be statistically valid, for use in the GTAP model these negative values have to be replaced.

We have identified the following categories of negatives that required adjustment of the original SAMs: negative payments to capital (56 cases); negative investment (9 cases); negative imports (3 cases) and negative exports (2 cases). Negative payments to capital were replaced by a positive

value based on the share of the sector from the representative IO table. Negative investment and trade entries were replaced by a positive value based on the share in total investment/trade from the representative table.

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Appendix

Table 1 Sectoral correspondence: AgroSAM to GTAP

Modified agricultural classification (AgroSAM)		GTAP classification	
Description	Code	Code	Description
Other wheat	A/C_OWHE	WHT	Wheat
Durum wheat	A/C_DWHE	WHT	Wheat
Barley	A/C_BARL	GRO	Cereal grains nec
Grain maize	A/C_MAIZ	GRO	Cereal grains nec
Other cereals	A/C_OCER	GRO	Cereal grains nec
Paddy rice	A/C_PARI	PDR	Paddy rice
Rape seed	A/C_RAPE	OSD	Oil seeds
Sunflower seed	A/C_SUNF	OSD	Oil seeds
Soya seed	A/C_SOYA	OSD	Oil seeds
Other oil plants	A/C_OOIL	OSD	Oil seeds
Other starch and protein plants	A/C_STPR	OCR	Crops nec
Potatoes	A/C_POTA	OCR	Crops nec
Sugar beet	A/C_SUGB	C_B	Sugar cane, sugar beet
Fiber plants	A/C_FIBR	PFB	Plant-based fibers
Grapes	A/C_GRPS	V_F	Vegetables, fruit, nuts
Fresh vegetables, fruit, and nuts	A/C_FVEG	V_F	Vegetables, fruit, nuts
Live plants	A/C_LPLT	OCR	Crops nec
Other crop products	A/C_OTCR	OCR	Crops nec
Fodder crops	A/C_FODD	OCR	Crops nec
Set aside	A_SETA	OCR	Crops nec
Raw milk from bovine cattle	A/C_COMI	RMK	Raw milk
Bovine cattle, slaughtered	A/C_LCAT	CTL	Bovine cattle, sheep and goats, horses
Swine, slaughtered	A/C_PIGF	OAP	Animal products nec
Raw milk from sheep and goats	A/C_SGMI	RMK	Raw milk
Sheep, goats, horses, asses, mules and hinnies, slaughtered	A/C_LSGE	CTL	Bovine cattle, sheep and goats, horses
Eggs	A/C_EGGS	OAP	Animal products nec
Poultry, slaughtered	A/C_PLTR	OAP	Animal products nec
Wool and animal hair; Silk-worm cocoons suitable for reeling	A/C_ANHR	WOL	Wool, silk-worm cocoons
Other animals, live, and their products	A/C_OANM	OAP	Animal products nec
Agricultural services	A/C_AGSV	OBS	Business services nec
Products of forestry, logging and related services	A/C_FORE	FRS	Forestry
Fish and other fishing products; services incidental of fishing	A/C_FISH	FSH	Fishing
Coal and lignite; peat	A/C_COAL	COA	Coal

Crude petroleum and natural gas; services incidental to oil and gas extraction excluding surveying	A/C_COIL	OIL_GAS	Oil and Gas
Uranium and thorium ores	A/C_URAN	OMN	Minerals nec
Metal ores	A/C_MEOR	OMN	Minerals nec
Other mining and quarrying products	A/C_OMIN	OMN	Minerals nec
Rice, milled or husked	A/C_RICE	PCR	Processed rice
Other food products	A/C_OFOD	OFD	Food products nec
Processed sugar	A/C_SUGA	SGR	Sugar
Vegetable oils and fats, crude and refined; oil-cake and other solid residues, of vegetable fats or oils	A/C_VOIL	VOL	Vegetable oils and fats
Dairy products	A/C_DAIR	MIL	Dairy products
Meat of bovine animals, fresh, chilled, or frozen	A/C_BFVL	CMT	Bovine meat products
Meat of swine, fresh, chilled, or frozen	A/C_PORK	OMT	Meat products nec
Meat of sheep, goats, and equines, fresh, chilled, or frozen	A/C_SGMT	OMT	Meat products nec
Meat and edible offal of poultry, fresh, chilled, or frozen	A/C_POUM	OMT	Meat products nec
Beverages	A/C_BEVR	B_T	Beverages and tobacco products
Prepared animal feeds	A/C_ANFD	OFD	Food products nec
Tobacco products	A/C_TOBA	B_T	Beverages and tobacco products
Textiles	A/C_TEXT	TEX	Textiles
Wearing apparel; furs	A/C_GARM	WAP	Wearing apparel
Leather and leather products	A/C_LETH	LEA	Leather products
Wood and products of wood and cork (except furniture); articles of straw and plaiting materials	A/C_WOOD	LUM	Wood products
Pulp, paper and paper products	A/C_PULP	PPP	Paper products, publishing
Printed matter and recorded media	A/C_MDIA	PPP	Paper products, publishing
Coke, refined petroleum products and nuclear fuels	A/C_RPET	P_C	Petroleum, coal products
Chemicals, chemical products and man-made fibers	A/C_CHEM	CRP	Chemical, rubber, plastic products
Rubber and plastic products	A/C_PLST	CRP	Chemical, rubber, plastic products
Other non-metallic mineral products	A/C_NMMP	NMM	Mineral products nec
Basic metals	A/C_FRMT	I_S_NFM	Ferrous metals and Metals nec
Fabricated metal products, except machinery and equipment	A/C_FAME	FMP	Metal products
Machinery and equipment n.e.c.	A/A/C_MA	OME	Machinery and equipment nec
Office machinery and computers	A/C_OFMA	ELE	Electronic equipment
Electrical machinery and apparatus n.e.c.	A/C_ELMA	OME	Machinery and equipment nec
Radio, television and communication equipment and apparatus	A/C_COEQ	ELE	Electronic equipment
Medical, precision and optical instruments, watches and clocks	A/C_MEIN	OME	Machinery and equipment nec
Motor vehicles, trailers and semi-trailers	A/C_MOTO	MVH	Motor vehicles and parts

Other transport equipment	A/C_TREQ	OTN	Transport equipment nec
Furniture; other manufactured goods n.e.c.	A/C_FURN	OMF	Manufactures nec
Secondary raw materials	A/C_RECY	OMF	Manufactures nec
Electrical energy, gas, steam and hot water	A/C_EGSW	ELY_GDT	Electricity and Gas manufacture, distribution
Collected and purified water, distribution services of water	A/C_WATR	WTR	Water
Construction work	A/C_CONS	CNS	Construction
Trade, maintenance and repair services of motor vehicles and motorcycles; retail sale of automotive fuel	A/C_SMOT	TRD	Trade
Wholesale trade and commission trade services, except of motor vehicles and motorcycles	A/C_WTRD	TRD	Trade
Retail trade services, except of motor vehicles and motorcycles; repair services of personal and household goods	A/C_RTRD	TRD	Trade
Hotel and restaurant services	A/C_HORE	TRD	Trade
Land transport; transport via pipeline services	A/C_TRLD	OTP	Transport nec
Water transport services	A/C_TRWA	WTP	Water transport
Air transport services	A/C_TRAR	ATP	Air transport
Supporting and auxiliary transport services; travel agency services	A/C_TROT	OTP	Transport nec
Post and telecommunication services	A/C_TECO	CMN	Communication
Financial intermediation services, except insurance and pension funding services	A/C_FINA	OFI	Financial services nec
Insurance and pension funding services, except compulsory social security services	A/C_INSU	ISR	Insurance
Services auxiliary to financial intermediation	A/C_FIAX	OFI	Financial services nec
Real estate services	A/C_ESTA	OBS	Business services nec
Renting services of machinery and equipment without operator and of personal and household goods	A/C_MARE	OBS	Business services nec
Computer and related services	A/C_COMP	OBS	Business services nec
Research and development services	A/C_RESC	OBS	Business services nec
Other business services	A/C_OTBS	OBS	Business services nec
Public administration and defence services; compulsory social security services	A/C_PUAD	OSG	Public Administration, Defense, Education, Health
Education services	A/C_EDUC	OSG	Public Administration, Defense, Education, Health
Health and social work services	A/C_HESO	OSG	Public Administration, Defense, Education, Health
Sewage and refuse disposal services, sanitation and similar services	A/C_SANI	OSG	Public Administration, Defense, Education, Health
Membership organisation services n.e.c.	A/C_ORGA	OSG	Health
Recreational, cultural and sporting services	A/C_CULT	ROS	Recreational and other services
Other services	A/C_OTSV	ROS	Recreational and other services
Private households with employed persons	A/C_PRRH	ROS	Recreational and other services

Source: (Mueller, Pérez Domínguez, & Gay, 2009)