Supporting Information

1. Appendix A—Aggregate MSUT

1.1. Data Description

In the following table detailed information about data availability on systems of monetary supply and use tables is presented. The column of notes is mostly concerned with data on various valuation layers, but other important points could also be mentioned there. For a number of countries (China, Indonesia, India, Japan and South Korea) a lot of manual changes of original data were required, and, therefore, the description of the carried out transformation is given after the table.

All the original data, which was originally in national currency and/or for a year other than 2007, was scaled to the required year using GDP growth and converted into millions of Euros prior to disaggregation procedure.

Table S1. Summary of available data used by individual country.

Countries	Available raw data	Notes
EU-27		
Austria	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>); valuation layers of net taxes and total margins, use in basic prices for year 2006 (<u>eeSUIOT</u> project)	Valuation layers (incl confidential information) were provided by Isabelle Rémond-Tiedrez (Eurostat) only for validation
Belgium	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>); valuation layers of net taxes and total margins, use in basic prices for year 2004 (<i>eeSUIOT project</i>)	Valuation layers (incl confidential information) were provided by Isabelle Rémond-Tiedrez (Eurostat) only for validation
Bulgaria	Supply and use in purchasers' prices until 2005 in national currency (<i>Eurostat</i>); valuation layers of net taxes and total margins for year 2003 (<i>eeSUIOT_project</i>)	Valuation layers (incl confidential information) were provided by Isabelle Rémond-Tiedrez (Eurostat) only for validation
Cyprus	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>)	For valuation layers, Italian rates are taken as proxy
Czech Republic	Supply and use in purchasers' prices until 2007 in national currency (<i>Eurostat</i>); use in basic prices for year 2007 (<i>eeSUIOT project</i>)	Use in basic prices was provided by Isabelle Rémond-Tiedrez (Eurostat) only for confidential use; for valuation layers rates of Romania are taken as proxy
Germany	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>)	For valuation layers, Austrian rates are taken as proxy
Denmark	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>); valuation layers of net taxes and total margins, use in basic prices for year 2007 (<i>eeSUIOT project</i>)	In use table for 2007 there are negatives in the intermediate part, so for now year 2006 is used

Table S1. Cont.

Countries	Available raw data	Notes
Estonia	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>)	For valuation layers rates of Romania are taken as proxy
Spain	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>); use in basic prices for year 2006 (<i>eeSUIOT project</i>)	Use in basic prices was provided by Isabelle Rémond-Tiedrez (Eurostat) only for confidential use; for valuation layers, Italian rates are taken as proxy
Finland	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>); valuation layers of net taxes and total margins, use in basic prices for year 2006 (<i>eeSUIOT project</i>)	Valuation layers (incl confidential information) were provided by Isabelle Rémond-Tiedrez (Eurostat) only for validation
France	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>)	For valuation layers, Austrian rates are taken as proxy
Greece	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>)	For valuation layers rates of Italy are taken as proxy
Hungary	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>)	For valuation layers, Romanian rates are taken as proxy
Ireland	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>)	For valuation layers, Danish rates are taken as proxy
Italy	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>); valuation layers of net taxes and total margins, use in basic prices for year 2007 (<i>eeSUIOT project</i>)	Valuation layers (incl confidential information) were provided by Isabelle Rémond-Tiedrez (Eurostat) only for validation
Lithuania	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>)	For valuation layers rates of Romania are taken as proxy
Luxembourg	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>)	For valuation layers, Austrian rates are taken as proxy
Latvia	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>)	For valuation layers, Romanian rates o are taken as proxy
Malta	Supply and use in purchasers' prices until 2004 in euros (<i>Eurostat</i>)	For valuation layers, Romanian rates are taken as proxy
Netherlands	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>); valuation layers of net taxes and total margins, use in basic prices for year 2007 (<i>eeSUIOT project</i>)	Valuation layers (incl confidential information) were provided by Isabelle Rémond-Tiedrez (Eurostat) only for validation
Poland	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>)	For valuation layers, Romanian rates are taken as proxy
Portugal	Supply and use in purchasers' prices until 2006 in euros (<i>Eurostat</i>)	For valuation layers, Italian rates are taken as proxy

Table S1. Cont.

Countries	Available raw data	Notes
Romania	Supply and use in purchasers' prices until 2007 in national currency (<i>Eurostat</i>); valuation layers of net taxes and total margins for year 2005 (<i>eeSUIOT project</i>)	Valuation layers (incl confidential information) were provided by Isabelle Rémond-Tiedrez (Eurostat) only for validation
Sweden	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>)	For valuation layers, Finnish rates are taken as proxy
Slovenia	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>)	For valuation layers, Romanian rates are taken as proxy
Slovakia	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>)	For valuation layers rates of Romania are taken as proxy
United Kingdom	Supply and use in purchasers' prices until 2007 in euros (<i>Eurostat</i>)	For valuation layers rates of Denmark are taken as proxy
Non EU-27 Australia	For year 2006–07 in national currency: supply, total use in basic prices, use of imported products in basic prices, valuation layers of taxes and subsidies (4 types), trade margins (2 types), transport margins (6 types) and other margins (4 types) (<i>ABS</i>)	In the use table, data was missing (n.p.) for the sector Water, Pipelines and Other Transport and the sector Air and Space Transport in the final demand categories. Also, the concerning rows/columns did not add up to the total. The missing amounts were estimated to achieve balance with total numbers. Use in purchasers' prices and use of domestic products in basic prices were derived from available tables.
Brazil	Supply and use in purchasers' prices for 2007 in national currency; supply, use in purchasers' prices, use of domestic products in basic prices and use of imported products in basic prices for 2005 in national currency (<i>IBGE</i>)	In 2005, table activities "Services to families and associations" and "Domestic services" were aggregated; the split was done to gain consistency with 2007 tables. For 2005, split between margins and net taxes valuation layers was done based on EXIOPOL rates.
Canada	For 2007 in national currency: supply, use in purchasers' prices, valuation layers of trade margins (2 types), transport margins (4 types), taxes (1 type) and total use in basic prices (Statistics Canada)	Many confidential values are forced to zero, therefore could not be differentiated from real zero transactions. According to a contact person in NSI "All column and row totals shown in the tables, however, are accurate". Use in purchasers' price has non-zero row of subsidies on products and valuation layer of taxes includes only taxes but no subsidies. This implies that the layer of subsidies should be estimated and added to the available use table.

Table S1. Cont.

Countries	Available raw data	Notes		
Switzerland	Supply and use in producers' prices for 2008 in national currency (ETH Zurich)	Vector of total margins was missing from supply table. Valuation layers of total margins and net taxes were estimated based on EXIOPOL rates. Subsequently, use in purchasers' prices and in basic prices were calculated based on available use and estimated values. Vector of total margins was calculated based on corresponding estimation of valuation layer.		
Non EU-27				
China	Input-output table in producers' prices for 2007 in national currency (<i>GTAP</i>).	See description after the table		
Indonesia	For year 2005 in national currency: input-output table in purchasers' prices, total input-output table in producers' prices and domestic input-output table in producers' prices (BADAN PUSAT STATISTIK)	See description after the table		
India	Use table in factor prices and product mix table for 2004 in national currency (CENTRAL STATISTICAL ORGANISATION)	See description after the table		
Japan	Input—output table for 2005 in national currencies in the following valuations: total producers' prices, imported products, trade margins (2 types), transport margins (7 types) and purchasers' prices (http://www.stat.go.jp/english/index.htm)	See description after the table		
South Korea	For year 2007's total, domestic and import input-output tables in producers' prices in national currency; for year 2005 input-output table in national currency in the following valuations: basic prices, producers' prices and purchasers' prices (<i>Bank of Korea</i>)	See description after the table		
Mexico	For year 2003 in national currency: supply, use in purchasers' prices, total use in basic prices, use of domestic products in basic prices, use of imported products in basic prices, valuation layers of taxes, subsidies, trade margins and transport margins (<i>National Institute for Statistics and Geography</i>)	Data is taken from EXIOPOL raw files. Availability of more recent data was checked, but nothing was available		
Norway	Supply and use in purchasers' prices until 2007 in national currency (<i>Eurostat</i>).	For valuation layers, Finnish rates are taken as proxy		

Table S1. Cont.

Countries	Available raw data	Notes	
Russia	For year 2003 in national currency: supply, use in purchasers' prices, total use in basic prices, use of domestic products in basic prices, use of imported products in basic prices, valuation layers of net taxes, trade margins and transport margins (<i>GKS</i>).	Original tables have significant imbalances	
Non EU-27			
Turkey	Supply and use in purchasers' prices for 2002 in national currency (<i>Eurostat</i>)	For valuation layers, Romanian rates are taken as proxy	
Taiwan	Input-output table for 2006 in national currency in the following valuations: total producers' prices (2 types: with and without import duties), domestic products, imported products (2 types: with and without import duties), trade margins (2 types), transport margins (7 types) and purchasers' prices (<i>National statistics</i>)	IO in purchasers' prices taken as use table, and supply was assumed diagonal. Since IO in producers' prices had non-zero row of product taxes, it was assumed that this table can be taken as use in basic prices with exception that VAT and net import duties moved from the value-added block to the row "Net taxes on products" (VA block in basic prices should be the same as in purchasers' prices). Valuation layer of net taxes was calculated as difference between use in purchasers' prices and sum of use in basic prices and total margins	
United States	For year 2002 in national currency: supply, use in purchasers' prices, total use in basic prices, use of domestic products in basic prices, use of imported products in basic prices, valuation layers of taxes (2 types), subsidies, trade margins (2 types), transport margins (6 types)	Data is taken from EXIOPOL raw files. Availability of more recent data was checked, but nothing was available	
South Africa	Supply and use in purchasers' prices for 2005 in national currency (<i>Statistics South Africa</i>)	For valuation layers, rates of EXIOPOL are taken as proxy	

China:

Since only an input-output table was available, it was taken as use table and supply was assumed diagonal. Original data was only available in producers' prices. Therefore, the valuation layer of net taxes had to be estimated based on tax rates available from EXIOPOL. The table of net taxes was then subtracted from the original data; the table in basic prices was the result. However, in some transactions, the tax rates from EXIOPOL were too high (60%–390%). These tax rates were replaced by the tax rate of a comparable transaction. This was the case for most transactions from the products Wholesale and retail trade. Also this was the case for the transactions: transport storage—petroleum processing and transport storage—GFCF. Valuation layer of total margins was estimated based on rates from EXIOPOL. The table of total margins was then added to the original data, and the table in

purchasers' prices was the result. In the original table, the vector of net taxes on products was missing; it was taken as a sum from the net taxes valuation layer. Net taxes on production (from value added block) were adjusted in such a way that all tables were in balance.

Indonesia:

Since only input-output tables are available, supply table was assumed to be diagonal and IO in purchasers' prices were taken as use in purchasers' prices. In IO in purchasers' prices, only taxes (duty and sales) on imported products are given. Taxes on domestic output were estimated using rate on VAT (10%) for most products and zero rate for some specific products. Tax rates were applied only on value added for each product (possible to do since supply is diagonal). Zero tax rate was used for the following products: paddy, beans, maize, "coal and metal ore mining", "crude oil, natural gas and geothermal mining", "other mining and quarrying", "restaurant and hotel", railway, road, water and air transport, financial intermediaries, "general government and defense", "social and community services". Rate of 9% was used for manufactured cigarettes. The rates were based on the Indonesian Tax Guide 2010 from Deloitte. Application of other types of product taxes was very difficult because their rates could vary significantly between specific products within 65 products groups available in IO tables. Vector of total use in purchasers' prices was kept as in original tables and operational surplus in use table was used to keep balance between columns of supply and use tables. Valuation layer of total margins was calculated as IO in purchasers' prices minus IO in producers' prices. Small imbalances were removed using RAS procedure. Valuation layer of net taxes is based on EXIOPOL rates.

India:

In order to get supply table column totals use tables were distributed accordingly with the product mix table. Import vector was already given as part of use table. Factor prices were assumed to be similar to basic prices. Valuation layer of total margins was estimated based on EXIOPOL rates. From available use table net indirect taxes per industry were already known. In order to estimate the net taxes valuation layer, an initial guess was estimated based on EXIOPOL rates and further balanced using minimum entropy taken total taxes from use table as a constraint. For some industries, the mathematical problem could not be solved (because of negatives) and the gross value added was adjusted in such a way that total industry output would remain unchanged. This occurred with the industries: paddy, wheat, gram, sugarcane, groundnut, coconut, tea, tobacco, other crops, milk and milk products, egg and poultry, other livestock products, electricity, railway transport services and communication.

Tax rates, calculated based on EXIOPOL data, were for some transactions extremely high (70%–200%). To compensate for this, either the average of the product category was taken or, when this option would not give an acceptable tax rate, the tax rates of a comparable product category was copied. In the list below the specifications are given:

- Product: Industrial machinery (others)—tax rates were copied from industrial machinery (F and T);
- Product: Other transport equipment—tax rates were copied from motor vehicles;
- Activity: Tea and coffee processing (col)—tax rates were copied from miscellaneous food products;

- Transactions: Industrial machinery (F and T) (row) and tobacco manufacturing—average of product category was taken;
- Activity: Beverages manufacturing (col)—tax rates were copied from miscellaneous food products;
- Transactions: Organic heavy chemicals (row) and computer-related services—tax rates from product category were taken;
- Transactions: Organic heavy chemicals (row) and plastic products—tax rates from product category were taken.

Japan:

In the original data, each transaction is marked by one of the following types: standard input, scrap input, scrap output, by-product input, by-product output, trade margins, transport margins. Original input and output of scrap, as well as by-products, are balanced between each other. The products which had scrap input/output transactions were split into two types: virgin and recycled. Firstly, use table was estimated using following assumptions:

- Intermediate block: standard input + scrap input + scrap output;
- Value added block: standard input;
- Final demand block: standard input + scrap input + scrap output + by-product input (since scrap output should be added with minus sign some of the final demand entries are negative, e.g. used paper, recycled glass product, *etc.*).

In the IO table only commodity taxes and duties on imported product were given. In order to estimate taxes on domestic products, the tax rate of commodity taxes on imported products were used with the following exceptions:

- 5% rate for the products where import rate was not available (5% is an estimate of average commodity tax rate);
- Zero rate on certain products and public services: pork (bone meat), school lunch, private power
 generation, waste management services, self-transportation by private cars, airport and traffic
 control, public administration, school education, social education, research institutes, health and
 hygiene, social insurance, social welfare, office supplies;
- Zero rate on recycled products.

In order to estimate intermediate part of the supply table, total domestic output per product was calculated as total use in purchasers' prices minus total margins minus total product taxes and minus imports. Then scrap output and by-product output were placed in the intermediate part and all the rest domestic output were put on the diagonal.

Since additional taxes on commodities were estimated, operating surplus in use table was used to keep balance between columns of supply and use tables. Valuation layer of net taxes is based on EXIOPOL rates.

South Korea:

Since only an input-output table was available, it was taken as use table and supply was assumed to be diagonal.

The problem with using original IO table for 2007 was that certain products had negatives due positive output of scrapped materials during production process. The table for 2005 had the following properties:

- Purchasers' prices: no negatives, because output of scrapped materials is given in a separate row and total use of scrapped materials is given in a separate column;
- Producers' prices: negatives due positive output of scrapped materials during production process; negatives are only in total and domestic tables, import table was without scrap;
- Basic prices: negatives due positive output of scrapped materials during production process.
 Value added differs from other valuations. It is likely that this adjustment by the value of net taxes on products was made by the statistical office in order to keep row-column balance (in purchasers' and producers' prices there are only columns with commodity taxes on imported products).

Firstly, valuation layer of total margins for year 2005 and output of scrapped materials by each production activity for year 2005 were estimated using minimum entropy problem. Restrictions used in the estimation:

- Total margins + scrap output = IO in purchasers' prices—IO in producers' prices;
- Each column of margins sums up to zero (positives and negatives are allowed only in specific places);
- Each row of margins sums up to the corresponding value from IO in purchasers' prices;
- Each column of scrap output sums up to the scrap output from IO in purchasers' prices;
- Each row of scrap output sums up to the scrap input from IO in purchasers' prices;

Secondly, IO in producers' prices for year 2005 without negatives was calculated as a difference between IO in purchasers' prices and estimated valuation layer of total margins. Thirdly, scrap output for year 2007 was estimated using the assumption that it equals a certain share of total intermediate inputs. Shares were assumed the same as in year 2005. Scrap output of dummy sector row was set to zero. Next, total scrap was distributed between users. It was assumed that the total amount of a certain scrapped material is used only by one sector. This sector was defined as a maximum user or taken the same as in Japan data. Next, IO in producers' prices for year 2007 without negatives (in intermediate part) was calculated as a sum of original IO in producers' prices and scrap output. All input of scrapped products was put into new product "Recycled materials." Negatives in final consumption reflect output of recycled materials by households and GFCF (this output cannot be put into supply table). Next, valuation layer of total margins for year 2007 was estimated using the margins rates from year 2005. The table was balanced to sum up to zero using the minimum entropy problem approach. Next, IO in purchasers' prices for year 2007 without negatives (in intermediate part) is calculated as a sum of IO in producers' price without negatives and estimated valuation layer of total margins. Next, net taxes on products for year 2007 are estimated using the tax rates from year 2005. For year 2005 net taxes valuation layer is calculated as IO in producers' prices—IO in basic prices. Next, IO in basic prices for year 2007 without negatives (in intermediate part) is calculated as a difference between IO in producers' price without negatives and estimated net taxes. Value added decreased (through taxes on production) by the amount on net taxes on products in order to keep row-column balance. Next, domestic IO in producers' prices for year 2007 is calculated as difference between IO in producers' prices without negatives and original import IO in producers' prices. Supply table was estimated at the

last step with total values on diagonal and all output of scrapped materials put into new product "Recycled materials." Column of other net taxes on products includes net taxes on domestic products and was calculated as difference between total net taxes from corresponding valuation layer and taxes on imported products (custom duties plus commodity taxes).

1.1.1. Purchasers by Residents Abroad; Purchases on the Domestic Territory by Non-Residents

As we follow the residential principle in the construction of MRIO tables, purchasers abroad must be treated as imports, and purchases on the domestic territory by non-residents are treated as exports. As most countries only report total purchasers abroad and non-resident purchasers, these must be allocated to product type. The allocation is done in a two-step process to estimate a representative import mix of households from the aggregate purchaser prices SUT data:

- (1) proportionally allocating imports vector across different uses to give a crude estimate of imports by households, then
- (2) using this estimate to re-allocate the purchasers abroad.

1.1.2. Electricity—Distribution and Transmission

In order to be able to disaggregate the electricity costs, the data sheets have been filled with information for industry and households, respectively, stemming from work done in EXIOPOL reconciled to Eurostat statistics for the EU (Eurostat 2012b). The data have been made comparable by transforming them into a common unit, *i.e.*, Euros/MWh. Some countries report the relative proportion of distribution and transmission (Australia and Canada) in the SUTs, and these values were confronted with aggregate country specific data where available. Similar treatment was done for distribution of natural gas.

1.1.3. Energy—Price Information

For most carriers/products, the data are directly taken from the IEA source (in \$ per toe) (International Energy Agency 2012b). These data pertain only to selected OECD countries. As for non-OECD countries covered by the IEA, the data are calculated using the original price data (\$ per unit) and suitable conversion factors (toe per unit). For some carriers/products prices per unit of calorific content are not provided by the IEA, so they are calculated even for OECD countries.

For every product, the missing data for a country was calculated using the average product price of other countries from the same geographical region. We distinguish between seven regions:

- 1. Austria, Belgium, Denmark, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Switzerland, UK
- 2. Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic
- 3. Finland, Sweden, Norway
- 4. Bulgaria, Cyprus, Greece, Malta, Romania, Slovenia, Turkey
- 5. China, India, Indonesia
- 6. Korea, Taiwan
- 7. Brazil, Canada, Mexico, USA.

Prices for Japan were usually too high and evidently independent from other Asian countries, and was therefore not assigned to any region. Because of geographic uncertainty, Australia, Russia and South Africa were also not assigned. For these countries, as well as the RoW, the average price of already-determined prices was taken.

Table S2. CREEA country classification.

Number	Country/Region	Code	EU member
1	Austria	AT	EU
2	Belgium	BE	EU
3	Bulgaria	BG	EU
4	Cyprus	CY	EU
5	Czech Republic	CZ	EU
6	Germany	DE	EU
7	Denmark	DK	EU
8	Estonia	EE	EU
9	Spain	ES	EU
10	Finland	FI	EU
11	France	FR	EU
12	Greece	GR	EU
13	Hungary	HU	EU
14	Ireland	IE	EU
15	Italy	IT	EU
16	Lithuania	LT	EU
17	Luxembourg	LU	EU
18	Latvia	LV	EU
19	Malta	MT	EU
20	Netherlands	NL	EU
21	Poland	PL	EU
22	Portugal	PT	EU
23	Romania	RO	EU
24	Sweden	SE	EU
25	Slovenia	SI	EU
26	Slovakia	SK	EU
27	United Kingdom	GB	EU
28	United States	US	nonEU
29	Japan	JP	nonEU
30	China	CN	nonEU
31	Canada	CA	nonEU
32	South Korea	KR	nonEU
33	Brazil	BR	nonEU
34	India	IN	nonEU
35	Mexico	MX	nonEU
36	Russia	RU	nonEU
37	Australia	AU	nonEU
38	Switzerland	СН	nonEU
39	Turkey	TR	nonEU
40	Taiwan	TW	nonEU

Table S2. Cont.

Number	Country/Region	Code	EU member
41	Norway	NO	nonEU
42	Indonesia	ID	nonEU
43	South Africa	ZA	nonEU
44	RoW Asia and Pacific	WA	nonEU
45	RoW America	WL	nonEU
46	RoW Europe	WE	nonEU
47	RoW Africa	WF	nonEU
48	RoW Middle East	WM	nonEU

 Table S3. EXIOBASE 2.0 product classification.

No.	Name	Code1	Code2
1	Paddy rice	p01.a	C_PARI
2	Wheat	p01.b	C_WHEA
3	Cereal grains nec	p01.c	C_OCER
4	Vegetables, fruit, nuts	p01.d	C_FVEG
5	Oil seeds	p01.e	C_OILS
6	Sugar cane, sugar beet	p01.f	C_SUGB
7	Plant-based fibers	p01.g	C_FIBR
8	Crops nec	p01.h	C_OTCR
9	Cattle	p01.i	C_CATL
10	Pigs	p01.j	C_PIGS
11	Poultry	p01.k	C_PLTR
12	Meat animals nec	p01.l	C_OMEA
13	Animal products nec	p01.m	C_OANP
14	Raw milk	p01.n	C_MILK
15	Wool, silkworm cocoons	p01.o	C_WOOL
16	Manure (conventional treatment)	p01.w.1	C_MANC
17	Manure (biogas treatment)	p01.w.2	C_MANB
18	Products of forestry, logging and related services (02)	p02	C_FORE
19	Fish and other fishing products; services incidental of fishing (05)	p05	C_FISH
20	Anthracite	p10.a	C_ANTH
21	Coking coal	p10.b	C_COKC
22	Other bituminous coal	p10.c	C_OTBC
23	Sub-bituminous coal	p10.d	C_SUBC
24	Patent fuel	p10.e	C_PATF
25	Lignite/Brown coal	p10.f	C_LIBC
26	BKB/Peat briquettes	p10.g	C_BKBP
27	Peat	p10.h	C_PEAT
28	Crude petroleum and services related to crude oil extraction, excluding surveying	p11.a	C_COIL
29	Natural gas and services related to natural gas extraction, excluding surveying	p11.b	C_GASE
30	Natural gas liquids	p11.b.1	C GASL
31	Other hydrocarbons	p11.c	C OGPL

Table S3. Cont.

No.	Name	Code1	Code2
32	Uranium and thorium ores (12)	p12	C_ORAN
33	Iron ores	p13.1	C IRON
34	Copper ores and concentrates	p13.20.11	С СОРО
35	Nickel ores and concentrates	p13.20.12	C NIKO
36	Aluminum ores and concentrates	p13.20.13	C ALUO
37	Precious metal ores and concentrates	p13.20.14	C PREO
38	Lead, zinc and tin ores and concentrates	p13.20.15	C LZTO
39	Other non-ferrous metal ores and concentrates	p13.20.16	C ONFO
40	Stone	p14.1	C STON
41	Sand and clay	p14.2	C SDCL
42	Chemical and fertilizer minerals, salt and other mining and quarrying products n.e.c.	p14.3	C_CHMF
43	Products of meat cattle	p15.a	C PCAT
44	Products of meat pigs	p15.a p15.b	C PPIG
45	Products of meat pigs Products of meat poultry	p15.c	C PPLT
46	Meat products nec	p15.c p15.d	C POME
	Products of Vegetable oils and fats		C VOIL
47		p15.e	_
48	Dairy products	p15.f	C_DAIR
49	Processed rice	p15.g	C_RICE
50	Sugar	p15.h	C_SUGR
51	Food products nec	p15.i	C_OFOD
52	Beverages	p15.j	C_BEVR
53	Fish products	p15.k	C_FSHP
54	Tobacco products (16)	p16	C_TOBC
55	Textiles (17)	p17	C_TEXT
56	Wearing apparel; furs (18)	p18	C_GARM
_57	Leather and leather products (19)	p19	C_LETH
58	Wood and products of wood and cork (except furniture); articles of straw and plaiting materials (20)	p20	C_WOOD
59	Wood material for treatment, reprocessing of secondary wood material into new wood material	p20.w	C_WOOW
60	Pulp	p21.1	C PULP
61	Secondary paper for treatment, reprocessing of secondary paper into new pulp	p21.w.1	C_PAPR
62	Paper and paper products	p21.2	C PAPE
63	Printed matter and recorded media (22)	p22	C MDIA
64	Coke oven coke	p23.1.a	C COKE
65	Gas coke	p23.1.b	C GCOK
66	Coal tar	p23.1.c	C COTA
67	Motor gasoline	p23.20.a	C MGSL
68	Aviation gasoline	p23.20.b	C AGSL
69	Gasoline-type jet fuel	p23.20.c	C GJET
70	Kerosene-type jet fuel	p23.20.d	C KJET
71	Kerosene	p23.20.e	C KERO
72	Gas/Diesel oil	p23.20.f	C DOIL
			_

Table S3. Cont.

No.	Name	Code1	Code2
73	Heavy fuel oil	p23.20.g	C_FOIL
74	Refinery gas	p23.20.h	C_RGAS
75	Liquefied petroleum gases (LPG)	p23.20.i	C_LPGA
76	Refinery feedstocks	p23.20.j	C REFF
77	Ethane	p23.20.k	C_ETHA
78	Naphtha	p23.20.1	C NAPT
79	White spirit and SBP	p23.20.m	C_WHSP
80	Lubricants	p23.20.n	C_LUBR
81	Bitumen	p23.20.o	C_BITU
82	Paraffin waxes	p23.20.p	C_PARW
83	Petroleum coke	p23.20.q	C_PETC
84	Non-specified petroleum products	p23.20.r	C NSPP
85	Nuclear fuel	p23.3	C NUCF
86	Plastics, basic	p24.a	C PLAS
87	Secondary plastic for treatment, reprocessing of secondary plastic into new plastic	p24.a.w	C_PLAW
88	N-fertilizer	p24.b	C NFER
89	P- and other fertilizer	p24.c	C PFER
90	Chemicals nec	p24.d	C CHEM
91	Charcoal	p24.e	C CHAR
92	Additives/Blending components	p24.c p24.f	C ADDC
93	Biogasoline	p24.r	C BIOG
94	Biodiesels	p24.g p24.h	C BIOD
95	Other liquid biofuels	p24.ii	C OBIO
96	Rubber and plastic products (25)	p25	C RUBP
97	Glass and glass products	p25 p26.a	C GLAS
	Secondary glass for treatment, reprocessing of secondary glass	p20.a	C_GE/15
98	into new glass	p26.w.1	C_GLAW
99	Ceramic goods	p26.b	C_CRMC
100	Bricks, tiles and construction products, in baked clay	p26.c	C_BRIK
101	Cement, lime and plaster	p26.d	C_CMNT
102	Ash for treatment, reprocessing of ash into clinker	p26.d.w	C_ASHW
103	Other non-metallic mineral products	p26.e	C_ONMM
104	Basic iron and steel and of ferro-alloys and first products thereof	p27.a	C_STEL
105	Secondary steel for treatment, reprocessing of secondary steel into new steel	p27.a.w	C_STEW
106	Precious metals	p27.41	C PREM
107	Secondary precious metals for treatment, reprocessing of secondary precious metals into new precious metals	p27.41.w	C_PREW
108	Aluminum and aluminum products	p27.42	C ALUM
109	Secondary aluminum for treatment, reprocessing of secondary aluminum into new aluminum	p27.42.w	C_ALUW
110	Lead, zinc and tin and products thereof	p27.43	C LZTP
111	Secondary lead for treatment, reprocessing of secondary lead into new lead	p27.43.w	C_LZTW

Table S3. Cont.

No.	Name	Code1	Code2
112	Copper products	p27.44	C_COPP
113	Secondary copper for treatment, reprocessing of secondary copper into new copper	p27.44.w	C_COPW
114	Other non-ferrous metal products	p27.45	C_ONFM
115	Secondary other non-ferrous metals for treatment, reprocessing of secondary other non-ferrous metals into new other non-ferrous metals	p27.45.w	C_ONFW
116	Foundry work services	p27.5	C METC
117	Fabricated metal products, except machinery and equipment (28)	p28	C FABM
118	Machinery and equipment n.e.c. (29)	p29	C_MACH
119	Office machinery and computers (30)	p30	C_OFMA
120	Electrical machinery and apparatus n.e.c. (31)	p31	C_ELMA
121	Radio, television and communication equipment and apparatus (32)	p32	C_RATV
122	Medical, precision and optical instruments, watches and clocks (33)	p33	C_MEIN
123	Motor vehicles, trailers and semi-trailers (34)	p34	C_MOTO
124	Other transport equipment (35)	p35	C_OTRE
125	Furniture; other manufactured goods n.e.c. (36)	p36	C_FURN
126	Secondary raw materials	p37	C_RYMS
127	Bottles for treatment, Recycling of bottles by direct reuse	p37.w.1	C_BOTW
128	Electricity by coal	p40.11.a	C_POWC
129	Electricity by gas	p40.11.b	C_POWG
130	Electricity by nuclear	p40.11.c	C_POWN
131	Electricity by hydro	p40.11.d	C_POWH
132	Electricity by wind	p40.11.e	C_POWW
133	Electricity by petroleum and other oil derivatives	p40.11.f	C_POWP
134	Electricity by biomass and waste	p40.11.g	C_POWB
135	Electricity by solar photovoltaic	p40.11.h	C_POWS
136	Electricity by solar thermal	p40.11.i	C_POWE
137	Electricity by tide, wave, ocean	p40.11.j	C_POWO
138	Electricity by geothermal	p40.11.k	C_POWM
139	Electricity nec	p40.11.1	C_POWZ
140	Transmission services of electricity	p40.12	C_POWT
141	Distribution and trade services of electricity	p40.13	C_POWD
142	Coke oven gas	p40.2.a	C_COOG
143	Blast furnace gas	p40.2.b	C_MBFG
144	Oxygen steel furnace gas	p40.2.c	C_MOSG
145	Gas works gas	p40.2.d	C_MGWG
146	Biogas	p40.2.e	C_MBIO
147	Distribution services of gaseous fuels through mains	p40.2.1	C_GASD
148	Steam and hot water supply services	p40.3	C_HWAT
149	Collected and purified water, distribution services of water (41)	p41	C_WATR
150	Construction work (45)	p45	C_CONS

Table S3. Cont.

No.	Name	Code1	Code2
151	Secondary construction material for treatment, reprocessing of secondary construction material into aggregates	p45.w	C_CONW
152	Sale, maintenance, repair of motor vehicles, motor vehicles parts, motorcycles, motor cycles parts and accessories	p50.a	C_TDMO
153	Retail trade services of motor fuel	p50.b	C_TDFU
154	Wholesale trade and commission trade services, except of motor vehicles and motorcycles (51)	p51	C_TDWH
155	Retail trade services, except of motor vehicles and motorcycles; repair services of personal and household goods (52)	p52	C_TDRT
156	Hotel and restaurant services (55)	p55	C_HORE
157	Railway transportation services	p60.1	C_TRAI
158	Other land transportation services	p60.2	C_TLND
159	Transportation services via pipelines	p60.3	C_TPIP
160	Sea and coastal water transportation services	p61.1	C_TWAS
161	Inland water transportation services	p61.2	C_TWAI
162	Air transport services (62)	p62	C TAIR
163	Supporting and auxiliary transport services; travel agency services (63)	p63	C_TAUX
164	Post and telecommunication services (64)	p64	C_PTEL
165	Financial intermediation services, except insurance and pension funding services (65)	p65	C_FINT
166	Insurance and pension funding services, except compulsory social security services (66)	p66	C_FINS
167	Services auxiliary to financial intermediation (67)	p67	C_FAUX
168	Real estate services (70)	p70	C_REAL
169	Renting services of machinery and equipment without operator and of personal and household goods (71)	p71	C_MARE
170	Computer and related services (72)	p72	C_COMP
171	Research and development services (73)	p73	C RESD
172	Other business services (74)	p74	C OBUS
173	Public administration and defense services; compulsory social security services (75)	p75	C_PADF
174	Education services (80)	p80	C_EDUC
175	Health and social work services (85)	p85	C HEAL
176	Food waste for treatment: incineration	p90.1.a	C INCF
177	Paper waste for treatment: incineration	p90.1.b	C INCP
178	Plastic waste for treatment: incineration	p90.1.c	C INCL
179	Inert/metal waste for treatment: incineration	p90.1.d	C INCM
180	Textiles waste for treatment: incineration	p90.1.e	C INCT
181	Wood waste for treatment: incineration	p90.1.f	C INCW
182	Oil/hazardous waste for treatment: incineration	p90.1.g	C INCO
183	Food waste for treatment: biogasification and land application	p90.2.a	C BIOF
184	Paper waste for treatment: biogasification and land application	p90.2.b	C BIOP
185	Sewage sludge for treatment: biogasification and land application	p90.2.c	C BIOS
186	Food waste for treatment: composting and land application	p90.3.a	C COMF
		r	

Table S3. Cont.

No.	Name	Code1	Code2
187	Paper and wood waste for treatment: composting and land application	p90.3.b	C_COMW
188	Food waste for treatment: waste water treatment	p90.4.a	C_WASF
189	Other waste for treatment: waste water treatment	p90.4.b	C_WASO
190	Food waste for treatment: landfill	p90.5.a	C_LANF
191	Paper for treatment: landfill	p90.5.b	C_LANP
192	Plastic waste for treatment: landfill	p90.5.c	C_LANL
193	Inert/metal/hazardous waste for treatment: landfill	p90.5.d	C_LANI
194	Textiles waste for treatment: landfill	p90.5.e	C_LANT
195	Wood waste for treatment: landfill	p90.5.f	C_LANW
196	Membership organization services n.e.c. (91)	p91	C_ORGA
197	Recreational, cultural and sporting services (92)	p92	C_RECR
198	Other services (93)	p93	C_OSER
199	Private households with employed persons (95)	p95	C_PRHH
200	Extraterritorial organizations and bodies	p99	C_EXTO

 Table S4. EXIOBASE 2.0 industry classification.

No.	EXIOBASE 2.0 Industry sectors	Code1	Code2
1	Cultivation of paddy rice	i01.a	A_PARI
2	Cultivation of wheat	i01.b	A_WHEA
3	Cultivation of cereal grains nec	i01.c	A_OCER
4	Cultivation of vegetables, fruit, nuts	i01.d	A_FVEG
5	Cultivation of oil seeds	i01.e	A_OILS
6	Cultivation of sugar cane, sugar beet	i01.f	A_SUGB
7	Cultivation of plant-based fibers	i01.g	A_FIBR
8	Cultivation of crops nec	i01.h	A_OTCR
9	Cattle farming	i01.i	A_CATL
10	Pig farming	i01.j	A_PIGS
11	Poultry farming	i01.k	A_PLTR
12	Meat animals nec	i01.1	A_OMEA
13	Animal products nec	i01.m	A_OANP
14	Raw milk	i01.n	A_MILK
15	Wool, silkworm cocoons	i01.o	A_WOOL
16	Manure treatment (conventional), storage and land application	i01.w.1	A_MANC
17	Manure treatment (biogas), storage and land application	i01.w.2	A_MANB
18	Forestry, logging and related service activities (02)	i02	A_FORE
19	Fishing, operating of fish hatcheries and fish farms; service activities incidental to fishing (05)	i05	A_FISH
20	Mining of coal and lignite; extraction of peat (10)	i10	A_COAL
21	Extraction of crude petroleum and services related to crude oil extraction, excluding surveying	i11.a	A_COIL
22	Extraction of natural gas and services related to natural gas extraction, excluding surveying	i11.b	A_GASE
23	Extraction, liquefaction, and regasification of other petroleum and gaseous materials	i11.c	A_OGPL

Table S4. Cont.

No.	EXIOBASE 2.0 Industry sectors	Code1	Code2
24	Mining of uranium and thorium ores (12)	i12	A_ORAN
25	Mining of iron ores	i13.1	A IRON
26	Mining of copper ores and concentrates	i13.20.11	A COPO
27	Mining of nickel ores and concentrates	i13.20.12	A NIKO
28	Mining of aluminum ores and concentrates	i13.20.13	A ALUO
29	Mining of precious metal ores and concentrates	i13.20.14	A PREO
30	Mining of lead, zinc and tin ores and concentrates	i13.20.15	A LZTO
31	Mining of other non-ferrous metal ores and concentrates	i13.20.16	A ONFO
32	Quarrying of stone	i14.1	A STON
33	Quarrying of sand and clay	i14.2	A_SDCL
34	Mining of chemical and fertilizer minerals, production of salt, other	i14.3	A CHAIR
<u> </u>	mining and quarrying n.e.c.		A_CHMF
35	Processing of meat cattle	i15.a	A_PCAT
36	Processing of meat pigs	i15.b	A_PPIG
37	Processing of meat poultry	i15.c	A_PPLT
38	Production of meat products nec	i15.d	A_POME
39	Processing vegetable oils and fats	i15.e	A_VOIL
40	Processing of dairy products	i15.f	A_DAIR
41	Processed rice	i15.g	A_RICE
42	Sugar refining	i15.h	A_SUGR
43	Processing of food products nec	i15.i	A_OFOD
44	Manufacture of beverages	i15.j	A_BEVR
45	Manufacture of fish products	i15.k	A_FSHP
46	Manufacture of tobacco products (16)	i16	A_TOBC
47	Manufacture of textiles (17)	i17	A_TEXT
48	Manufacture of wearing apparel; dressing and dyeing of fur (18)	i18	A_GARM
49	Tanning and dressing of leather; manufacture of luggage, handbags,	i19	A LETH
	saddlery, harness and footwear (19)	117	
	Manufacture of wood and of products of wood and cork, except		
50	furniture; manufacture of articles of straw and plaiting	i20	A_WOOD
	materials (20)		
51	Reprocessing of secondary wood material into new wood material	i20.w	A_WOOW
52	Pulp	i21.1	A_PULP
53	Reprocessing of secondary paper into new pulp	i21.w.1	A_PAPR
_54	Paper	i21.2	A_PAPE
_55	Publishing, printing and reproduction of recorded media (22)	i22	A_MDIA
56	Manufacture of coke oven products	i23.1	A_COKE
57	Petroleum refinery	i23.2	A_REFN
58	Processing of nuclear fuel	i23.3	A_NUCF
59	Plastics, basic	i24.1	A_PLAS
60	Reprocessing of secondary plastic into new plastic	i24.1.w	A_PLAW
61	N-fertilizer	i24.2	A_NFER
62	P- and other fertilizer	i24.3	A_PFER
63	Chemicals nec	i24.4	A_CHEM
64	Manufacture of rubber and plastic products (25)	i25	A_RUBP

Table S4. Cont.

No.	EXIOBASE 2.0 Industry sectors	Code1	Code2
65	Manufacture of glass and glass products	i26.a	A_GLAS
66	Reprocessing of secondary glass into new glass	i26.w.1	A_GLAW
67	Manufacture of ceramic goods	i26.b	A_CRMC
68	Manufacture of bricks, tiles and construction products, in baked clay	i26.c	A_BRIK
69	Manufacture of cement, lime and plaster	i26.d	A_CMNT
70	Reprocessing of ash into clinker	i26.d.w	A ASHW
71	Manufacture of other non-metallic mineral products n.e.c.	i26.e	A ONMM
72	Manufacture of basic iron and steel and of ferro-alloys and first products thereof	i27.a	A_STEL
73	Reprocessing of secondary steel into new steel	i27.a.w	A_STEW
74	Precious metals production	i27.41	A_PREM
75	Reprocessing of secondary precious metals into new precious metals	i27.41.w	A_PREW
76	Aluminum production	i27.42	A_ALUM
77	Reprocessing of secondary aluminum into new aluminum	i27.42.w	A_ALUW
78	Lead, zinc and tin production	i27.43	A_LZTP
79	Reprocessing of secondary lead into new lead	i27.43.w	A_LZTW
80	Copper production	i27.44	A_COPP
81	Reprocessing of secondary copper into new copper	i27.44.w	A_COPW
82	Other non-ferrous metal production	i27.45	A_ONFM
83	Reprocessing of secondary other non-ferrous metals into new other non-ferrous metals	i27.45.w	A_ONFW
84	Casting of metals	i27.5	A METC
85	Manufacture of fabricated metal products, except machinery and equipment (28)	i28	A_FABM
86	Manufacture of machinery and equipment n.e.c. (29)	i29	A MACH
87	Manufacture of office machinery and computers (30)	i30	A OFMA
88	Manufacture of electrical machinery and apparatus n.e.c. (31)	i31	A ELMA
89	Manufacture of radio, television and communication equipment and apparatus (32)	i32	A_RATV
90	Manufacture of medical, precision and optical instruments, watches and clocks (33)	i33	A_MEIN
91	Manufacture of motor vehicles, trailers and semi-trailers (34)	i34	A MOTO
92	Manufacture of other transport equipment (35)	i35	A OTRE
93	Manufacture of furniture; manufacturing n.e.c. (36)	i36	A FURN
94	Recycling of waste and scrap	i37	A RYMS
95	Recycling of bottles by direct reuse	i37.w.1	A BOTW
96	Production of electricity by coal	i40.11.a	A POWC
97	Production of electricity by gas	i40.11.b	A POWG
98	Production of electricity by nuclear	i40.11.c	A POWN
99	Production of electricity by hydro	i40.11.d	A POWH
100	Production of electricity by wind	i40.11.e	A POWW
101	Production of electricity by petroleum and other oil derivatives	i40.11.f	A POWP
102	Production of electricity by biomass and waste	i40.11.g	A POWB
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Table S4. Cont.

No.	EXIOBASE 2.0 Industry sectors	Code1	Code2
103	Production of electricity by solar photovoltaic	i40.11.h	A POWS
104	Production of electricity by solar thermal	i40.11.i	A POWE
105	Production of electricity by tide, wave, ocean	i40.11.j	A POWO
106	Production of electricity by geothermal	i40.11.k	A POWM
107	Production of electricity nec	i40.11.1	A POWZ
108	Transmission of electricity	i40.12	A POWT
109	Distribution and trade of electricity	i40.13	A POWD
110	Manufacture of gas; distribution of gaseous fuels through mains	i40.2	A_GASD
111	Steam and hot water supply	i40.3	A_HWAT
112	Collection, purification and distribution of water (41)	i41	A_WATR
113	Construction (45)	i45	A_CONS
114	Reprocessing of secondary construction material into aggregates	i45.w	A_CONW
115	Sale, maintenance, repair of motor vehicles, motor vehicles parts,	;50 a	A TDMO
113	motorcycles, motor cycles parts and accessories	i50.a	A_TDMO
116	Retail sale of automotive fuel	i50.b	A_TDFU
117	Wholesale trade and commission trade, except of motor vehicles and	i51	A TDWH
11/	motorcycles (51)	131	A_IDWII
118	Retail trade, except of motor vehicles and motorcycles; repair of	i52	A TDRT
110	personal and household goods (52)	132	A_IDKI
119	Hotels and restaurants (55)	i55	A_HORE
120	Transport via railways	i60.1	A_TRAI
121	Other land transport	i60.2	A_TLND
122	Transport via pipelines	i60.3	A_TPIP
123	Sea and coastal water transport	i61.1	A_TWAS
124	Inland water transport	i61.2	A_TWAI
124	Air transport (62)	i62	A_TAIR
126	Supporting and auxiliary transport activities; activities of travel	i63	A TAUX
	agencies (63)		
127	Post and telecommunications (64)	i64	A_PTEL
128	Financial intermediation, except insurance and pension funding (65)	i65	A_FINT
129	Insurance and pension funding, except compulsory social	i66	A FINS
	security (66)		
130	Activities auxiliary to financial intermediation (67)	i67	A_FAUX
131	Real estate activities (70)	i70	A_REAL
132	Renting of machinery and equipment without operator and of personal	i71	A MARE
122	and household goods (71)	:50	
133	Computer and related activities (72)	i72	A_COMP
134	Research and development (73)	i73	A_RESD
135	Other business activities (74)	i74	A_OBUS
136	Public administration and defense; compulsory social security (75)	i75	A_PADF
137	Education (80)	i80	A_EDUC
138	Health and social work (85)	i85	A_HEAL
139	Incineration of waste: food	i90.1.a	A_INCP
140	Incineration of waste: paper	i90.1.b	A_INCI
141	Incineration of waste: plastic	i90.1.c	A_INCL

Table S4. Cont.

No.	EXIOBASE 2.0 Industry sectors	Code1	Code2
142	Incineration of waste: metals and inert materials	i90.1.d	A_INCM
143	Incineration of waste: textiles	i90.1.e	A_INCT
144	Incineration of waste: wood	i90.1.f	A_INCW
145	Incineration of waste: oil/hazardous waste	i90.1.g	A_INCO
146	Biogasification of food waste, incl. land application	i90.3.a	A_BIOF
147	Biogasification of paper, incl. land application	i90.3.b	A_BIOP
148	Biogasification of sewage sludge, incl. land application	i90.3.c	A_BIOS
149	Composting of food waste, incl. land application	i90.4.a	A_COMF
150	Composting of paper and wood, incl. land application	i90.4.b	A_COMW
151	Waste water treatment, food	i90.5.a	A_WASF
152	Waste water treatment, other	i90.5.b	A_WASO
153	Landfill of waste: food	i90.6.a	A_LANF
154	Landfill of waste: paper	i90.6.b	A_LANP
155	Landfill of waste: plastic	i90.6.c	A_LANL
156	Landfill of waste: inert/metal/hazardous	i90.6.d	A_LANI
157	Landfill of waste: textiles	i90.6.e	A_LANT
158	Landfill of waste: wood	i90.6.f	A_LANW
159	Activities of membership organization n.e.c. (91)	i91	A_ORGA
160	Recreational, cultural and sporting activities (92)	i92	A_RECR
161	Other service activities (93)	i93	A_OSER
162	Private households with employed persons (95)	i95	A_PRHH
163	Extraterritorial organizations and bodies	i99	A_EXTO