

Supply & Use Tables (SUTs) Input/Output Tables (IOTs)



IO Converter

3-5 OCTOBER 2022, GENEVA, ONLINE



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Real Sector Division

- Background
- Main features
 - Mapping SUT transactions and DataMapping SUT and IOT classifications
- Dry run
 - Inclusion of subsidiesInclusion of imports

Refinement

- A way forward
- DEMO

Background

Main features

Mapping SUT transactions and DataMapping SUT and IOT classifications

Dry run

Inclusion of subsidiesInclusion of imports

Refinement

- A way forward
- DEMO

From SUTs to IOTs Benefits for Measuring Climate

STA

Develop Climate Indicators with Authorities & Improve Coverage of Climate Indicator Dashboard



IMF Climate Indicators Database & Dashboard (CID)



Urgency of adjustment to low/no carbon



Impact of International trade and globalization



- Background
- Main features
 - Mapping SUT transactions and Data
 Mapping SUT and IOT classifications
- Dry run
 >Inclusion of subsidies
 >Inclusion of imports

Refinement

- A way forward
- DEMO

Mapping SUT transactions and Data

Help the IO Converter to Recognize your Data

4	A	В	С	D	E	F	G	Н	1	J	К	
1	Code	Description	Quadrant	Group	Level	Order	Block					
2	IO Activity Code	Activity code	Classification	Activity_Code			1	1				
3	IO_Activity_Description	Activity description	Classification	Activity_Description			1	1				
4	IO_Product_Code	Product code	Classification	Product_Code			1	1				
5	IO_Product_Description	Product description	Classification	Product_Description			1	1				
6	I0_P1	Gross output	Supply	Output			1			lick on		Where are data?
7	IO_P7	Imports	Supply	Imports			2	2	u30 0			
8	IO_PM1	Trade Margins	Supply	Margins			3	2 this	s arrov	v to rui	า	
9	IO_PM1_W	Wholesale Margins	Supply	Margins		1	4	2				
10	IO_PM2	Transport Margins	Supply	Margins		1	4	2 the	V/RA	rodo		
11	IO_PM1_R	Retail Margins	Supply	Margins		1	5	2 Do	o no c	hange		
12	IO_D21	Taxes on Products	Supply	Taxes			6	2				
13	IO_D211	Value Added Taxes	Supply	Taxes	1		7	W	ording	OT		
14	IO_D211_FCE	Value Added Tax on Hou	s Supply	Taxes	2		8	2	togori	oc for		
15	IO_D211_GFCF	Value Added Tax on Gros	s Supply	Taxes	2		9	2	negon	65 101		
16	IO_D211_IC	Value Added Tax on Inter	r Supply	Taxes	2	1	0	2 th	ese co	olumns		
17	IO_D211_X	Value Added Tax on Exp	o Supply	Taxes	2	1	1	2				
18	IO_D31	Subsidies on products	Supply	Subsidies		1	2	2 Ch	ande	wordin	a	
19	IO_D214	Other Taxes on products	Supply	Taxes		1	3	2	ange	in or ann	9	
20	IO_D214_Excises	Excise Duties	Supply	Taxes	2	14	+	z of	categ	ories f	or	
21	IO_D214_Other	Other Taxes	Supply	Taxes	2	1	5	2				
22	IO_D212	Customs Duties	Supply	Taxes		1	6	2 the	ese co	lumns		
23	IO_D213	Taxes on exports	Supply	Taxes		1	7	2				
24	IO_P2	Intermediate consumption	n Use	IC			1	3				What is the transaction?
25	IO_P3	Final Consumption Exper	Use	FCE	1		2	3				
26	IO_P3_S14/S15	Households Final Consur	r Use	FCE	2		3	3				
27	IO P3 S14 OwnAccount	Households Own Account	t Use	FCF	3		4	3				
	Parameter	s SUT Code Mapp	ing Mapping Activ	ty Mapping Prod	uct	(+)						

Note:

- A single vector for imports is accepted
- Valuation adjustment and final demand can be broken down
- Choose to include either only total or only subcomponents

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	3			Trade	Marg Trai	nsport Mar	Taxes (VA	Taxes on im	Agric	ultu Mani	ufactur	Service	Services	\$2-3	Impor	purcha	ser's
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	5	Agriculture:	2		10	20	11		4	562	9	57	- 79	3	45		797
	6	Manufactur	ing		40	30	60	40) ;	200	1500	269	33	1	189		2659
	7	Service1		_	-70		18		2 3	208	137	202	123	3	49		669
	8	Service2				-55				198	73	200	11:	3	45		574
	9	Service3					120	Į	5 3	233	116	38	185	5	52		749
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	11														_		6247
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	19	Agriculture	2		_	—— D	o no cl	nange		104	420	99	195	5 20	6 94		797
	10	Manufactur	ina						-	374	535	369	450	200 201 201 201 201 201 201 201 201 201	5 290		2659
	17	Service1				- ta	ab nam	e	<u> </u>	80	283	40	10	2 17	0 84	<u> </u>	669
	18	Service2							1	91	136	47	1	5 19	7 88		574
	19	Service3								128	291	11	1	7 20	1 101		749
	20	Value Adde	d (COE, GOS, I	GMI)						816	545	173	100)			1634
	21	Value Adde	d, Net							796	535	153	50)			
>	22	COE								150	230	25	10	0			
	23	Othe, Taxes	s on production							10	5	20	0	Э			
	24	Oh, Sub, O	n production							-5		-2					
	25	CFC								20	10	20	50)			
	26	GOS							<u> </u>	661	310	130	8	1	_		
	27	Uperating s	urplus, Net							641	300	110	3	1 400	7 740		7001
	28	Total Inputs	3						16	39	2226	824	837	60	/ /48		7881
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Mapping SUT and IOT classifications

Help the IO Converter to convert rectangular matrix into square matrix.



Note:

- Use meaningful IOTs Codes: they will be sorted
- Use coefficients to allow breakdown and aggregation

Background

Main features

Mapping SUT transactions and Data
 Mapping SUT and IOT classifications

Dry run

Inclusion of subsidiesInclusion of imports

Refinement

- A way forward
- DEMO

Sign of subsidies and basis to allocate imports to use

Help the IO Converter to properly include subsidies and imports

IO Converter X
Generate IOTs
Generate Valuation adjustment categories
Recalculate Ratios to have sum that adds up to 1
Subsidies are positive values
 Ratio for Imports is relative to use at Basic Prices
Estimation of ratios
Ask the system to propose all ratios
⊂ Ask the system to propose ratios for imports
○ Ask the system to use existing ratio
Remove unnecessary worksheets
Keep Ratios and Valuation Adjustment sheets
Cancel

	Generate IOTs
	Generate Valuation adjustment categories
Rec	alculate Ratios to have sum that adds up to 1
Sub	sidies are positive values
 Rati 	o for Imports is relative to use at Basic Prices
- Esti	mation of ratios
Ask	the system to propose all ratios
C Ask	the system to propose ratios for imports
C Ask	the system to use existing ratio
	Remove unnecessary worksheets
Kee	p Ratios and Valuation Adjustment sheets

Generate IOTs

Request the IO Converter to generate IOTs (domestic + imported product).



Case of an industry output of zero value :

The transformation matrix is $D = V \cdot (\tilde{x}^{-1})$

where
$$(\tilde{x}^{-1}) = \begin{bmatrix} \tilde{x}^{-1}_{11} & \cdots & \tilde{x}^{-1}_{1n} \\ \vdots & \ddots & \vdots \\ \tilde{x}^{-1}_{n1} & \cdots & \tilde{x}^{-1}_{nn} \end{bmatrix}$$
 and
 $\tilde{x}^{-1}_{ij} = \begin{cases} 1/x_i \ 1 \ if \ i = j \ and \ x_i \neq 0 \\ 0 \ elswhere \end{cases}$.
 (\tilde{x}^{-1}) is slightly different from $(x)^{-1}$ as defined in the literature.

10

- Background
- Main features

Mapping SUT transactions and DataMapping SUT and IOT classifications

Dry run
 >Inclusion of subsidies
 >Inclusion of imports

Refinement

- A way forward
- DEMO

Include self-computed ratios

Request the IO Converter to use exogeneous information

	Α	В	С	D	E	F	G	н	1	
1	Structure	to allocate	price comp	onents and	imports (a	ccording to	intermedia	te and final	use)	
2	Keep form	at of the us	se matrix; l	gnore total	or summat	ion cells fro	m SUTs fo	r ratio; Dat	a snould sta	rt
3	Yellow cel	s with NA	transaction	codes are	mandatory	to link ratio	and transa	action/price	ategory	-
4			A1-2	C1	U1	U1-2	IO_P3	IO_P6		Ι
5			Agriculture	Manufactu	Services1	Services2-	Final Cons	Total Exp	rts	
6	IO_P7								Check	
7	A1	Agriculture	0.058815	0.530784	0.119613	0.052331	0.122105		0.116352	
8	A2	Agriculture	2				1		0	
9	C1	Manufactu	ring	1			2		-2	
10	U1	Service1	0.110381	0.417263	0.068073	0.031289	0.257095		0.1159	
11	U2	Service2	0.155989	0.23045	0.085806	0.040224	0.337769		0.149762	
12	U3	Service3	0.170895	0.388518	0.014686	0.022697	0.268358		0.134846	
13	IO_PM1								Check	
14	A1	Agriculture	e1	0.533166	0.12015	0.052566	0.122653		0.171464	
15	A2	Agriculture	2	0.012547	0.110414	0.244668	0.38394		0.248432	1
16	C1	Manufactu	ring	0.201203	0.138774	0.171493	0.238812		0.249718	
17	U1	Service1		0.423019	0.059791	0.017937	0.254111		0.245142	
18	U2	Service2		0.236934	0.081882	0.026132	0.343206		0.311847	
19	U3	Service3		0.388518	0.014686	0.022697	0.268358		0.305741	
	10, 0140		e Manning	Manni	na Activity	Mannir	a Product	Pation	M Valuati	
	,		e_mapping	i i i i i i i i i i i i i i i i i i i	ig_Activity	Mappi	ig_rioduct	Ratios	Ivi_valuati	
										1
	А	В	С	D	E	F	G	н	I	
1	A Estimates	B of Valuatio	C n Adjustme	D nt compone	E ents and im	F ports	G	н	I	
1 2	A Estimates	B of Valuation	C n Adjustme	D nt compone	E ents and im	F ports	G	Н	I	
1 2 3	A Estimates	B of Valuation	C n Adjustme	D nt compone	E ents and im	F ports	G	н	1	
1 2 3 4	A Estimates	B of Valuation	C n Adjustme A1-2	D nt compone C1	E ents and im U1	F ports U1-2	G IO_P3	H IO_P6		
1 2 3 4 5	A Estimates	B of Valuation	C n Adjustme A1-2 Agriculture	D nt compone C1 Manufactu	E ents and im U1 Services1	F ports U1-2 Services2-	G IO_P3 Final Cons	H IO_P6 Total Expo	l Irts	
1 2 3 4 5 6	A Estimates IO_P7	B of Valuation	C n Adjustme A1-2 Agriculture	D nt compone C1 Manufactu	E ents and im U1 Services1	F ports U1-2 Services2-	G IO_P3 Final Cons	H IO_P6 Total Expo	l Irts Check	
1 2 3 4 5 6 7	A Estimates IO_P7 A1	B of Valuation Agriculture	C n Adjustmer A1-2 Agriculture 4.175871	D nt compone C1 Manufactu 37.68566	E ents and im U1 Services1 8.492544	F ports U1-2 Services2- 3.715488	G IO_P3 Final Cons 8.669472	H IO_P6 Total Expo	l Ister Check 8.260963	
1 2 3 4 5 6 7 8	A Estimates IO_P7 A1 A2	B of Valuation Agriculture Agriculture	C Adjustmer A1-2 Agriculture 4.175871	D nt compone C1 Manufactu 37.68566	E ents and im U1 Services1 8.492544	F ports U1-2 Services2- 3.715488	G IO_P3 Final Cons 8.669472 45	H IO_P6 Total Expo	I rhs Check 8.260963	
1 2 3 4 5 6 7 8 9	A Estimates IO_P7 A1 A2 C1	B of Valuation Agriculture Agriculture Manufactu	C Adjustmer A1-2 Agriculture 4.175871	D nt compone C1 Manufactu 37.68566 189	E ents and im U1 Services1 8.492544	F ports U1-2 Services2- 3.715488	G IO_P3 Final Cons 8.669472 45 378	H IO_P6 Total Expo	l Check 8.260963 -378	
1 2 3 4 5 6 7 8 9 10	A Estimates IO_P7 A1 A2 C1 U1	B of Valuation Agriculture Agriculture Manufactu Service1	C Adjustmer A1-2 Agriculture 4.175871 5.408651	D nt compone C1 Manufactu 37.68566 189 20.44588	E ents and im U1 Services1 8.492544 3.335599	F ports U1-2 Services2- 3.715488 1.533143	G IO_P3 Final Cons 8.669472 45 378 12.59764	H IO_P6 Total Expo	I Check 8.260963 -378 5.679084	
1 2 3 4 5 6 7 8 9 10 11	A Estimates IO_P7 A1 A2 C1 U1 U2	B of Valuation Agriculture Agriculture Manufactu Service1 Service2	C Adjustmer A1-2 Agriculture 4.175871 5.408651 7.019519	D nt compone C1 Manufactu 37.68566 189 20.44588 10.37024	E ents and im U1 Services1 8.492544 3.335599 3.86129	F ports U1-2 Services2- 3.715488 1.533143 1.810085	G IO_P3 Final Cons 8.669472 45 378 12.59764 15.19958	H IO_P6 Total Expo	I Check 8.260963 -378 5.679084 6.739284	
1 2 3 4 5 6 7 8 9 10 11 12	A Estimates IO_P7 A1 A2 C1 U1 U1 U2 U2 U3	B of Valuation Agriculture Manufactu Service1 Service2 Service3	C Adjustmer A1-2 Agriculture 4.175871 5.408651 7.019519 8.886515	D nt compone C1 Manufactu 37.68566 189 20.44588 10.37024 20.20294	E ents and im U1 Services1 8.492544 3.335599 3.86129 0.763685	F ports U1-2 Services2- 3.715488 1.533143 1.810085 1.18024	G IO_P3 Final Cons 8.669472 45 378 12.59764 15.19958 13.95461	H IO_P6 Total Expo	I Check 8.260963 -378 5.679084 6.739284 7.012016	
1 2 3 4 5 6 7 8 9 10 11 12 13	A Estimates IO_P7 A1 A2 C1 U1 U2 U2 U3 IO_PM1	B of Valuation Agriculture Agriculture Manufactu Service1 Service3	C Adjustmer A1-2 Agriculture 4.175871 5.408651 7.019519 8.886515	D nt compone C1 Manufactu 37.68566 189 20.44588 10.37024 20.20294	E ents and im U1 Services1 8.492544 3.335599 3.86129 0.763685	F ports U1-2 Services2- 3.715488 1.533143 1.810085 1.18024	G IO_P3 Final Cons 8.669472 45 378 12.59764 15.19958 13.95461	H IO_P6 Total Expo	I Check 8.260963 -378 5.679084 6.739284 7.012016 Check	
1 2 3 4 5 6 7 8 9 10 11 12 13 14	A Estimates IO_P7 A1 A2 C1 U1 U2 U3 IO_PM1 A1	B of Valuation Agriculture Agriculture Manufactu Service1 Service2 Service3 Agriculture	C Adjustmer A1-2 Agriculture 4.175871 5.408651 7.019519 8.886515	D nt compone C1 Manufactu 37.68566 189 20.44588 10.37024 20.20294 10.66333	E ents and im U1 Services1 8.492544 3.335599 3.86129 0.763685 2.403004	F ports U1-2 Services2- 3.715488 1.533143 1.810085 1.18024 1.051314	G IO_P3 Final Cons 8.669472 45 378 12.59764 15.19958 13.95461 2.453066	H IO_P6 Total Expo	I Check 8.260963 -378 5.679084 6.739284 7.012016 Check 3.429287	
1 2 3 4 5 6 7 8 9 10 11 11 12 13 14 15	A Estimates IO_P7 A1 A2 C1 U1 U2 U3 IO_PM1 A1 A2	B of Valuation Agriculture Agriculture Manufactu Service1 Service2 Service3 Agriculture Agriculture	C A1-2 Agriculture 4.175871 5.408651 7.019519 8.886515	D nt compone C1 Manufactu 37.68566 189 20.44588 10.37024 20.20294 10.66333 0.125471	E ents and im U1 Services1 8.492544 3.335599 3.86129 0.763685 2.403004 1.104141	F ports U1-2 Services2- 3.715488 1.533143 1.810085 1.18024 1.051314 2.446675	G IO_P3 Final Cons 8.669472 45 378 12.59764 15.19958 13.95461 2.453066 3.839398	H IO_P6 Total Expo	I Check 8.260963 -378 5.679084 6.739284 7.012016 Check 3.429287 2.484316	
1 2 3 4 5 6 7 8 9 10 11 11 12 13 14 15 16	A Estimates IO_P7 A1 A2 C1 U1 U2 U3 IO_PM1 A1 A2 C1	B of Valuation Agriculture Agriculture Manufactu Service1 Service2 Service3 Agriculture Agriculture Manufactu	C Adjustmer A1-2 Agriculture 4.175871 5.408651 7.019519 8.886515	D nt compone C1 Manufactu 37.68566 189 20.44588 10.37024 20.20294 10.66333 0.125471 8.048138	E ents and im U1 Services1 8.492544 3.335599 3.86129 0.763685 2.403004 1.104141 5.550959	F ports U1-2 Services2- 3.715488 1.533143 1.810085 1.18024 1.051314 2.446675 6.859722	G IO_P3 Final Cons 8.669472 45 378 12.59764 15.19958 13.95461 2.453066 3.839398 9.552463	H IO_P6 Total Expo	I Check 8.260963 -378 5.679084 6.739284 7.012016 Check 3.429287 2.484316 9.988718	
1 2 3 4 5 6 7 8 9 10 11 11 12 13 14 15 16 17	A Estimates IO_P7 A1 A2 C1 U1 U2 U3 IO_PM1 A1 A2 C1 U1 U1	B of Valuation Agriculture Manufactu Service1 Service2 Service3 Agriculture Manufactu Service1	C Adjustmer A1-2 Agriculture 4.175871 5.408651 7.019519 8.886515	D nt compone C1 Manufactu 37.68566 189 20.44588 10.37024 20.20294 10.66333 0.125471 8.048138 -18.8369	E ents and im U1 Services1 8.492544 3.335599 3.86129 0.763685 2.403004 1.104141 5.550959 -9.0581	F ports U1-2 Services2- 3.715488 1.533143 1.810085 1.18024 1.051314 2.446675 6.859722 -10.3577	G IO_P3 Final Cons 8.669472 45 378 12.59764 15.19958 13.95461 2.453066 3.839388 9.552463 -15.8449	H IO_P6 Total Expo	I Check 8.260963 -378 5.679084 6.739284 7.012016 Check 3.429287 2.484316 9.988718 -15.9023	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	A Estimates IO_P7 A1 A2 C1 U1 U2 U3 IO_PM1 A1 A2 C1 U1 U2 U1 U2 U1 U2	B of Valuation Agriculture Agriculture Manufactu Service3 Agriculture Manufactu Service1 Service2	C Adjustmer A1-2 Agriculture 4.175871 5.408651 7.019519 8.886515	D nt compone C1 Manufactu 37.68566 189 20.44588 10.37024 20.20294 10.66333 0.125471 8.048138 -18.8369	E ents and im U1 Services1 8.492544 3.335599 3.86129 0.763685 2.403004 1.104141 5.550959 -9.0581	F ports U1-2 Services2- 3.715488 1.533143 1.810085 1.18024 1.051314 2.446675 6.859722 -10.3577	G IO_P3 Final Cons 8.669472 45 378 12.59764 15.19958 13.95461 2.453066 3.839398 9.552463 -15.8449	H IO_P6 Total Expo	I Check 8.260963 -378 5.679084 6.739284 7.012016 Check 3.429287 2.484316 9.988718 -15.9023	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	A Estimates IO_P7 A1 A2 C1 U1 U2 U3 IO_PM1 A1 A2 C1 U1 U2 U1 U1 U2 U3 U1 U2 U3	B of Valuation Agriculture Agriculture Manufactu Service1 Service2 Service3 Agriculture Manufactu Service1 Service1 Service2 Service3	C Adjustmer A1-2 Agriculture 4.175871 5.408651 7.019519 8.886515	D nt compone C1 Manufactu 37.68566 189 20.44588 10.37024 20.20294 10.66333 0.125471 8.048138 -18.8369	E ents and im U1 Services1 8.492544 3.335599 3.86129 0.763685 2.403004 1.104141 5.550959 -9.0581	F ports U1-2 Services2- 3.715488 1.533143 1.810085 1.18024 1.051314 2.446675 6.859722 -10.3577	G IO_P3 Final Cons 8.669472 45 378 12.59764 15.19958 13.95461 2.453066 3.839398 9.552463 -15.8449	H IO_P6 Total Expo	I Check 8.260963 -378 5.679084 6.739284 7.012016 Check 3.429287 2.484316 9.988718 -15.9023	

IO Converter	×
Generate IOTs	
Generate Valuation adjustment categories	
Recalculate Ratios to have sum that adds up to 1	
 Subsidies are positive values Ratio for Imports is relative to use at Basic Prices 	5
Estimation of ratios Ask the system to propose all ratios	
$\ensuremath{}$ Ask the system to propose ratios for imports	
Ask the system to use existing ratio	
Remove unnecessary worksheets	
Keep Ratios and Valuation Adjustment sheets	
Cancel	

		Α	В	С	D	E	F	G	н	- I
	1	Estimates	of Valuation	n Adjustme	nt compone	ents and im	ports			
	2									
	3									
	4			A1-2	C1	U1	U1-2	IO_P3	IO_P6	
	5			Agriculture	Manufactu	Services1	Services2-	Final Cons	Total Expo	orts
	6	IO_P7								Check
	7	A1	Agriculture	4.749735	42.63235	9.607289	4.203189	9.807441		
	8	A2	Agriculture					45		
	9	C1	Manufactu		63			126		
	10	U1	Service1	5.965088	22.92802	3.887042	1.94524	14.27461		
	11	U2	Service2	8.255945	12.19686	4.541422	2.128916	17.87686		
	12	U3	Service3	10.2716	23.35185	0.882716	1.364198	16.12963		
	13	IO_PM1								Check
	14	A1	Agriculture		12.87009	2.900302	1.268882	2.960725		
	15	A2	Agriculture		0.166945	1.469115	3.255426	5.108514		
	16	C1	Manufactu		10.72682	7.398496	9.142857	12.73183		
	17	U1	Service1		-23.7639	-11.7679	-13.6672	-20.8011		
	18	U2	Service2							
	19	U3	Service3							
F	<u>,</u>		Manning P	roduct I	Pation M	Valuation	Catagony	CLIT Po	cic Dricos I	lom long

Background

Main features

Mapping SUT transactions and Data
 Mapping SUT and IOT classifications

Dry run

>Inclusion of subsidies

>Inclusion of imports

Refinement

- A way forward
- DEMO

Future developments

- Additional checks on classification and consistency (SUTs, intermediary steps, IOTs)
- Replicate SUT format including total Improve
- Implement the remaining models
 - industry by industry approach using industry sales structure
 - product by product IOTs using product technology assumption
 - product by product IOTs using industry technology assumption
 - Hybrid model
- Add an impact analysis module
- Add a TiVA module

Background

Main features

Mapping SUT transactions and Data
 Mapping SUT and IOT classifications

Dry run

>Inclusion of subsidies

➢Inclusion of imports

Refinement

- A way forward
- DEMO