

IO Converter

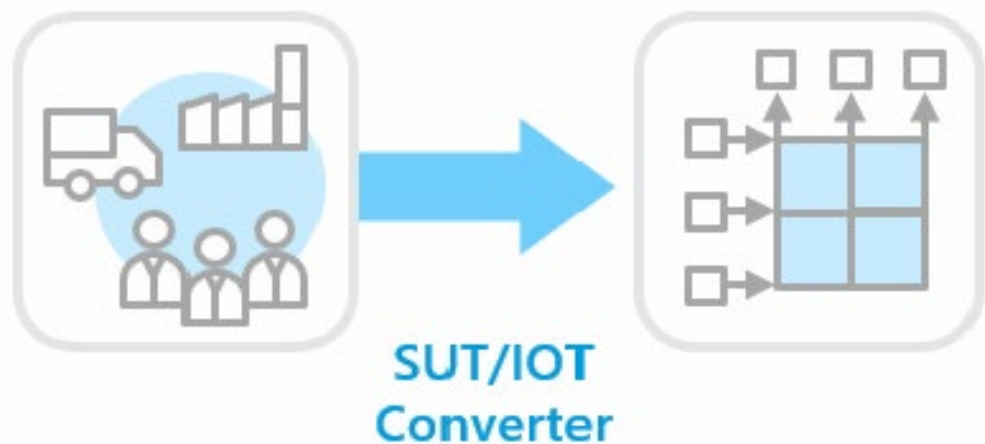
3-5 OCTOBER 2022, GENEVA, ONLINE

Achille Pegoue

Real Sector Division

Supply & Use
Tables (SUTs)

Input/Output
Tables (IOTs)



Outline

- **Background**
- **Main features**
 - Mapping SUT transactions and Data
 - Mapping SUT and IOT classifications
- **Dry run**
 - Inclusion of subsidies
 - Inclusion of imports
- **Refinement**
 - Force consistency for basic prices and domestic transactions
- **A way forward**
- **DEMO**

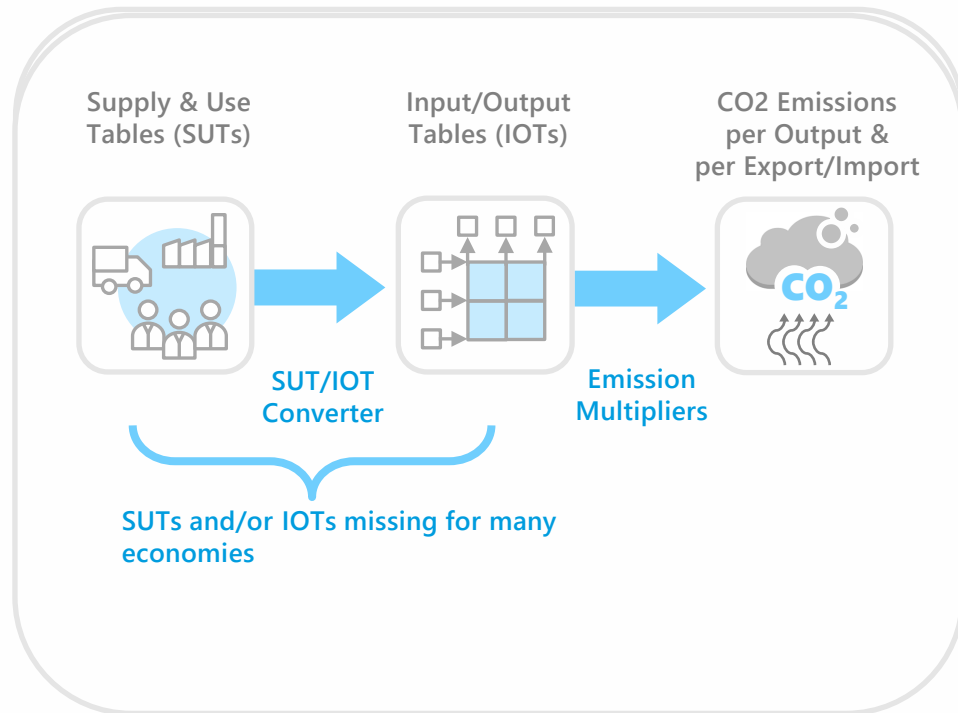
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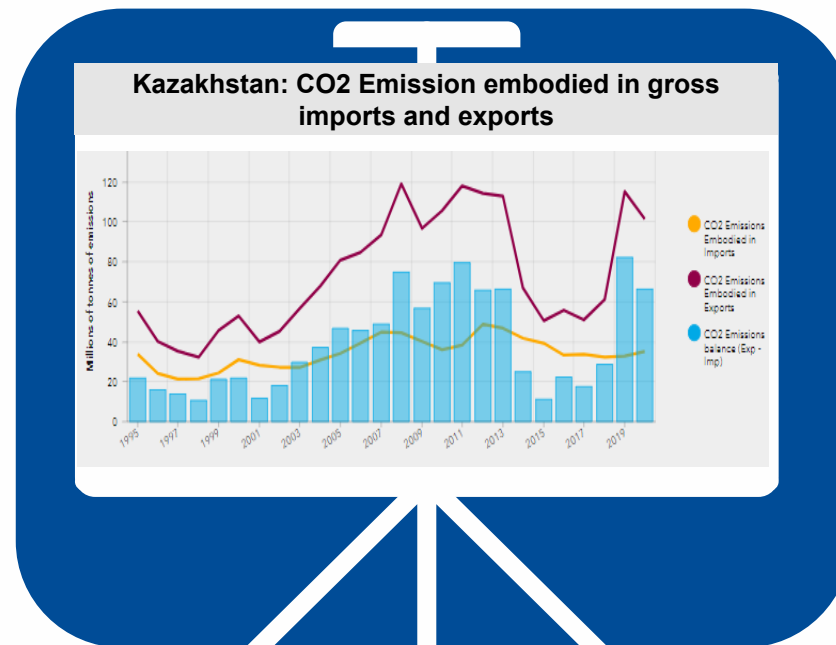
From SUTs to IOTs Benefits for Measuring Climate

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



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Mapping SUT transactions and Data

Help the IO Converter to Recognize your Data

A	B	C	D	E	F	G	H	I	J	K
Code	Description	Quadrant	Group	Level	Order	Block				
IO_Activity_Code	Activity code	Classification	Activity_Code							
IO_Activity_Description	Activity description	Classification	Activity_Description							
IO_Product_Code	Product code	Classification	Product_Code							
IO_Product_Description	Product description	Classification	Product_Description							
IO_P1	Gross output	Supply	Output							
IO_P7	Imports	Supply	Imports							
IO_PM1	Trade Margins	Supply	Margins							
IO_PM1_W	Wholesale Margins	Supply	Margins							
IO_PM2	Transport Margins	Supply	Margins							
IO_PM1_R	Retail Margins	Supply	Margins							
IO_D21	Taxes on Products	Supply	Taxes							
IO_D211	Value Added Taxes	Supply	Taxes							
IO_D211_FCE	Value Added Tax on Hous Supply		Taxes	2	8	2				
IO_D211_GFCE	Value Added Tax on Gros Supply		Taxes	2	9	2				
IO_D211_IC	Value Added Tax on Interr Supply		Taxes	2	10	2				
IO_D211_X	Value Added Tax on Expo Supply		Taxes	2	11	2				
IO_D31	Subsidies on products	Supply	Subsidies							
IO_D214	Other Taxes on products	Supply	Taxes							
IO_D214_Excises	Excise Duties	Supply	Taxes	2	14	2				
IO_D214_Other	Other Taxes	Supply	Taxes	2	15	2				
IO_D212	Customs Duties	Supply	Taxes		16	2				
IO_D213	Taxes on exports	Supply	Taxes		17	2				
IO_P2	Intermediate consumption Use		IC		1	3				
IO_P3	Final Consumption Expen Use		FCE		1	3				
IO_P3_S14/S15	Households Final Consum Use		FCE		2	3				
IO_P3_S14	Own Account Households Own Account Use		FCE		3	4				

Where are data?

Mouse click on this arrow to run the VBA code

Do not change wording of categories for these columns

Change wording of categories for these columns

What is the transaction?

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

SUTs	B	C	D	E	F	G	H	I	J	K	L	M
Supply table		Trade Marg	Transport Marg	Taxes (VA	Taxes on imp	A1:2	C1	U1	U1:2			
Agriculture1	20	5	10	4	238	391	58	6	71			799
Agriculture2	10	20	11	4	562	9	57	79	45			797
Manufacturing	40	30	60	40	200	1500	269	331	189			2659
Service1	-70		18	2	208	137	202	123	49			669
Service2		-55			198	73	200	113	45			574
Service3			120	5	233	116	38	185	52			749
Total	0		219	51	1639	2226	824	837	451			6247

Do not change tab name

SUTs	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Matri matrix		Trade Marg	Transport Marg	Taxes (VA	Taxes on imp	IO_Activity	IO_Activity_Cc	IO_Activity_Descriptio	Import	Total Supply purchaser's price	Supply				
IO_Product_Cod	IO_Product_Descriptio	IO_PM1	IO_PM2	IO_D211	IO_D214	IO_P1	IO_P1	IO_P1	IO_P1					0	0
IO_Product_Cod	IO_Product_Descriptio	IO_PM1	IO_PM2	IO_D211	IO_D214	IO_P1	IO_P1	IO_P1	IO_P1					0	0
IO_Product_Cod	IO_Product_Descriptio	IO_PM1	IO_PM2	IO_D211	IO_D214	IO_P1	IO_P1	IO_P1	IO_P1					0	0
IO_Product_Cod	IO_Product_Descriptio	IO_PM1	IO_PM2	IO_D211	IO_D214	IO_P1	IO_P1	IO_P1	IO_P1					0	0
IO_Product_Cod	IO_Product_Descriptio	IO_PM1	IO_PM2	IO_D211	IO_D214	IO_P1	IO_P1	IO_P1	IO_P1					0	0
Total		0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start at the same position as SUTs Mat and transaction

Mapping SUT and IOT classifications

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

A	B	C	D	E	F	G	H	I	J	K	L
1	SUT_Code	SUT_Description	IOT_Code	IOT_Description	Coefficient	IOT classification could be larger than SUT one					
2	A1-2	Agriculture	A	Agriculture	1	Coefficient will be used to make aggregation (1) or breakdown (less					
3	C1	Manufacturing	C	Manufacturing	1						
4	U1	Services1	U	Service	1						
5	U1-2	Services2-3	U	Service	1						
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											

Will be used to sort IOT classification"

Check that the sum of coefficient for each SUT category adds up to 1

Do not change tab name

Note:

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

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Sign of subsidies and basis to allocate imports to use

Help the IO Converter to properly include subsidies and imports

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

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

IO Converter

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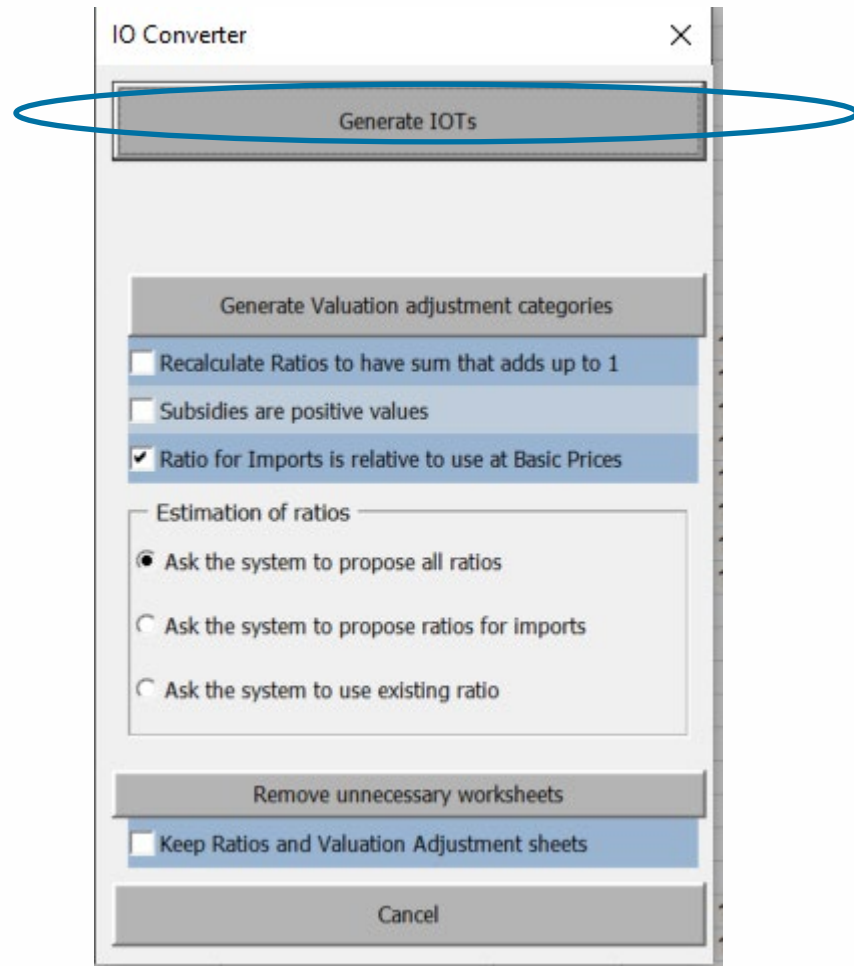
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Generate IOTs

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 $(\tilde{x}^{-1}) = \begin{bmatrix} \tilde{x}^{-1}_{11} & \dots & \tilde{x}^{-1}_{1n} \\ \vdots & \ddots & \vdots \\ \tilde{x}^{-1}_{n1} & \dots & \tilde{x}^{-1}_{nn} \end{bmatrix}$ and

$$\tilde{x}^{-1}_{ij} = \begin{cases} 1/x_i & \text{if } i = j \text{ and } x_i \neq 0 \\ 0 & \text{elsewhere} \end{cases}$$

(\tilde{x}^{-1}) is slightly different from $(x)^{-1}$ as defined in the literature.

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Include self-computed ratios

Request the IO Converter to use exogenous information

	A	B	C	D	E	F	G	H	I
1	Structure to allocate price components and imports (according to intermediate and final use)								
2	Keep format of the use matrix; Ignore total or summation cells from SUTs for ratio; Data should start on								
3	Yellow cells with NA transaction codes are mandatory to link ratio and transaction/price category								
4		A1-2	C1	U1	U1-2	IO_P3	IO_P6		
5		Agriculture	Manufactu	Services1	Services2-	Final Cons	Total Exports		
6	IO_P7								Check
7	A1	Agriculture	0.058815	0.530784	0.119613	0.052331	0.122105		0.116352
8	A2	Agriculture2						1	0
9	C1	Manufacturing		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	Agriculture1		0.533166	0.12015	0.052566	0.122653		0.171464
15	A2	Agriculture2		0.012547	0.110414	0.244668	0.38394		0.248432
16	C1	Manufacturing		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		0.311877
19	U3	Service3		0.388518	0.014686	0.022697	0.268358		0.305741

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

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

	A	B	C	D	E	F	G	H	I
1	Estimates of Valuation Adjustment components and imports								
2									
3									
4									
5		A1-2	C1	U1	U1-2	IO_P3	IO_P6		
6		Agriculture	Manufactu	Services1	Services2-	Final Cons	Total Exports		
7	IO_P7								Check
8	A1	Agriculture	4.175871	37.68566	8.492544	3.715488	8.669472		8.260963
9	A2	Agriculture						45	
10	C1	Manufactu		189				378	-378
11	U1	Service1	5.408651	20.44588	3.335599	1.533143	12.59764		5.679084
12	U2	Service2	7.019519	10.37024	3.86129	1.810085	15.19958		6.739284
13	U3	Service3	8.886515	20.20294	0.763685	1.18024	13.95461		7.012016
14	IO_PM1								Check
15	A1	Agriculture		10.66333	2.403004	1.051314	2.453066		3.429287
16	A2	Agriculture		0.125471	1.104141	2.446675	3.839398		2.484316
17	C1	Manufactu		8.048138	5.550959	6.859722	9.552463		9.988718
18	U1	Service1		-18.8369	-9.0581	-10.3577	-15.8449		-15.9023
19	U2	Service2							
20	U3	Service3							

	A	B	C	D	E	F	G	H	I
1	Estimates of Valuation Adjustment components and imports								
2									
3									
4									
5		A1-2	C1	U1	U1-2	IO_P3	IO_P6		
6		Agriculture	Manufactu	Services1	Services2-	Final Cons	Total Exports		
7	IO_P7								Check
8	A1	Agriculture	4.749735	42.63235	9.607289	4.203189	9.807441		
9	A2	Agriculture						45	
10	C1	Manufactu		63				126	
11	U1	Service1	5.965088	22.92802	3.887042	1.94524	14.27461		
12	U2	Service2	8.255945	12.19686	4.541422	2.128916	17.87686		
13	U3	Service3	10.2716	23.35185	0.882716	1.364198	16.12963		
14	IO_PM1								Check
15	A1	Agriculture		12.87009	2.900302	1.268882	2.960725		
16	A2	Agriculture		0.166945	1.469115	3.255426	5.108514		
17	C1	Manufactu		10.72682	7.398496	9.142857	12.73183		
18	U1	Service1		-23.7639	-11.7679	-13.6672	-20.8011		
19	U2	Service2							
20	U3	Service3							

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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

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