UNDERSTANDING AND WORKING WITH OECD'S TIVA INDICATORS

Joaquim Guilhoto / Norihiko YAMANO

OECD Directorate for Science, Technology and Innovation

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BETTER POLICIES FOR BETTER LIVES

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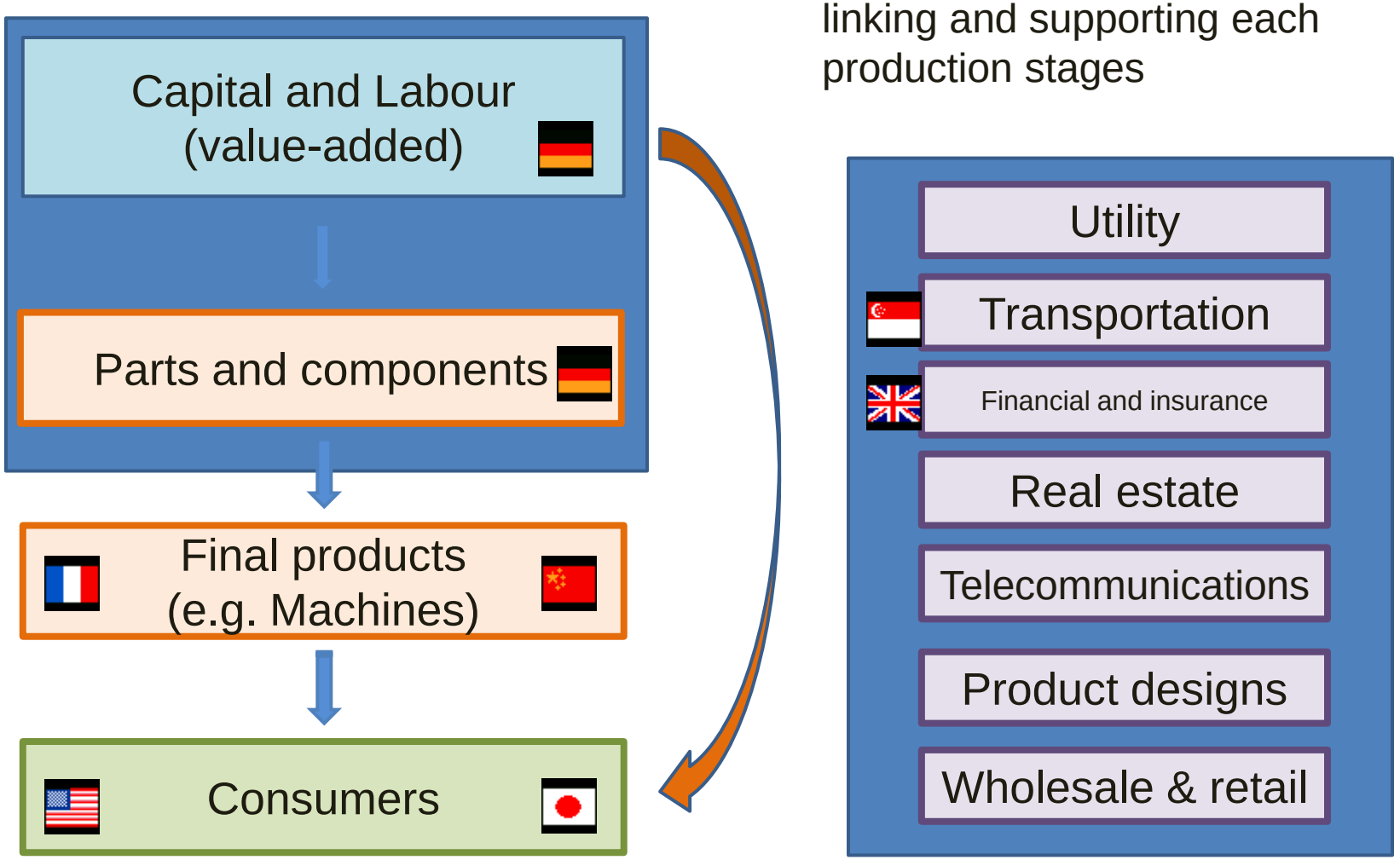
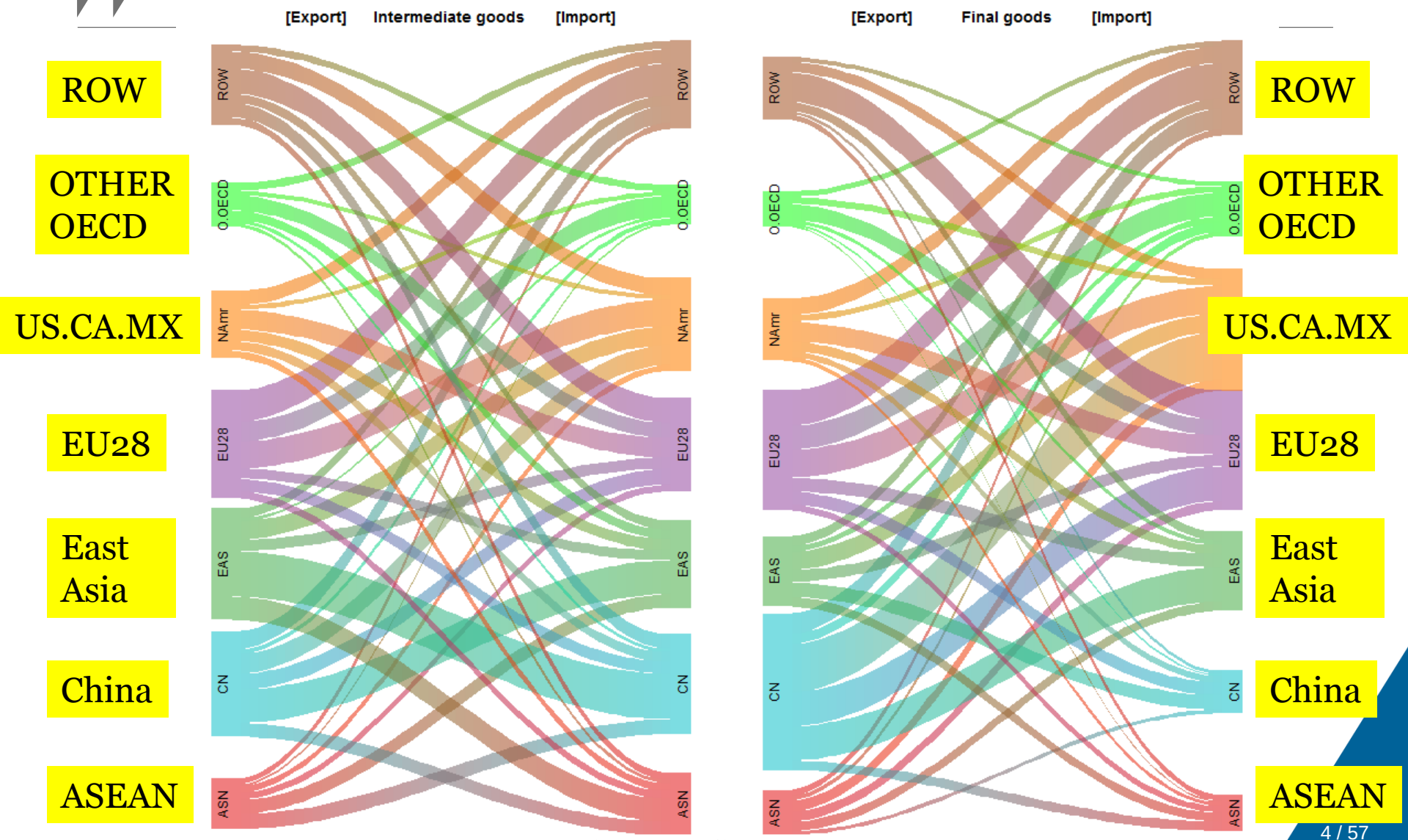
International production networks

Business service activities are linking and supporting each production stages

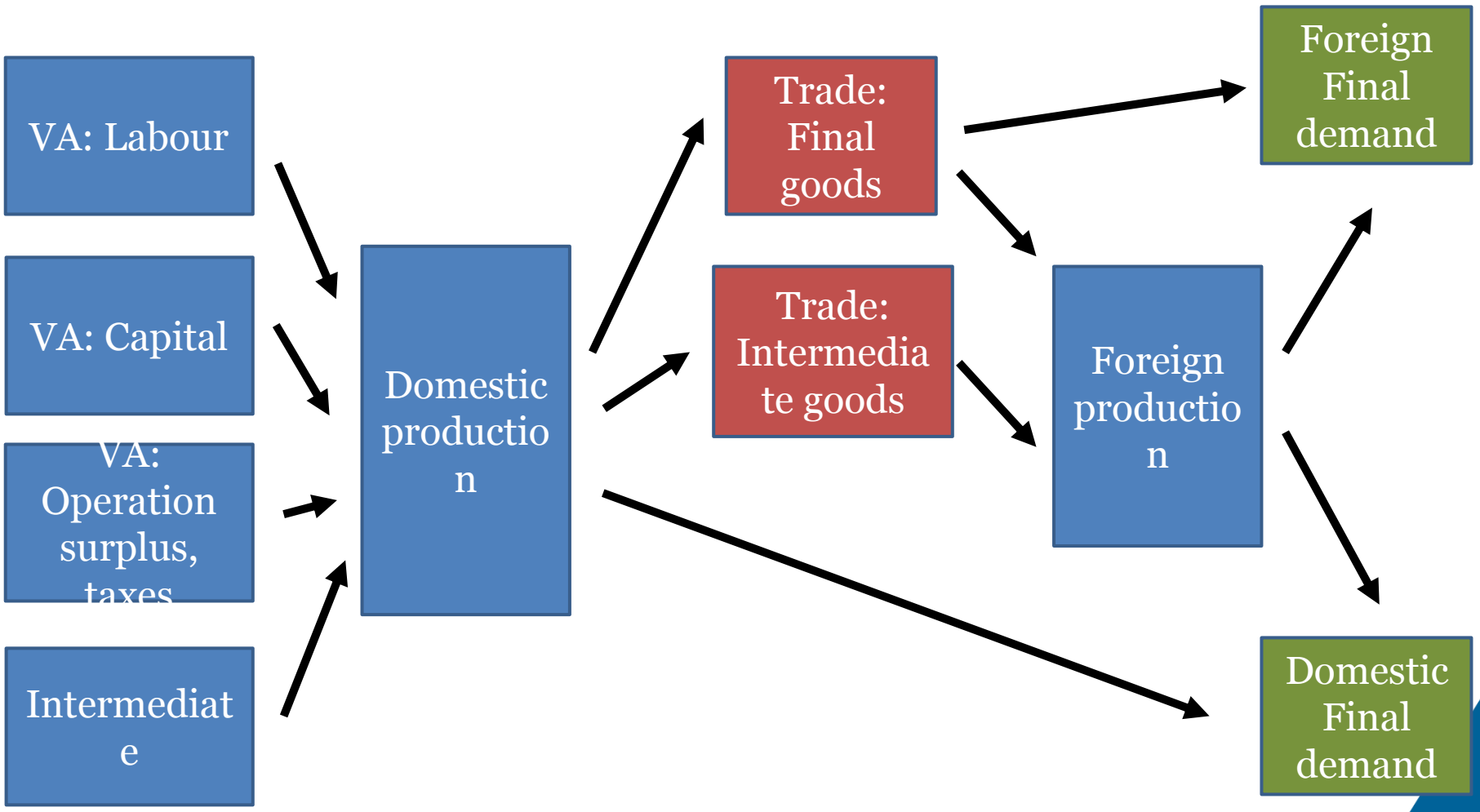


Trade flows of intermediate and final goods(2013)



Source: OECD BTDIXE June 2015, import flows

VA, Production, Trade, Final demand



Review: Input-Output Table

Domestic table

		Intermediate demand		Personal expenditur	Other final expenditures	Exports	Imports cif	Output
		ind 1	ind 2					
Industry 1: Goods		Z_{11}	Z_{12}	HC1	FE1	EX1	-IM1	X_1
Industry 2: Services		Z_{21}	Z_{22}	HC2	FE2	EX2	-IM2	X_2
Imports		IM_Z_1	IM_Z_2	IM_HC	IM_FE	Re-Exports	Total IM	
Taxes less subsidies on products		NTZ_1	NTZ_2	NTHC	NTFE	NTEX	NTIM	
Value-added (total)		V_1	V_2					
	Labor compensation	VL_1	VL_2					
	Operating surplus	VO_1	VO_2					
	Net taxes on production	VT_1	VT_2					
Output at basic price		X_1	X_2					

Import matrix in c.i.f.

	Intermediate demand		Personal expenditure	Other final expenditures	Re-exports	Imports cif
	ind 1	ind 2				
Product p1: Goods	$ZM_{11}+TMZ_{11}$	$ZM_{12}+TMZ_{12}$	HCM_1+TMHC_1	FEM1+TMFE1	REX1+TMREX1	IM1+TM1
Product p2: Services	$ZM_{21}+TMZ_{21}$	$ZM_{22}+TMZ_{22}$	HCM_2+TMHC_2	FEM2+TMFE2	REX2+TMREX2	IM2+TM2

Why Trade in Value Added (TiVA) ?

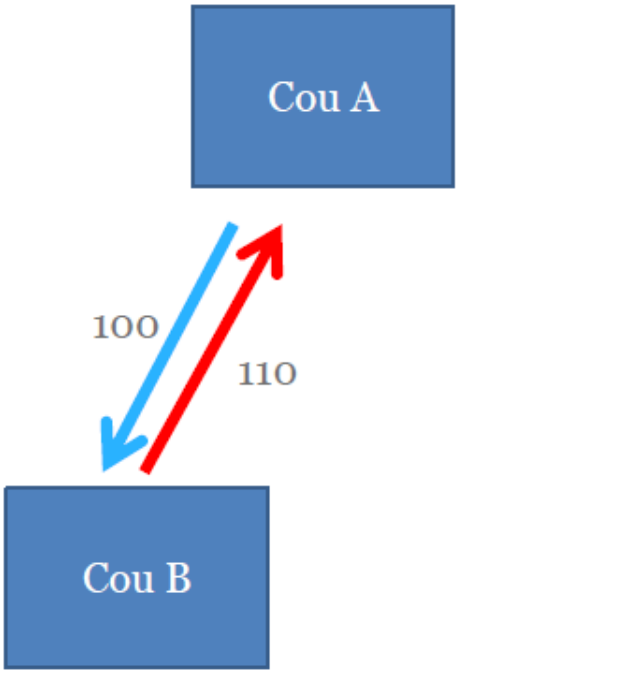
Increasing recognition that current ‘gross’ measures of trade may create ‘misleading perceptions’ and imperfect policies:

- **Export driven growth strategies** may target the wrong sectors.
  Gross trade statistics :
  - typically reveal a low contribution made by the service sector (< 25%)
  - cannot reveal whose final consumers drive supply
- **Protectionism can be counter-productive:**
  - Imports can improve competitiveness
  - Imports increasingly embody value originally generated in the importing country itself.
- **Systemic risks** - impact of macro-economic shocks on supply-chains
- understanding the **impact of international trade on jobs** and the **integration of emerging economies in GVCs**

Many calls for new statistics that better respond to these issues.

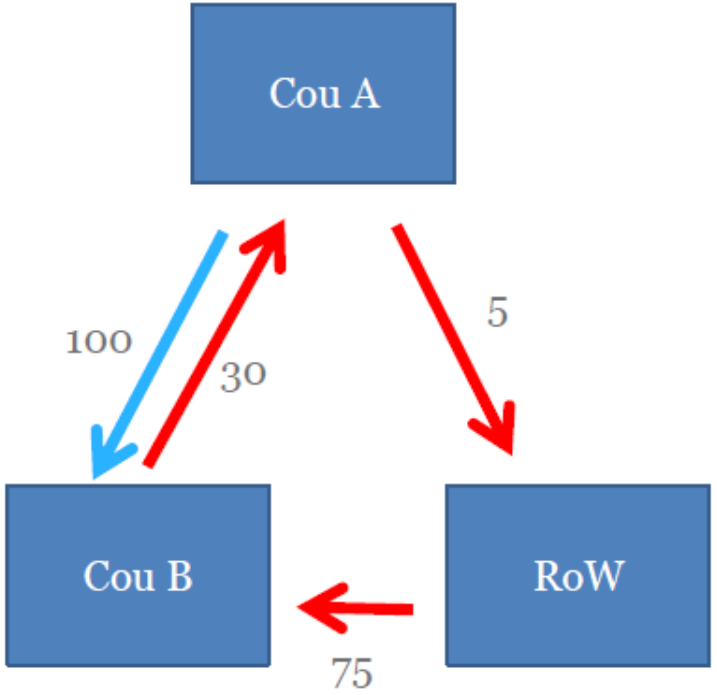
Bilateral relationships in conventional and TiVA framework

Conventional trade balance



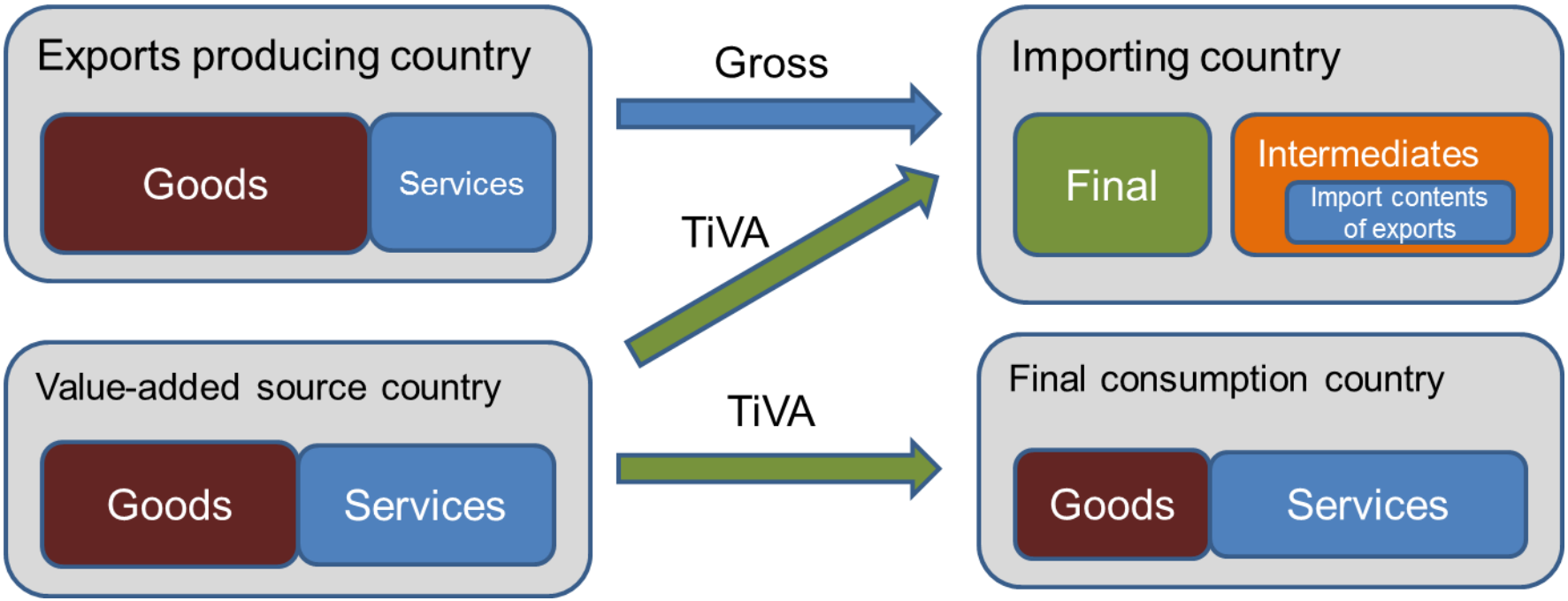
Gross trade balance A – B
= 100-110 =-10

TiVA balance



VA trade balance A – B
= 100-30 = 70
Reimports = 5 / 110

Complex country and industry dimensions



Country

- VA source country
- Exporting country
- Importing country
- Final expenditure country

Industry / Product

- VA source industry
- Products form exporting industry
- Importing industry
- Final expenditure products

Global ICIO analysis (TiVA)

- VBF =

VA/Output			Global Leontief			Final demand	
Vd	o	x	Bdd	Bfd	x	Fdd	Ffd
o	Vf		Bdf	Bff		Fdf	Fff

- Domestic VA embodied in Foreign demand: Vd (Bdd*Ffd+Bfd*Fff)
- Foreign VA embodied in Domestic demand: Vf (Bdf*Fdd + Bff*Fdf)
- V can be any sectoral variables, employment, labour compensation, GHG emissions
- The ICIO related files in Rdata format are available here

https://www.dropbox.com/sh/eub7jubukjp4hzy/AACC7t7ZF30BlNBuXe-VHYfea?dl=0

ICIO system for TiVA

Core of the TiVA database is an economic model based on Inter-country Input-Output table (ICIO).

These ICIO models allow us to analyse

- Intermediate trade flows of goods and services
- Harmonised (mirror) bilateral trade balances
- Sectoral GDP and output at global level

Inter-Country Input-Output Data

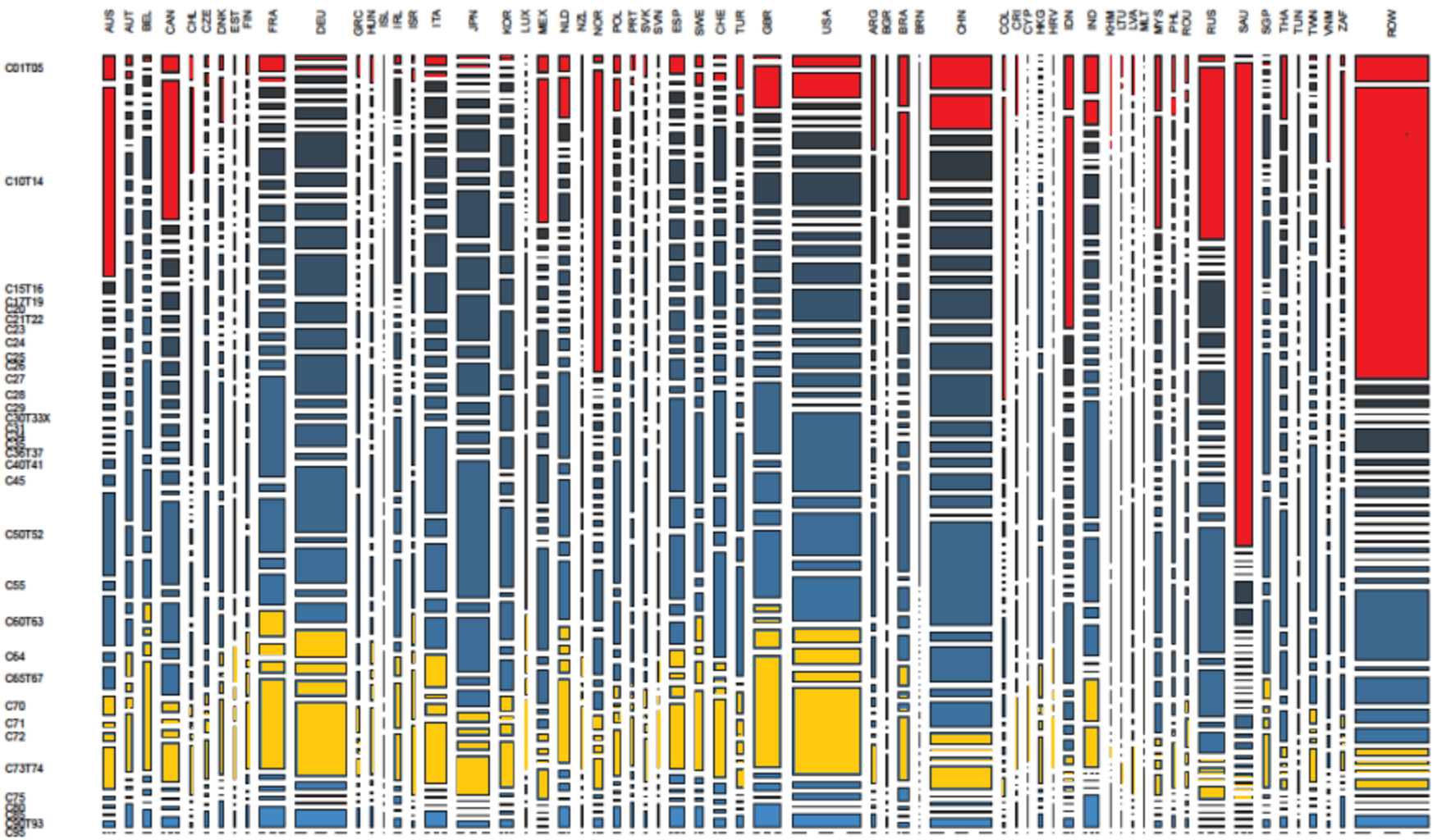
Inter-country I-O		Intermediate demand						Final consumption and capital formation			Direct purchases by non-residents			Output
at basic prices		Cou A		Cou B		Cou C		Cou A	Cou B	Cou C	Cou A	Cou B	Cou C	
		Ind 1	Ind 2	Ind 1	Ind 2	Ind 1	Ind 2							
Cou A	Ind 1													X(A1)
	Ind 2													X(A2)
Cou B	Ind 1													X(B1)
	Ind 2													X(B2)
Cou C	Ind 1													X(C1)
	Ind 2													X(C2)
Taxes less subsidies ..		*... on intermediate products*						*... on final products*						Global GDP
		NTZA1	NTZA2	NTZB1	NTZB2	NTZC1	NTZC2	FA	FB	FC	FA	FB	FC	
Value-added		V(A1)	V(A2)	V(B1)	V(B2)	V(C1)	V(C2)							
Output		X(A1)	X(A2)	X(B1)	X(B2)	X(C1)	X(C2)							

Key:

Cross-border flows of **intermediate** goods and services	**Cross-border** flows of **final** goods and services
Domestic flows of **intermediate** goods and services	**Domestic** flows of **final** goods and services

The genome of world trade

Value added in world exports by source country and source industry, 2011



Coefficient = DATA.ICIOeconCVB ; Demand = DATA.ICIOeconGRTR ; Calculation = couSindS
ExportCou = WOR ; ExportInd = CTOTAL ; DemandCou = WOR

History of OECD's I-O studies

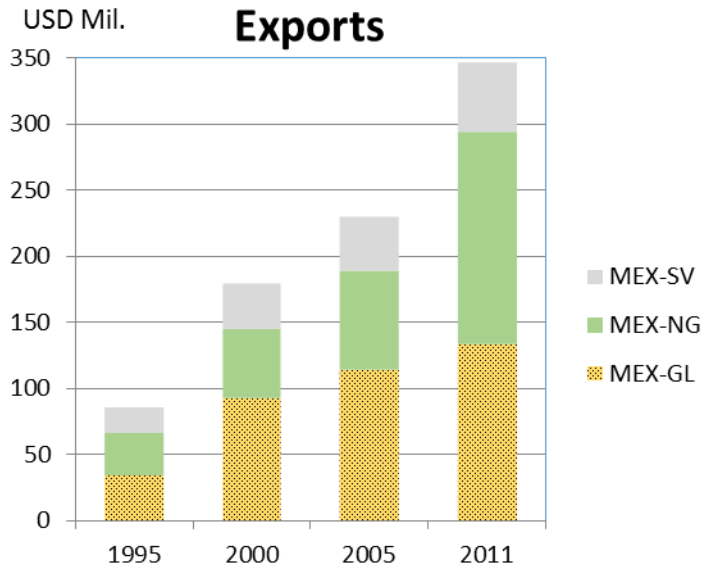
Edition	Target	Methodology	Application
1995 2003 2006-2009	Every 5yrs 10 - 40+	Collection, sector classification Industry-by-industry format	Vertical specialisation, R-D, Carbon footprint
2011-12	2000,2005 48cou	Connecting symmetric import tables	Demand-based CO_2 GVC analyses
2013	95/00/05/08/09 53cou+row	Connecting use imp at basic prices CHN hetero.	TiVA
2015	95/00/05/08-11 61cou+row	Connecting use at pu prices MEX/CHN hetero.	TiVA +Jobs / CO_2 ICIO published
2016 - 2017	1995-2011 63cou+row	Two additional countries	TiVA +Jobs & skills / CO_2
		Steel industry Tourism industry Nowcast (2012-2014)	

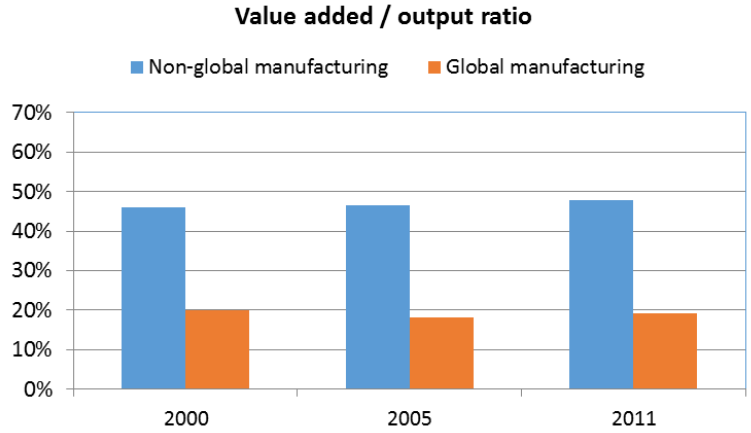
Features of OECD ICIO

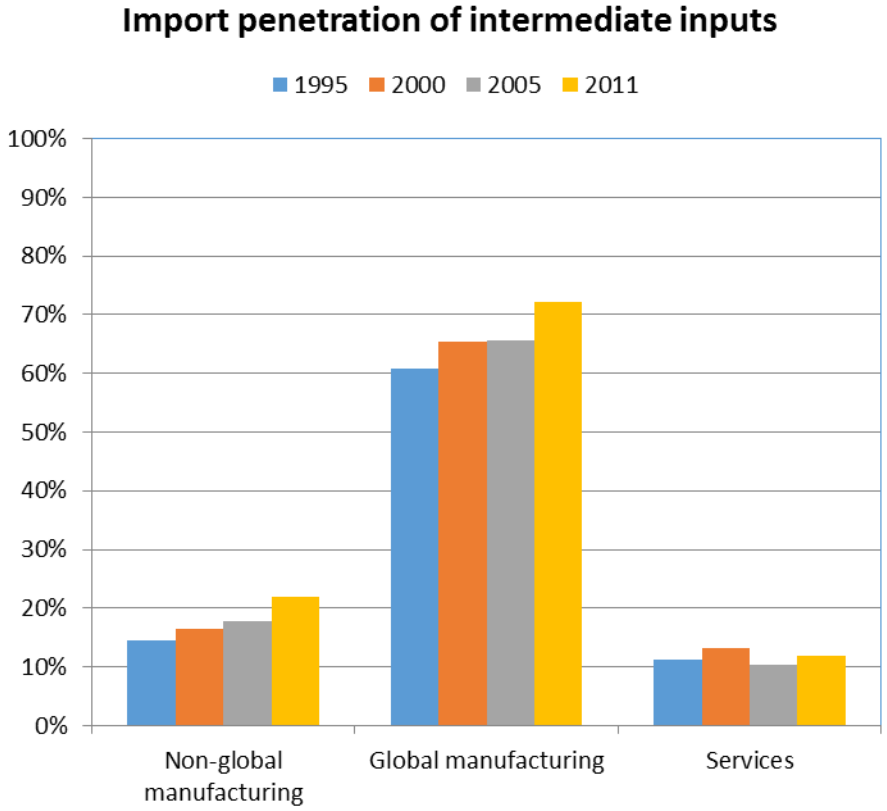
- Institutional long-term
- Official I-O data used for all countries
- Benchmarked to National Accounts (exports, imports and value-added) and Balance of Payment
- Re-imports / Re-exports adjustment
- Rest of the world (closed model)
- *Explicit linkage between goods and distribution*
- *Non-resident expenditures (tourism & education)*
- Firm heterogeneity within manufacturing industry :

  China and Mexico

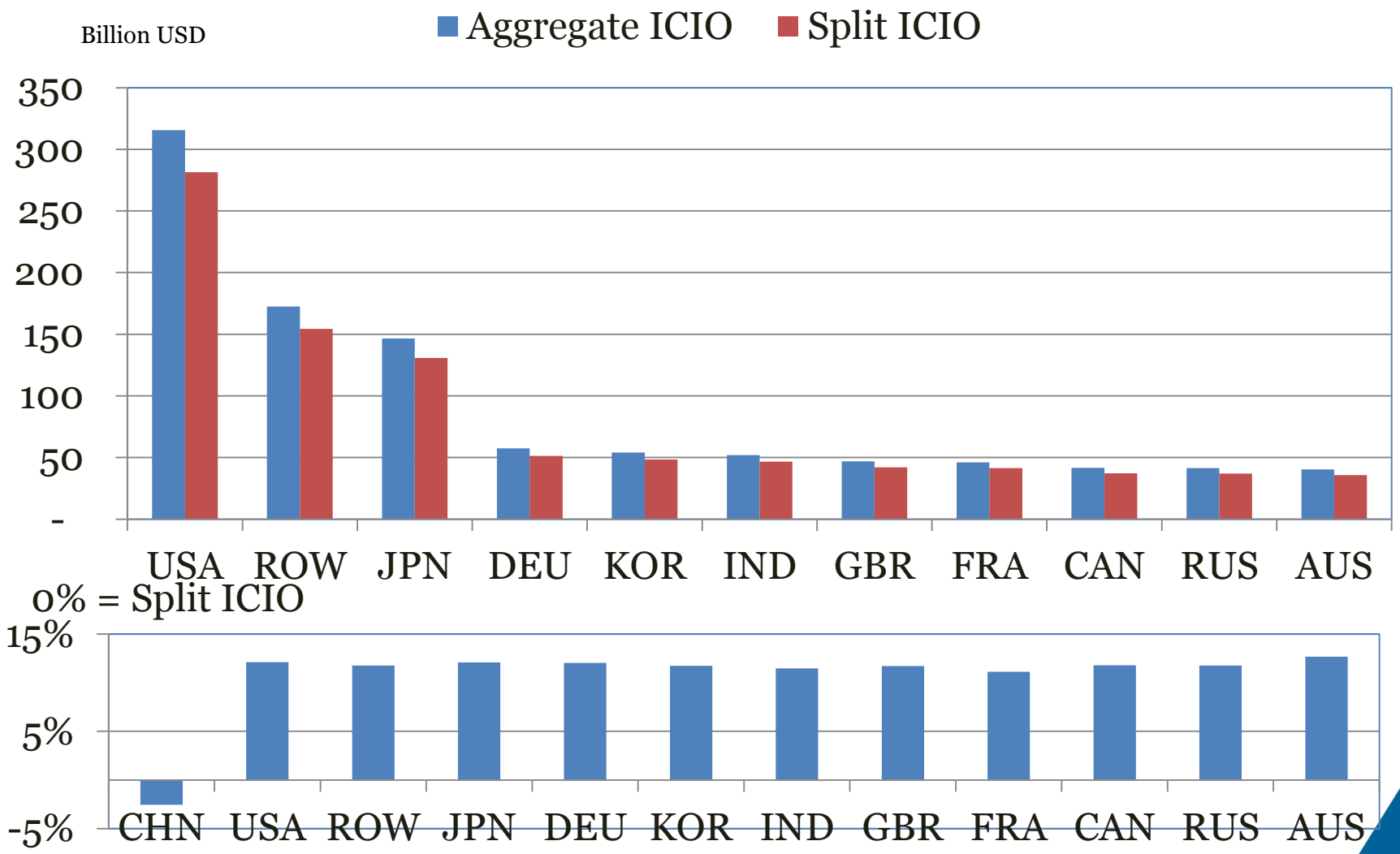
Mexico: exports, import penetration and value-added/output ratio







CHN VA in Domestic final demand (2011)



Source: OECD ICIO (2015)

Coverage, 1995- 2011

OECD	All OECD 35 countries
BRIICS	Brazil, China, India, Indonesia, Russian Federation, South Africa
Other EU28	Bulgaria, Croatia, Cyprus, Lithuania, Malta, Romania
Other G20	Argentina, Saudi Arabia
Other South Eastern Asia	Brunei Darussalam, Cambodia, Malaysia, Philippines, Singapore, Thailand, Viet Nam
Other Eastern Asia	Chinese Taipei, Hong Kong China
Other	Columbia, Costa Rica, Tunisia, Peru, Morocco, RoW
Region groups	OECD, Non-OECD, APEC, ASEAN, EasternAsia,EU28, EuroArea,NorthAmerica,etc

Industry list

Agriculture, Mining	Agriculture [01T05], Mining [10T14]	
Manufacturing (16)	Food products [15T16], Textiles & apparel[17T19] Wood [20] Paper print publishing [21T22] Coke, petroleum[23] Chemicals[24] Rubber & plastics[25] Non-metallic minerals[26]	Basic metals[27] Fabricated metals[28] Machinery [29] ICT & electronics [30,32,33] Electrical machinery [31] Motor vehicles [34] Other transport [35] Other manufacturing [36T37]
Utility and Construction	Utilities [40T41] Construction [45]	
Business services for industry and households (9)	Wholesale & retail [50T52] Hotels & restaurants [55] Transport & storage [60T63] Post & telecoms [64] Finance & insurance [65T67]	Real estate [70] Renting of machinery [71] IT services [72] Other business services [73,74]
Community services	Public admin [75] Education [80] Health [85]	Other services [90T93] Private households [95]

[ISIC Rev.3 code], http://oe.cd/tiva

ICIO 2018 – Construction Under Way

OECD Inter-Country Input-Output (ICIO) infrastructure

Main improvements/changes from ICIO 2016:

- SNA 2008, ISIC Rev. 4
- More up-to-date information
  - Core years: 2005-2015
- Under consideration:
  - Methods and coverage for projections to 2016
- New countries and industries are also being considered
  - Pending on data and resource availability

FAQ – *"why are TiVA gross trade stats different from official trade stats? "*

1. TiVA aggregate trade compared to SNA and BoP sources

e.g. different trade in goods / trade in services split

ICIO is consistent with SNA in construction.

SNA in *"purchasers' prices"*, while ICIO in "*basic prices*"

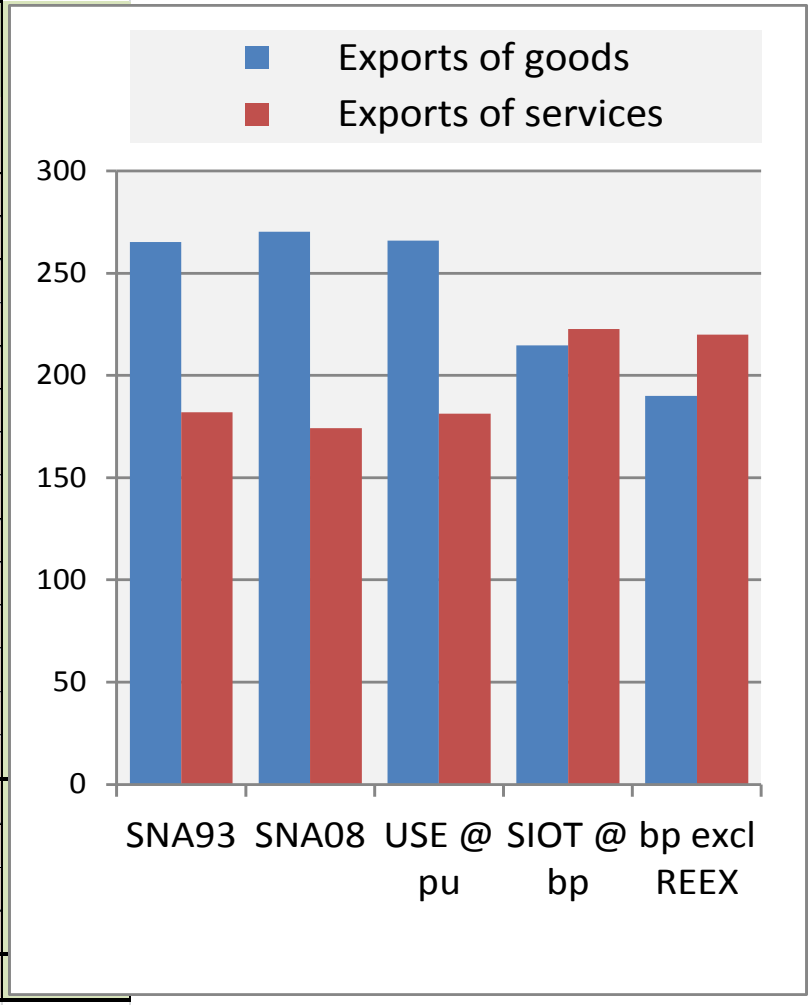
Alternative source of trade stats = official SUTs and IOTs

From *purchasers' prices* to *basic prices*, main adjustments are:

- Taxes *(less subsidies)* on products excluded
- Domestic trade and transport margins allocated to service sectors

1. example with official stats, UK 2010

2010	USE @ pu	SIOT @ bp Total	Re-exports: SIOT @ bp Imports	Exports FOB, @ bp, excl. re-exports
PRODUCTS (CPA*64)	Exports FOB	Exports FOB	Exports FOB	
Agriculture, forestry and fishing [A]	2.7	2.5		2.5
Mining and quarrying [B]	23.6	22.6	1.0	21.6
Total manufactures [C]	**234.5**	**184.5**	**23.6**	**160.9**
Coke and petroleum [19]	16.7	11.2		11.2
Chemicals [20]	27.6	22.7		22.7
Pharmaceuticals [21]	23.3	17.7		17.7
Basic metals [24]	11.6	9.9	2.0	7.9
ICT equipment [26]	24.0	17.6	10.5	7.2
Electrical equipment [27]	8.8	7.8	2.6	5.2
Machinery and equipment [28]	23.1	20.5	3.8	16.7
Motor vehicles [29]	25.7	22.9		22.9
Other transport equip [30]	20.8	20.4	4.7	15.8
Other manufactures	52.8	33.8		33.8
Utilities [D-E]	5.3	5.1		5.1
Construction [F]	1.4	1.4		1.4
Wholesale and retail trade [G]	**4.2**	**48.3**	**0.3**	**48.0**
Transport services [H]	17.3	17.5	2.4	15.2
Other services	158.3	155.5		155.5
Total	447.3	437.4	27.3	410.2
Taxes less subsidies on products		9.8	6.2%	
Total		447.3		



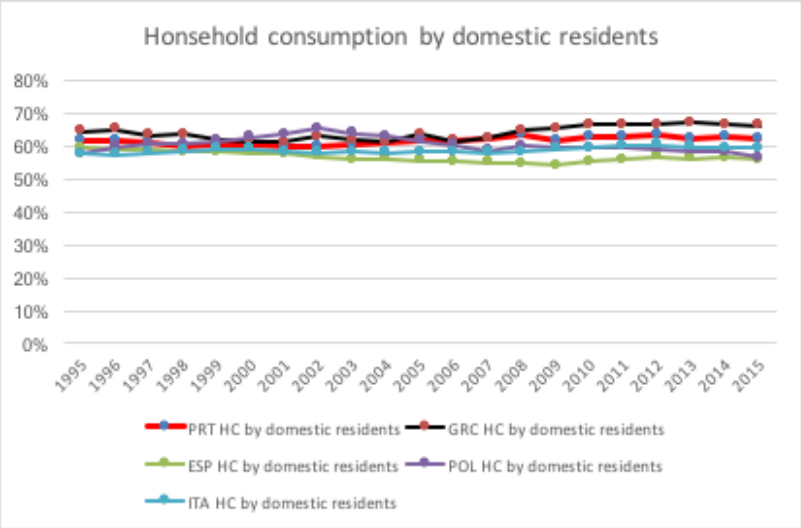
A little more on re-exports

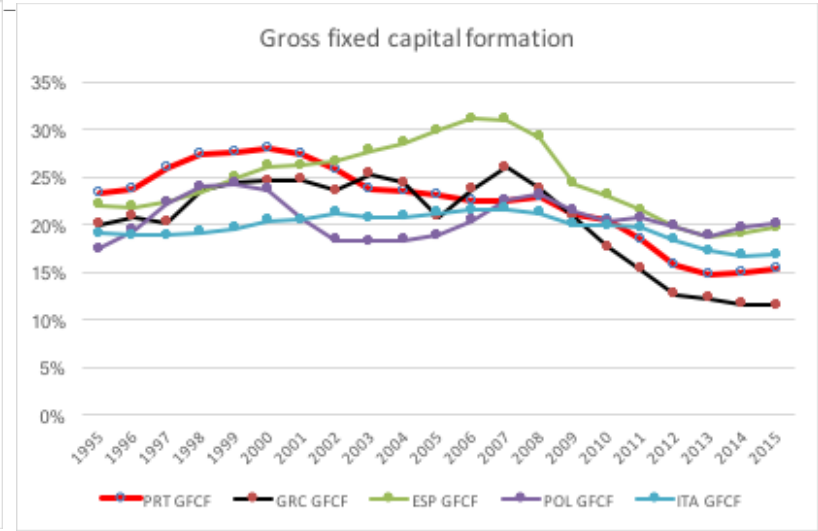
- Re-exports can be concentrated in a few sectors
  - 15% of USA reported exports of goods are re-exports;
  - 43% for ICT goods (2016)
  - 68% for ICT goods exports to Mexico, 58% to Canada (2016)
- USA report re-exports by product and partner destination; but not by country of origin of the goods (c.f. HKG)
- However, *at least*, we have detailed re-export data for USA. For most ICIO target countries, such data not reported by product - for many EU countries we have total re-exports e.g. NLD (40%). Problems for non-EU trading hubs e.g. SGP (50%)
- In general, in construction of ICIO, *for partner shares* of trade in goods, reported imports are prioritised as initial values.

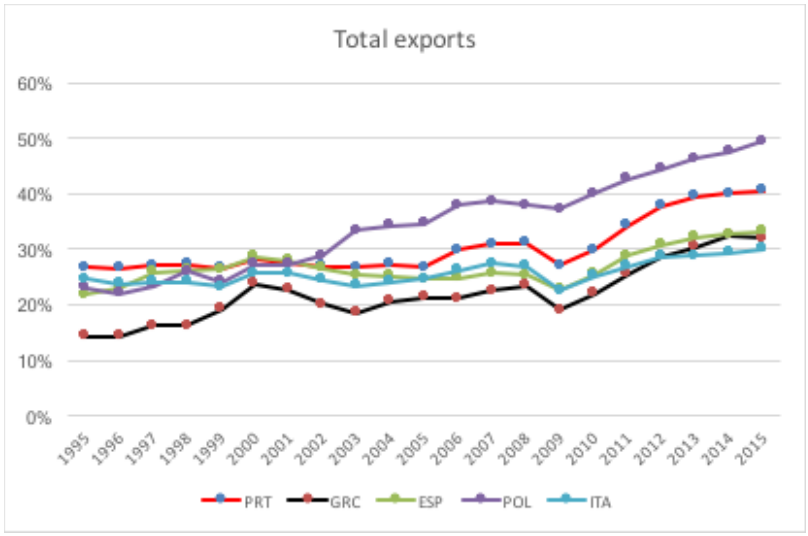
Portugal

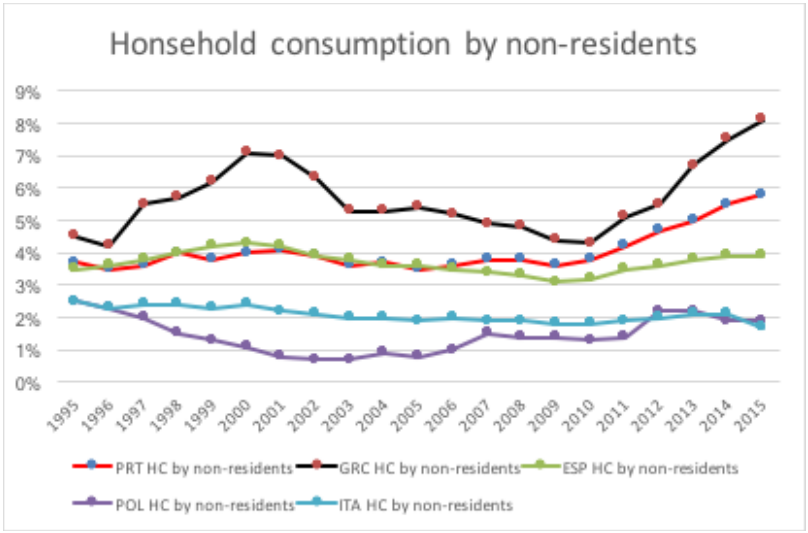
- Interpretations of existing databases by industry and product
  - Value added / SNA expenditure
  - Exports characteristics
  - Trade partners

Expenditure to GDP ratio (total GDP = 100%)



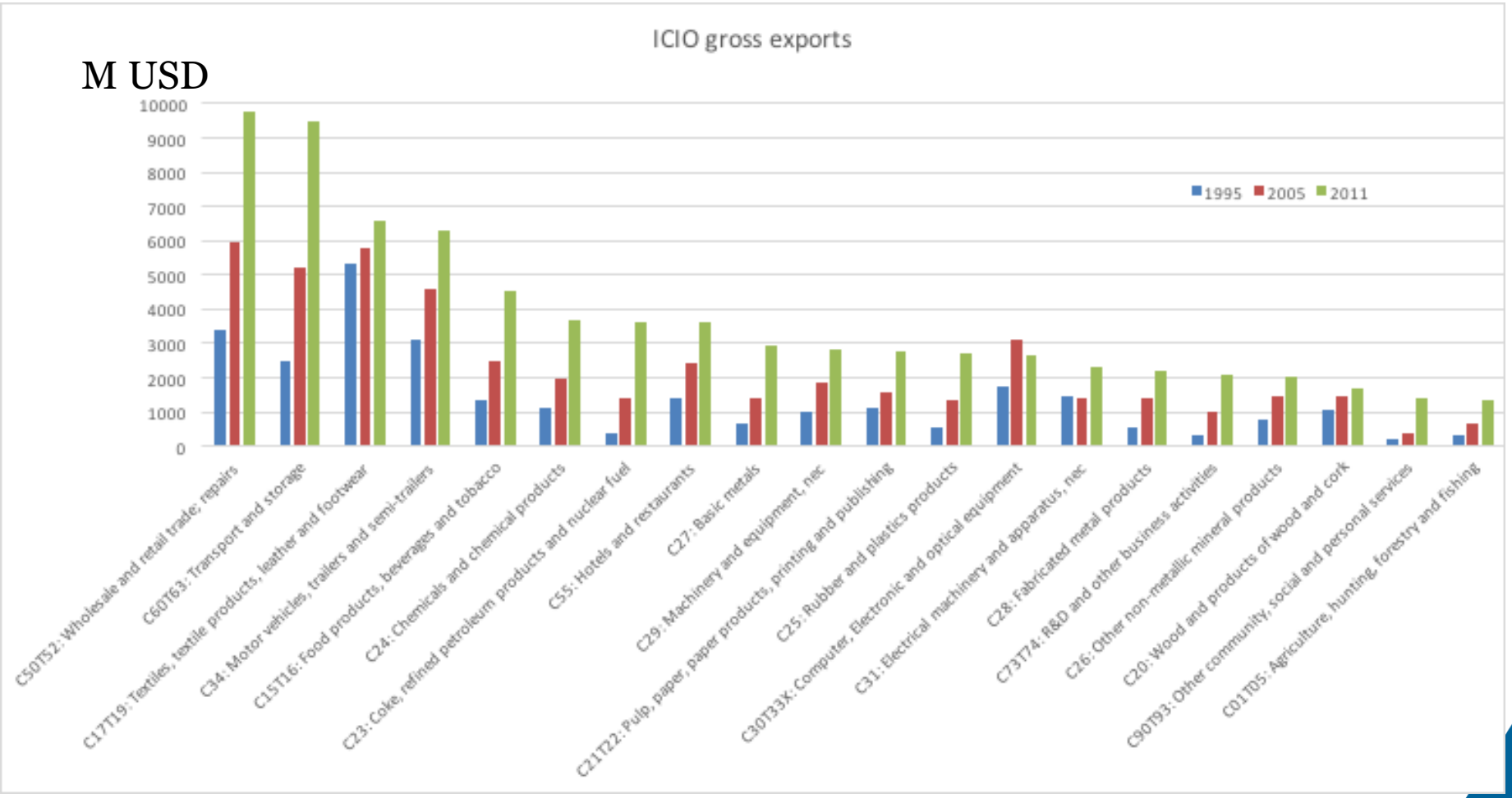






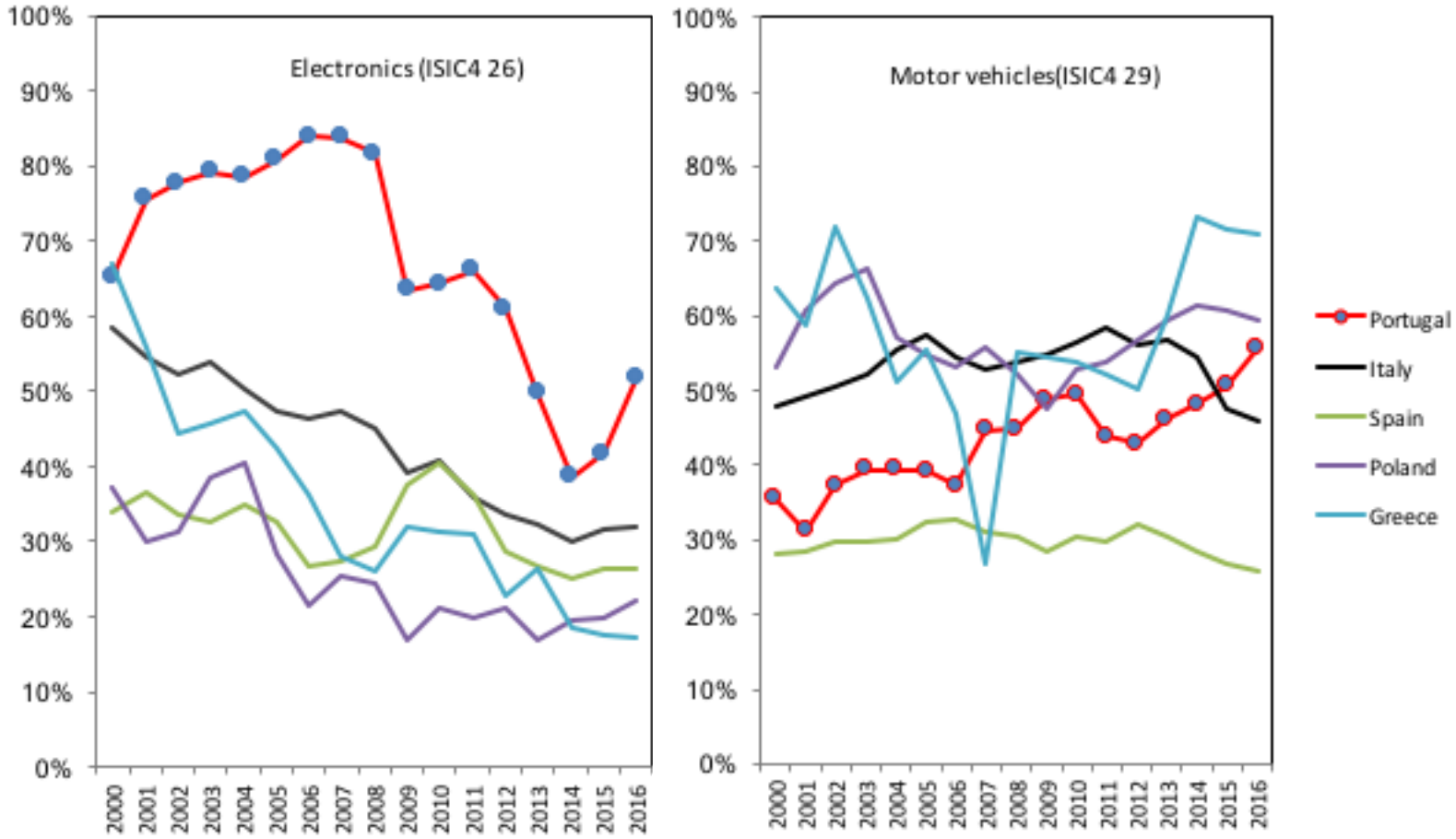
National Accounts (SNA 2008 format)

Gross exports at basic prices (PRT)



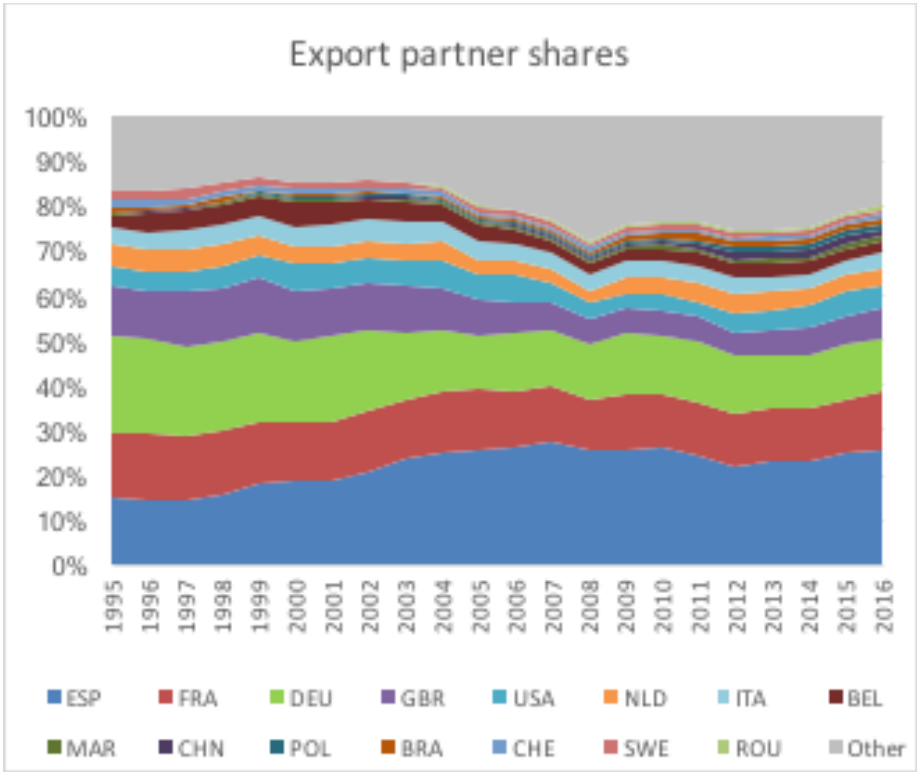
OECD Inter-country Input-Output Database 2016

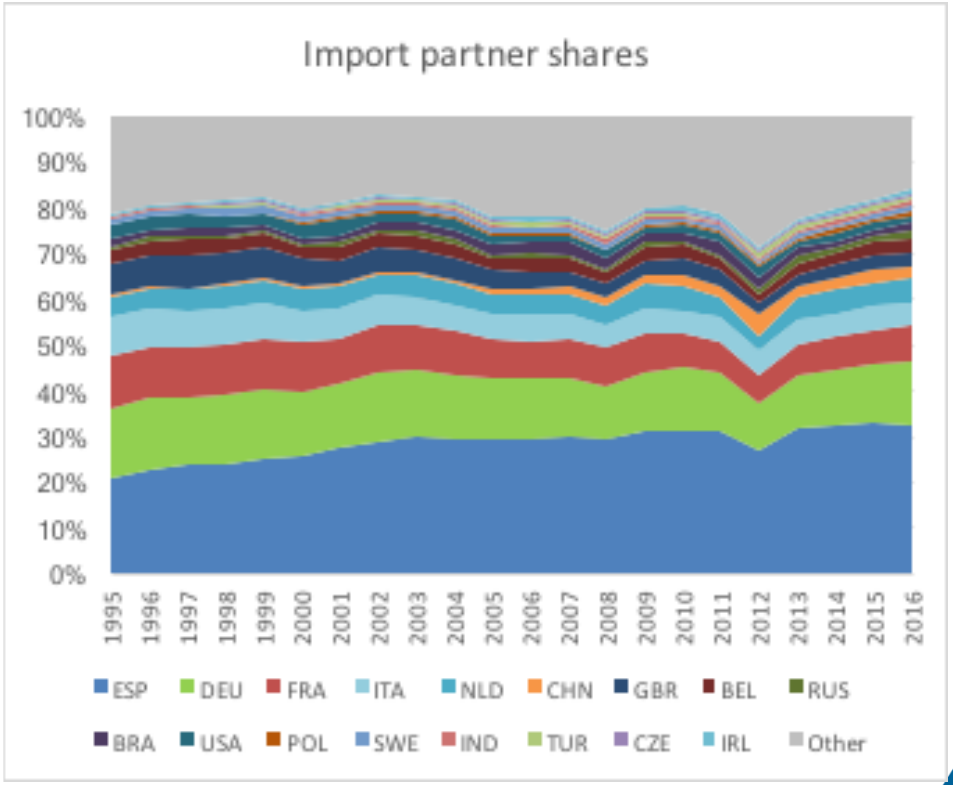
Intermediate product share in gross exports (PRT)



OECD 2018 Bilateral Trade Database by Industry and by Enduse category (BTDIXE)

Trade partners (PRT 1995-2016)





OECD 2018 Bilateral Trade Database by Industry and by Enduse category (BTDIXE)

summary

1.Wahere is PRT VA come from (VA by industry)?: Textile & Motor vehicles largest
2.How about expenditure items?
HFCE/GDP is stable
Relatively high tourism expenditure / gdp
Expo +impo/ gdp is higher
3a.What is PRT EXP products?
GVC oriented products: textile and motor vehicles are high
But the shares decreased in recent years (chemical, petroleum and Food increased)
3b.What is PRT IMP products?
Motor vehicles, chemicals, food, crude oil, Decrease: ICT, motor vehicles, machine
Increase : chemical, food
4.Intermediate or final products?
Intermediate shares are become higher, then stable after 2005
GVC intensive sectors intermediate expo motor vehicle increased / ict decreased

5.Where it goes (expo destination)?

Beyond national statistics

- 6.How exported products are made (foreign input by source country) ?
- 7.Where is it sourced from (import partner)?
- 8. What is the domestic economic & social impacts by foreign demand
- 9. What is the impacts of domestic demand on other countries
- 10. Exported intermediate products final consumed elsewhere (extra-EU regions) ?

Equation for TiVA final demand

- Methodology:

$$VA_{c,i}\begin{cases} Domestic_i \\ Foreign_i \end{cases} = \mathbf{vBy}$$

$$v_{c,i} = \frac{value\ added_{c,i}}{Output_{c,i}}$$

B- $(\mathbf{I} - \mathbf{A})^{-1}$ Global Leontief inverse matrix

vB- Value added multiplier

y- Global final demand $\begin{cases} \text{Domestic final demand} \\ \text{Foreign final demand} \end{cases}$

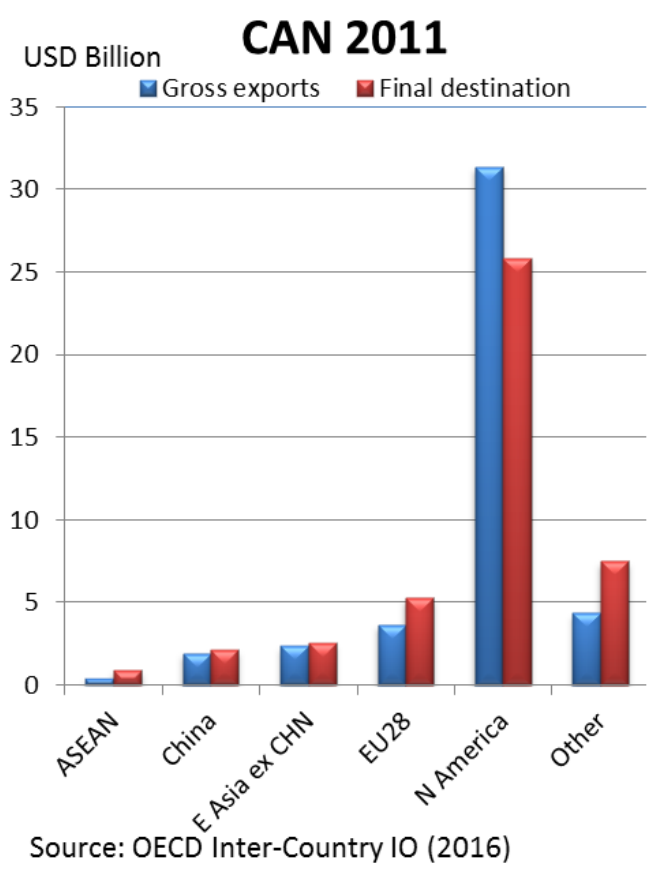
c- Country

i- Industry

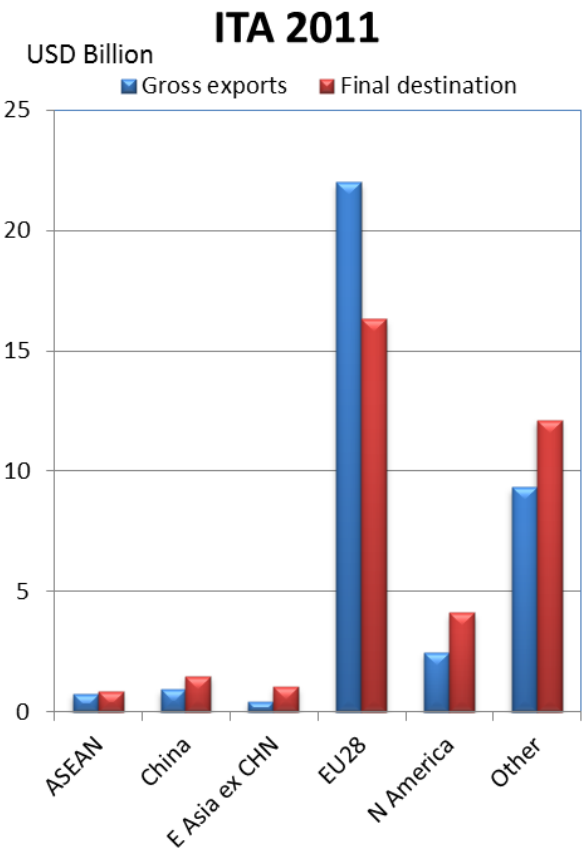
Examples of indicators on global supply-chains

- Distribution services embodied in gross exports as % of total exports
- VA backward linkages by upstream countries as % of total exports
- VA embodied in final destinations of intermediate exports
- Decomposition of exports (VA of exporting industry, other indirect impacts, foreign VA)
- Jobs embodied in foreign final demand as % of total employment

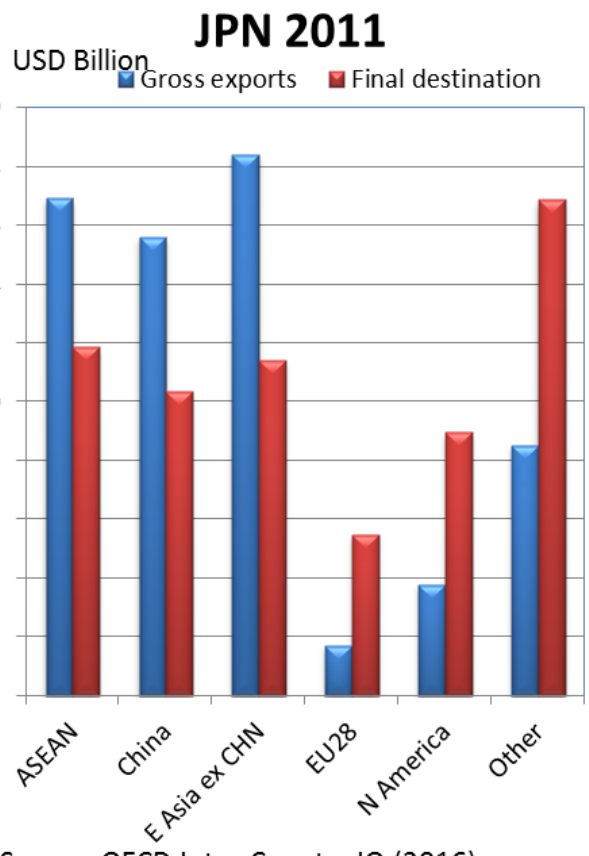
Intermediate exports of basic metals by destination region bloc



Source: OECD Inter-Country IO (2016)



Source: OECD Inter-Country IO (2016)



Source: OECD Inter-Country IO (2016)

CAN→ NAFTA → EU28
→ S.Amr
→ ASEAN
→ RoW

ITA → EU28 → Asia
→ N.Amr
→ RoW

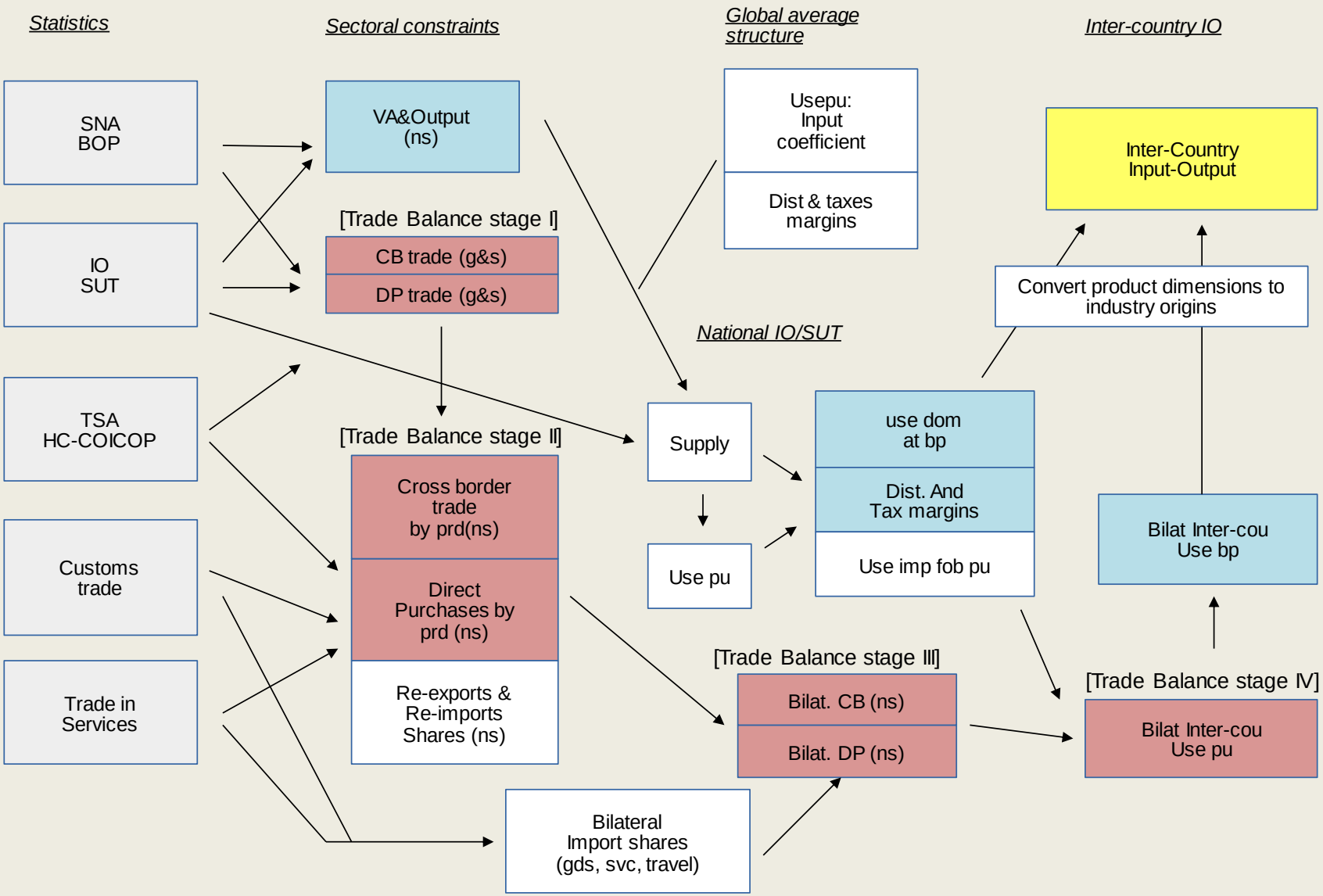
JPN → Other Asia → EU28
→ N.Amr
→ RoW

Development flow of ICIO/TiVA

- Collection of data sources
- Harmonisation of main aggregate components of National Accounts
- Harmonisation of national SUTs
- Domestic and import matrices
- Bilateral trade partner shares
- Development of IC-Use and ICIO
- Introducing heterogeneity within economy
- Indicator calculations
- Dissemination

Trade balancing stages

- National Accounts based (fob, *purchasers' prices*) goods, services (intl dist margin), non-res direct purchases
- 34 sectoral exports and imports (for cross-border trade *and* direct purchases)
- Sectoral exports and imports by partner (still *purchasers' prices*, no-end use)
- Bilateral use table i.e. by end-use industry and final expenditure category (still pu price)
- Convert global Use to basic prices (distribution margin of product origin country is reallocated to corresponding services of origin countries)



(ns) is number of products / industries in ICIO system e.g. 34; (g&s) : goods and services;
CB: Cross border; DP: Direct purchases; SNA:National Accounts; BOP: Balance of Payment; IO; Input-Output; SUT supply and use; TSA: Tourism Satellite Account; HC: Household consumption

Components of Global SUT

Trade balancing stages

Data sources for OECD Inter-country inter-industry model

Data sources (national sources / international data portals)

National Accounts: official country data, main aggregate and satellite account

Balance of Payments

Supply-use and Input-Output tables (import, margins)

Bilateral trade statistics for goods and services

Employment

Tourism satellite account

Intermediate analytical data products at OECD

Harmonised SUT / symmetric Input-Output tables (OECD I-O)

Bilateral Trade Database by Industry and by End-use for goods (OECD BTDIxE)

Bilateral Trade in Services (OECD-WTO)

Sectoral Value-Added, Output, Employment(OECD STAN)

Adjusted National Accounts (currency, non-resident expenditures and re-exports)

Challenges (Statistics)

- Low
  - IO / SUT structures of selected reference year
  - Bilateral merchandise trade data
- Medium
  - IO / SUT structures for all target years (tables for recent years only available for larger OECD countries)
  - Use tables at *purchasers' prices*
  - Import tables
  - Gross output by economic activity (esp. for non-OECD)
  - Bilateral Trade in Services
  - *Nowcasting* (depth of challenge depends on methodology)
- High
  - Transportation, trade, taxes and subsidy margin matrices
  - Non-resident direct purchases by product
  - Re-imports/Re-exports shares by product (and, ideally by partner)

Inter-Country Input-Output (ICIO) structure

Inter-country I-O		Intermediate demand						Final consumption and capital formation			Direct purchases by non-residents			Output
at basic prices		Cou A		Cou B		Cou C		Cou A	Cou B	Cou C	Cou A	Cou B	Cou C	
		Ind 1	Ind 2	Ind 1	Ind 2	Ind 1	Ind 2							
Cou A	Ind 1													X(A1)
	Ind 2													X(A2)
Cou B	Ind 1													X(B1)
	Ind 2													X(B2)
Cou C	Ind 1													X(C1)
	Ind 2													X(C2)
Taxes less subsidies ..		*... on intermediate products*						*... on final products*						
		NTZA1	NTZA2	NTZB1	NTZB2	NTZC1	NTZC2	FA	FB	FC	FA	FB	FC	
Value-added		V(A1)	V(A2)	V(B1)	V(B2)	V(C1)	V(C2)							
Output		X(A1)	X(A2)	X(B1)	X(B2)	X(C1)	X(C2)							

Key:

Cross-border flows of **intermediate** goods and services	**Cross-border** flows of **final** goods and services
Domestic flows of **intermediate** goods and services	**Domestic** flows of **final** goods and services

Extended use table structure

Extended use table at basic prices (domestic and import tables)

			CN1			CN2			CN3						
			PR	MN	SVC	PR	MN	SVC	PR	MN	SVC	MRG	DOM FD	EXP gds	EXP svc	TOTAL bp
Dom products used by CN1	CN1 dom sales	PR														
		MN														
		SVC														
Dom products used by CN2	CN2 Proc MNF	PR														
		MN														
		SVC														
Dom products used by CN3	CN3 Other exporters	PR														
		MN														
		SVC														
Foreign made Imported products		PR														
		MN														
		SVC														
	Imports for FD & re-exp	PR														
		MN														
		SVC														
	Margin															
	net taxes															
		VA														
		Output														

CN1: Domestic sales only, CN2: Processing exporter, CN3: Other exporters

What can countries do to improve availability of existing statistical framework

- National Accounts
  - Filling gaps of detail COICOP/Sectoral VA and Output
  - Tourism satellite account
- SUT/IO
  - Annual supply, use and I-O domestic / import tables
  - Purchasers', producers' and Basic price
  - Re-exports in IO/SUT
  - More detail margin vectors/matrices
- Correspondence table for published IO/SUT
  - Official concordance many-to-many
  - National classification – ISIC/CPC 2dgt

TiVA indicators: meeting various needs

Experienced I-O practitioners / GVC analysts

- with appropriate IT skills and software tools, carry out a wide range of GVC-related analyses. Just need the ICIO "objects" i.e. vectors and matrices (http://oecd/icio)
- Understand and discuss indicators with equations (matrix algebra etc.)
- "*OECD produces too many indicators!*"

Researchers and policy analysts not familiar with I-O techniques

- Demand for easy-to-use, and understand, TiVA indicators
- Require 'simple' explanations of indicators and their use
- *"More indicators please!"*

Based on much user feedback:

- Metadata for TiVA indicators has been updated (in OECD.STAT "cubes")
- The TiVA indicator document is being updated to provide "simpler explanations" for the uninitiated

Indicators overview (published on OECD.STAT)

Core indicators (2 or 3 dimensions)

Gross exports based:

e.g. Domestic and foreign VA content of exports (EXGR_DVA and EXGR_FVA)

Final demand based:

e.g. DVA embodied in Foreign final demand, Foreign VA in domestic demand

Four cubes with 4 dimensions (for the more adventurous)

Value added origin of gross exports, Value added origin of gross imports

Value added origin of final demand.

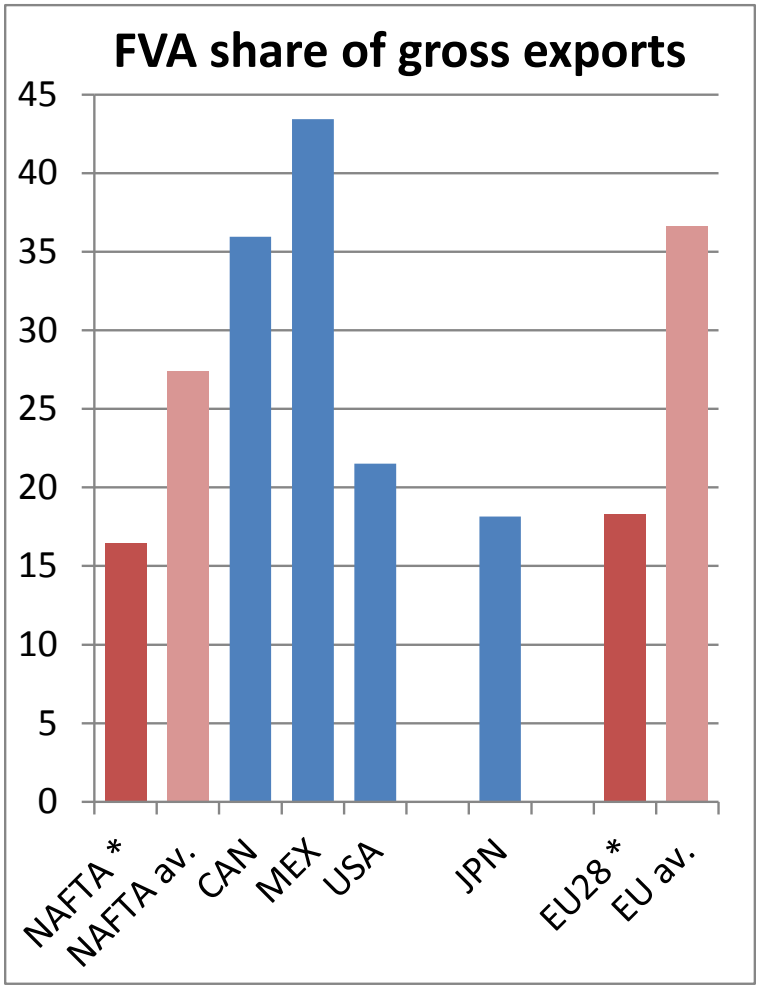
Value added origin of gross exports by final demand destination

Common confusion: what does industry refer to?

Value added origin industry? exporting industry? or final demand industry/product group?

Indicators for regions

- Regions = country groups e.g. EU, NAFTA
- For indicators such as EXGR_FVA, can include or exclude intra-region trade flows and/or VA flows.
- Including is equivalent to showing average of countries e.g. intra-region VA flows treated as FVA
- Excluding is treating the region as a single economy e.g. intra-region VA flows treated as DVA
- Under review …



* excl. intra-region VA and trade flows

Core indicators of TiVA

41 indicators; maximum number of dimensions = 3: country, partner, industry

of which: 20 ratios and shares:

code	description	CN Fig.
EXGR_DVASH	Domestic value added share of gross exports	2
EXGR_FVASH	Foreign value added share of gross exports	1,3
EXGR_FNLDVASH	Domestic value added in exports of *final products* as a share of total gross exports	2
EXGR_INTDVASH	Domestic value added in exports of *intermediate products* as a share of total gross exports	2
EXGR_INTDVApSH	Domestic value added in exports of intermediate products, partner shares	8
EXGRpSH	Gross exports, partner shares	7
EXGR_DVApSH	DVA in gross exports, partner shares	
EXGR_TDVAIND	Industry domestic value added contribution to gross exports	3
EXGR_TFVAIND	Industry foreign value added contribution to gross exports	3
EXGR_SERV_DVASH	Domestic services VA content of gross exports	9
EXGR_SERV_FVASH	Foreign services VA content of gross exports	9
IMGRINT_REII	Re-exported intermediate imports as % of intermediate imports	4
IMGRpSH	Gross imports, partner shares	7
FFD_DVApSH	Domestic value added in foreign final demand, partner shares	7
DFD_FVApSH	Foreign value added in domestic final demand, partner shares	7
VALUX_FFDDVA	Domestic value added embodied in foreign final demand, as share of total value added	5,6
PROD_VASH	Value added as a % of production	
FD_VASH	Value added share of total final demand by source country and industry	
CONS_VASH	Value added share of total consumption by origin	12
GFCF_VASH	Value added share of gross fixed capital formation by origin	

http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C1

Core indicators of TiVA

of which: 21 measures in USD:

code	description
EXGR	Gross exports
EXGR_FNL	Gross exports of final products
EXGR_INT	Gross exports of intermediate products
EXGR_DVA	Domestic value added content of gross exports
EXGR_DDC	Direct domestic value added content
EXGR_IDC	Indirect domestic value added content from domestic intermediates
EXGR_RIM	Re-imported domestic value added content
EXGR_FVA	Foreign value added content of gross exports
IMGR	Gross imports
IMGR_FNL	Gross imports of final products
IMGR_INT	Gross imports of intermediate products
BALGR	Gross trade balance
REII	Re-exported intermediate imports
PROD	Production, gross output
VALU	Value added
FFD_DVA	Domestic value added embodied in foreign final demand
DFD_FVA	Foreign value added embodied in domestic final demand
BALVAFD	Value added embodied in final demand, balance
FD_VA	Value added embodied in final demand, by source country and industry
CONS_VA	Value added content of total consumption, by source country and industry
GFCF_VA	Value added content of gross fixed capital formation, by source country and industry

http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C1

Dissemination

- Publication

- Internal and external committee and other meetings

- Country notes
  - http://www.oecd.org/sti/ind/tiva2015countrynotes.htm

- OECD.STAT
  - https://stats.oecd.org/Index.aspx?DataSetCode=TIVA_2016_C1
- ICIO data in R format for advanced practitioners


ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT
OECD.Stat
Welcome Norihiko
Industry
Balance of Payments (BOP)
International Trade (MEI)
Trade in Value Added OECD-WTO
Trade in Value Added OECD-WTO
Colin please Name Me: VIEW without dim PARTNER
Trade in Value Added OECD-WTO
Customise
Export
Draw chart
My queries
Variable
Industry
Time
FDDVA: Domestic value added embodied in foreign final demand
IMGR: Gross imports
IMGRSH: Gross imports - partner shares, % of total world imports
IMGR_GDP: Gross imports as a % of GDP (total value added)
TSGR: Gross trade surplus
TSGR_GDP: Gross trade surplus as a % of GDP (total value added)
NAVIGATION
HIDE NAVIGATION
Partner
Country
TOTAL: TOTAL
01T05: Agriculture, hunting, forestry and fishing
10T14: Mining and quarrying
15T16: Food products, beverages and tobacco
17T19: Textiles, textile products, leather and foo
20T22: Wood, paper, paper products, printing an
23T26: Chemicals and non-metallic mineral prod
27T28: Basic metals and fabricated metal produc
29: Machinery and equipment, nec
30T33: Electrical and optical equipment
34T35: Transport equipment
36T37: Manufacturing nec; recycling
40T41: Electricity, gas and water supply
45: Construction
50T55: Wholesale and retail trade; Hotels and re
60T64: Transport and storage, post and telecom
65T67: Financial intermediation
70T74: Business services
75T95: Other services
Australia
Austria
Belgium
Canada
Chile
Czech Republic
Denmark
74 851.1
1 139.9
554.4
875.5
958.3
2005
2008
2009
Trade in Value Added OECD-WTO
Customise
Export
Draw chart
Variable
Industry
Time
Partner
FDDVA: Domestic value added embodied
TOTAL: TOTAL
2005
2005
2008
2009
stralia
Austria
Belgium
Canada

Download CSV ➔ EXCEL (pivot)

- Layout
- Option (change code)
- Export csv format text file
- Read text file by Excel
- Insert / Pivot

Sample R code for ICIO analysis 2: Foreign VA embodied in Portuguese Exports

```
load('DATA.ICIOeconVA.Rdata') # VA
load('DATA.ICIOeconX.Rdata') # OUTPUT
load('DATA.ICIOeconB.Rdata') # LEONTIEF
load('DATA.ICIOeconGRTR.Rdata') # EXPORTS OF INT & FD
year = 1995
vax<-diag(DATA.ICIOeconVA[year,,]/ DATA.ICIOeconX[year,,]);
vax[is.nan(vax)]<-0
temp<-DATA.ICIOeconGRTR[1,,1]; temp[]<-0
temp[613:646]<-DATA.ICIOeconGRTR[1,613:646,1]
result<-vax%*%DATA.ICIOeconB[year,,] %*% temp
print(round(result[613:646]))  # Korean DVA in Korean FD
```

```
[1] KOR_C01T05AGR    KOR_C10T14MIN    KOR_C15T16FOD
KOR_C17T19TEX
                39                9               13               87
     KOR_C20WOD    KOR_C21T22PAP       KOR_C23PET       KOR_C24CHM
                3               53               12              101
     KOR_C25RBP       KOR_C26NMM       KOR_C27MET       KOR_C28FBM
              136               20               83               49
```

Sample R code for ICIO analysis 1: Korean VA embodied in Portuguese FD

```
load('DATA.ICIOeconVA.Rdata') # VA
load('DATA.ICIOeconX.Rdata') # OUTPUT
load('DATA.ICIOeconB.Rdata') # LEONTIEF
load('DATA.ICIOeconFD.Rdata') # FINAL DEMAND
year = 1995
vax<-diag(DATA.ICIOeconVA[year,,]/ DATA.ICIOeconX[year,,]);
vax[is.nan(vax)]<-0
result<-vax%*%DATA.ICIOeconB[year,,]
%*%DATA.ICIOeconFDTTLdisc[year,,"KOR"]
print(round(result[613:646]))  # Korean DVA in Korean FD
```

```
[1] 26629 1610 8127 5520 940 6168 1925 8320 2244 5761 [11] 7740
3275 8744 8187 3089 8241 2133 2427 7835 49930 [21] 31388 12024
11566 6839 24493 33515 2294 2394 14610 26470 [31] 22205 10390
14301 209
```

ICIO/TiVA 2016-2017

- 'light' update of Inter-Country Input-Output (ICIO) tables completed end-2016, Trade in Value Added (TiVA) indicators, published early 2017. http://oe.cd/tiva
- **63 countries** (Morocco and Peru added)
- Indicators for **all years 1995-2011**
- New indicators e.g. domestic value added content of imports, final destinations of exported value added
- Extensions to meet needs of other Committees: *Steel, Tourism, Environment, Trade, Economic policy, Investment etc.*
- Estimates (projections), 2012-14, for a limited set of TiVA indicators: released June 2017 http://oe.cd/tiva-nowcast

Demand for this work shows no signs of slowing

ICIO/TiVA - ongoing

- **Major update of ICIO infrastructure**
- based on latest available (SNA08) national data and international sources: SUTs, IOTs, SNA time series, bilateral trade in goods and services etc.
- **Core years: 2005-2015**
- Preliminary aggregate indicators for input into MCM 2018 document(s): Q1 2018
- National volunteers for reviewing first results welcomed
- First release of results: Q2 2018 (e.g. csv format)
- "*Formal publication*" of ICIO and TiVA indicators (OECD. STAT): Q3 2018
- Updates of embodied CO2 and embodied employment indicators: Q3 2018 (http://oe.cd/io-co2, http://oe.cd/io-emp)

TiVA 2018 Industry list

ISIC 4		Industry	ISIC 4		Industry
0		Total	21	35 to 39	Utilities
1	01, 02, 03	Agriculture	22	41,42,43	Construction
2	05,06	Mining, energy	23	45,46,47	Wholesale & retail
3	07,08	Mining, non-energy	24	49 to 53	Transport & storage
4	09	Mining, services *	25	55, 56	Hotels & restaurants
5	10,11,12	Food products	26	58,59,60	Publishing, broadcasting
6	13,14,15	Textiles & apparel	27	61	Telecoms
7	16	Wood	28	62,63	IT services
8	17,18	Paper and printing	29	64,65,66	Finance & insurance
9	19	Coke, petroleum	30	68	Real estate
10	20,21	Chemicals	31	69 to 82	Other business services
11	22	Rubber & plastics	32	84	Public admin
12	23	Non-metal minerals	33	85	Education
13	24	Basic metals	34	86,87,88	Health
14	25	Fabricated metals	35	90 to 96	Other services
15	26	ICT & electronics	36	97,98	Private households *
16	27	Electrical machinery			
17	28	Machinery			
18	29	Motor vehicles			
19	30	Other transport			
20	31,32,33	Other manufacturing			

16 manufacturing activities
14 service activities

* optional

Extended industry and product dimensions

- More detailed product list for better allocation of exports into importing industries and final expenditure items
- Margin industry output
  - trade
  - transport services
- Taxes and subsidies
  - Import duty
  - VAT/Consumption tax /sales tax
  - Other taxes
- Real estate: separation *of imputed rent of owner occupiers* (68A)
  - No trade
  - Approximately 20% of household final consumption
- Processing / manufacturing services (wholesale)

Summary of steps to build ICIO 2018

1. Harmonizing National Accounts constraints
2. Sectoral output, VA, exports and imports constraints
3. National Supply and Use tables (SUTs) balancing
4. Manufacturing heterogeneity within a country (Mexico and China)
5. Bilateral trade in good and services by Use table harmonized industry
6. International Use table balancing

Final remarks

- Quality of indicators depends on quality of ICIO which depends on quality and availability of underlying national stats (SNA, bilateral trade etc) … and, estimation techniques used
- Regional and national initiatives
- Review of indicators for next edition.
- App for generating multi-dimensional indicators

Thank you!

OECD ICIO Database and analytical indicators

http://oe.cd/icio

Time series data available in csv & Rdata format

TiVA http://oe.cd/tiva (data)

Embodied Carbon http://oe.cd/io-co2 (data)

Jobs http://oe.cd/io-emp (data)

THANK YOU

More information at

http://oe.cd/tiva
http://oe.cd/i-o

OECD
BETTER POLICIES FOR BETTER LIVES

Other applications

- 1. Industry specific TiVA Indicators
  - Steel and iron, shipbuilding, tourism
- 2.Jobs and Skills
  - Domestic jobs and labour income engaged in foreign final demand
- 3. CO_2 emissions embodied in intl. trade
  - Carbon footprint

Industries serving tourism in an Input-Output framework (direct and indirect industries)

Tourism characteristic products

- Hotels and Restaurants
- Passenger transportation
- Cultural and sporting activities

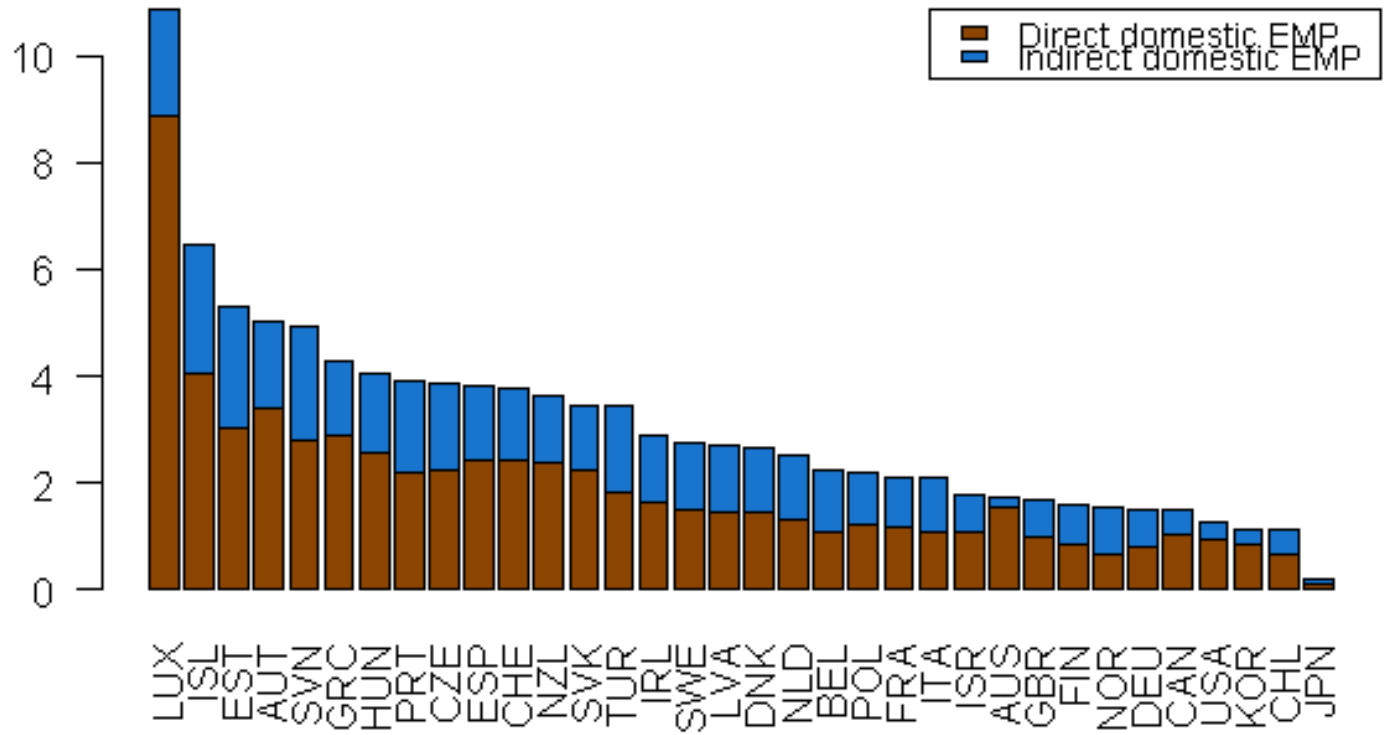
Other consumption products

- Food, beverages and tobacco
- Apparel and footwear

Indirect industries:

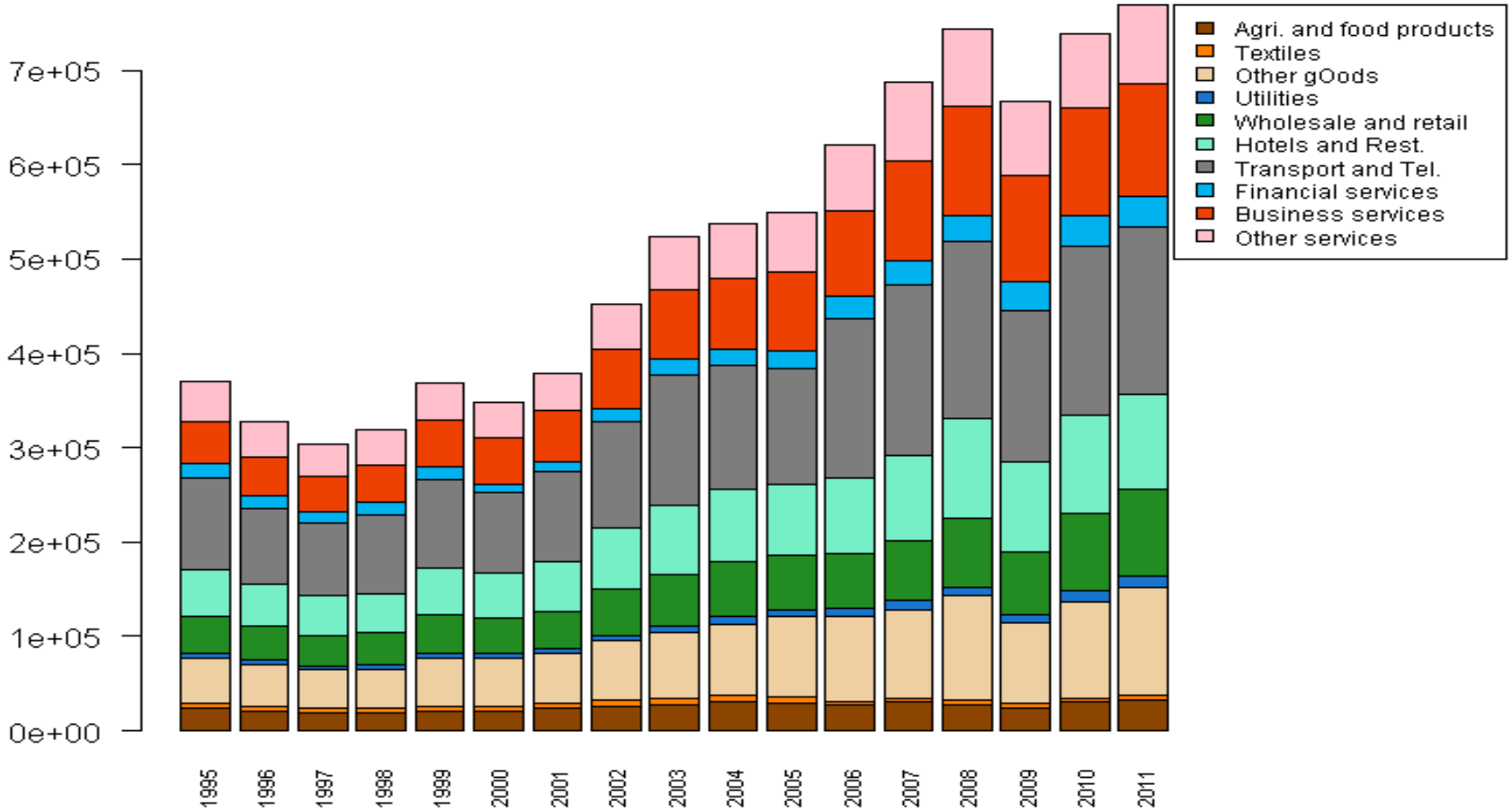
- Agriculture
- Fuels
- Utility
- Construction
- Business services
- Other goods

Domestic jobs sustained by non-residents expenditures as % of total employment (2011)



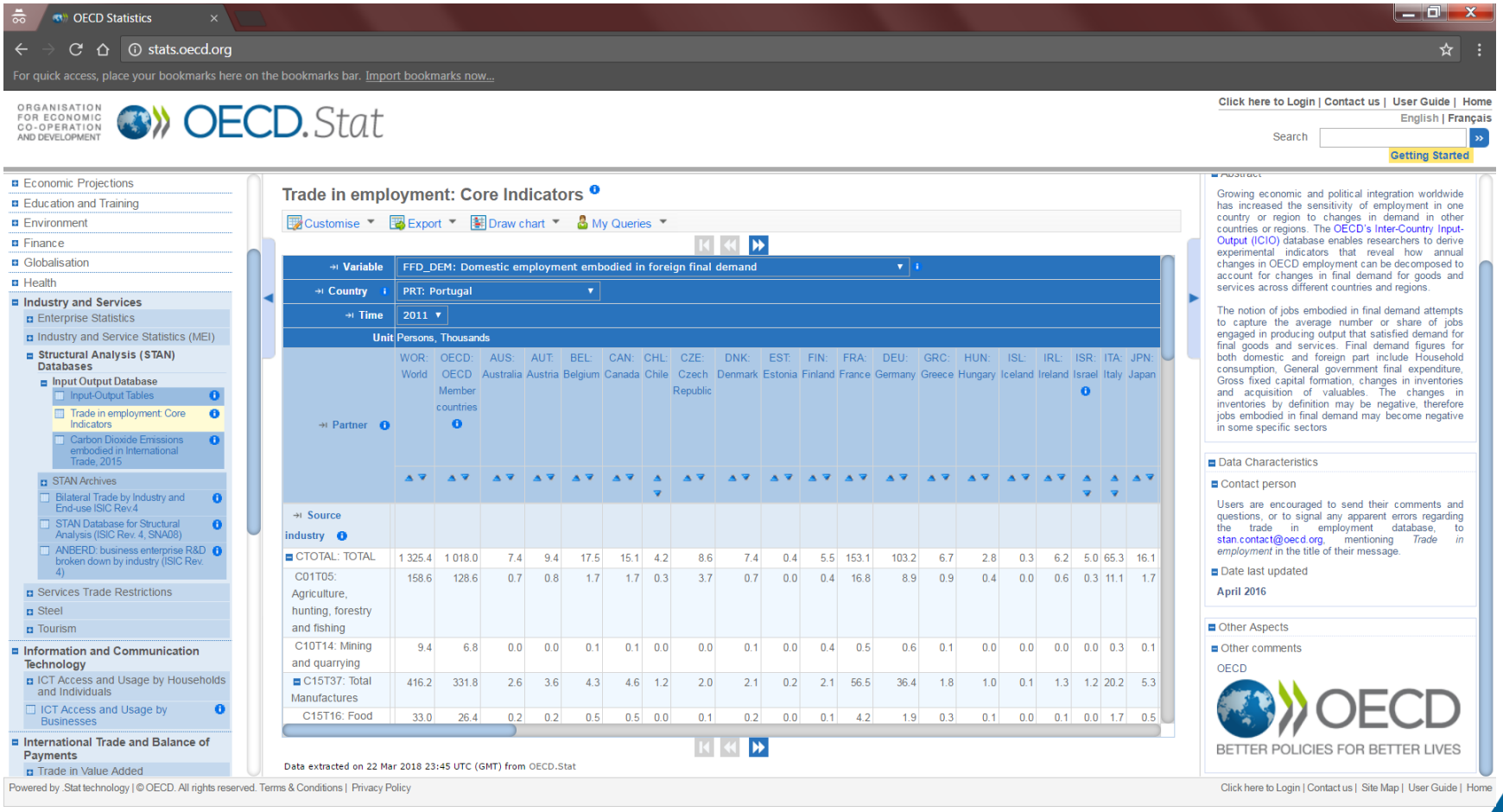
Source: OECD Inter-Country Input-Output Database 2016
OECD Trade in employment (2015)

Domestic value added of expenditure by non-residents– Denmark (Million USD)

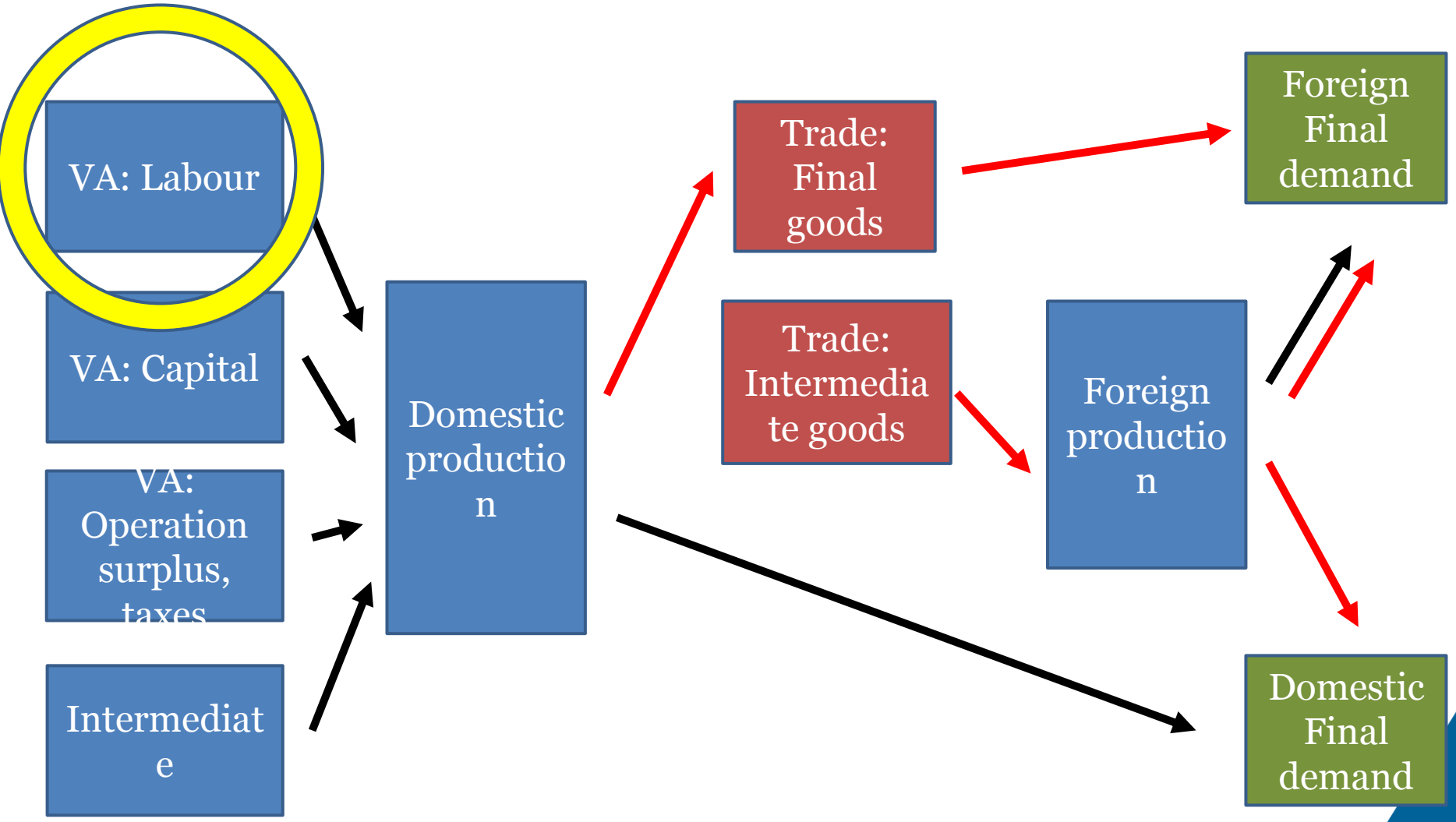


Source: OECD Inter-Country Input-Output Database 2016

Trade in employment



VA, Production, Trade, Final demand

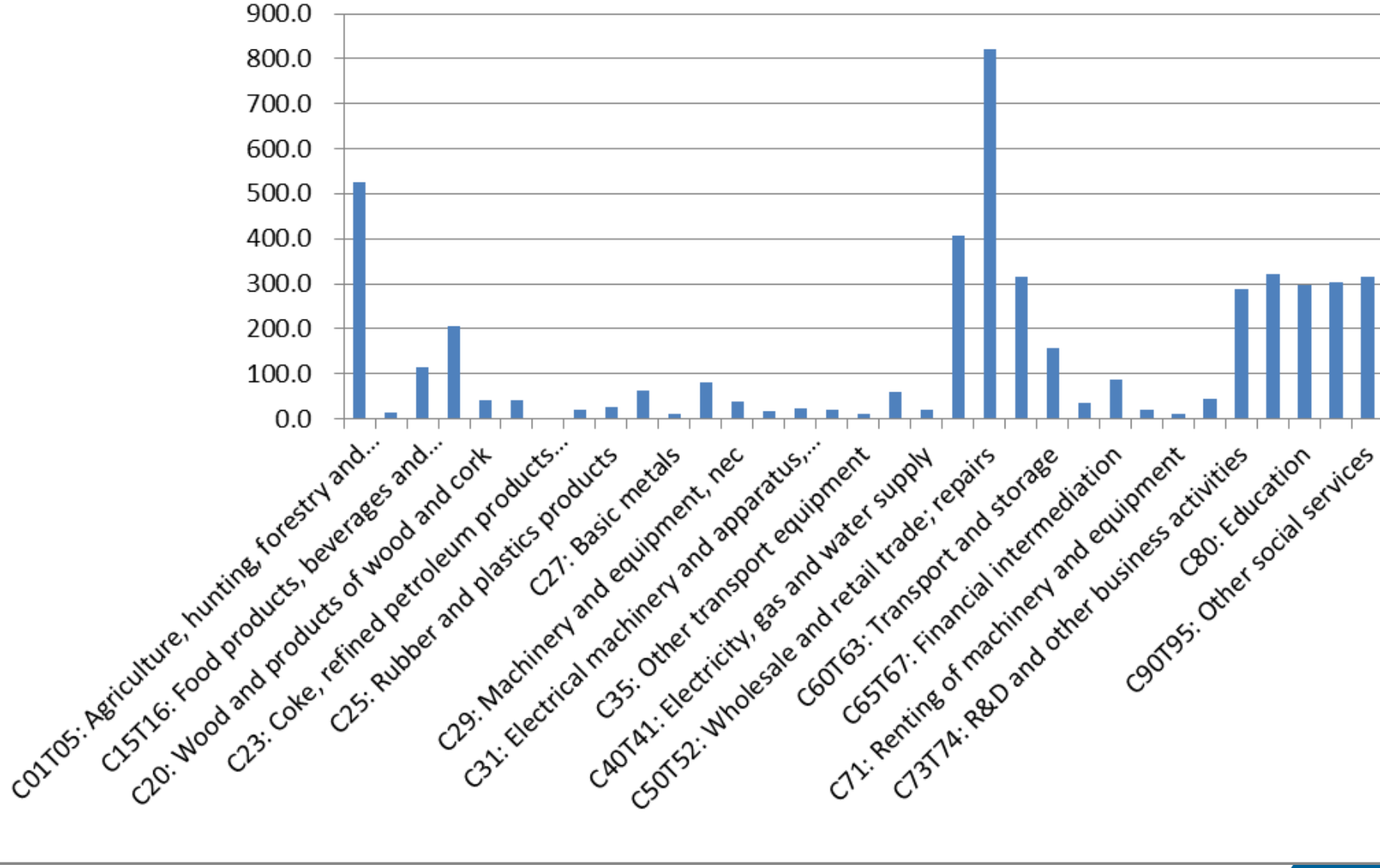


Employment characteristics (by economic activity/industry)

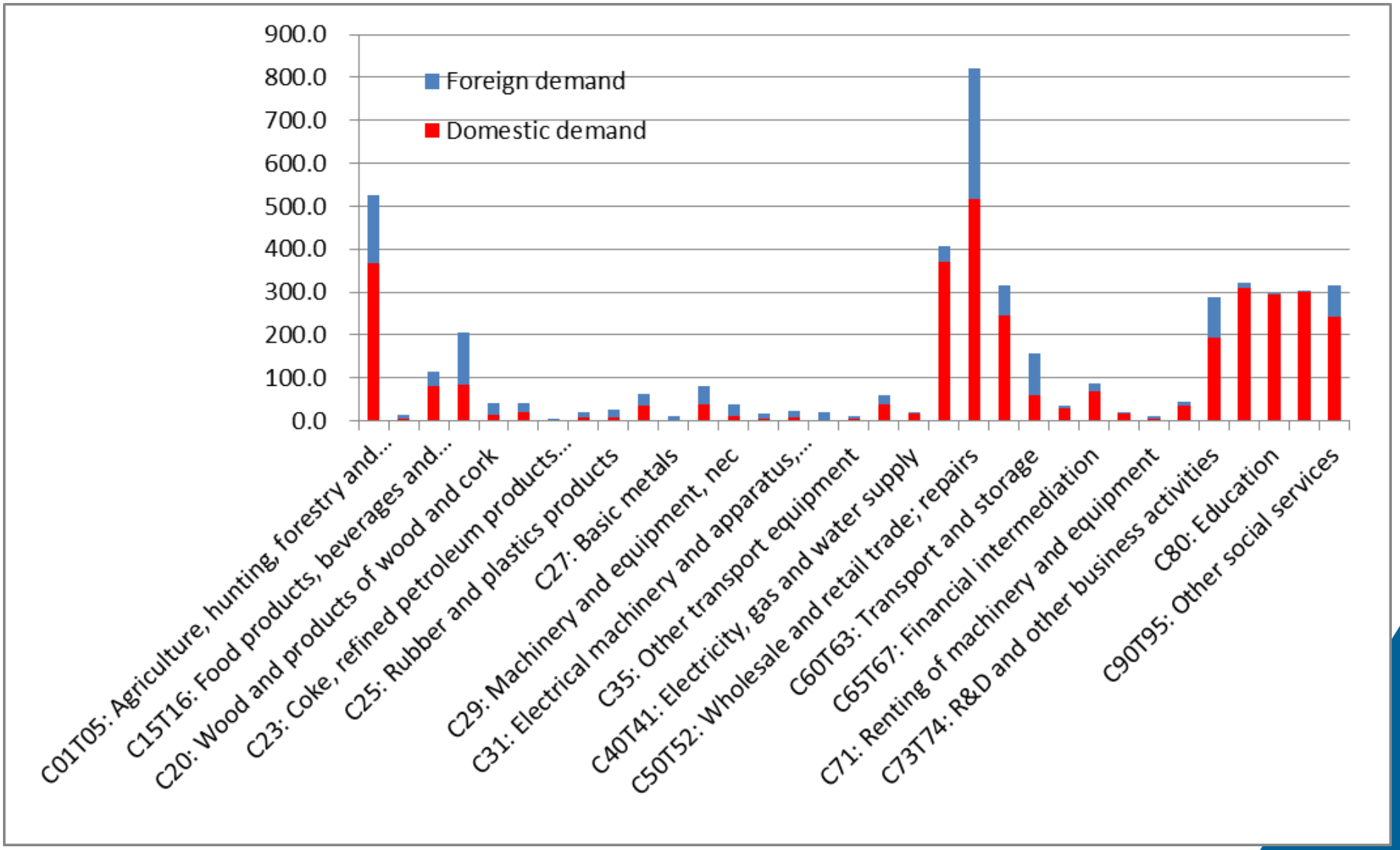
- Educational attainment (ISCED)
- Occupation (ISCO)
- Professional status (employer/employees/unpaid)
- Full-time/ part-time
- Hours worked
- Median gross hourly earnings
- Age
- Gender

Eurostat EU-LFS ; Earnings statistics;

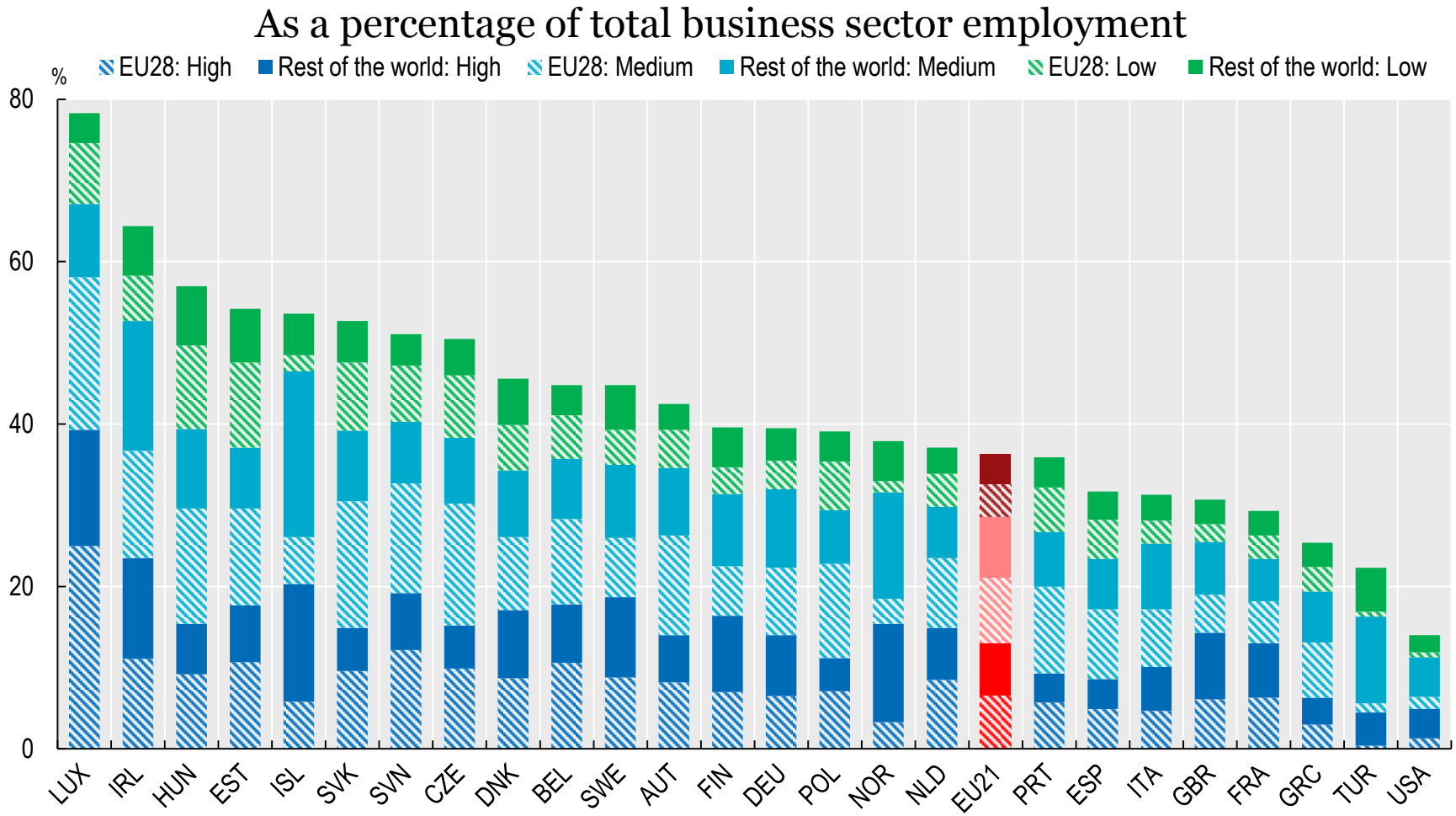
Employment by industry (PRT, 2011)



Employment by industry (PRT, 2011)



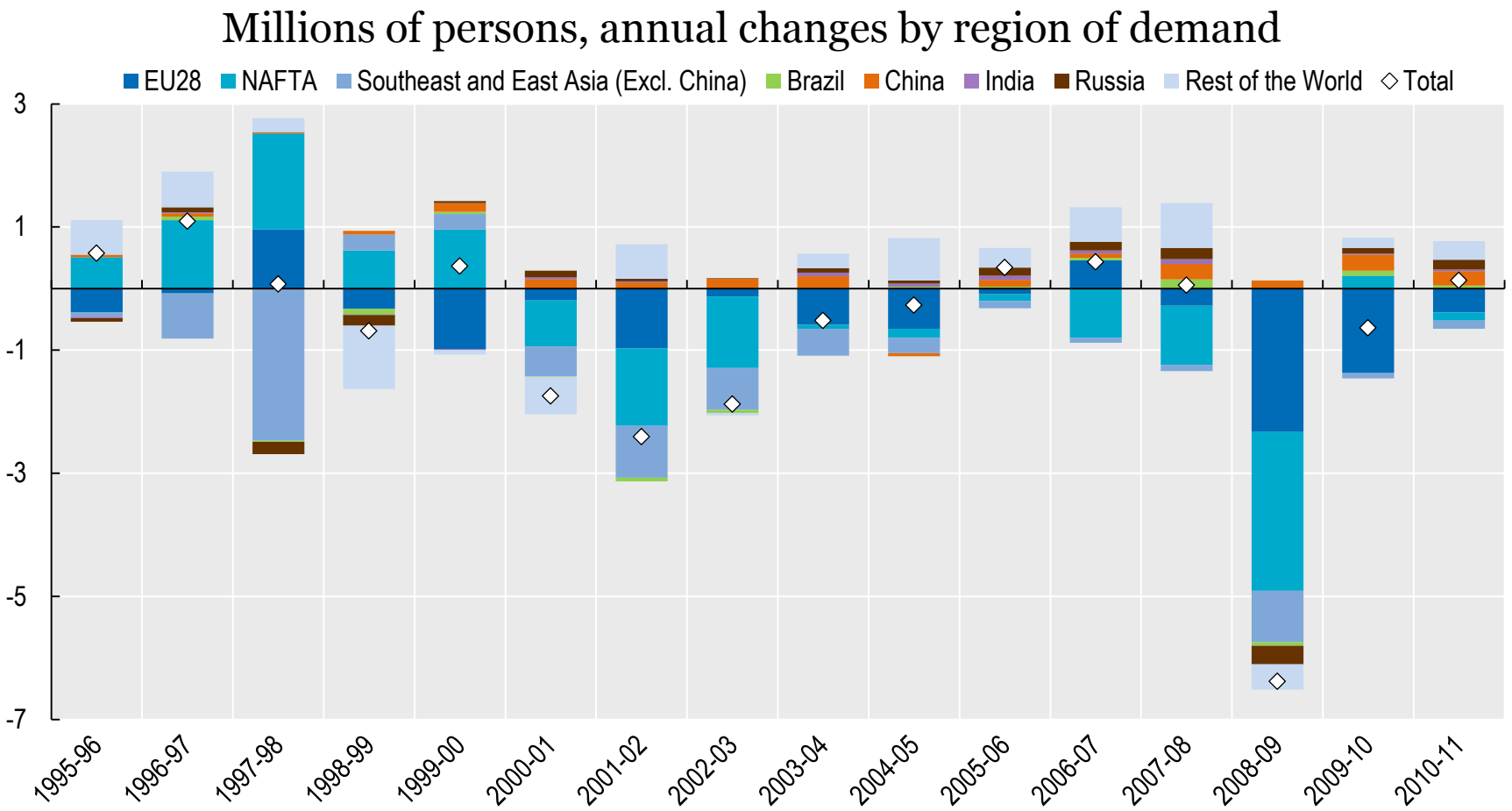
Jobs sustained by foreign final demand, by skill intensity, 2011



Source: OECD (2015), *OECD Science, Technology and Industry Scoreboard 2015: Innovation for Growth*, OECD Publishing, doi: http://dx.doi.org/10.1787/sti_scoreboard-2015-en.

The business sector is defined according to ISIC Rev. 3 Divisions 10 to 74.

Origin of demand for manufacturing jobs in OECD, 1995-2011



Source: OECD (2015), *OECD Science, Technology and Industry Scoreboard 2015: Innovation for Growth*, OECD Publishing, doi: http://dx.doi.org/10.1787/sti_scoreboard-2015-en.

The manufacturing sector corresponds to ISIC Rev. 3 Divisions 15 to 37.

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OECD.Stat

Carbon Dioxide Emissions embodied in International Trade

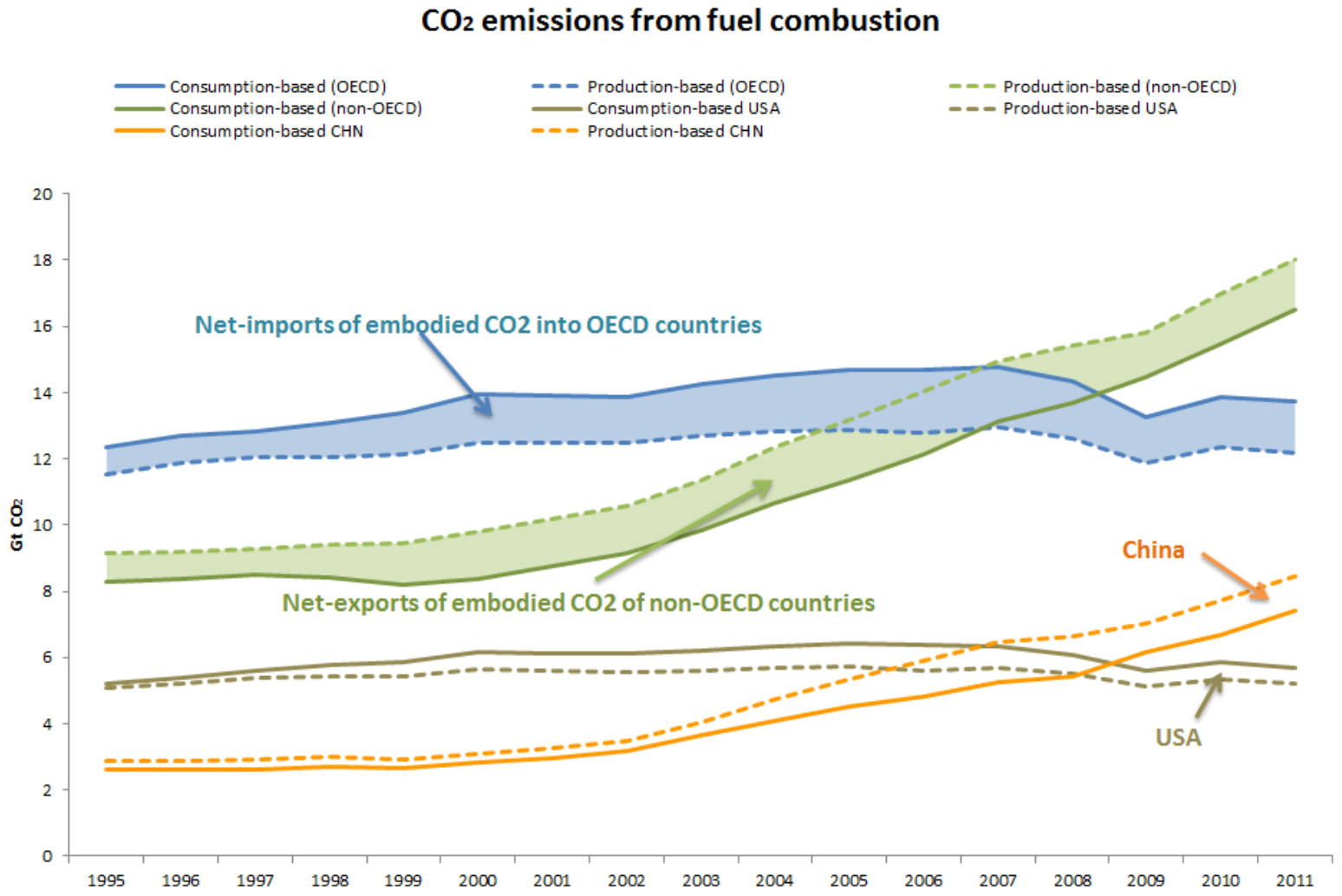
Customise | Export | Draw chart | My Queries

Variable	FD_CO2: CO2 embodied in domestic final demand
Industry	TOTAL: All industries
Partner	WOR: World
Unit	Tonnes, Millions

Country \ Time	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
WOR: World	21 130.880	21 677.780	21 894.870	21 986.580	22 095.470	22 915.660	23 165.000	23 503.980	24 582.630	25 671.780	26 508.970
OECD: OECD	12 554.973	12 938.625	13 052.702	13 260.226	13 577.221	14 146.084	14 105.062	14 085.140	14 464.314	14 761.255	14 961.235
AUS: Australia	271.225	285.418	293.911	318.930	323.541	330.449	330.422	353.939	376.462	401.465	414.466
AUT: Austria	84.656	90.048	85.073	85.254	91.015	94.676	93.575	97.440	98.448	98.390	98.324
BEL: Belgium	119.815	126.083	117.852	125.042	122.489	125.007	121.589	117.345	124.752	127.331	127.880
CAN: Canada	420.573	431.338	460.979	464.883	473.688	490.656	481.882	490.394	526.900	536.815	552.962
CHL: Chile	39.865	47.134	51.545	53.929	52.773	54.149	48.941	52.756	52.159	56.407	59.481
CZE: Czech Republic	117.170	119.685	110.144	108.213	100.882	130.421	119.451	122.566	118.196	116.295	110.387
DNK: Denmark	68.772	75.817	68.572	69.540	64.088	61.130	63.664	65.970	67.342	69.291	63.365
EST: Estonia	12.213	13.009	12.578	13.454	12.586	14.286	15.819	15.935	17.424	15.095	16.157
FIN: Finland	66.426	64.739	61.399	68.791	68.686	71.849	75.331	80.544	82.992	79.885	72.111
FRA: France	454.797	464.949	439.516	477.337	484.164	483.697	496.946	481.698	520.653	529.128	537.173
DEU: Germany	1 046.071	1 057.860	1 004.405	1 010.124	994.576	992.603	993.599	933.626	974.066	941.153	925.174
GRC: Greece	83.636	86.142	85.672	90.350	94.832	106.892	111.600	118.421	123.689	127.899	122.768
HUN: Hungary	54.297	51.917	53.372	59.193	74.445	78.399	69.812	72.123	73.718	74.669	68.680
ISL: Iceland	2.365	2.508	2.411	2.969	3.088	3.224	2.863	2.843	3.079	3.321	3.860
IRL: Ireland	36.408	38.187	38.578	42.158	44.991	47.379	49.169	47.890	48.870	51.975	55.821
ISR: Israel	59.268	61.598	63.131	64.477	67.014	71.680	72.844	73.160	72.218	72.771	70.472

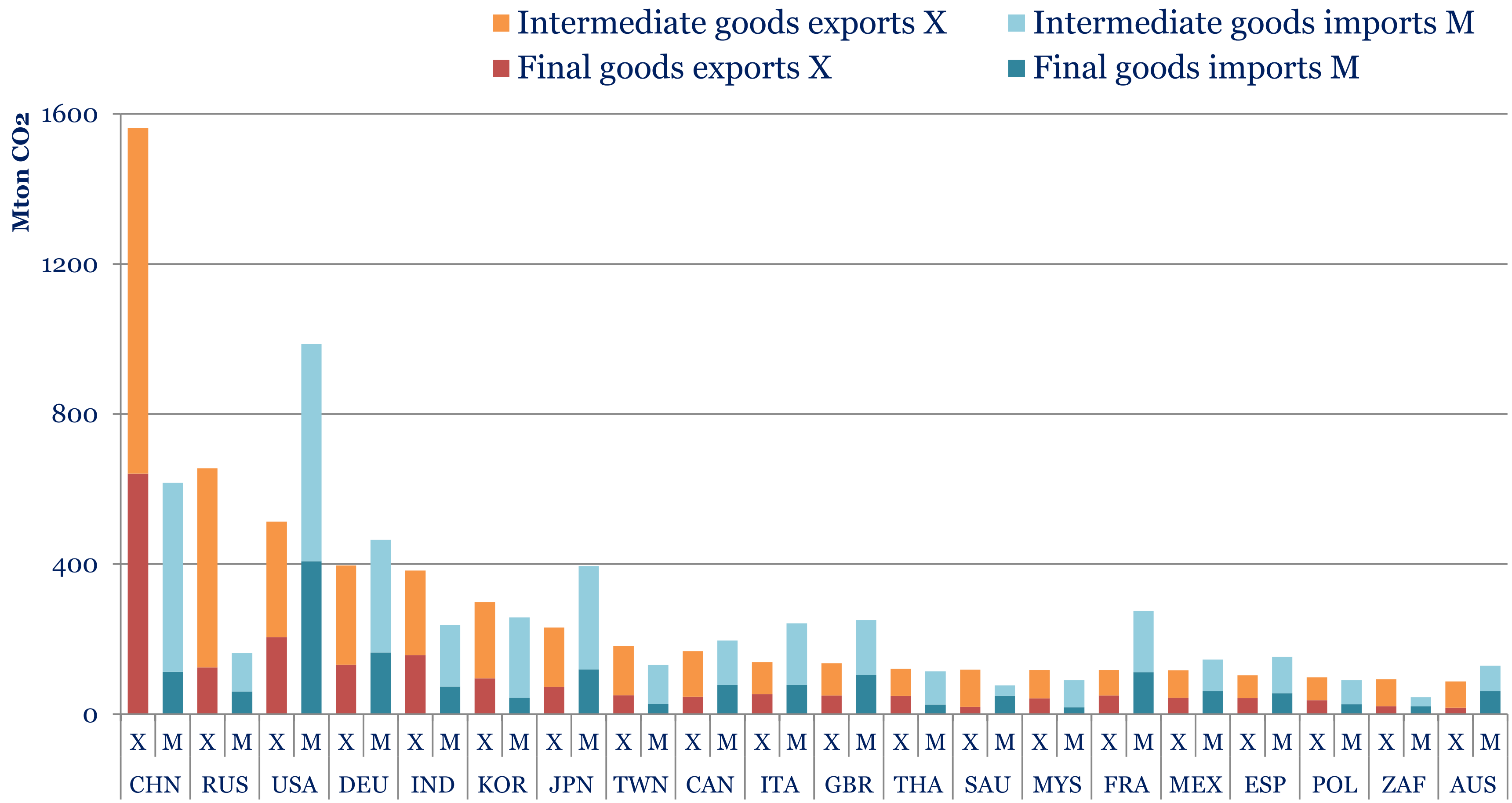
Data extracted on 22 Mar 2018 10:05 UTC (GMT) from OECD.Stat

General Trends
OECD Net Importer



Source: ICIO 2016 and IEA 2016

General trends
CO_2 embodied in intermediate and final goods trade



Import contents of exports