



Measuring Trade in Value Added, and Beyond

International Conference on Measurement of Trade and Economic Globalization

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An **Interconnected** World.....

- Increasing:
 - *International Fragmentation of Production* within a ‘Global Factory’
 - Role of MNEs
 - Transfer pricing, Intellectual property flows, Supply Mode 3
- And New types of ‘Producers’
 - Factoryless, Processors, SPEs
- Complicating our ability to measure activity



....and **Inter**pretable? statistics...

- **‘Double counting’ of trade**
 - Who trades with who?
 - Who’s creating growth?
 - Imports: good or bad?

- **‘Double counting’ of FDI**
 - Capital-in-transit..... Real FDI?

- **Blurring line between GNI and GDP**



..produced with **Disconnected** sources

- **Stove pipes:**
- **Business Registers**
 - SBS, NA, FATs, TiS?, FDI?
- **Trade Registers**
 - Merchandise, TiS?
- **Interconnected world but ‘disconnected’ data**
 - Within countries
 - And across
 - **With potentially misleading results and imperfect policies**



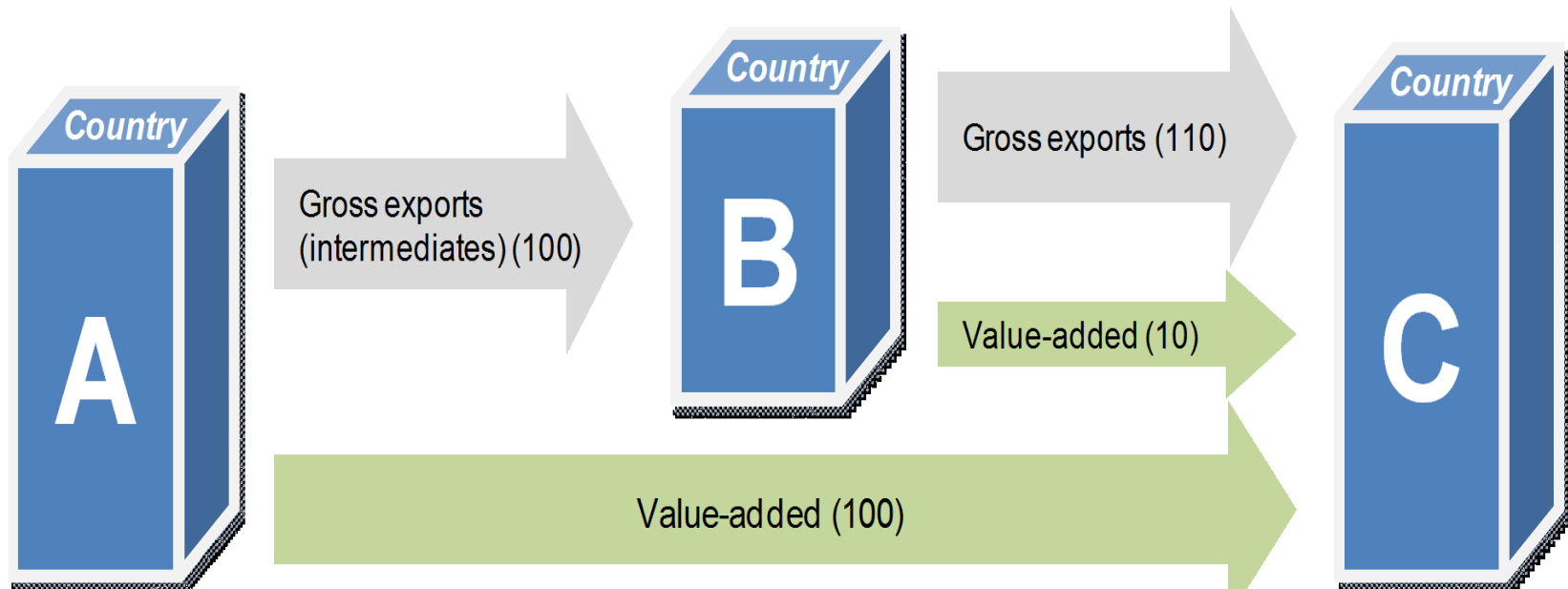
How are we responding?

- **Interconnected economies > Interconnected (integrated) statistics**
 - **BDM4** – ‘Real’ FDI.. (double counting via SPEs)
 - Linking Trade and Business Registers (**TEC**) and (**TEC+** > ownership) to improve national coherence
 - **TiVA** – to improve international coherence and provide interpretability for global phenomena



What is TiVA: a statistical initiative

- A means to better reflect global interdependencies



- **Using a global IO table**



What is TiVA: A response to policy demands

- To name but two of many:
- From the G20 – starting with Los Cabos, 2012
- And Trade Ministers (OECD MCM: strong call in both 2013-2014)



What is TiVA: A collective effort

- Launched in 2013 by the OECD and WTO
 - **in close collaboration with other agencies:**
 - USITC, IDE-JETRO, MOFCOM
 - And through the OECD's WP on Trade, National Accounts, Industry and Innovation and Trade Committee.
 - **with OECD co-ordinating further *international 'institutionalisation'***
 - MoU being developed with **Eurostat**,
 - Formal collaboration with **APEC**,
 - Active collaboration with **UNESCWA** and **UNECLAC**
 - And planned collaboration with **African Development Bank** to start in the next few weeks
- Given **high priority** by the OECD Committee of Statistics and Statistical Policy, and **mainstreamed, with significant resources, into the OECD's core statistical work programme.**



What is the output?

- A series of ‘global’ IO tables:
 - Currently 1995, 2000, 2005, 2008, 2009, 2010, 2011 (available Nov 2014)
 - Updated annually
 - With a series of derived indicators available on [OECD.Stat](#)



The current OECD Inter-Country I-O model

57 economies + Row, 1995-2009, 18 sectors

OECD	All OECD 34 countries
BRIICS	Brazil, China, India, Indonesia, Russian Federation, South Africa
Other EU27	Bulgaria, Cyprus, Latvia, 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	Rest of the World

**November 2014: Plus, Colombia, Costa Rica, Croatia, Tunisia and 2010
– 34 sectors released**



TiVA on OECD.STAT – industry list

	ISIC Rev 3	Industry
1	01-05	Agriculture, hunting, forestry and fishing
2	10-14	Mining and quarrying
3	15-16	Food products, beverages and tobacco
4	17-19	Textiles, textile products, leather and footwear
5	20-22	Wood, paper, paper products, printing and publishing
6	23-26	Chemicals and non-metallic mineral products
7	27-28	Basic metals and fabricated metal products
8	29	Machinery and equipment, nec
9	30-33	Electrical and optical equipment
10	34-35	Transport equipment
11	36-37	Manufacturing nec; recycling
12	40-41	Electricity, gas and water supply
13	45	Construction
14	50-55	Wholesale and retail trade; Hotels and restaurants
15	60-64	Transport and storage, post and telecommunication
16	65-67	Financial intermediation
17	70-74	Real estate, renting and business activities
18	75-95	Community, social and personal services



TiVA 2014 – Industry List

IO Industries	ISIC Rev.3	Industry
1	01t05	Agriculture, hunting, forestry and fishing
2	10t14	Mining and quarrying
3	15t16	Food products, beverages and tobacco
4	17t19	Textiles, textile products, leather and footwear
5	20	Wood and products of wood and cork
6	21t22	Pulp, paper, paper products, printing and publishing
7	23	Coke, refined petroleum products and nuclear fuel
8	24	Chemicals and chemical products
9	25	Rubber and plastics products
10	26	Other non-metallic mineral products
11	27	Basic metals
12	28	Fabricated metal products except machinery and equipment
13	29	Machinery and equipment n.e.c
14	30,32,33	Computer, electronic and optical products
15	31	Electrical machinery and apparatus n.e.c
16	34	Motor vehicles, trailers and semi-trailers
17	35	Other transport equipment
18	36t37	Manufacturing n.e.c; recycling
19	40t41	Electricity, gas and water supply
20	45	Construction
21	50t52	Wholesale and retail trade; repairs
22	55	Hotels and restaurants
23	60t63	Transport and storage
24	64	Post and telecommunications
25	65t67	Finance and insurance
26	70	Real estate activities
27	71	Renting of machinery and equipment
28	72	Computer and related activities
29	73, 74	Other Business Activities (incl. R&D)
30	75	Public admin. and defence; compulsory social security
31	80	Education
32	85	Health and social work
33	90t93	Other community, social and personal services
34	95	Private households with employed persons

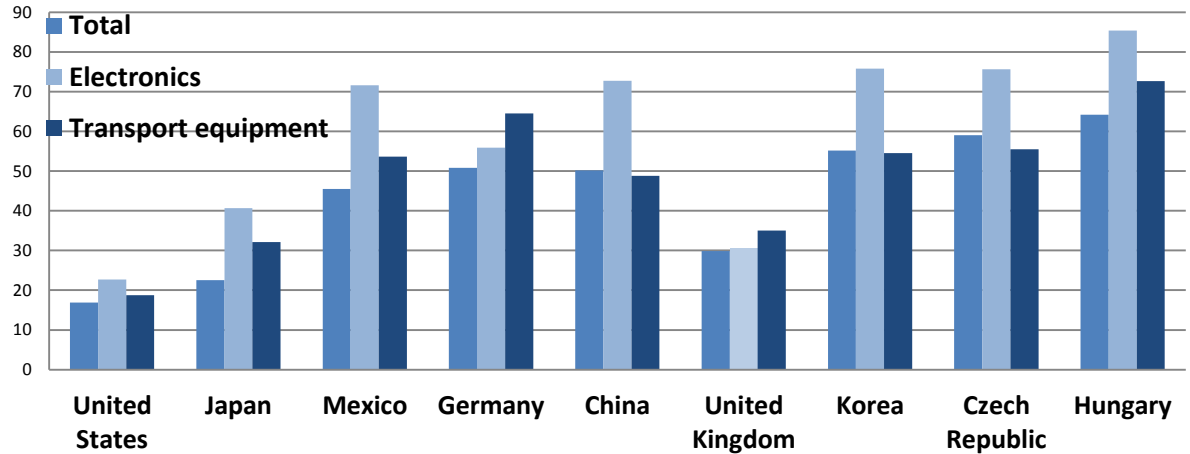


WHAT DOES THE LATEST RELEASE TELL US

Highlights

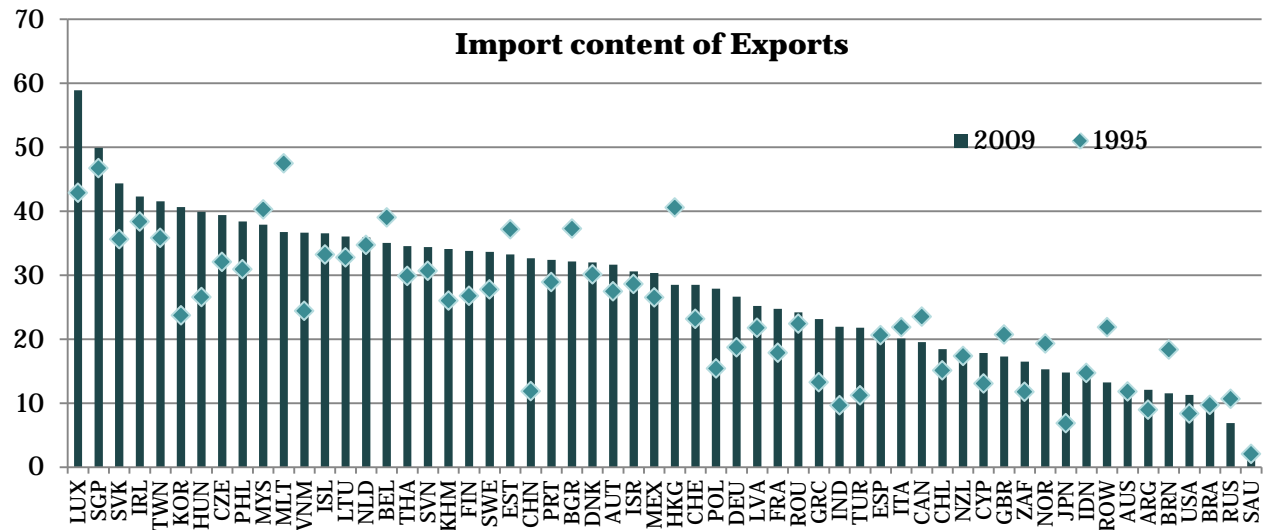
- Exports require imports

Intermediate imports embodied in exports, 2009
% of total intermediate imports



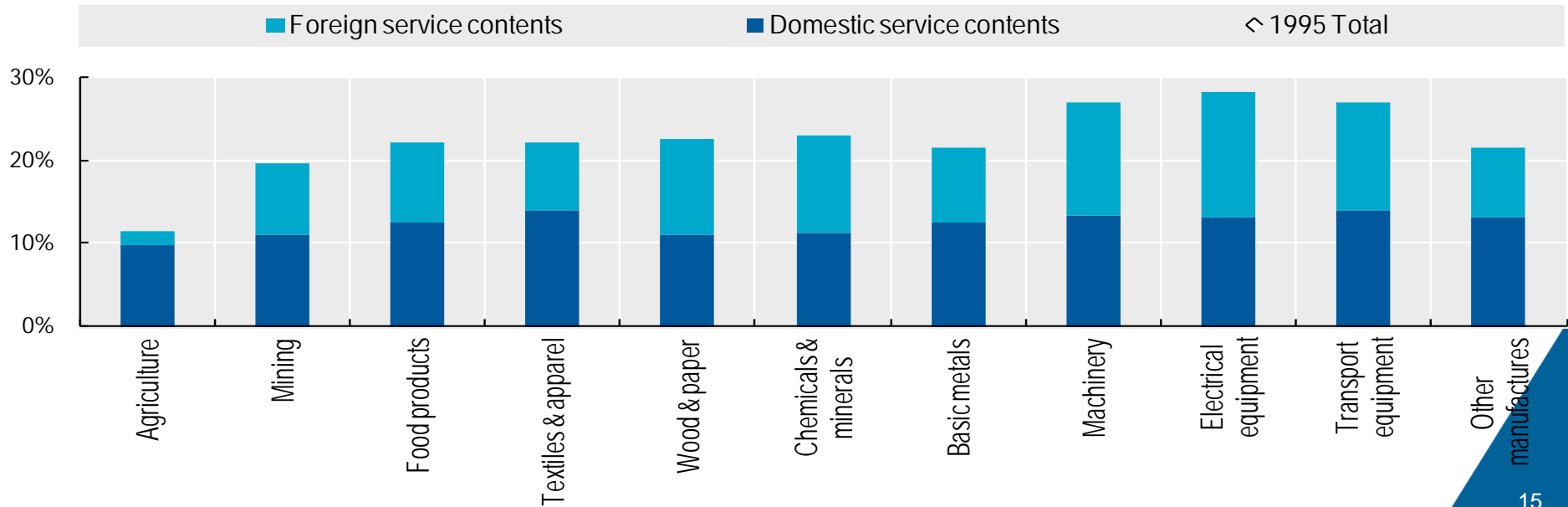
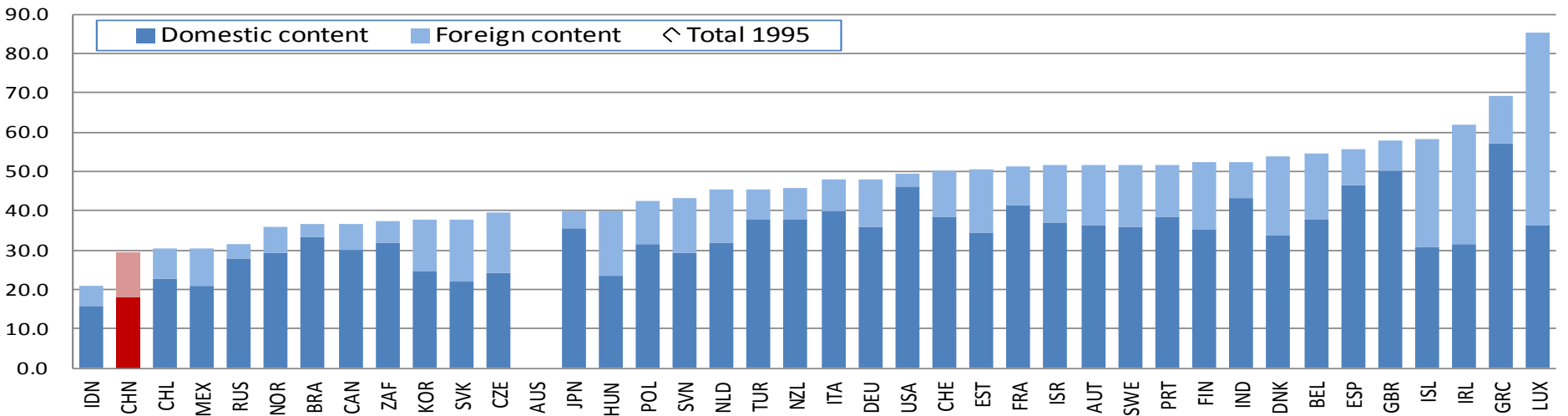
- Growing fragmentation

Import content of Exports



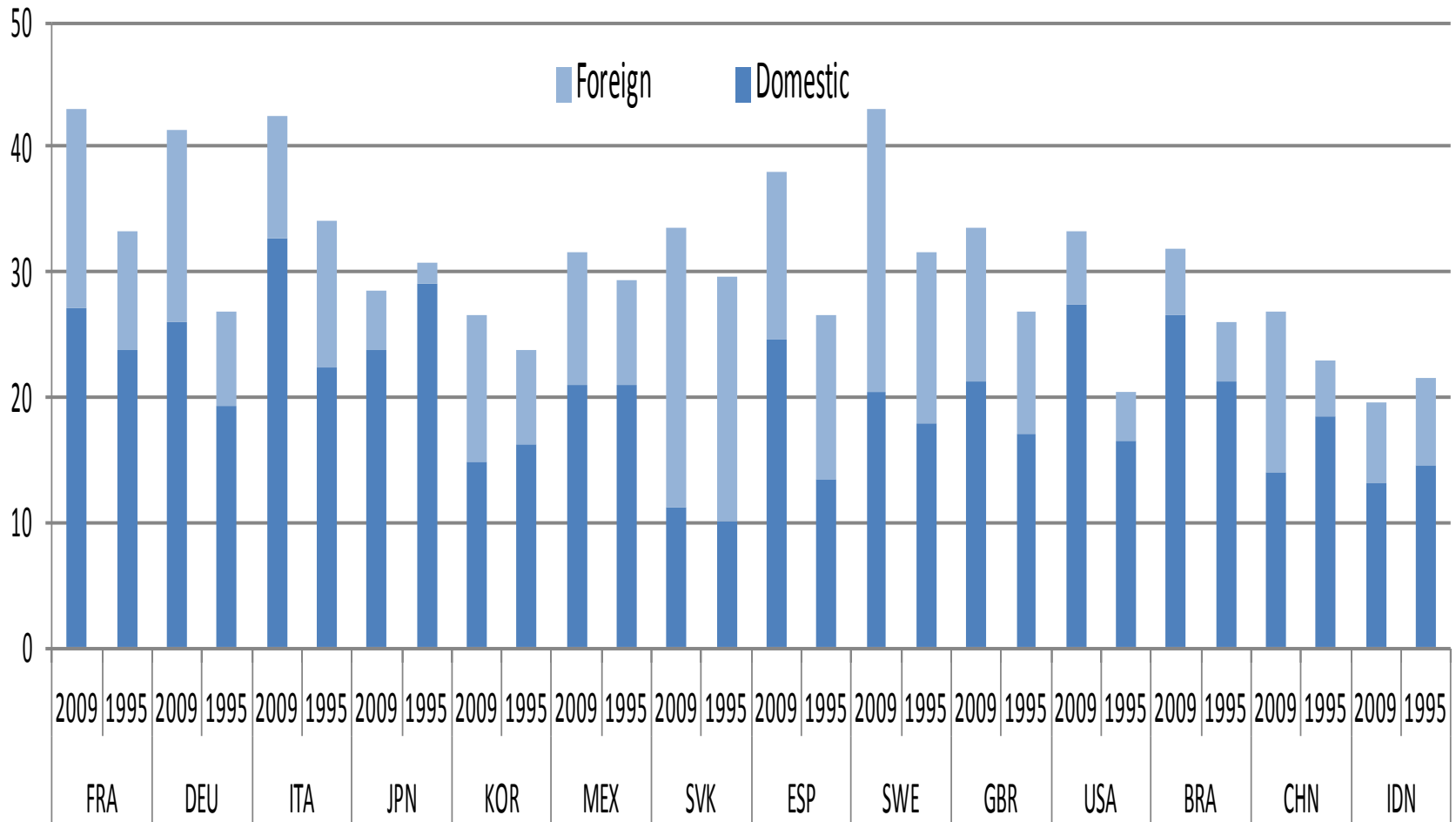


Services matter!.....China

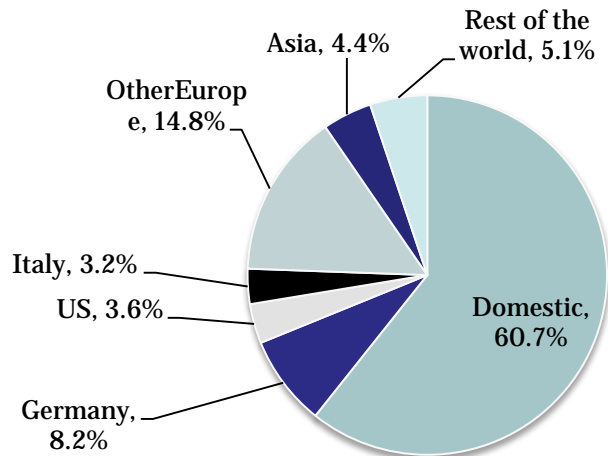




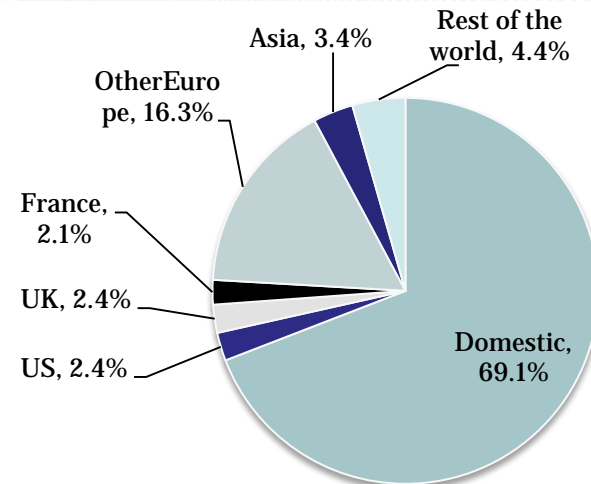
Design, R&D, software etc becoming more important - Services content of transport equipment



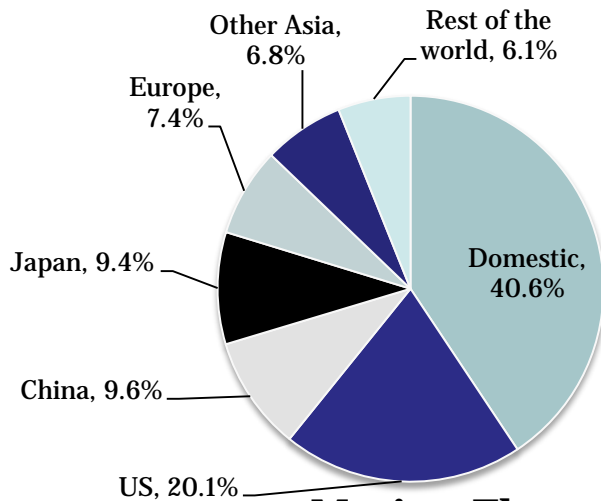
Geography remains important



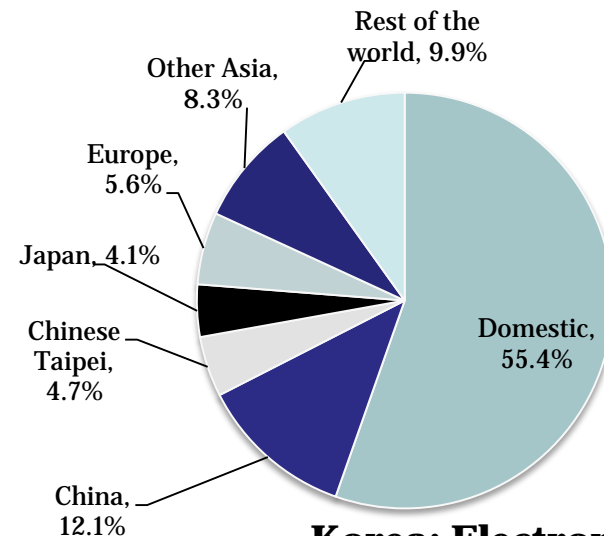
France: Motor vehicles, 2009



Germany: Motor vehicles, 2009



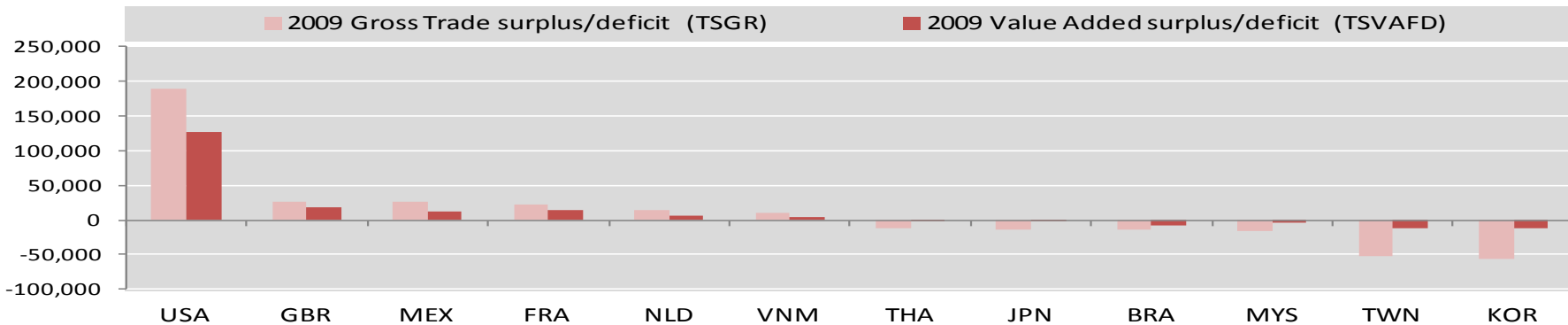
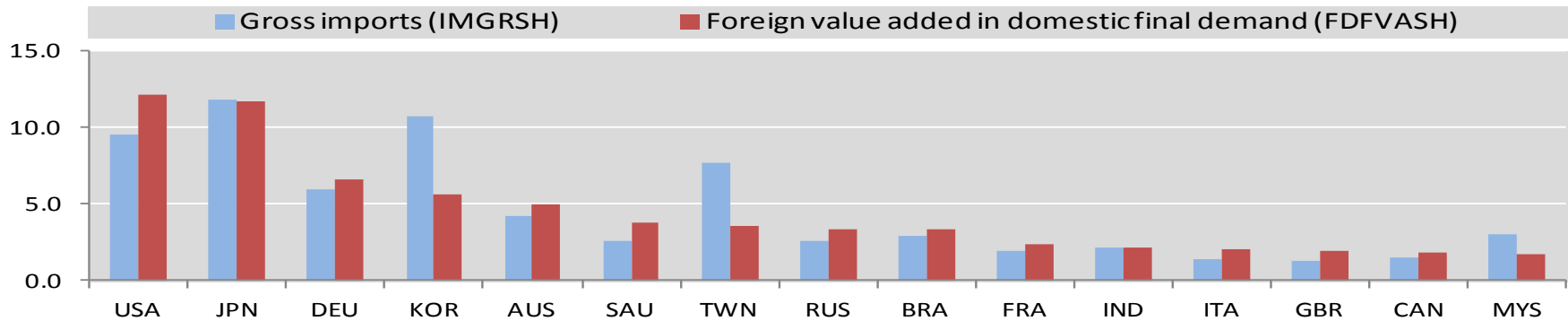
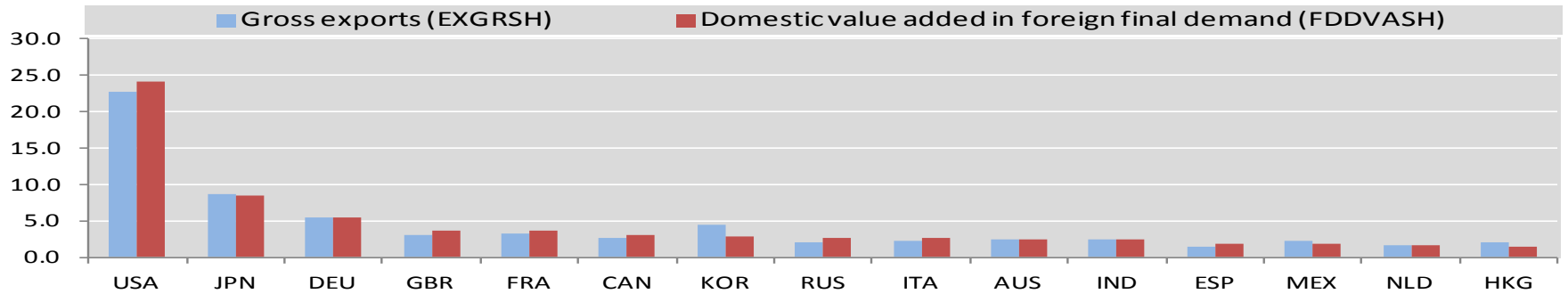
Mexico: Electronics, 2009



Korea: Electronics, 2009



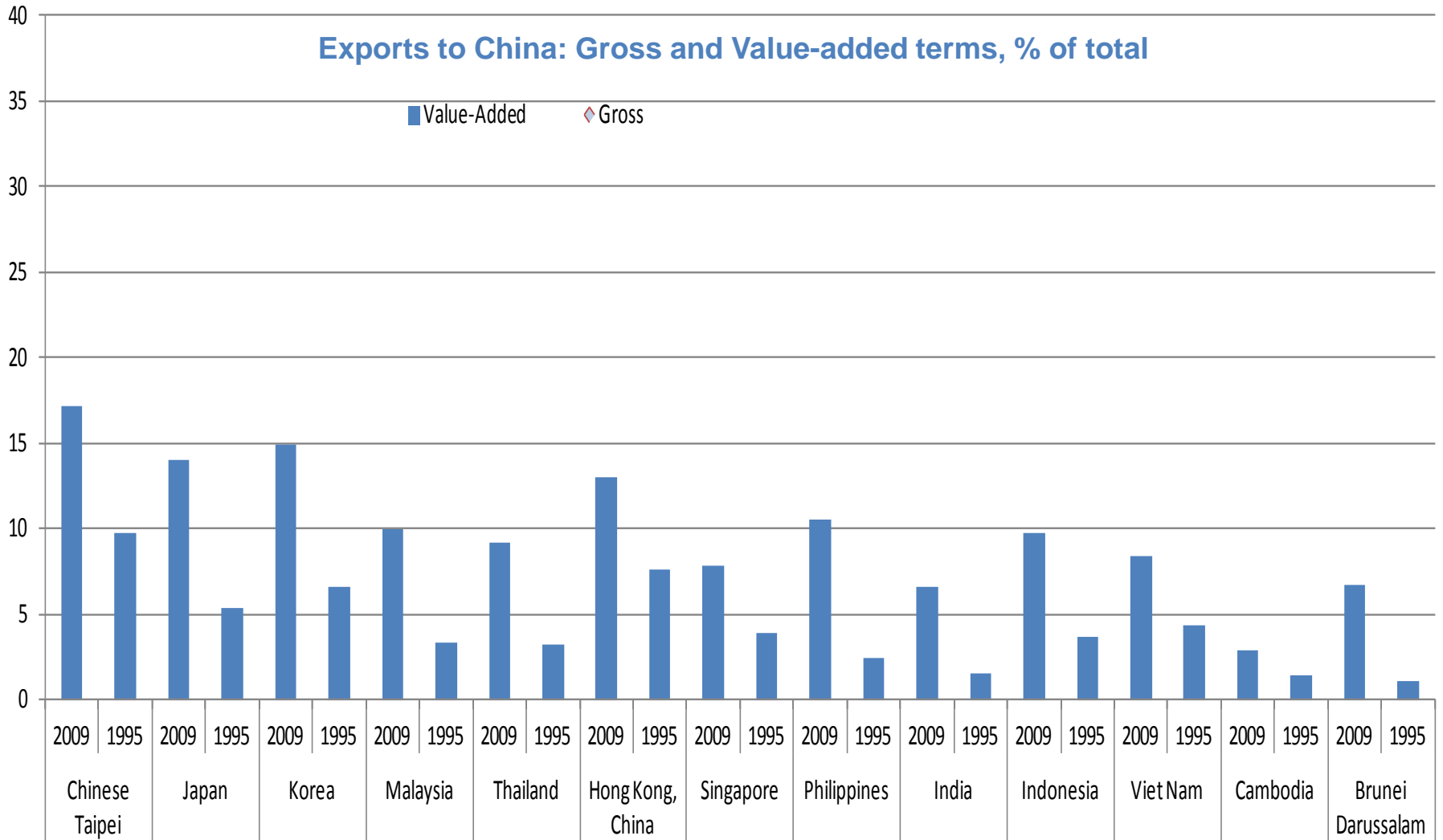
Trade patterns change: China





And throughout Factory Asia

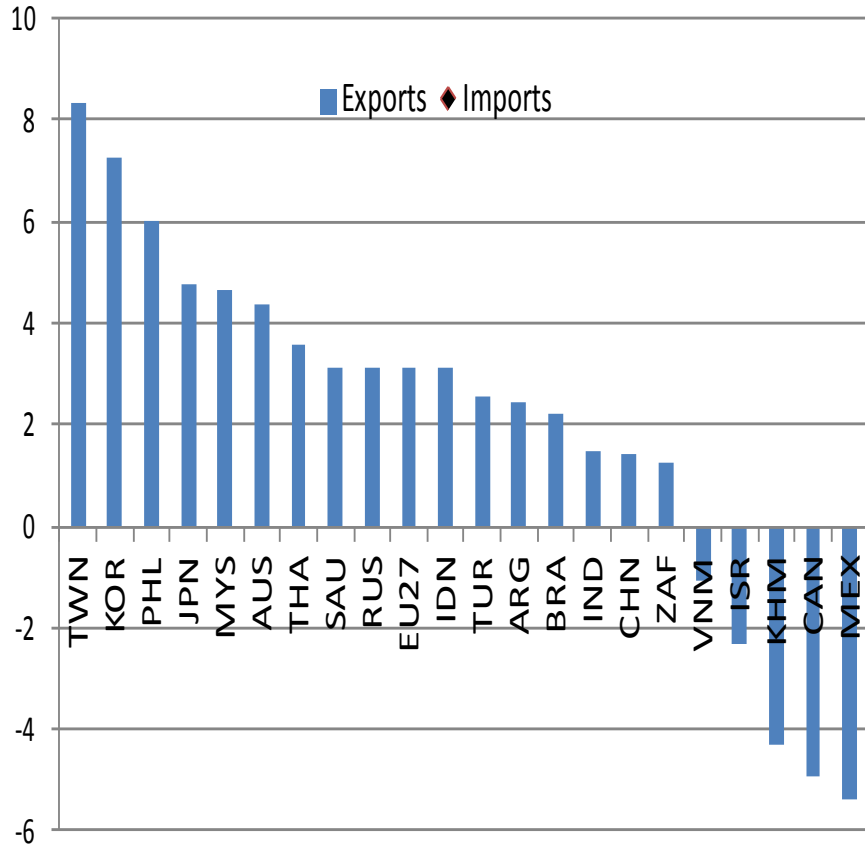
Exports to China: Gross and Value-added terms, % of total



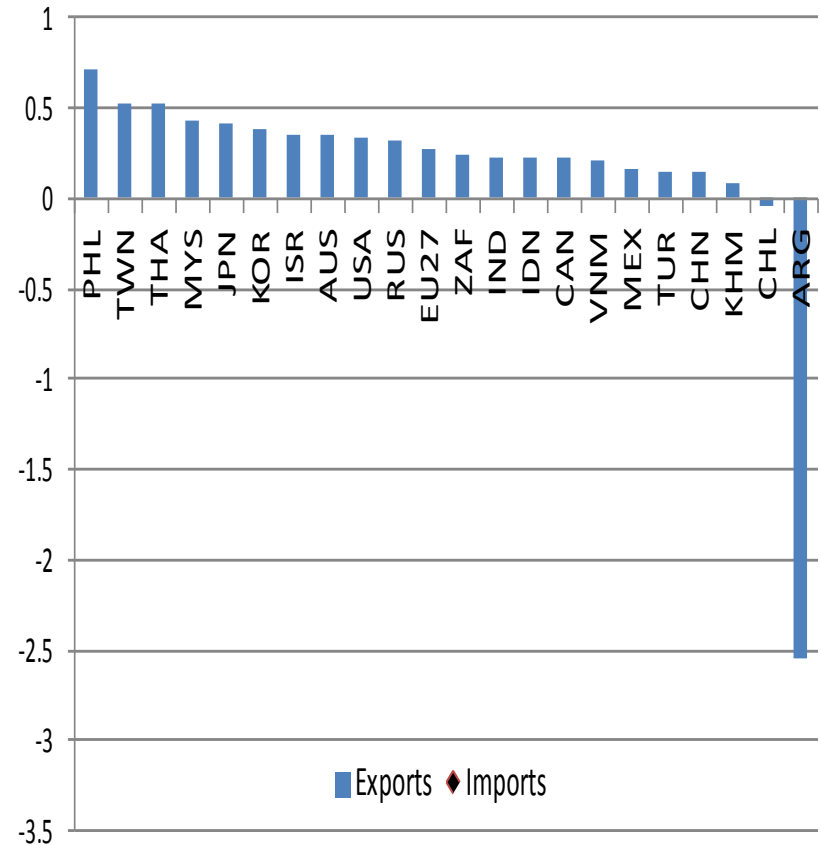
In general – the more distant the countries the more likely that gross trade statistics underestimate the relationship

Change in trade shares based on Value-Added in

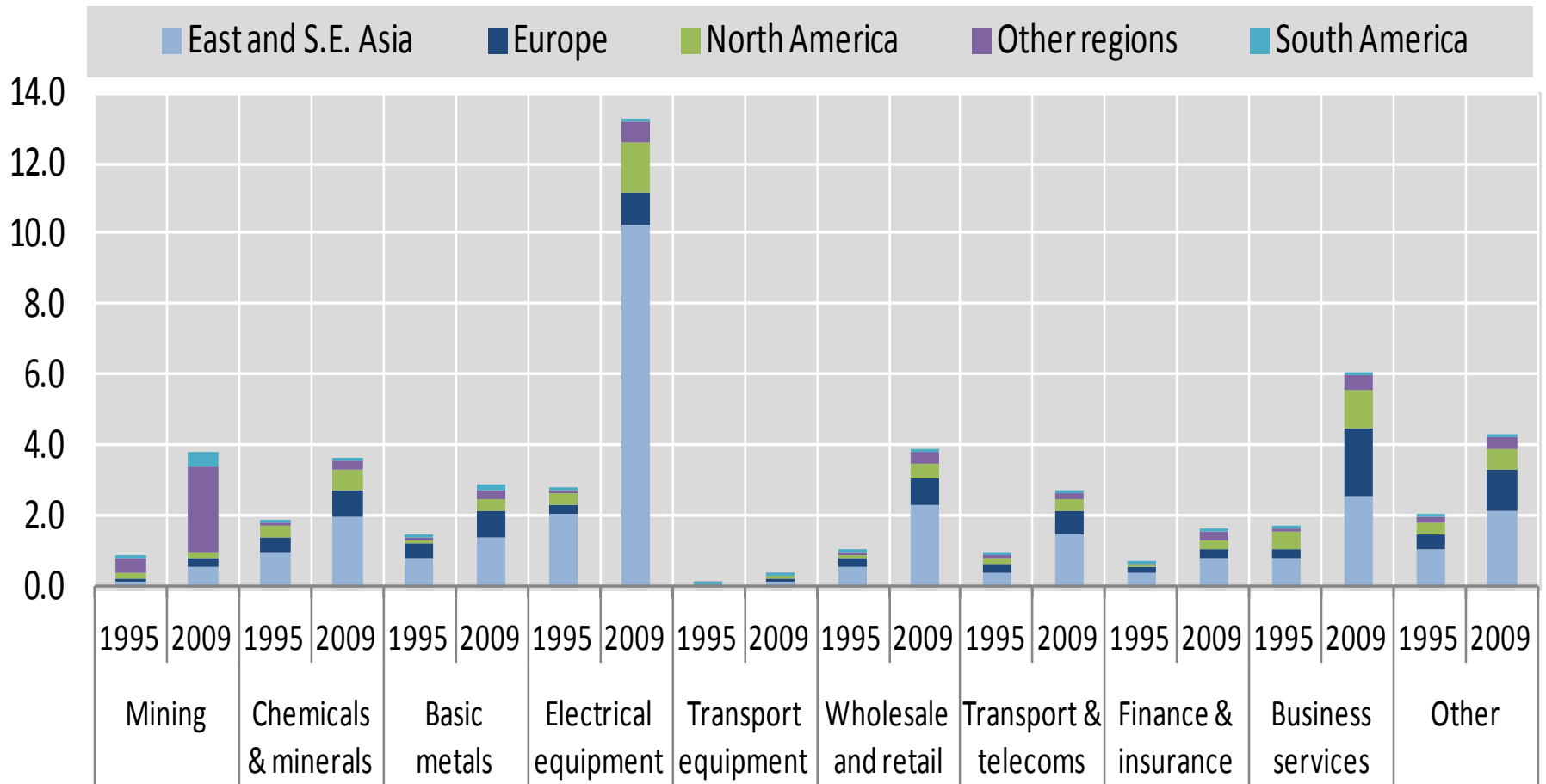
United States



Brazil



Foreign value added in Chinese Electrical equipment, by originating region and industry, %





ESTIMATION?

OECD Inter-country I-O table

National I-O/SU tables

Production linkage
Final expenditure
Income (Value-added)
Import procurement info

+

Bilateral Trade Database

by industry and end-use categories (intermediates, capital and consumption goods)



61 countries, 1995-2010/11, 34 sectors, consistent with SNA

		Country A		Country B		Final Demand	
		Sector 1	Sector 2	Sector 1	Sector 2	Country A	Country B
Country A	Sector 1: Goods	Z_{11}^{AA}	Z_{12}^{AA}	Z_{11}^{AB}	Z_{12}^{AB}	F_1^{AA}	F_1^{AB}
	Sector 2: Services	Z_{21}^{AA}	Z_{22}^{AA}	Z_{21}^{AB}	Z_{22}^{AB}	F_2^{AA}	F_2^{AB}
Country B	Sector 1: Goods	Z_{11}^{BA}	Z_{12}^{BA}	Z_{11}^{BB}	Z_{12}^{BB}	F_1^{BA}	F_1^{BB}
	Sector 2: Services	Z_{21}^{BA}	Z_{22}^{BA}	Z_{21}^{BB}	Z_{22}^{BB}	F_2^{BA}	F_2^{BB}
Tax less subsidy on products		NTZ_1^A	NTZ_2^A	NTZ_1^B	NTZ_2^B	NTF^A	NTF^B
International trade margin and insurance		TIZ_1^A	TIZ_2^A	TIZ_1^B	TIZ_2^B	TIF^A	TIF^B
Value-Added	Labor compensation	VL_1^A	VL_2^A	VL_1^B	VL_2^B		
	Operating surplus	VO_1^A	VO_2^A	VO_1^B	VO_2^B		
	Tax less subsidy on production	VT_1^A	VT_2^A	VT_1^B	VT_2^B		
Output		X_1^A	X_2^A	X_1^B	X_2^B		



What are the challenges?

- Data:
 - Availability
 - Coherence



Bilateral Trade statistics

- An international IO table requires **high quality** international trade statistics
 - **Asymmetries & missing data**
 - **Re-exports**
 - Additional information on cif/fob adjustments
 - Rules for dealing with confidentiality
 - **Supporting Import flow matrices**
 - Estimates of non-residents and residents expenditure abroad
 - An ability to reconcile merchandise trade/TIS flows with National Accounts SU and IO tables.



Merchandise trade asymmetries - examples

Top 5 export asymmetries (countries) for Costa Rica

	Reported exports	Mirror imports	X-M	%RA (abs)
1 USA	4,307	12,303	-7,996	48.1%
2 China	327	5,270	-4,944	88.3%
3 Netherlands	850	4,114	-3,264	65.8%
4 Mexico	315	3,259	-2,944	82.4%
5 Singapore	62	746	-684	84.6%

Top 5 export asymmetries (countries) for Colombia

	Reported exports	Mirror imports	X-M	%RA (abs)
1 USA	22,216	25,225	-3,008	6.3%
2 Germany	395	1,782	-1,387	63.7%
3 Netherlands	2,503	1,355	1,148	29.8%
4 United Kingdom	1,129	1,639	-510	18.4%
5 Israel	526	17	509	93.7%

Top 5 export asymmetries (countries) for Korea

	Reported exports	Mirror imports	X-M	%RA (abs)
1 China	134,322	168,728	-34,406	11.4%
2 Mexico	9,042	13,341	-4,299	19.2%
3 Germany	7,510	10,838	-3,328	18.1%
4 France	2,827	5,601	-2,774	32.9%
5 Singapore	22,888	25,626	-2,738	5.6%

Top 5 import asymmetries (countries) for Costa Rica

	Reported imports	Mirror exports	M-X	%RA (abs)
1 USA	9,519	7,198	2,321	13.9%
2 China	1,446	902	544	23.2%
3 Japan	561	954	-393	26.0%
4 Mexico	1,187	993	194	8.9%
5 Israel	44	231	-187	68.0%

Top 5 import asymmetries (countries) for Colombia

	Reported imports	Mirror exports	M-X	%RA (abs)
1 China	9,565	6,229	3,336	21.1%
2 USA	14,140	16,395	-2,254	7.4%
3 Mexico	6,362	5,592	770	6.4%
4 Canada	1,133	829	304	15.5%
5 Korea	1,288	1,468	-180	6.5%

Top 5 import asymmetries (countries) for Korea

	Reported imports	Mirror exports	M-X	%RA (abs)
1 Singapore	9,676	16,576	-6,900	26.3%
2 China	80,782	87,674	-6,892	4.1%
3 Japan	64,363	61,538	2,825	2.2%
4 Russia	11,354	13,865	-2,512	10.0%
5 Australia	22,988	20,541	2,447	5.6%



Services Trade asymmetries - examples

Top 5 services export asymmetries (countries) for United Kingdom

	Reported exports	Mirror imports	X-M		%RA (abs)
1 USA	60,147	45,669	14,478		13.7%
2 Germany	16,666	26,349	-9,683		22.5%
3 Spain	8,375	17,489	-9,115		35.2%
4 Australia	8,979	5,271	3,708		26.0%
5 Korea	2,173	5,096	-2,924		40.2%

Top 5 services export asymmetries (countries) for Korea

	Reported exports	Mirror imports	X-M		%RA (abs)
1 USA	15,858	11,025	4,833		18.0%
2 United Kingdom	3,765	615	3,150		71.9%
3 Japan	9,954	8,018	1,936		10.8%
4 Canada	1,362	355	1,007		58.6%
5 France	837	1,236	-399		19.2%

Top 5 services export asymmetries (countries) for Luxembourg

	Reported exports	Mirror imports	X-M		%RA (abs)
1 Germany	12,224	5,137	7,087		40.8%
2 United Kingdom	9,679	2,829	6,850		54.8%
3 Ireland	988	7,106	-6,118		75.6%
4 Belgium	6,349	3,853	2,496		24.5%
5 France	7,262	5,013	2,250		18.3%

Top 5 services import asymmetries (countries) for United Kingdom

	Reported imports	Mirror exports	M-X		%RA (abs)
1 USA	29,038	52,970	-23,932		29.2%
2 Ireland	6,391	20,924	-14,533		53.2%
3 Germany	14,018	28,277	-14,259		33.7%
4 Spain	15,008	26,614	-11,606		27.9%
5 Netherlands	6,244	13,347	-7,103		36.3%

Top 5 services import asymmetries (countries) for Korea

	Reported imports	Mirror exports	M-X		%RA (abs)
1 USA	26,831	16,767	10,064		23.1%
2 Japan	8,934	3,465	5,469		44.1%
3 United Kingdom	5,096	2,173	2,924		40.2%
4 Germany	4,315	2,878	1,437		20.0%
5 France	1,609	2,499	-890		21.7%

Top 5 services import asymmetries (countries) for Luxembourg

	Reported imports	Mirror exports	M-X		%RA (abs)
1 Germany	5,600	9,994	-4,393		28.2%
2 USA	2,610	6,018	-3,408		39.5%
3 Italy	2,614	1,064	1,551		42.2%
4 France	4,139	5,622	-1,483		15.2%
5 United Kingdom	5,141	4,031	1,110		12.1%



National Supply Use and Input-Output tables

- Supply-Use: Make and Use tables at Purchasers and Basic Prices..... preferably every year
- but **if not**: at the very least periodically and recent, with supporting National Accounts information on value-added and output by industry and all categories of final demand
- And supporting import flow tables
- Plus periodical IO tables



IS TIVA ENOUGH?

Research rewrites global trade data

OCDE et OMC affinent la vision du commerce mondial grâce à de nouvelles données

PAGE 4

FINANCIAL TIMES FT.com

L'OMC et l'OCDE rebattent les cartes du commerce mondial

Scoop
INDEPENDENT NEWS

Research reshapes debate on global trade policy

OECD und WTO messen Welthandel neu

Trade's added value

New statistics reveal glorious interdependence of countries

NASDAQ

THE IRISH TIMES

theguardian

WORLD ECONOMICS

LesEchos
LE QUOTIDIEN DE L'ECONOMIE

DER STANDARD

la Repubblica

THE WALL STREET JOURNAL

LE DEVOIR

Statistics is not always the bedfellow of lies and damned lies. At its best, it brings epiphanies. An initiative by the OECD and the World Trade Organisation to map the value added embodied in international trade flows should be an eye-opener for policy makers.

Revolutionary Trade Database Launched by OECD and WTO

Bloomberg

OECD/WTO 'Value-Added' Trade Measure Shows Exchange Rate Issues Overstated

The Washington Post

services in creating goods. Whilst there are, at present, limitations to the widespread calculation of trade in value-added data, this OECD-WTO initiative is to be applauded for providing a more revealing look into global trade and interaction, and for paving the way for further development in this area.

Handelsblatt

Ces produits qui bouleversent le commerce mondial

PORTAL GOSPODARCZY

CHINA DAILY

Expansión



REUTERS

THE ECONOMIC TIMES



El Financiero

Research rewrites global trade data

OCDE et OMC effinent la vision du commerce mondial grâce à de nouvelles données

Whilst there are limitations to the widespread calculation of trade in value-added data, the OECD-WTO initiative is to be applauded for providing a more revealing look into global trade and integration and for paving the way for further development in this area.



REUTERS

THE ECONOMIC TIMES



El Financiero



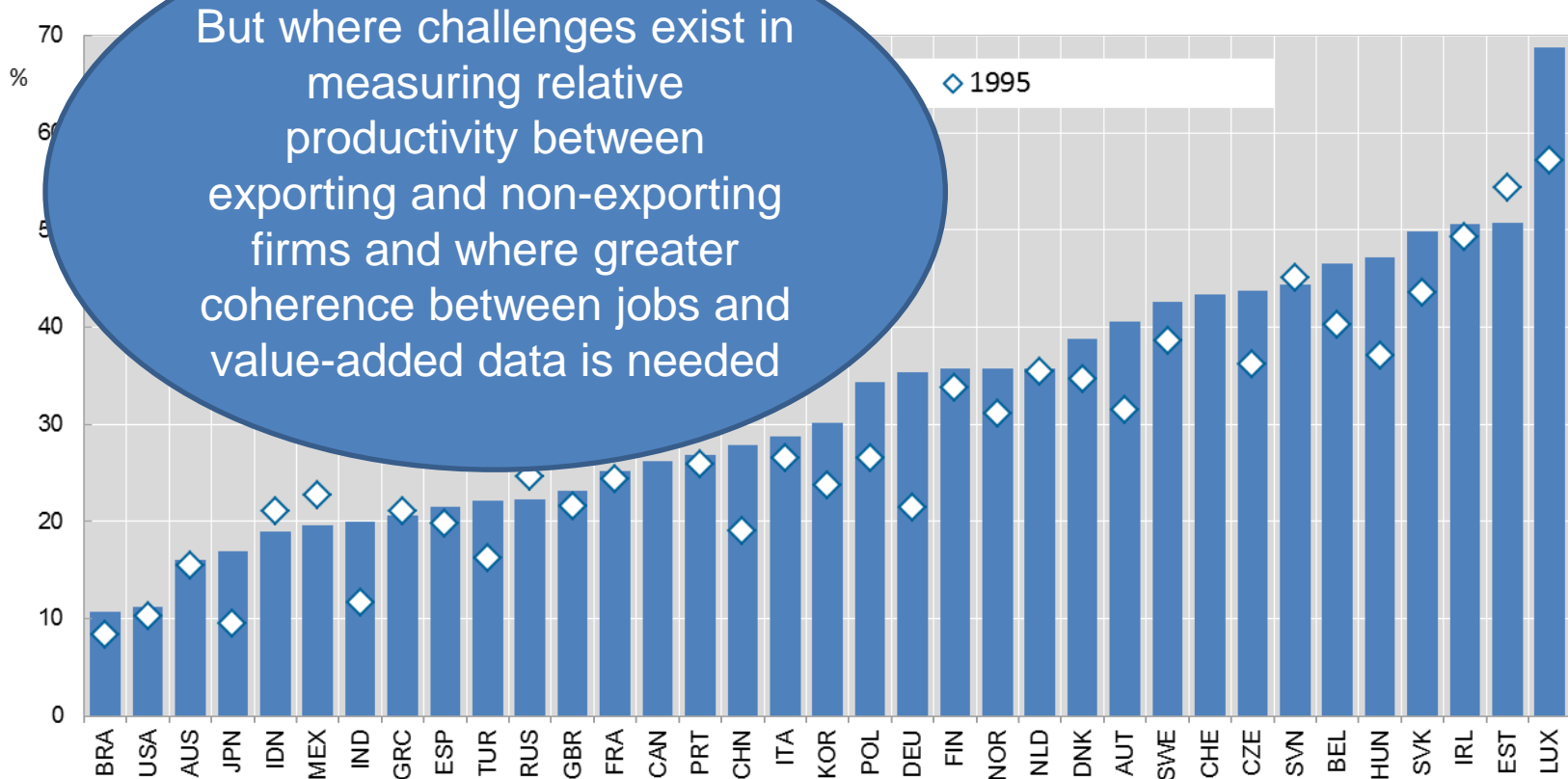
No....strong demand for

- Jobs \longrightarrow **Skills?**
 - Information by ISCO?
- **Investment?**
 - Creating a Trade-Investment Story



Jobs in the business sector* sustained by foreign final demand

As a % of total business sector employment



* Business sector = ISIC Rev.3 divisions 10 to 74)

Source: OECD, Science, Technology and Industry Scoreboard, 2013

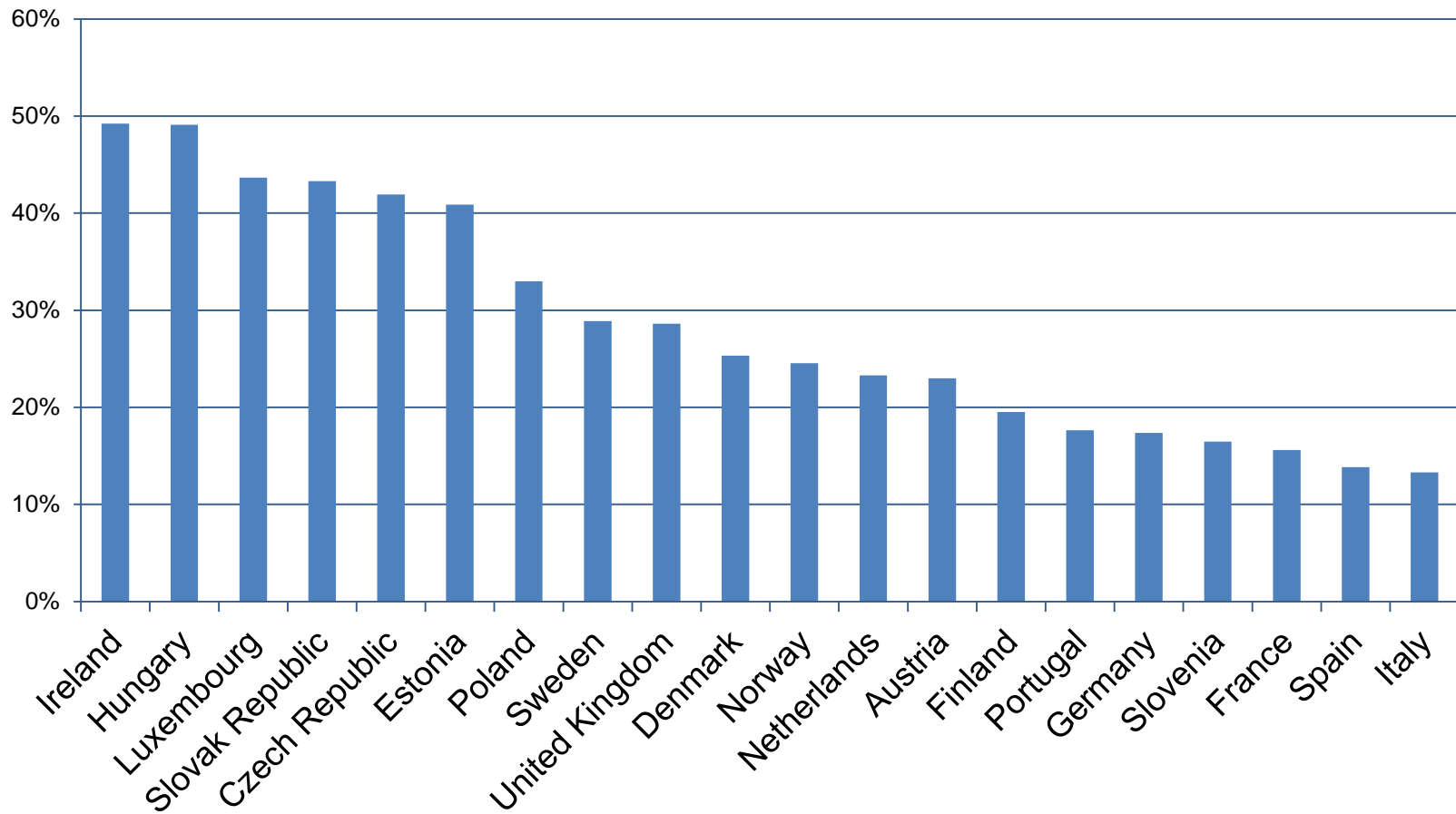


Why Investment?

- Because value added does not always stick (compensation for use of knowledge based assets – where increasingly registration is determined by tax environment)
- And.....Statistically,
 - the line between trade in services and property income is becoming more blurred.....distorting value-added measures....
 - Trade in services versus mode 3?

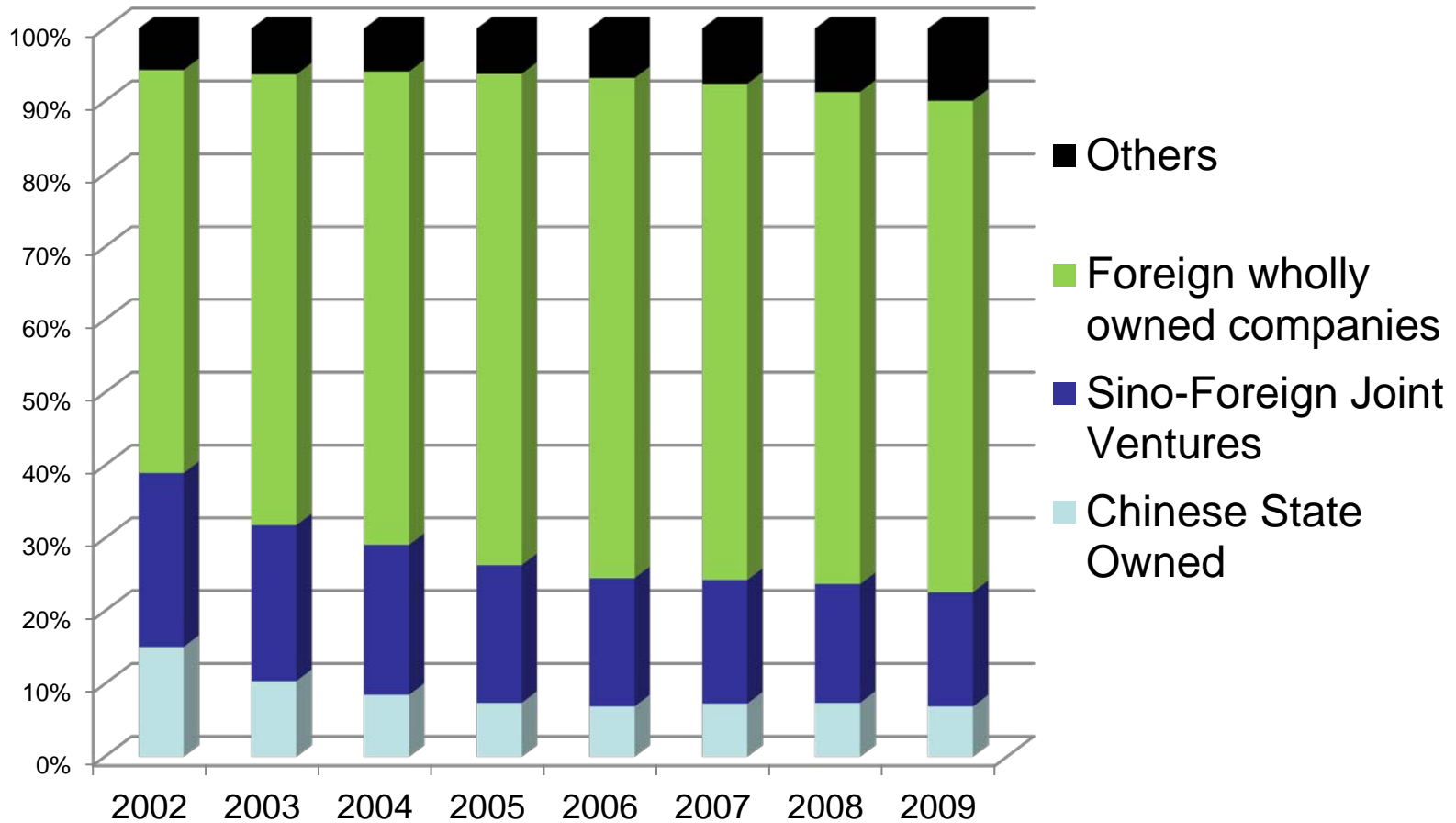


Value-Added of Foreign Affiliates – share of national Total 2009 (ISIC B-N, ex K)



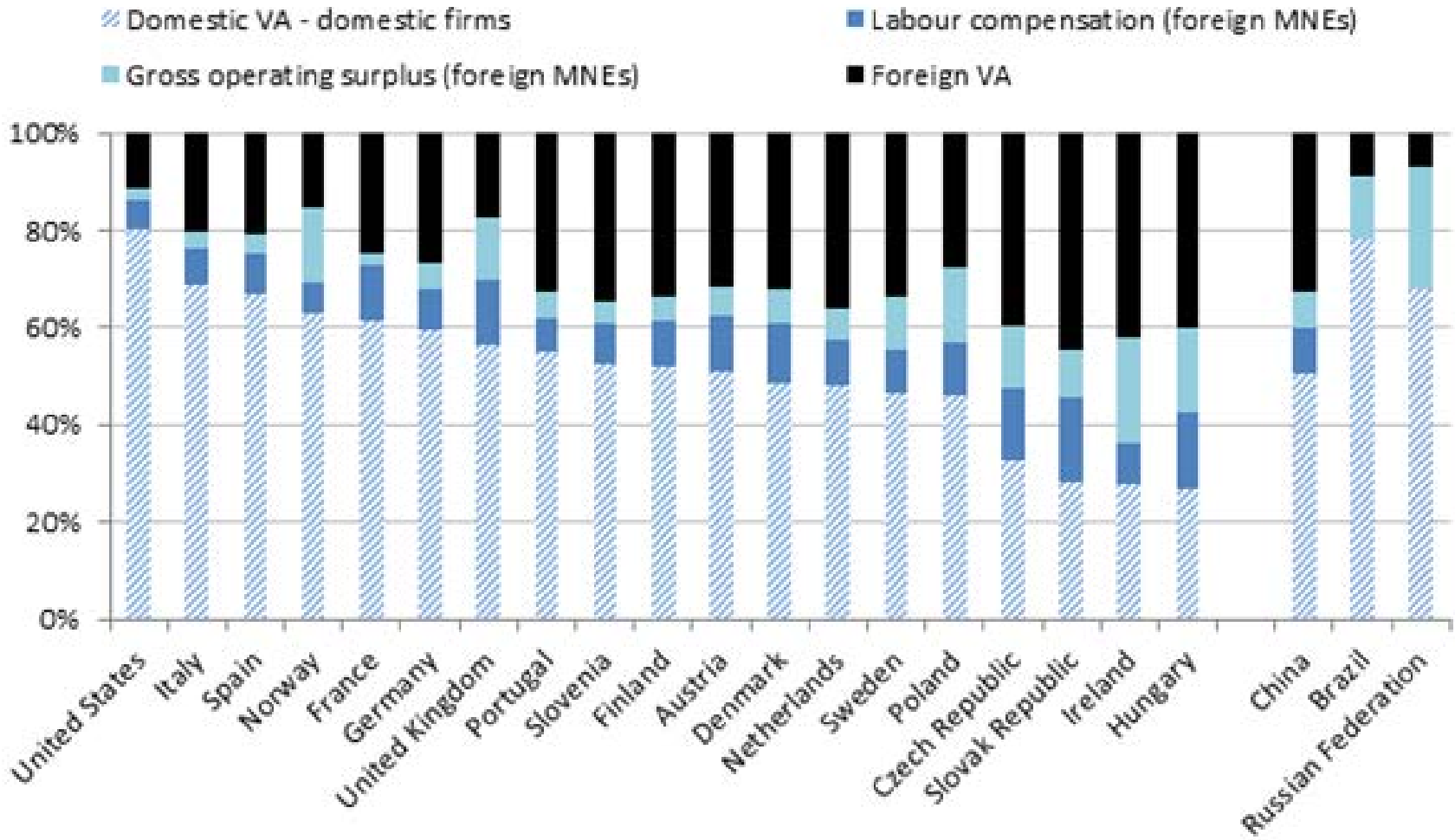


China's hi-tech exports





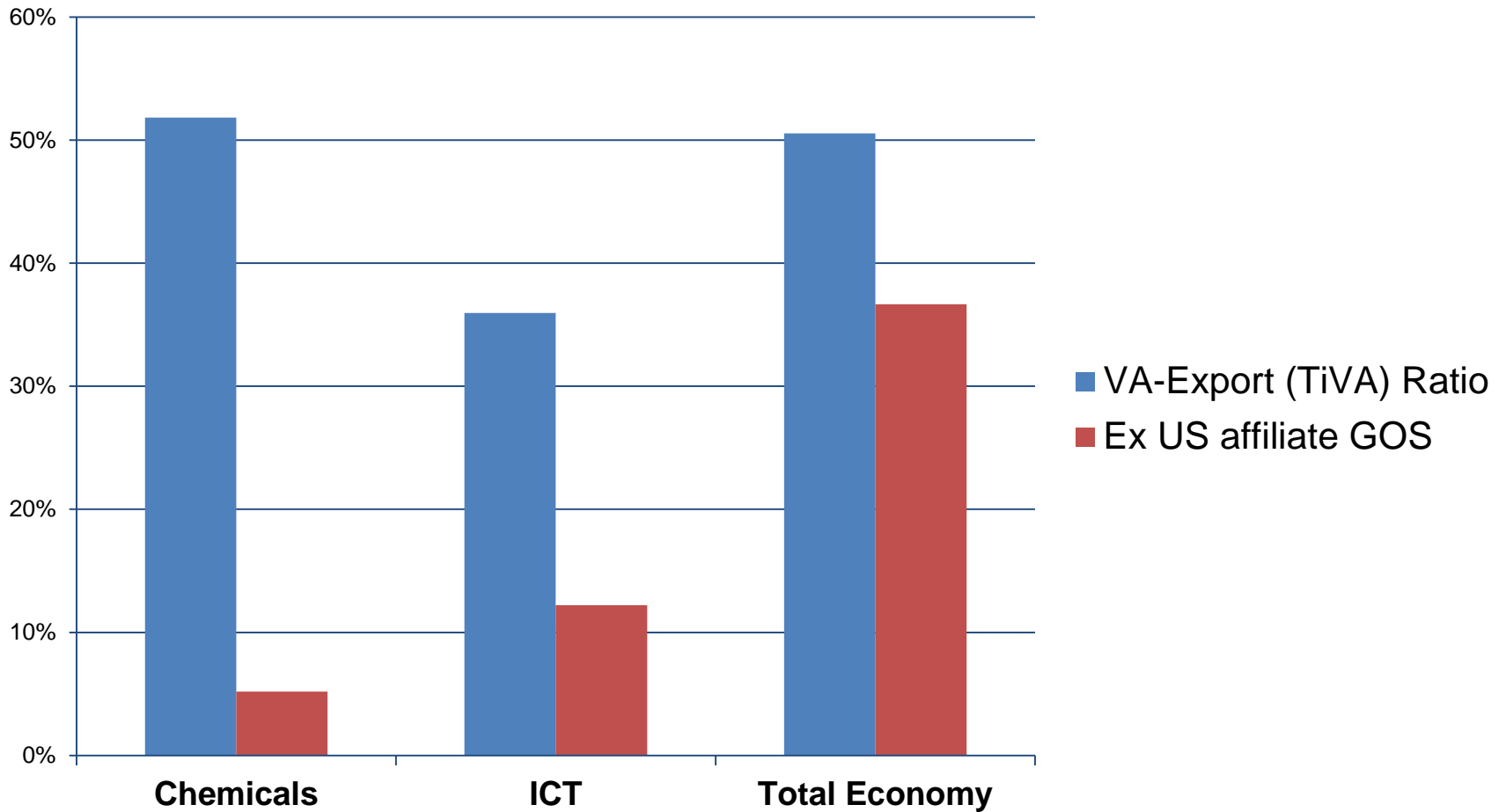
The contribution of foreign affiliates to domestic value added in exports, 2009.



Source: OECD AMNE and TiVA databases



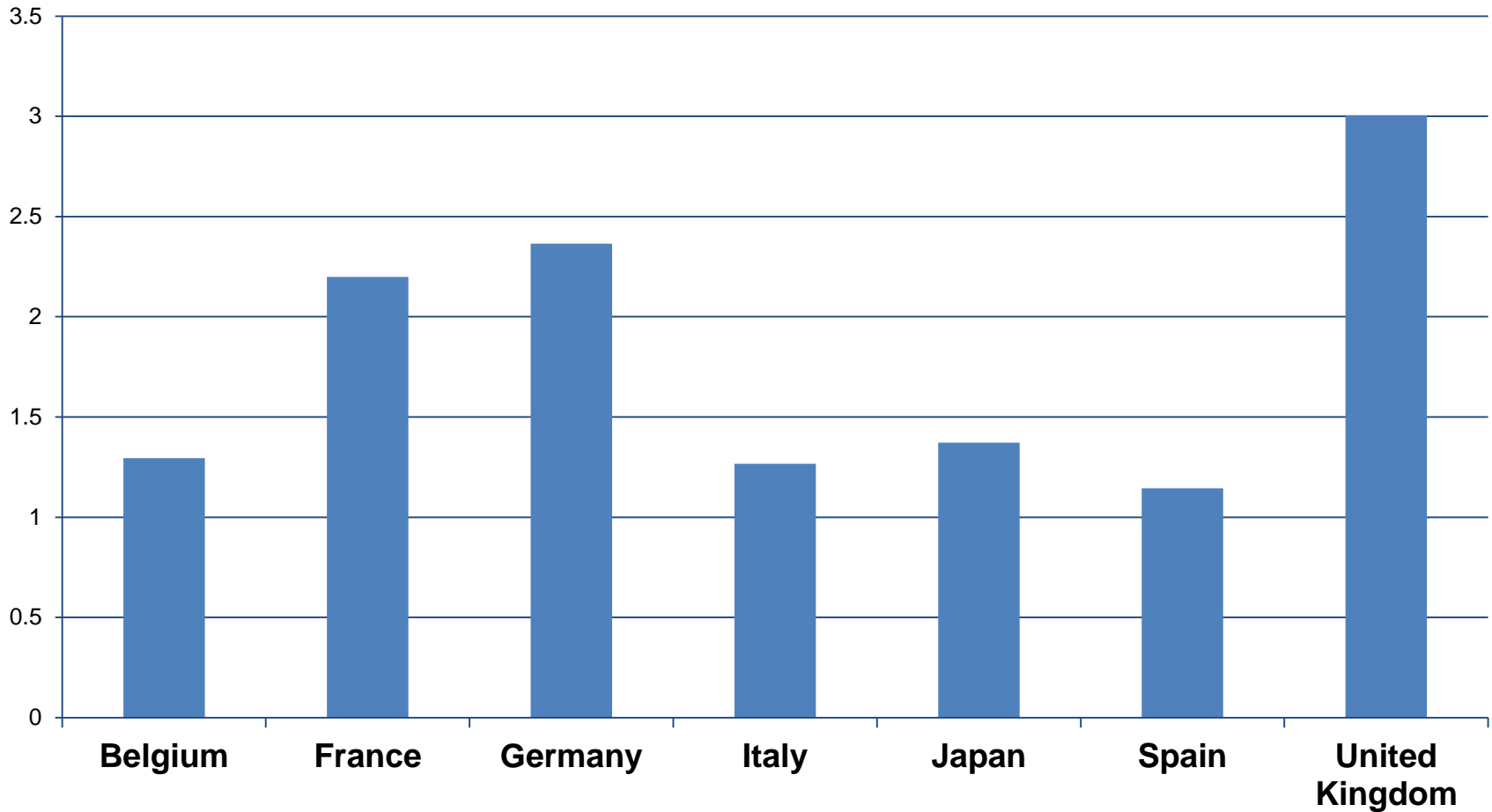
Ireland's VA to export ratios?



Source: OECD illustrative estimates



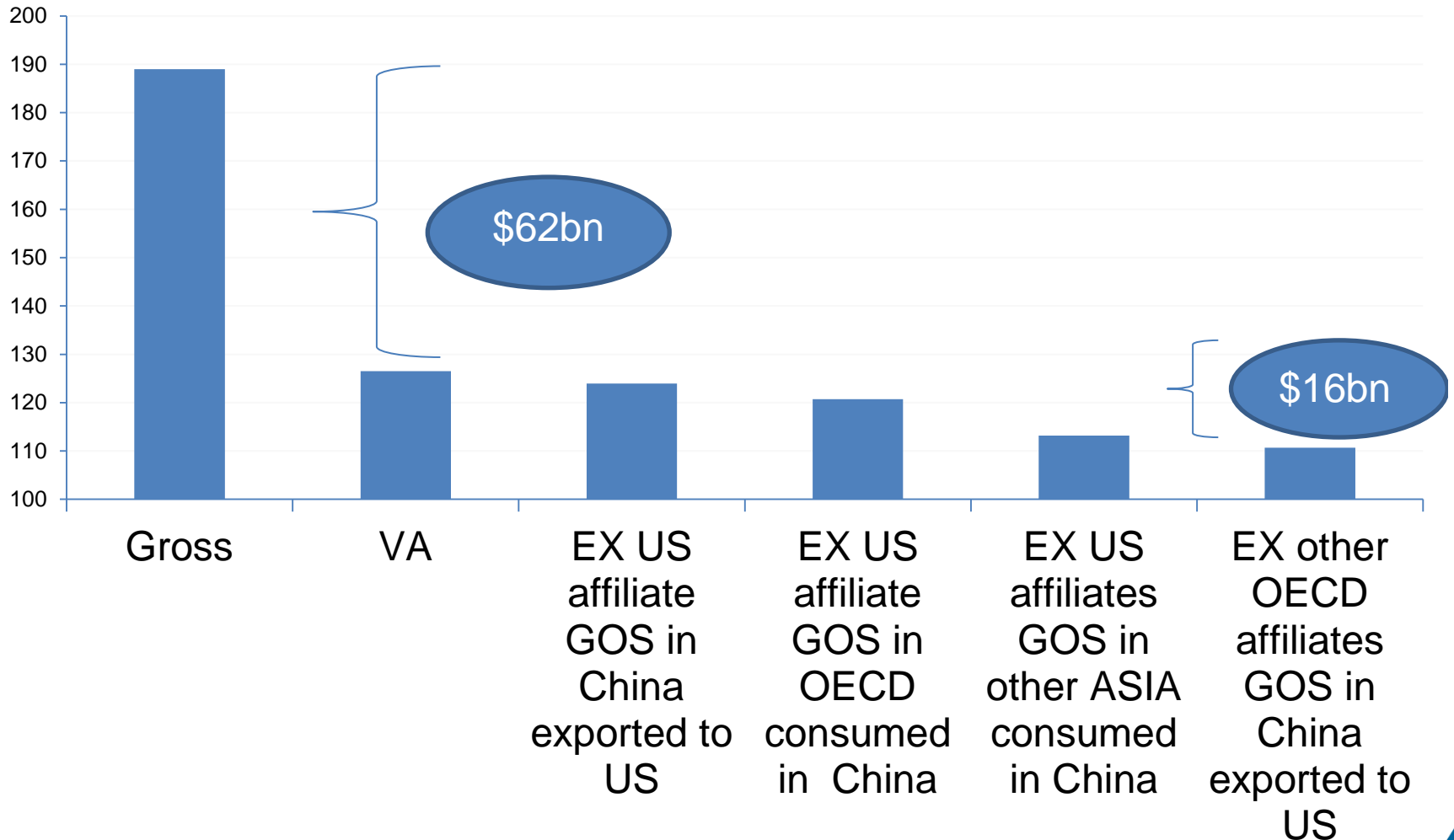
Increase in US TiVA Trade balance, adjusted for US affiliate trade in Ireland, 2009 \$bn



Source: OECD illustrative estimates



China's Trade surplus with the US?





Planned extensions

- Jobs \longrightarrow **Skills?**
 - Information by ISCO?
- **Investment?**
 - Creating a Trade-Investment Story
- **Improving quality**
 - **Dealing with heterogeneity**



TiVA key assumptions

- (1) That all firms allocated to a particular industry have the same ‘production’ function.
- (2) That for a given product, imports by industries (firms) are sourced from the same mix of countries.



But....

- We know these assumptions don't generally hold (especially with 2008 SNA).
 - Exporting firms typically import more
 - And have higher labour productivity than non-exporters (in the same industry)
- Meaning that import content of export estimates are **downward biased**
- Requiring new approach to developing SU tables that better reflects today's global production:
 - Linking and leveraging across existing datasets



Expert Group on Extended SU tables

- To create an integrated economic accounting framework for globalisation - ‘mainstreaming-**integrating**’ FATS and TEC
- More detailed SU tables:
 - Industries
 - More heterogeneity: Foreign/Domestic, Export/non-export, S/M/L
 - Imports
 - With all products at fob and separate column for residents expenditure abroad
 - Import use tables by main import partner
 - Exports
 - With non-residents expenditure and re-exports separately identified
- PLUS
 - transparent adjustments for some non-observed items (e.g. own account agricultural production)
 - Jobs by industry row
 - Emissions by industry row
 - new rows for property income flows: *interest, distributed income of corporations, reinvested earnings on FDI, Investment income disbursements*
 - And, for BEPS: *current taxes on income, wealth etc*



Use Table

FATS →

		Industry 1		Industry 2		HHFC	GGFC	GFCF	Changes in Inventories	Vauables	Exports	of which re-exports	of which - non-residents expenditure
		Foreign Exporter	Non-Exporter	Foreign Non-orter	Domestic Exporter Non-Exporter								
Industry 1	Foreign	Exporter											
		Non-Exporter											
Domestic	Exporter												
	Non-Exporter												
Industry 2	Foreign	Exporter											
		Non-Exporter											
Domestic	Exporter												
	Non-Exporter												
		Taxes on Products											
		Subididies on Products											
		Total Domestic intermediate Consumption											
		Total imports											
		Total intermediate Consumption											
		Value-Added											
		of which											
		Mixed Income											
		Compensation of Employees											
		Gross Operating Surplus											
		Other Taxes on Production											
		Other Subsidies on Production											
		Total Output											
		of which											
		own-account production of software											
		own-account production of R&D											
		other own-account production											

← **TEC**

With re-exports broken down, ideally, by destination (main partner countries/regions)



Import Use table

	Industry 1				Industry 2				HHFC	<i>of which: Residents expenditure abroad</i>	GGFC	GFCF	Changes in Inventories	Vauables	Exports
	Foreign Exporter	Non- Exporter	Domestic Exporter	Non- Exporter	Foreign Exporter	Non- Exporter	Domestic Exporter	Non- Exporter							
Industry 1															
Industry 2															
Total imports															
Taxes/Subsidies on Imports															

With TEC providing info on direct imports

With separate tables made available broken down by main country or region of origin 'groupings'



Supply Table

			Industry 1				Industry 2				Total Domestic Supply at Basic Prices	Imports F.O.B	Total Supply
			Foreign Exporter	Non-Exporter	Domestic Exporter	Non-Exporter	Foreign Exporter	Non-Exporter	Domestic Exporter	Non-Exporter			
Industry 1	Foreign	Exporter											
		Non-Exporter											
	Domestic	Exporter											
		Non-Exporter											
Industry 2	Foreign	Exporter											
		Non-Exporter											
	Domestic	Exporter											
		Non-Exporter											
Total													
of which													
own-account production of software													
own-account production of R&D													
other own-account production													

Memorandum item

Taxes and Subsidies on Products	of which import taxes / subsidies



Extensions?

	Industry 1				Industry 2			
	Foreign Exporter	Non-Exporter	Domestic Exporter	Non-Exporter	Foreign Exporter	Non-Exporter	Domestic Exporter	Non-Exporter
Property income payments - to abroad								
<i>of which</i>								
<i>Interest</i>								
<i>Distributed Income of Corporations</i>								
<i>Reinvested Earnings on FDI</i>								
<i>Investment Income Disbursements</i>								
Property Income payments - to abroad								
<i>of which</i>								
<i>Interest</i>								
<i>Distributed Income of Corporations</i>								
<i>Reinvested Earnings on FDI</i>								
<i>Investment Income Disbursements</i>								
Current taxes on income and wealth								
Employment								
Employees								
Hours worked								
Co2 emissions								



Summary

- Much has already been done...
- But plenty more to do
- With strong support and mandates from G20 and Trade Ministers and CSSP, OECD will continue to:
 - Ensure that its WP meetings serve this agenda
 - Devote considerable resources to achieving the broader needs of the international statistical community
 - Leverage its links between Policy and Statistics
 - Develop the international network to **mainstream** global SU tables and extensions to national SU tables.
- For more info see: oe.cd/tiva