

# Trade in Value Added and Multinational Groups

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- We combine the latter with a new dataset mapping the presence of more than 270,000 business groups worldwide, with a total of more than 1,500,000 affiliates in 2010 (Altomonte and Rungi, ECB WP 1554).

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- We combine the latter with a new dataset mapping the presence of more than 270,000 business groups worldwide, with a total of more than 1,500,000 affiliates in 2010 (Altomonte and Rungi, ECB WP 1554).
- e.g. what is the domestic value added contribution of Germany in its automotive exports to the USA? How does it differ when we consider Poland as the export destination? Are these differences related to the distribution and the characteristics of MGs that are jointly present in Germany-USA vs. Germany-Poland?

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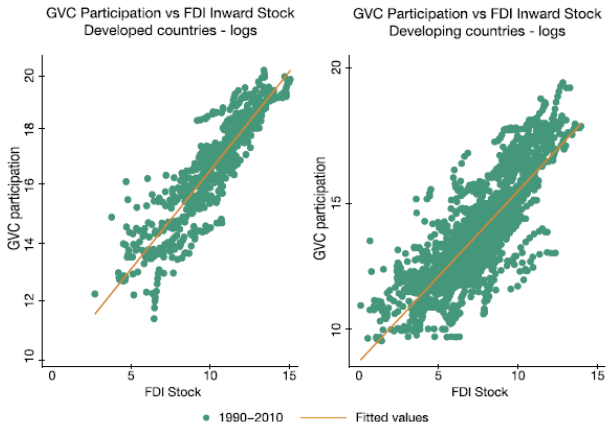
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- Hence less than 30 per cent of world trade takes place between the 'stand-alone' independent companies traditionally considered in economic models.

# Motivation: the link between Trade in VA and MGs

- Positive broad correlation between FDI and GVC participation at macro-level... Micro-evidence missing!

Figure 2. FDI and GVC participation, developed and developing countries, 1990-2010



Source: UNCTAD, *World Investment Report 2013 – GVCs: Investment and Trade for Development*.

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- 5 Work in progress and further lines of investigation



- 1 Recent methodological contributions on the value added decomposition of trade flows  
(Johnson and Noguera 2012; Koopman et al. 2014; Wang et al. 2013)
- 2 Literature on the evolution of GVCs worldwide  
(Grossman and Rossi-Hansberg 2008; Costinot et al. 2013; Antràs et al. 2012; Miroudot and Ragoussis 2009)
- 3 Studies on multinational business groups  
(recent review by Antràs e Yeaple 2014)

# Value Added decomposition of trade flows

- We rely on the gross export accounting methodology of Wang, Wei and Zhu (2013): a generalization of Koopman et al. (2014), allowing for a (WIOD-based) decomposition of gross export flows in several value added components at the sector, bilateral and bilateral-sector level [Koopman et al.: one country vs. rest of the world]

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- Sample of 40 economies and 34 sectors (as covered by the World Input-Output Database - WIOD)

# Countries

Country	3-digit ISO code
Australia	AUS
Austria	AUT
Belgium	BEL
Bulgaria	BGR
Brazil	BRA
Canada	CAN
China	CHN
Cyprus	CYP
Czech Republic	CZE
Germany	DEU
Denmark	DNK
Spain	ESP
Estonia	EST
Finland	FIN
France	FRA
United Kingdom	GBR
Greece	GRC
Hungary	HUN
Indonesia	IDN
India	IND

Country	3-digit ISO code
Ireland	IRL
Italy	ITA
Japan	JPN
South Korea	KOR
Lithuania	LTU
Luxembourg	LUX
Latvia	LVA
Mexico	MEX
Malta	MLT
Netherlands	NLD
Poland	POL
Portugal	PRT
Romania	ROM
Russia	RUS
Slovak Republic	SVK
Slovenia	SVN
Sweden	SWE
Turkey	TUR
Taiwan	TWN
U.S.A	USA

WIOD Sector Code	Description
c01	Agriculture, Hunting, Forestry and Fishing
c02	Mining and Quarrying
c03	Food, Beverages and Tobacco
c04	Textiles and Textile Products
c05	Leather and Footwear
c06	Wood and Products of Wood and Cork
c07	Pulp, Paper, Paper, Printing and Publishing
c08	Coke, Refined Petroleum and Nuclear Fuel
c09	Chemicals and Chemical Products
c10	Rubber and Plastics
c11	Other Non-Metallic Mineral
c12	Basic Metals and Fabricated Metal
c13	Machinery, Nec
c14	Electrical and Optical Equipment
c15	Transport Equipment
c16	Manufacturing, Nec; Recycling
c17	Electricity, Gas and Water Supply

WIOD Sector Code	Description
c18	Construction
c19	Sale, Maintenance and Repair of Motor Vehicles Retail Sale of Fuel
c20	Wholesale Trade and Commission Trade, Except of Motor Vehicles
c21	Retail Trade, Except of Motor Vehicles ; Repair of Household Goods
c22	Hotels and Restaurants
c23	Inland Transport
c24	Water Transport
c25	Air Transport
c26	Other Supporting and Auxiliary Transport Activities
c27	Post and Telecommunications
c28	Financial Intermediation
c29	Real Estate Activities
c30	Renting of M&Eq and Other Business Activities
c31	Public Admin and Defence; Compulsory Social Security
c32	Education
c33	Health and Social Work
c34	Other Community, Social and Personal Services

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- *RDV*: domestic value added embodied in the export flows of a home country/industry which returns home from a given partner country (i.e. intermediate exports that return home either as final or intermediate goods).

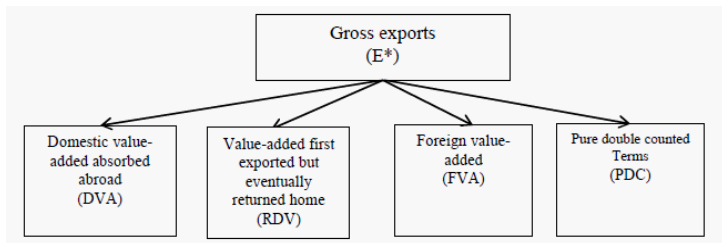
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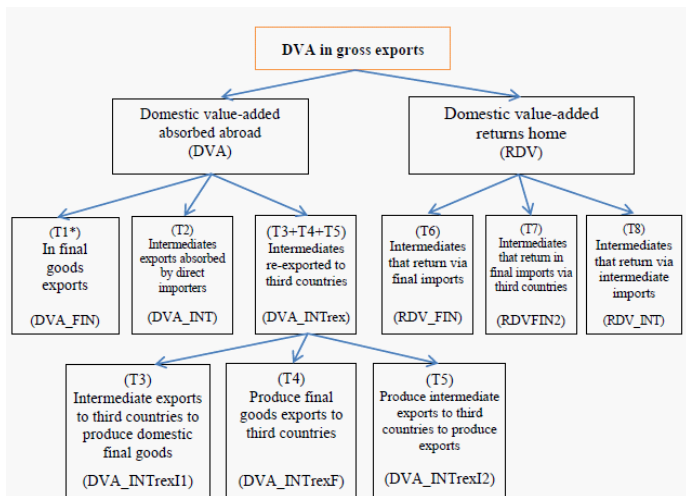
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- *PDC*: pure double counting, as generated by intermediates crossing borders several times between partners in a given industry before being finally absorbed.

# Gross exports accounting: major categories



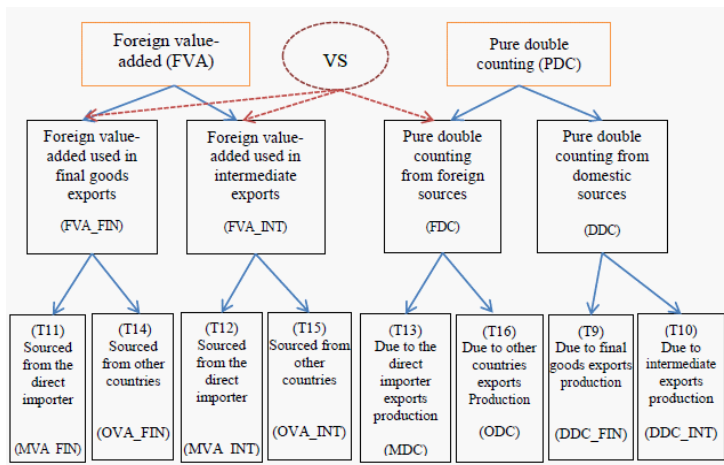
From Wang et al. (2013)

# Gross exports accounting: decomposition of DVA



From Wang et al. (2013)

# Gross exports accounting: decomposition of FVA / PDC



From Wang et al. (2013)

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- In particular, we are going to explore how their patterns across triplets are associated to the underlying distribution of multinational business groups.
- For example, we will study how differences in the decomposition of exports from the automotive industry of Germany towards the US, as compared to the same exports towards Poland, can be put in relation to the underlying distribution of multinational business groups across the different triplets.

# Value Added decomposition: descriptives

<b>Variable</b>	<b>Obs.</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
sh_dva	49411	0.7667	0.1424	0.1294	0.9908
sh_rdv	49411	0.0040	0.0092	0.0000	0.3033
sh_fva	49411	0.1678	0.1130	0.0004	0.8025
sh_pdc	49411	0.0615	0.0621	0.0000	0.6074

# A practical example

Home country	Home sector	Partner country	Total Exports	sh_dva	sh_rdv	sh_fva	sh_pdc
DEU	c15	USA	26.093	66,15%	0,18%	30,97%	2,70%
FRA	c15	USA	7.793	62,04%	0,18%	33,34%	4,45%
ITA	c15	USA	2.481	70,10%	0,09%	25,49%	4,31%
DEU	c15	CHN	22.794	65,72%	0,38%	30,16%	3,74%
FRA	c15	CHN	4.392	62,29%	0,12%	34,37%	3,23%
ITA	c15	CHN	5.854	69,94%	0,25%	25,40%	4,41%
DEU	c15	POL	7.288	59,81%	0,40%	19,84%	16,34%
FRA	c15	POL	1.203	61,32%	0,91%	29,45%	8,32%
ITA	c15	POL	1.925	65,95%	3,91%	15,87%	14,27%
DEU	c03	USA	1.353	76,14%	0,07%	23,04%	0,75%
FRA	c03	USA	2.457	82,64%	0,00%	17,30%	0,06%
ITA	c03	USA	2.527	80,54%	0,00%	19,40%	0,06%

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- (see Altomonte and Rungi 2013 for technical details)

# Business Groups Data: country representation

Home country	Country Identifier	Tot. Nodes	Home country	Country Identifier	Tot. Nodes
Australia	AUS	24,141	Italy	ITA	33,216
Austria	AUT	12,335	Japan	JPN	31,796
Belgium	BEL	12,493	South Korea	KOR	3,122
Bulgaria	BGR	7,795	Lithuania	LTU	1,300
Brazil	BRA	8,378	Luxembourg	LUX	6,741
Canada	CAN	15,493	Latvia	LVA	1,097
China	CHN	23,970	Mexico	MEX	10,062
Cyprus	CYP	2,915	Malta	MLT	872
Czech Republic	CZE	5,269	Netherlands	NLD	30,473
Germany	DEU	67,132	Poland	POL	11,719
Denmark	DNK	11,403	Portugal	PRT	7,091
Spain	ESP	34,076	Romania	ROM	2,541
Estonia	EST	1,663	Russia	RUS	17,492
Finland	FIN	5,324	Slovakia	SVK	2,233
France	FRA	48,432	Slovenia	SVN	1,294
United Kingdom	GBR	134,159	Sweden	SWE	14,500
Greece	GRC	3,245	Turkey	TUR	3,413
Hungary	HUN	3,094	Taiwan	TWN	3,710
Indonesia	IDN	2,370	United States	USA	130,200
India	IND	7,034			
Ireland	IRL	15,103			
			<b>Total</b>		<b>758,696</b>

Considering the "triplet": home country-home sector-partner country, we first identify the business groups that are present in home country-home sector *and* in partner country (any sector). We then compute the number of their nodes present in:

- *Nodes\_hCountry\_hSec*: home country-home sector

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  - *Nodes\_pCountry\_hSec*: partner country, home sector
  - *Nodes\_pCountry\_otherSec*: partner country, other sectors

# Business Groups Indicators - A practical example

Let us consider the triplet France (home country) - Food (home sector) - Italy (partner country)

- $Nodes\_hCountry\_hSec = 145 \Rightarrow$  in the French food sector there are 145 nodes owned by multinational groups (no matter where they are originated) which also operate in Italy.



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- $Nodes\_pCountry\_hSec = 110 \Rightarrow$  nodes owned by French food MGS in the Italian food sector;
- $Nodes\_pCountry\_otherSec = 120$ , nodes owned by French food MGS in any other sector (but food).

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- Diversification
  - *GEO\_DIV*: average number of countries in which the groups are active
  - *IND\_DIV*: average of the number of sectors (NACE 2) in which the groups are active

# Business Groups indicators, median figures by home country

Home Country	Nodes pCountry allSec	Nodes pCountry hSec	Nodes pCountry otherSec	Nodes hCountry hSec	AVG SALES	AVG_N	GEO DIV	IND DIV
AUS	43	19	20	53	14.674.116	311	24	14
AUT	65	13	43	17	19.082.830	366	24	17
BEL	105	19	76	26	25.073.384	385	25	17
BGR	24	8	12	5	14.835.578	356	26	15
BRA	76	18	53	23	21.200.436	356	25	16
CAN	88	20	62	31	23.137.028	353	25	16
CHN	53	23	26	50	20.230.366	297	23	14
CYP	13	5	5	5	11.558.296	303	22	14
CZE	66	16	43	13	20.231.190	366	25	16
DEU	275	33	209	113	23.826.804	356	24	17
DNK	43	12	29	13	15.485.565	322	25	15
ESP	164	23	126	56	24.593.904	385	24	16
EST	17	4	10	3	13.617.586	349	26	16
FIN	38	9	25	8	16.485.939	306	25	15
FRA	202	28	155	106	29.848.053	403	25	17
GBR	277,5	38,5	221,5	253	24.845.375	349	22	16
GRC	27	8	15	6	22.298.174	364	26	15
HUN	49	16	27	11	20.502.895	372	26	16
IDN	22	9	9	6	18.844.333	338	26	15

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Home Country	Nodes pCountry allSec	Nodes pCountry hSec	Nodes pCountry otherSec	Nodes hCountry hSec	AVG SALES	AVG_N	GEO DIV	IND DIV
IND	42	19	20	20	17.665.032	321	25	15
IRL	64	14	42,5	19	24.330.286	387	25	16
ITA	134	23	101	35	21.642.671	386	24	17
JPN	70,5	12	51	21	32.429.070	330	23	16
KOR	32	12	19	8	24.269.402	321	26	16
LTU	13	3	7	2	10.800.584	287	24	14
LUX	44	16	21	19	20.940.257	380	25	16
LVA	9	3	5	2	9.787.161	262	24	13
MEX	90	19	62	32	24.098.509	371	26	17
MLT	4	1	1	1	8.803.183	304	23	12
NLD	123	24	88	56	21.146.170	344	24	16
POL	112	23	79	25	22.421.414	367	24	16
PRT	58	15	37	15	22.208.305	392	26	16
ROM	52	18	28	11	21.567.157	404	27	16
RUS	97,5	21	69,5	27	25.090.180	357	24	17
SVK	37	11	20	8	20.624.558	371	26	16
SVN	14	4	7	3	13.091.379	325	27	16
SWE	85	16	62	35	19.434.209	353	25	16
TUR	30	12,5	14	13	18.562.468	333	26	15
TWN	16	8	6	6	15.895.090	321	27	15
USA	317	39	266	263,5	28.202.264	365	24	16

# Estimation Results

Dependent Variable:	ln (dva)	ln (rdv)	ln (fva)	ln (pdc)
	(1)	(2)	(3)	(4)
ln (Nodes_pCountry_hSec)	0.0331*** [0.010]	-0,001 [0.004]	0.0329*** [0.008]	0.0319*** [0.006]
ln (Nodes_pCountry_otherSec)	0.1615*** [0.008]	0.0415*** [0.003]	0.1126*** [0.006]	0.1012*** [0.005]
ln (Nodes_hCountry_hSec)	0.1998*** [0.009]	0.0797*** [0.004]	0.1396*** [0.007]	0.1083*** [0.006]
ln (AVG_SALES)	0.1899*** [0.009]	0.0772*** [0.004]	0.1589*** [0.007]	0.1195*** [0.006]
ln (AVG_N)	-0.1862*** [0.034]	-0.0284** [0.014]	-0.1058*** [0.026]	-0.0751*** [0.022]
ln (IND_DIV)	-0,0693 [0.065]	-0.0902*** [0.027]	-0.1760*** [0.050]	-0.1360*** [0.041]
ln (GEO_DIV)	-0.8013*** [0.046]	-0.3447*** [0.019]	-0.6419*** [0.036]	-0.4995*** [0.029]
Constant	0.5326*** [0.073]	0,0482 [0.030]	0.4795*** [0.056]	0.3795*** [0.046]
home country fe	yes	yes	yes	yes
home sector fe	yes	yes	yes	yes
partner country fe	yes	yes	yes	yes
Observations	51.626	51.626	51.626	51.626
R-squared	0,57	0,36	0,56	0,52

# Estimation Results

Dependent Variable:	ln (dva)	ln (rdv)	ln (fva)	ln (pdc)
	(1)	(2)	(3)	(4)
ln (Nodes_pCountry_hSec)	0,005 [0.009]	-0.0065* [0.004]	0,0061 [0.007]	0.0129** [0.006]
ln (Nodes_pCountry_otherSec)	0.0940*** [0.007]	0.0251*** [0.003]	0.0668*** [0.006]	0.0727*** [0.005]
ln (Nodes_hCountry_hSec)	0.1687*** [0.009]	0.0550*** [0.003]	0.1182*** [0.007]	0.0876*** [0.006]
ln (AVG_SALES)	-0,0004 [0.009]	0.0080** [0.004]	0.0189*** [0.007]	0.0198*** [0.006]
ln (AVG_N)	-0.2205*** [0.032]	-0.0690*** [0.012]	-0.1413*** [0.025]	-0.1095*** [0.020]
ln (IND_DIV)	0.2910*** [0.061]	0.0526** [0.023]	0.1027** [0.048]	0.0656* [0.040]
ln (GEO_DIV)	-0,0329 [0.045]	-0,0159 [0.017]	-0.0683* [0.035]	-0.0734** [0.029]
Constant	-0,3828 [0.269]	-0,049 [0.103]	-0.3933* [0.210]	-0,2121 [0.174]
home*partner country fe	yes	yes	yes	yes
home sector fe	yes	yes	yes	yes
Observations	51.626	51.626	51.626	51.626
R-squared	0,64	0,55	0,63	0,59

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ln (GEO_DIV)	-0,0329 [0.045]	-0,0159 [0.017]	-0.0683* [0.035]	-0.0734** [0.029]
ln (Home GDP)	0.4536*** [0.038]	0.2588*** [0.014]	0.2706*** [0.029]	0.2202*** [0.024]
ln (Partner GDP)	0,0562 [0.047]	-0,0121 [0.018]	0,0452 [0.037]	-0,016 [0.030]
Constant	-4.5760*** [0.689]	-2.1434*** [0.263]	-2.8959*** [0.537]	-1.7981*** [0.445]
home*partner country fe	yes	yes	yes	yes
home sector fe	yes	yes	yes	yes
Observations	51.626	51.626	51.626	51.626
R-squared	0,64	0,55	0,63	0,59

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- Controlling for avg. group sales, negative correlation with avg. n. of affiliates worldwide  $N$ ;
- Negative association with geographic diversification disappearing when controlling for relative distance of countries;
- Positive association with Home country GDP, while Partner country GDP not significant;

# Work in progress and further lines of investigation

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- Investigating differences between manufacturing and services industries / role of geography