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A METHODOLOGY TO IDENTIFY GVC: A NEW PERSPECTIVE TO ANALYSE INTERNATIONAL TRADE

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Presentation outline

1. Justification and objectives
2. Methodology
3. Data and Results
4. Conclusions

Fragmentation of production

- Different stages of productive processes are now spread over different national jurisdictions
- Basic force: reduction in trade cost
  - Technological nature
    - Goods- containers and cargo unitization
    - Services- Information technologies and telecommunications
  - Policies liberalization
    - Trade : mix unilateral, preferential and multilateral agreement.
    - Investment: unilateral policies and preferential agreements

Trade modes

- Conventional trade -One country sells to another
  - Final goods (services) and
  - Intermediate goods (services) which will be elaborated for final consumption.
- Supply Chain Trade: Import to export. Typical case:
  - High tech manufactured firms combined know how with low salaries in developing countries to produce a good for the international market.
  - Main sectors: transport equipment; electrical and optical equipment ;and chemicals.

Characteristics typical Global Value Chain case

- Technological asymmetry
  - Headquarter economies: US, Japan and Germany, new evolving Taipei and Korea
  - Factory economies: China, India, Turkey, Indonesia, Thailand, Poland
  - Micro perspective: leader firm MC/Supplier main components/Assembly/Leader firm (distribution product,..)

Characteristics of typical GVCs case

- Regionalization
  - GVCs are mainly regional: Europe; North America; South East Asia.
- Policies requirements
  - trade policy package that includes a set of traditionally domestic issues but that are essential for a dynamic integration in GVCs.
  - Increase the exchange of intermediate goods but mostly increases knowledge sharing. This requires new disciplines and rules.

How are GVC in others sectors with other countries participation?

- Trade in final goods are reduced in all sectors or trade in intermediate increases everywhere (Baldwin and Lopez Gonzalez, 2013)
- Sectors
  - Natural resources: Agricultural (Food and Raw materials); Fuels and minerals
  - Other matures manufactures (textiles and apparel)
  - Services (BPO, KPO)
- Have all the same characteristics?:
  - Developing countries could only participate as providers of low labor cost?
  - Technological asymmetries and governance of GVCs: these others networks could have many different shapes. **It will be useful to develop a typology of the different GVCs, considering, among other criteria:**
    - **the role played by the lead country (firm) in the network**.
    - Type of regionalization of the different networks
    - Trade policy requirements

Methodology: Three alternatives

1) National input-output tables into larger international (global and regional) input-output tables (IIOTs).
   - Coverage mainly developed countries and selected emerging markets.
2) Case studies at a level of specific sectors and /or firms tracking value chain at the highest level of disaggregation (product and firm). Needs new data and so it needs new surveys. Restricted to some countries.
3) Analyzed trade data to elaborate a global architecture of GVCs networks by type of product, using available information at a global and regional level. Global coverage.

	Weakness	Strenght
1) IIOTs	• Harmonization problems among countries (developing countries is worst) • Level of aggregation • Assumptions to solve data problems- Proportionality	• Consistency and balancing • Standard well know measures of IO literature applied to the global economy
2) Case Studies- firms and sectors	• Restrictions to generalize results to global economy • Cost of collecting new data	• Level of disaggregation • Value added origin and value added capture (origin of capital)
3) Trade Data and Trade Policy	**•Consistency and balancing •Geographic distribution and flow of value added •Level of aggregation- could be difficult to link inputs and outputs.**	**• Systemic approach using trade and trade policy data: a) specialization indexes and Graph theory. b) gravity models.**

GVCs a complex phenomenon to measure

- Each method has its own weakness and strength
- Restrictions in the availability of good information
  - In particular developing countries not good primary information (or too less) about international inter industrial relationships.
  - Use available data: opportunity and disaggregation level
- Measure and interpretation needs an eclectic approach that combine the different type of methods.

Objectives

- Develop a new methodology to measure trade in GVC
  - combining trade data and IO information.
  - increase coverage of countries
- Build the basic data to be able to track the sequence of stages of product transformation in the trade net at high level of disaggregation
- Characterize trade with this new tools between particular regions and trade blocs
  - South East Asia and Latin America
    - TPP+3 and MERCOSUR+2
    - China, India, EU, ROW

Organization presentation

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New tools for a new methodology

- Modern empirical methodology that describes international trade as a net that links countries with products (bipartite net) .
- See:
  - Hausmann, R. e Hidalgo, C., 2009. The Building Blocks of Economic Complexity.
  - Hidalgo, C.A., Klinger, B., Barabási, A.L., Hausmann, R., 2007. The product space conditions the development of nations.

“New” tools for the new methodology

- Previous result proximity among products in the:
  - Export space
- Generalize the methodology to link inputs with outputs using export and import data simultaneously.
  - Export-import space.
- Amador and Cabral (2008). “Vertical specialization across the world: a relative measure”.

Trade Specialization: Two Bipartite Networks

- Trade Bipartite Network ($\mathcal{T}$) is defined by:
  - Two groups of nodes: products ($\mathcal{P}$) and countries ($\mathcal{C}$)
  - Edges ($\mathcal{E}$) that connect products with countries

$$\Rightarrow \mathcal{T} = \{\mathcal{P}, \mathcal{C}, \mathcal{E}\}$$

- Edge connects a country with a product
  - When product *i* has a share in country *j* trade (import or exports) that is sufficiently greater ($\underline{u_1}$) than the world average (Balassa)
- Two matrix summarize trade specialization: **M** for imports and **X** for exports (**T=M,X**)
  - Products are in rows and countries in columns
  - Binary entries (value 1 if there is an edge and 0 if there is not)

Three stages

- Trade revealed link between input and outputs at product level
- Input Output relationship expanded to the product dimension
- Combination of both information produces to different dyads:
  - country of destiny *c* imports a product *j* to be incorporated in a certain export product *i*.
  - *country of origin c´ exports a product i which uses some import product j*

1 stage: proximity inputs (I) and ouputs (E)

- Revealed link by trade between an export product and an import one (number of countries both are associated)

$$E_{PxP} = XM' = \left[e_{ij} \right]$$

- Probability of have RCA in export product *i* conditional of have a specialization in import product *j*.

$$En_{PxP} = XM' \left[D(m^p) \right]^{-1} = \left[\frac{e_{ij}}{\sum_c m_{jc}} \right]$$

- Unconditional probability of been specialized in export product *i* = $\left[\frac{\sum_c x_{ic}}{C} \right]$.
- Conditional over unconditional sufficiently greater

$$E_{bPxP} = \begin{bmatrix} e_{b_{ij}} = 1, if\ C \left[D(x^p) \right]^{-1} XM' \left[D(m^p) \right]^{-1} > \underline{u}_2, \\ otherwise\ e_{b_{ij}} = 0 \end{bmatrix}$$

2 stage: Input Output relationship

- Disaggregated Input Output Matrix

$$A_{SxS} = \left[a_{ss'} \right]$$

- Link between sectors greater than certain threshold

$$\overline{A}_{SxS} = \left[\overline{a}_{ss'} = 1 \; if \; a_{ss'} > \underline{u}_3 \; otherwise \; \overline{a}_{ss'} = 0 \right]$$

- Correlations table from sectors to products and expansion of the input-output table

$$\overline{\overline{A}}_{PxP} = \left[\overline{\overline{a}}_{ij} = 1 \; if \; \overline{a}_{ss'} = 1, i \in s, j \in s'; otherwise \; \overline{\overline{a}}_{ij} = 0 \right]$$

3 stage: Combination

- Connection between export product *i* and import product j revealed by international trade and IO relationship

$$G_{PxP} = E_b .* \overline{\overline{A}}' = \left[g_{ij} = e_{ij} \overline{\overline{a}}_{ji} \right]$$

- Participation of each country *c* in GVC

$$E^c{}_{PxP} = x_c m_c' = \left[x_{ic} m_{jc} \right] = \left[e_{ij}^c \right]$$

$$G^c = G .* E^c = \left[g_{ij} e_{ij}^c \right]$$

- ✓ Rows: export product *i linked with some import input j*
- ✓ *Columns: import input j linked with some export product i*

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Data

- BACI Average trade 2009-2014, HS 2002, 6 digits
  - Source: CEPII
- Commodity by Industry Matrix (385x385), Commodity-by-Commodity Direct Requirements (385x385), after Redefinitions Table, year 2007, 6 digit BEA codes
  - Source: US Bureau of Economic Analysis.
- Correlations table HS to BEA built from 2 sources:
  - HS-NAICS (Pierce & Schott, 2009)
  - NAICS-BEA (Bureau of Economic Analysis)

First approach to the results

- Checking preliminary results to analyze the consistent of the methodology
- Zoom in a particular case LA and Asia.
- We link a HS 6 digit product (#5218) with a country of destiny (#92)
  - Region and sector (BEA 2,3 and 6 digit) perspective
  - main flows

TRADE BY REGIONS (thousands : and %)

GLOBAL

	ASEAN+5	SA	MERCOSUR+	NAFTA+CA	EU	RUSIA+	AFRICA	ROW	TOTAL
ASEAN+5	2538	182	138	903	836	98	82	295	5071
SOUTH ASIA	120	27	9	46	96	6	19	70	395
MERCOSUR+	156	22	110	131	115	9	11	35	591
NAFTA+CA	422	27	121	987	363	20	27	107	2073
EU	581	100	98	471	3828	198	125	340	5742
RUSIA+	97	14	6	27	320	108	12	35	618
AFRICA	52	26	12	37	122	2	26	39	316
ROW	664	129	18	152	248	10	48	90	1360
TOTAL	4630	527	513	2755	5927	451	351	1011	16165

	ASEAN+5	SA	MERCOSUR+	NAFTA+CA	EU	RUSIA+	AFRICA	ROW	TOTAL
ASEAN+5	16	1	1	6	5	1	1	2	31
SOUTH ASIA	1	0	0	0	1	0	0	0	2
MERCOSUR+	1	0	1	1	1	0	0	0	4
NAFTA+CA	3	0	1	6	2	0	0	1	13
EU	4	1	1	3	24	1	1	2	36
RUSIA+	1	0	0	0	2	1	0	0	4
AFRICA	0	0	0	0	1	0	0	0	2
ROW	4	1	0	1	2	0	0	1	8
TOTAL	29	3	3	17	37	3	2	6	100

	ASEAN+5	SA	MERCOSUR+	NAFTA+CA	EU	RUSIA+	AFRICA	ROW	TOTAL
ASEAN+5	50	4	3	18	16	2	2	6	100
SOUTH ASIA	30	7	2	12	24	2	5	18	100
MERCOSUR+	26	4	19	22	19	2	2	6	100
NAFTA+CA	20	1	6	48	17	1	1	5	100
EU	10	2	2	8	67	3	2	6	100
RUSIA+	16	2	1	4	52	17	2	6	100
AFRICA	16	8	4	12	39	1	8	12	100
ROW	49	10	1	11	18	1	4	7	100
TOTAL	29	3	3	17	37	3	2	6	100

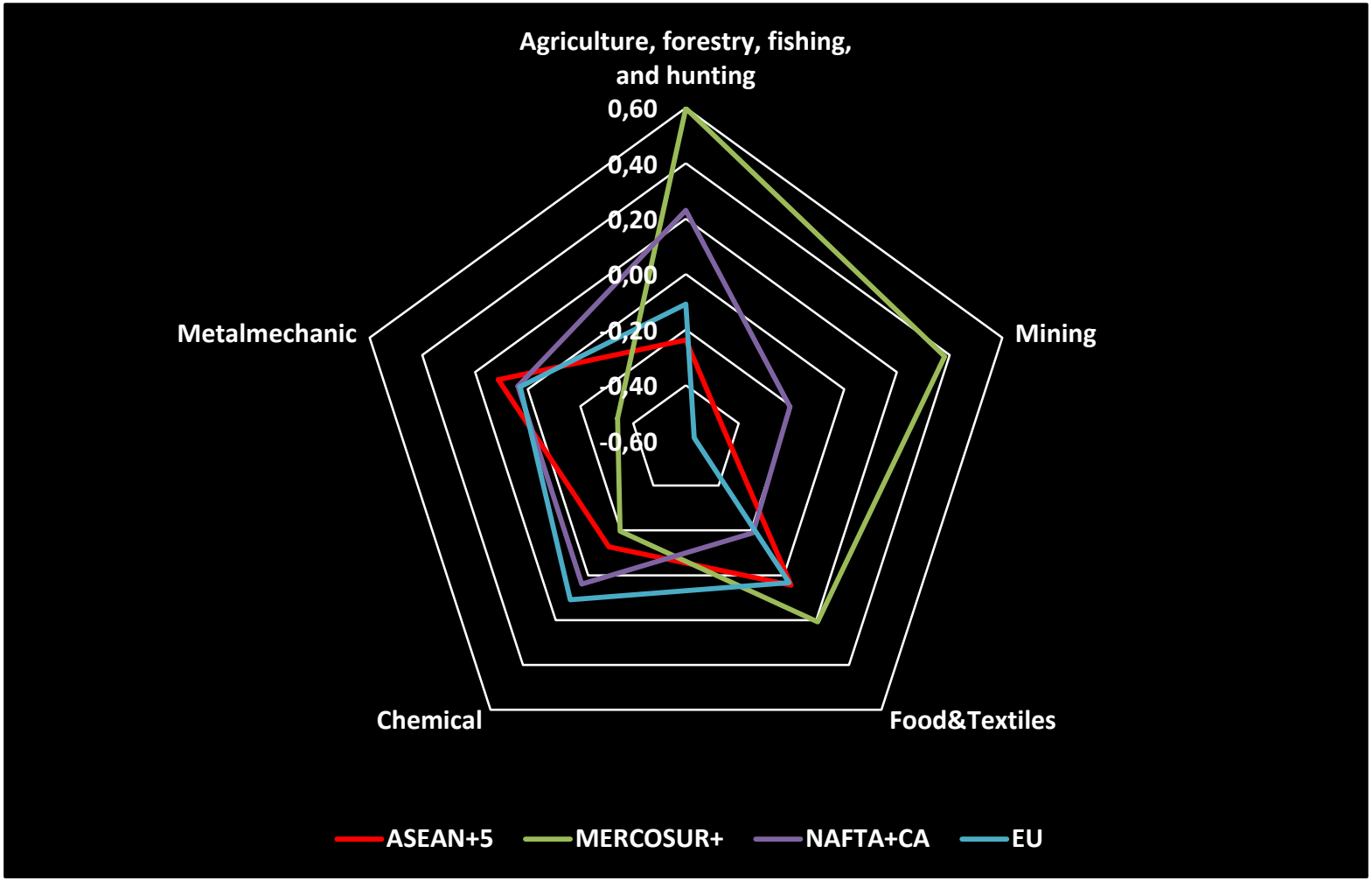
	ASEAN+5	SA	MERCOSUR+	NAFTA+CA	EU	RUSIA+	AFRICA	ROW	TOTAL
ASEAN+5	55	34	27	33	14	22	23	29	31
SOUTH ASIA	3	5	2	2	2	1	5	7	2
MERCOSUR+	3	4	21	5	2	2	3	3	4
NAFTA+CA	9	5	24	36	6	4	8	11	13
EU	13	19	19	17	65	44	36	34	36
RUSIA+	2	3	1	1	5	24	3	3	4
AFRICA	1	5	2	1	2	1	7	4	2
ROW	14	25	4	6	4	2	14	9	8
TOTAL	100	100	100	100	100	100	100	100	100

	ASEAN+5	SOUTH ASIA	MERCOSUR+	NAFTA+CA	EU+	RUSIA+	AFRICA	ROW	TOTAL
ASEAN+5	**2537,5**	**181,7**	**137,7**	**903,4**	**835,7**	**97,6**	**82,3**	**294,7**	**5070,6**
CHN	698,2	73,4	81,0	469,8	436,2	59,6	42,9	129,7	1990,8
JPN	402,0	13,3	15,3	154,1	107,0	13,3	8,5	35,7	749,3
KOR	275,5	19,1	17,0	79,0	67,3	11,7	6,9	47,8	524,3
MYS	159,0	12,7	3,1	31,2	29,0	1,7	3,3	11,8	251,7
SGP	162,7	12,0	1,7	20,5	28,4	1,0	3,3	13,6	243,3
AUS	173,1	15,1	2,1	10,9	15,4	1,0	2,9	10,2	230,7
IDN	114,0	14,9	2,8	19,8	23,8	1,8	3,5	7,4	188,1
HKG	77,9	5,0	1,7	5,3	17,1	0,5	1,3	9,3	118,1
VNM	50,5	2,3	1,7	22,8	26,0	2,1	1,5	4,8	111,8
NZL	21,2	1,1	0,5	4,0	4,7	0,3	0,9	3,4	36,1
RASEAN	403,5	12,8	10,7	86,0	80,9	4,5	7,2	20,9	626,5
SOUTH ASIA	**120,3**	**27,3**	**9,4**	**46,4**	**96,4**	**6,3**	**19,1**	**70,1**	**395,3**
IND	59,3	12,9	8,6	34,1	57,0	4,0	15,8	58,1	249,9
RSA	61,0	14,4	0,8	12,3	39,3	2,3	3,3	12,0	145,4
MERCOSUR+	**156,5**	**22,3**	**110,2**	**131,5**	**114,6**	**9,2**	**11,2**	**35,0**	**590,5**
BRA	63,9	7,0	37,7	32,5	52,4	4,9	6,8	20,2	225,3
VEN	25,4	8,0	3,0	33,0	5,0	0,4	0,2	2,4	77,4
CHL	34,3	2,2	10,1	12,3	13,8	0,6	0,3	0,9	74,4
ARG	12,6	2,8	28,2	7,3	13,1	1,1	3,1	5,0	73,2
COL	4,8	1,5	8,6	22,5	11,2	0,1	0,2	4,3	53,2
PER	10,8	0,4	6,2	10,5	11,5	0,1	0,2	0,5	40,4
ECU	1,4	0,2	5,4	10,8	3,5	0,9	0,1	0,7	23,0
BOL	1,3	0,0	5,9	1,4	1,1	0,0	0,0	0,0	9,8
URY	1,5	0,1	3,0	0,8	1,7	0,3	0,2	0,6	8,2
PRY	0,4	0,2	2,2	0,3	1,4	0,6	0,2	0,4	5,7
NAFTA+CA	**422,0**	**26,6**	**121,3**	**986,6**	**362,7**	**19,5**	**27,0**	**107,0**	**2072,7**
USA	356,9	19,7	91,7	398,0	294,2	16,4	23,5	89,6	1289,9
CAN	42,6	4,0	6,6	299,2	37,5	1,9	2,5	7,5	401,8
MEX	17,1	2,6	18,7	267,8	24,4	0,8	0,8	5,1	337,3
CRI	3,8	0,1	0,6	10,0	4,6	0,1	0,0	1,1	20,4
GTM	0,5	0,1	0,5	6,0	0,8	0,1	0,1	2,4	10,4
PAN	1,0	0,2	2,8	2,5	0,9	0,2	0,1	0,9	8,5
NIC	0,2	0,0	0,4	3,1	0,3	0,0	0,0	0,4	4,4

Geography of trade

- Regions: world in seven regions.
- Three hubs: Southeast Asia; North-America; Europe
- Intraregional trade
  - ASEAN+5;EU+;NAFTA+CA
- LA more linked to Asia Hub
- Europe with Rusia+; Africa and ROW.
- USA with NAFTA+CA

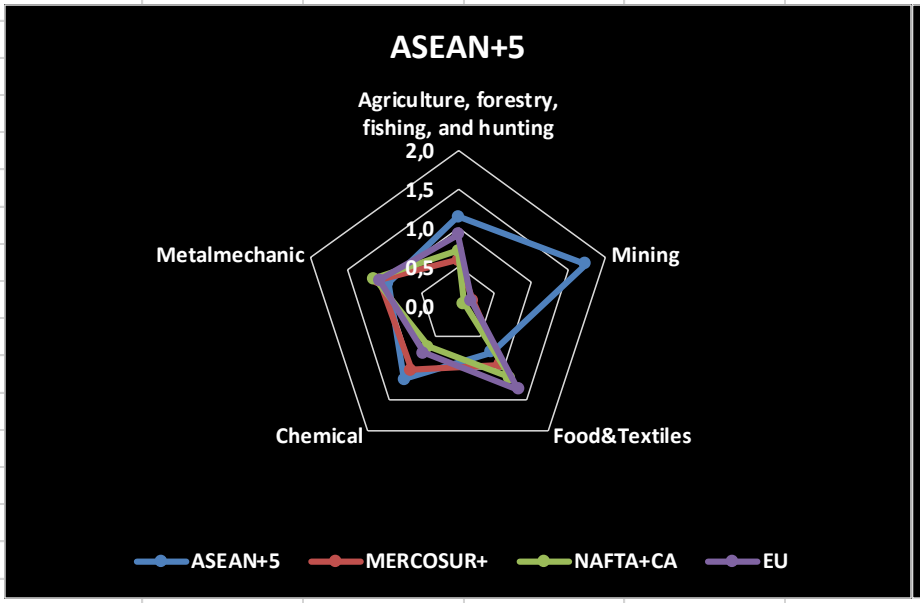
PATTERN OF TRADE: RCA BY REGIONS (logRCA)

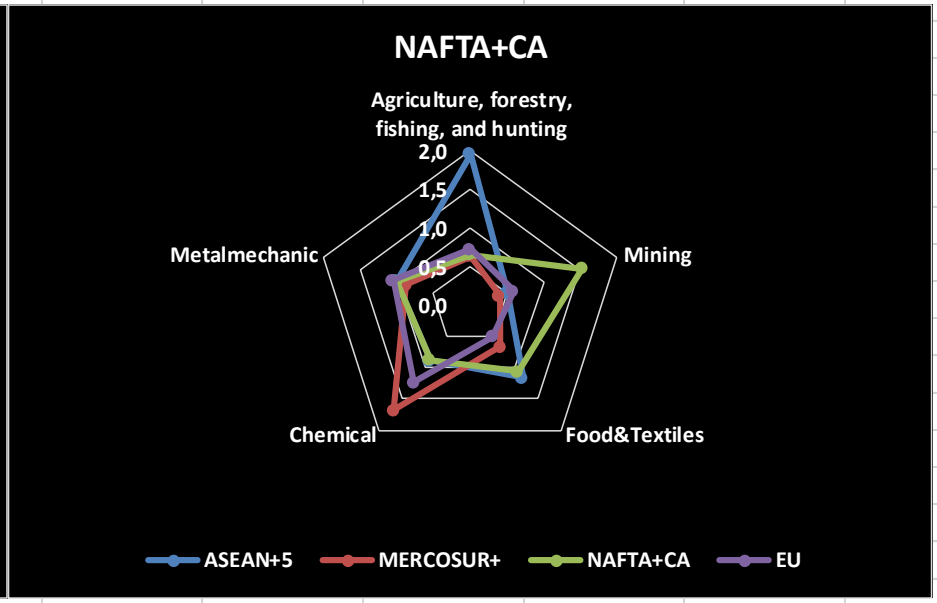


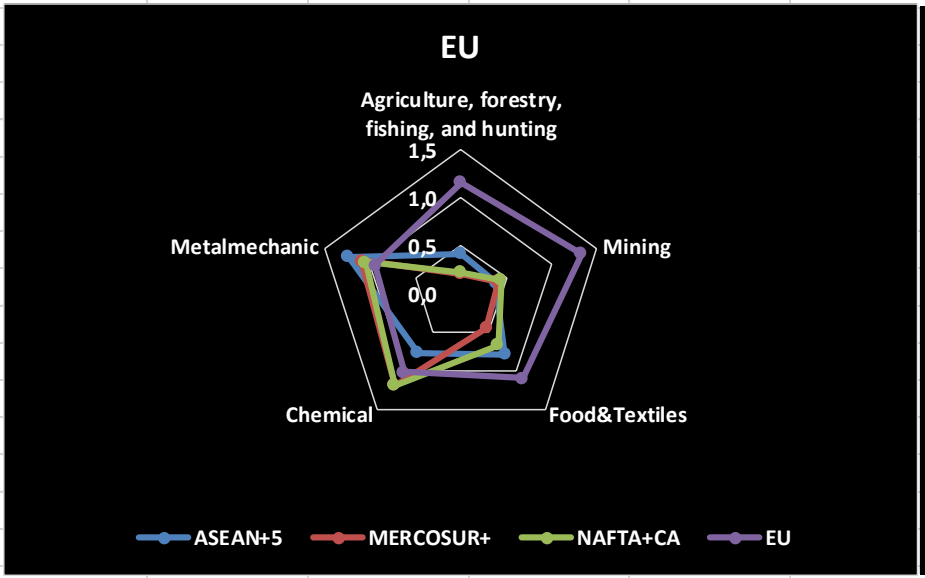
Trade patterns by regions (average)

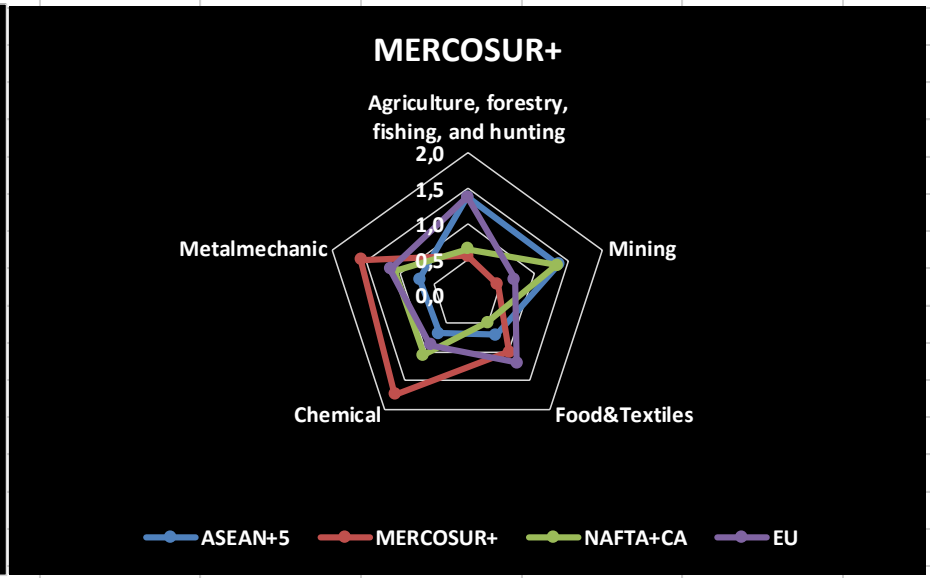
- ASEAN+5
  - Metalmechanic (++)
  - Food&textils
- MERCOSUR+
  - Agriculture,…(++)
  - Mining,… (++)
  - Food&textils
- NAFTA+CA
  - Agriculture,…
  - Chemical,…
- EU
  - Metalmechanic
  - Chemical (++)
  - Agriculture,…

TRADE INTENSITY BY REGIONS (ratio)









Trade intensity: sectors and regions (average)

- ASEAN+5
  - Intraregional: more in Mining, Chemical, Agriculture
  - Other regions: Metalmechanic and Food&textils
- MERCOSUR+
  - Intraregional: Metalmechanic, Chemical
  - NAFTA+CA:Mining
  - ASEAN+5: Agriculture and Mining
  - EU: Agriculture and Food&Textils
- NAFTA+CA
  - Intraregional: Mining
  - ASEAN+5: Agriculture; Food&textils
  - MERCOSUR+: Chemical
  - EU: Chemical, Metalmechanic
- EU
  - Intraregional: Mining, Agriculture, Food&textils
  - Others regions: Chemical, Metalmechanic

I2E by BEA3 sectors (t : USD and %)

BEA	Trade	Exports_G	Imports_G	E_G/T	I_G/T
Agriculture…	528	102	92	19	17
Agricultur	380	85	48	22	13
Cattle and Dairy	50	12	12	23	25
Forestry	44	6	15	14	34
Fishing	54	0	17	0	31
Mining	2197	183	1348	8	61
Oil and gas	1831	0	1100	0	60
Mining	366	183	248	50	68
Food&textiles	1729	443	113	26	7
Food and bever	777	126	52	16	7
Alcoholic beverg	121	17	1	14	1
Textile , fibres	184	61	24	33	13
Carpet and rugs	73	14	0	19	0
Apparel manufa	379	113	18	30	5
Leather and allie	194	112	18	58	10
Chemical produ	3578	1399	503	39	14
Wood products	106	32	13	31	12
Paper products	241	102	23	42	10
Printing and rela	41	17	0	40	0
Petroleum and	90	8	31	9	35
Chemical produ	2534	1063	393	42	16
Plastics and rub	343	127	25	37	7
Nonmetallic mir	222	50	17	22	8
Metalmechanic	8134	4969	2253	61	28
Primary metals	1270	513	541	40	43
Fabricated meta	425	164	34	39	8
Machinery	1560	999	432	64	28
Computer and e	2104	1600	803	76	38
Electrical equipr	550	292	79	53	14
Transportation	1534	1031	285	67	19
Furniture and re	103	40	6	39	5
Miscellaneous n	586	330	73	56	13
Total	16165	7096	4309	44	27

I2E: main 20 BEA6 sectors GVC_e (t : USD and %)

BEA	Name	Trade	G_E	G_I	G_E/T	G_I/T
334413	Semiconductor and relat	519	400	403	77	78
325412	Pharmaceutical preparat	360	295	16	82	4
336111	Automobile manufacturi	377	282	0	75	0
325190	Other basic organic chen	400	223	189	56	47
334418	Printed circuit assembly	257	207	117	81	45
333111	Farm machinery and equ	244	188	135	77	56
336213	Motor home manufactu	232	188	0	81	0
331490	Nonferrous metal (excep	355	183	251	52	71
334111	Electronic computer mar	203	172	0	85	0
334220	Broadcast and wireless c	209	164	2	78	1
325211	Plastics material and resi	235	159	44	68	19
334300	Audio and video equipm	180	139	17	78	9
333618	Other engine equipment	154	126	76	82	49
336411	Aircraft manufacturing	137	117	0	86	0
2122A0	Iron, gold, silver, and oth	148	115	118	78	80
33329A	Other industrial machine	186	114	54	61	29
315000	Apparel manufacturing	379	113	18	30	5
316000	Leather and allied produ	194	112	18	58	10
331110	Iron and steel mills and f	280	110	82	39	29
333415	Air conditioning, refriger	154	102	37	66	24

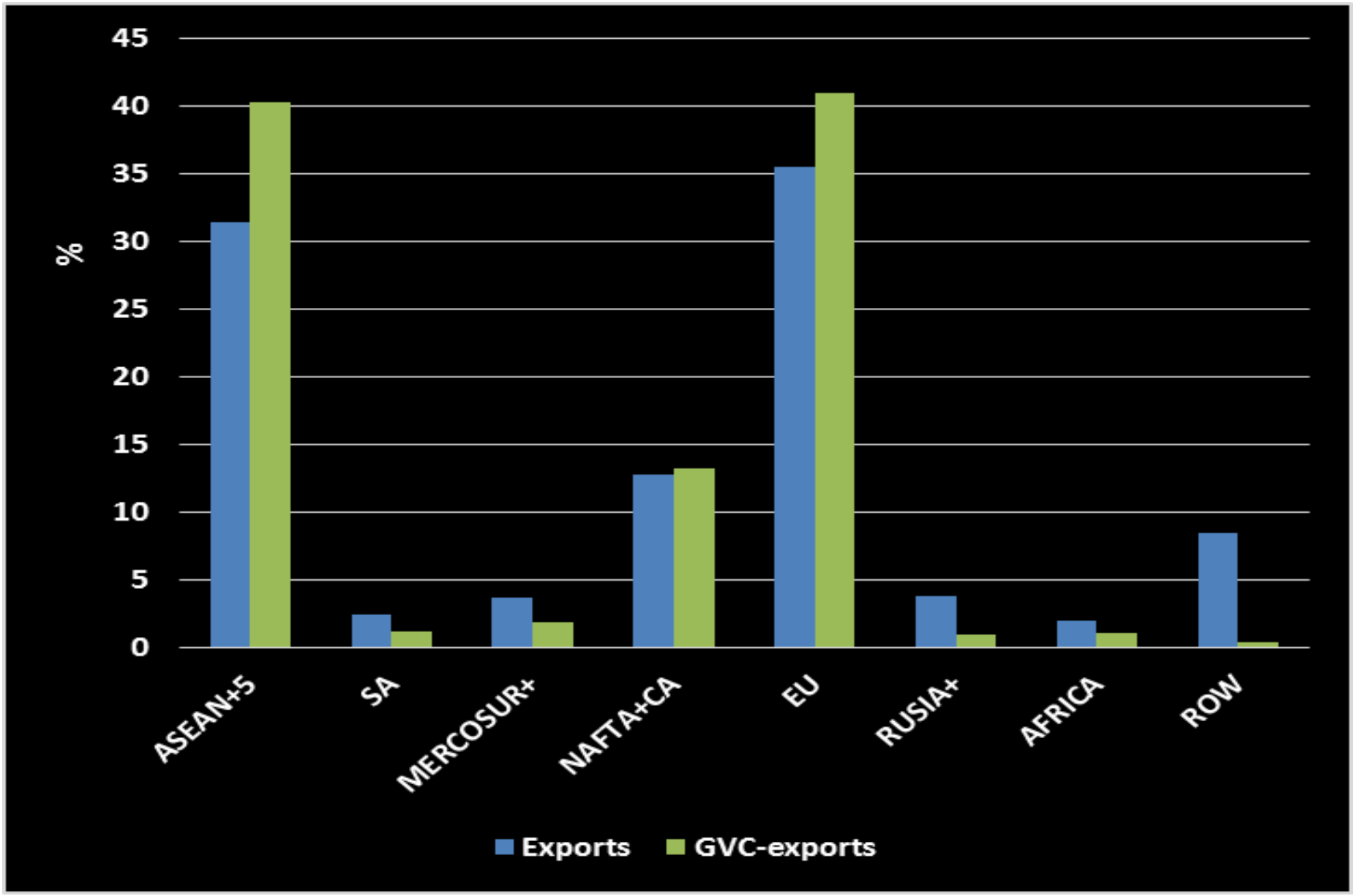
I2E: main 20 BEA6 sectors GVC_i (billons USD and %)

BEA	Name	Trade	G_E	G_I	G_E/T	G_I/T
211000	Oil and gas ex	1831	0	1100	0	60
334413	Semiconduct	519	400	403	77	78
331490	Nonferrous m	355	183	251	52	71
325190	Other basic o	400	223	189	56	47
333111	Farm machin	244	188	135	77	56
2122A0	Iron, gold, silv	148	115	118	78	80
334418	Printed circui	257	207	117	81	45
331110	Iron and stee	280	110	82	39	29
333618	Other engine	154	126	76	82	49
212100	Coal mining	122	56	72	46	60
331411	Primary smelt	103	42	72	41	70
33441A	Other electro	117	83	68	70	58
336320	Motor vehicle	95	44	62	46	65
212230	Copper, nicke	67	8	56	12	84
33329A	Other industr	186	114	54	61	29
334210	Telephone ap	107	81	50	76	47
331419	Primary smelt	69	27	48	40	70
325414	Biological pro	95	84	48	88	50
336413	Other aircraft	68	55	47	80	69
334112	rage device m	120	95	46	79	38

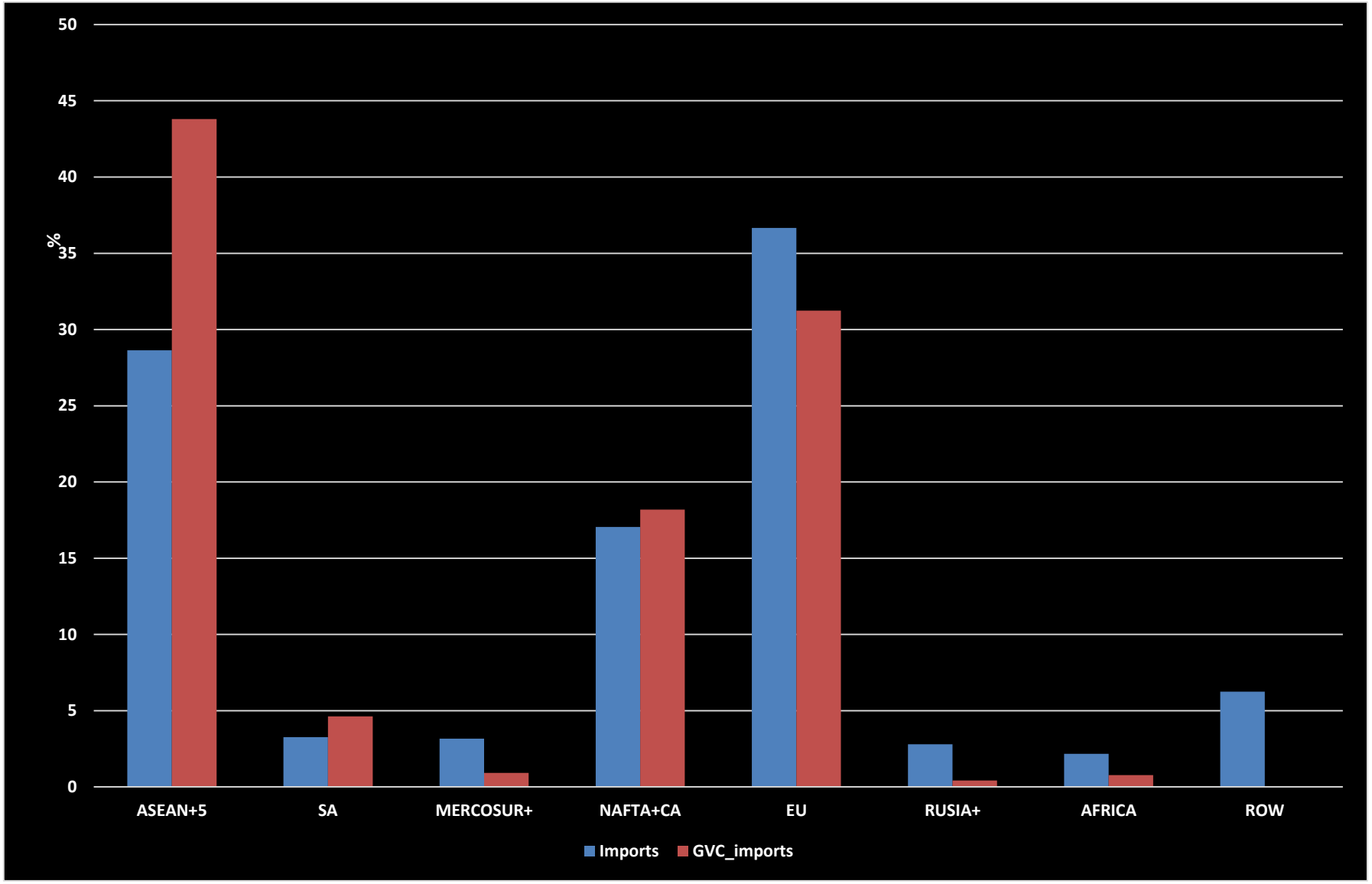
Sectors

- I2E- BEA2 & BEA3
  - Exports: Metalmechanic and Chemical
  - Imports: Metalmechanic; mining; chemical
- I2E- BEA6
  - GVC_exports- 20 products +50% (electronics and transport goods); inputs and final goods.
  - GVC_imports- 20 products 70% (oil, minerals, inputs of the same industries).

Exports and GVC _E (Er/E and GVC_E/E in %)



Imports and GVC _I (Ir/I and I2Er/I in %)



TRADE GVC_ e BY REGIONS (thousands : and %)

	ASEAN+5	SA	MERCOSUR+	NAFTA+CA	EU	RUSIA+	AFRICA	ROW	TOTAL
ASEAN+5	1392	75	79	586	512	53	34	123	2854
SA	18	3	2	16	30	1	2	15	88
MERCOSUR+	62	1	23	15	27	1	2	5	135
NAFTA+CA	219	9	50	394	205	10	11	37	936
EU	362	64	56	290	1835	102	52	144	2906
RUSIA+	14	2	0	4	26	13	3	5	68
AFRICA	24	8	1	7	32	0	3	4	79
ROW	17	3	0	0	5	0	2	2	30
TOTAL	2108	166	213	1313	2673	180	110	334	7096

	ASEAN+5	SA	MERCOSUR+	NAFTA+CA	EU	RUSIA+	AFRICA	ROW	TOTAL
ASEAN+5	20	1	1	8	7	1	0	2	40
SA	0	0	0	0	0	0	0	0	1
MERCOSUR+	1	0	0	0	0	0	0	0	2
NAFTA+CA	3	0	1	6	3	0	0	1	13
EU	5	1	1	4	26	1	1	2	41
RUSIA+	0	0	0	0	0	0	0	0	1
AFRICA	0	0	0	0	0	0	0	0	1
ROW	0	0	0	0	0	0	0	0	0
TOTAL	30	2	3	18	38	3	2	5	100

	ASEAN+5	SA	MERCOSUR+	NAFTA+CA	EU	RUSIA+	AFRICA	ROW	TOTAL
ASEAN+5	49	3	3	21	18	2	1	4	100
SA	20	4	3	18	34	1	3	17	100
MERCOSUR+	46	1	17	11	20	1	2	3	100
NAFTA+CA	23	1	5	42	22	1	1	4	100
EU	12	2	2	10	63	4	2	5	100
RUSIA+	21	3	1	6	39	19	4	7	100
AFRICA	30	10	1	9	41	0	3	5	100
ROW	57	9	1	1	18	1	6	7	100
TOTAL	30	2	3	18	38	3	2	5	100

	ASEAN+5	SA	MERCOSUR+	NAFTA+CA	EU	RUSIA+	AFRICA	ROW	TOTAL
ASEAN+5	66	45	37	45	19	29	31	37	40
SA	1	2	1	1	1	1	2	5	1
MERCOSUR+	3	0	11	1	1	0	2	1	2
NAFTA+CA	10	6	24	30	8	5	10	11	13
EU	17	39	27	22	69	57	48	43	41
RUSIA+	1	1	0	0	1	7	3	1	1
AFRICA	1	5	0	1	1	0	2	1	1
ROW	1	2	0	0	0	0	2	1	0
TOTAL	100	100	100	100	100	100	100	100	100

TRADE GVC_ i BY REGIONS (thousands : and %)

	ASEAN+5	SA	MERCOSUR+	NAFTA+CA	EU	RUSIA+	AFRICA	ROW	TOTAL
ASEAN+5	1023	25	8	190	168	2	3	0	1420
SA	46	11	1	8	17	0	2	1	85
MERCOSUR+	73	14	10	66	40	0	1	0	204
NAFTA+CA	127	7	8	287	116	1	2	0	547
EU	132	27	11	109	772	2	8	0	1060
RUSIA+	42	2	0	10	99	12	1	0	167
AFRICA	29	19	1	22	44	0	5	0	120
ROW	415	94	1	92	91	1	11	0	705
Total general	1887	199	40	783	1346	18	33	2	4309

	ASEAN+5	SA	MERCOSUR+	NAFTA+CA	EU	RUSIA+	AFRICA	ROW	TOTAL
ASEAN+5	24	1	0	4	4	0	0	0	33
SA	1	0	0	0	0	0	0	0	2
MERCOSUR+	2	0	0	2	1	0	0	0	5
NAFTA+CA	3	0	0	7	3	0	0	0	13
EU	3	1	0	3	18	0	0	0	25
RUSIA+	1	0	0	0	2	0	0	0	4
AFRICA	1	0	0	1	1	0	0	0	3
ROW	10	2	0	2	2	0	0	0	16
Total general	44	5	1	18	31	0	1	0	100

	ASEAN+5	SA	MERCOSUR+	NAFTA+CA	EU	RUSIA+	AFRICA	ROW	TOTAL
ASEAN+5	72	2	1	13	12	0	0	0	100
SA	54	13	1	9	20	0	2	1	100
MERCOSUR+	36	7	5	32	20	0	1	0	100
NAFTA+CA	23	1	1	52	21	0	0	0	100
EU	12	3	1	10	73	0	1	0	100
RUSIA+	25	1	0	6	59	7	1	0	100
AFRICA	24	16	1	18	37	0	4	0	100
ROW	59	13	0	13	13	0	2	0	100
Total general	44	5	1	18	31	0	1	0	100

	ASEAN+5	SA	MERCOSUR+	NAFTA+CA	EU	RUSIA+	AFRICA	ROW	TOTAL
ASEAN+5	54	13	21	24	12	9	9	24	33
SA	2	6	2	1	1	0	6	49	2
MERCOSUR+	4	7	24	8	3	3	3	0	5
NAFTA+CA	7	3	20	37	9	5	5	2	13
EU	7	13	28	14	57	12	24	6	25
RUSIA+	2	1	1	1	7	67	4	1	4
AFRICA	2	10	2	3	3	1	14	0	3
ROW	22	47	3	12	7	3	34	17	16
Total general	100	100	100	100	100	100	100	100	100

I2E participation regions and main flows

- GVC_exports
  - ASEAN+5; EU; NAFTA+CA
- GVC_imports
- Main order of regions
- Latin American participation marginal in both directions
- Type of I2E
  - Basic Inputs- Raw materials intensive in Natural Resources (Low Transformation)
  - Manufacturing of raw materials (Intensive Labour)
    - Food; textiles; apparel; primary metals.
  - Technological Inputs (Intensive Capital and Human Capital)
    - Chemical; Computer; Transport Equipment.

Main LA countries and sectors in GVC_e (t : USD)

	ASEAN+5	MERCOSUR+	NAFTA+CA	EU	Total general
MEX	7,4	9,9	133,9	9,9	161,1
Agriculture, f	0,0	0,0	0,0	0,0	0,0
Mining	1,0	0,0	0,2	0,3	1,5
Food&Textile	0,3	0,0	0,0	0,0	0,3
Chemical	0,1	0,8	0,6	0,6	2,1
Metalmechar	6,1	9,0	133,1	9,0	157,3
BRA	37,7	8,3	7,8	16,6	70,5
Agriculture, f	13,3	0,0	0,2	3,2	16,7
Mining	20,3	0,8	0,3	6,3	27,8
Food&Textile	0,0	0,0	0,1	0,4	0,5
Chemical	0,9	2,2	1,2	2,1	6,4
Metalmechar	3,2	5,2	6,0	4,6	19,0
CHL	18,1	2,1	4,1	6,7	31,0
Agriculture, f	0,0	0,0	0,0	0,0	0,0
Mining	1,8	0,1	0,1	0,4	2,4
Food&Textile	0,3	0,1	0,0	0,1	0,5
Chemical	1,8	0,5	0,6	1,4	4,3
Metalmechar	14,3	1,5	3,3	4,8	23,8
ARG	3,8	10,0	1,0	1,2	15,9
Agriculture, f	3,4	1,5	0,0	0,1	5,2
Mining	0,0	0,0	0,0	0,0	0,0
Food&Textile	0,0	0,2	0,0	0,4	0,7
Chemical	0,1	0,9	0,1	0,1	1,2
Metalmechar	0,3	7,3	0,8	0,5	8,9
CRI	3,4	0,4	5,8	2,3	12,0
Agriculture, f	0,0	0,0	0,0	0,0	0,0
Mining	0,0	0,0	0,0	0,0	0,0
Food&Textile	0,0	0,0	0,0	0,0	0,0
Chemical	0,0	0,0	0,1	0,0	0,1
Metalmechar	3,4	0,4	5,7	2,3	11,8
PER	1,6	0,7	0,8	1,1	4,2
Agriculture, f	0,0	0,0	0,0	0,0	0,0
Mining	1,4	0,4	0,3	0,2	2,2
Food&Textile	0,0	0,2	0,2	0,5	0,9
Chemical	0,0	0,0	0,1	0,0	0,1
Metalmechar	0,2	0,2	0,2	0,4	1,0

BRAZIL GVC_e with ASEAN+5 (t : USD)

BEA	Destiny_c	Trade	expGe
Iron and steel mills and ferr	CHN	0,61	0,49
Aircraft manufacturing	CHN	0,45	0,45
Steel product manufacturir	KOR	0,36	0,36
Iron and steel mills and ferr	SGP	0,28	0,25
Steel product manufacturir	RASEAN	0,30	0,23
Iron and steel mills and ferr	JPN	0,34	0,18
Steel product manufacturir	IDN	0,16	0,14
Iron and steel mills and ferr	RASEAN	0,17	0,12
Aircraft manufacturing	JPN	0,10	0,10
Iron and steel mills and ferr	KOR	0,16	0,09
Steel product manufacturir	CHN	0,10	0,08
Primary smelting and refini	JPN	0,07	0,06
Aircraft manufacturing	IDN	0,06	0,05
Aircraft manufacturing	AUS	0,04	0,04
Air conditioning, refrigerati	CHN	0,04	0,04
Other engine equipment m	JPN	0,03	0,03
Other engine equipment m	CHN	0,04	0,03
Motor vehicle body manuf	IDN	0,03	0,03
Motor vehicle gasoline engi	CHN	0,03	0,02

Others LA GVC_e with ASEAN+5 (t : USD)

- Chile

BEA	Destiny_c	Trade	expGe
Primary smelting a	CHN	9,88	9,55
Primary smelting a	KOR	1,90	1,82
Primary smelting a	RASEAN	1,52	1,52
Primary smelting a	AUS	0,63	0,63
Primary smelting a	JPN	0,28	0,28
Primary smelting a	VNM	0,15	0,15
Primary smelting a	MYS	0,12	0,12
Primary smelting a	IDN	0,06	0,06
Primary smelting a	SGP	0,05	0,05
Primary smelting a	HKG	0,05	0,05
Iron and steel mills	JPN	0,03	0,03
Iron and steel mills	RASEAN	0,03	0,01
Iron and steel mills	AUS	0,01	0,01

Costa Rica

BEA	Destiny_c	Trade	expGe
Semiconduct	MYS	0,97	0,97
Semiconduct	CHN	0,76	0,76
Semiconduct	HKG	0,70	0,70
Printed circui	MYS	0,16	0,15
Semiconduct	SGP	0,12	0,12
Semiconduct	JPN	0,10	0,10
Printed circui	KOR	0,09	0,08
Printed circui	HKG	0,08	0,07
Semiconduct	RASEAN	0,05	0,05
All other misc	CHN	0,05	0,05
Semiconduct	AUS	0,04	0,04
Other electro	CHN	0,04	0,04
Surgical and r	JPN	0,04	0,03
Semiconduct	KOR	0,03	0,03
Printed circui	JPN	0,03	0,03
Printed circui	CHN	0,03	0,03
Other electro	HKG	0,02	0,02
Surgical and r	AUS	0,02	0,02

COUNTRIES AND TRADE BLOCS (Source WTO)

COUNTRIES	AUS	NZL	BRU	MYL	VTM	SGP	JPN	CAN	USA	MEX	PER	CHI	KOR	CHN	IND	IDN	COL	ARG	BRA	PAR	URU	VEN	BOL	ECU
Australia	.	FTA	FTA	FTA	FTA	FTA	FTA	.	FTA	.	.	FTA	FTA	FTA	FTA	FTA	.	.	.	.	.	.	.	.
New Zeland	FTA	.	FTA	FTA	FTA	FTA	.	.	.	.	.	FTA	FTA	FTA	FTA	FTA	.	.	.	.	.	.	.	.
Brunei Darussalam	FTA	FTA	.	FTA	FTA	FTA	FTA	.	.	.	.	FTA	FTA	FTA	FTA	FTA	.	.	.	.	.	.	.	.
Malasia	FTA	FTA	FTA	.	FTA	FTA	FTA	.	.	.	.	FTA	FTA	FTA	FTA	FTA	.	.	.	.	.	.	.	.
Vietnam	FTA	FTA	FTA	FTA	.	FTA	FTA	.	.	.	.	FTA	FTA	FTA	FTA	FTA	.	.	.	.	.	.	.	.
Singapur	FTA	FTA	FTA	FTA	FTA	.	FTA	.	FTA	.	FTA	FTA	FTA	FTA	FTA	FTA	.	.	.	.	.	.	.	.
Japon	FTA	.	FTA	FTA	FTA	FTA	.	.	.	FTA	FTA	FTA	.	.	FTA	FTA	.	.	.	.	.	.	.	.
Canada	.	.	.	.	.	.	.	.	FTA	FTA	FTA	FTA	FTA	.	.	.	FTA	.	.	.	.	.	.	.
USA	FTA	.	.	.	.	FTA	.	FTA	.	FTA	FTA	FTA	FTA	.	.	.	FTA	.	.	.	.	.	.	.
Mexico	.	.	.	.	.	.	FTA	FTA	FTA	.	FTA	FTA	.	.	.	.	FTA	.	.	.	.	.	.	.
Perú	.	.	.	.	.	FTA	FTA	FTA	FTA	FTA	.	FTA	FTA	FTA	.	.	FTA	FTA	FTA	FTA	FTA	FTA	FTA	FTA
Chile	FTA	FTA	FTA	FTA	FTA	FTA	FTA	FTA	FTA	FTA	FTA	.	FTA	FTA	FTA	.	FTA	FTA	FTA	FTA	FTA	FTA	FTA	FTA
Korea	FTA	FTA	FTA	FTA	FTA	FTA	.	FTA	FTA	.	FTA	FTA	.	FTA	FTA	FTA	.	.	.	.	.	.	.	.
China	FTA	FTA	FTA	FTA	FTA	FTA	.	.	.	.	FTA	FTA	FTA	.	.	FTA	.	.	.	.	.	.	.	.
India	.	.	FTA	FTA	FTA	FTA	FTA	.	.	.	.	FTA	FTA	.	.	FTA	.	.	.	.	.	.	.	.
Indonesia	FTA	FTA	FTA	FTA	FTA	FTA	FTA	.	.	.	.	.	FTA	FTA	FTA	.	.	.	.	.	.	.	.	.
Colombia	.	.	.	.	.	.	.	FTA	FTA	FTA	FTA	FTA	.	.	.	.	.	FTA	FTA	FTA	FTA	FTA	FTA	FTA
Argentina	.	.	.	.	.	.	.	.	.	.	FTA	FTA	.	.	.	.	FTA	.	FTA	FTA	FTA	FTA	FTA	FTA
Brazil	.	.	.	.	.	.	.	.	.	.	FTA	FTA	.	.	.	.	FTA	FTA	.	FTA	FTA	FTA	FTA	FTA
Paraguay	.	.	.	.	.	.	.	.	.	.	FTA	FTA	.	.	.	.	FTA	FTA	FTA	.	FTA	FTA	FTA	FTA
Uruguay	.	.	.	.	.	.	.	.	.	.	FTA	FTA	.	.	.	.	FTA	FTA	FTA	FTA	.	FTA	FTA	FTA
Venezuela	.	.	.	.	.	.	.	.	.	FTA	FTA	FTA	.	.	.	.	FTA	FTA	FTA	FTA	FTA	.	FTA	FTA
Bolivia	.	.	.	.	.	.	.	.	.	.	FTA	FTA	.	.	.	.	FTA	FTA	FTA	FTA	FTA	FTA	.	FTA
Ecuador	.	.	.	.	.	.	.	.	.	.	FTA	FTA	.	.	.	.	FTA	FTA	FTA	FTA	FTA	FTA	FTA	.

Organization presentation

1. Justification and objectives
2. Methodology
3. Data and results
4. Conclusions

Conclusions

- New Methodology
  - Revealed links between input and outputs in international trade combining trade data with IO relationships.
  - increase the coverage of countries and sectors to analyses GVC.
  - could be applied over yearly data
- First preliminary evidence of the consistency of the methodology:
  - styles facts are aligned with previous results in the literature.

Conclusions

- Import to export (2009-2014)
  - 44 % GVC_exports
  - 27% GVC_imports
  - Participation:
    - ASEAN+5 at the top +40% GVC_e/E and 44%GVC_i/I
    - MERCOSUR at the bottom -2% GVC_e/E and 1% GVC_i/I
    - NAFTA+CA +13 GVC_e/E and 18% GVC_i/I
  - Three types of sectors
    - Basic inputs (agricultural, minerals)
    - Intermediate low transformations (textile, food&beverage)
    - Technological inputs (chemical, metalmecanical and electronics)
  - Sectors and regions I2E
    - Exporter basic inputs MERCOSUR
    - Technological inputs: TPP (USA, Japan); EU (Chemical)

Conclusions

- Bilateral trade I2E highlighted relationships:
  - Mainly intraregional with FTA relationships
  - Low participation of LA countries in GVC less in exports as provider of imports that will be used in others GVC
  - Three examples with ASEAN+5:
    - Brazil
    - Chile
    - Costa Rica

Main basic unity to identify GVC

- Final objective is tracking an input (and its value added) over the trade net
- The idea is that trade data could reveal that sequence. How? Using network techniques in the analysis of international trade.
- The paper builds the basic information that allows to do this task in the FUTURE!!!
- Complete with FDI flows and trade in services

Thank you

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