

# Eclac's Value Chain Dashboard

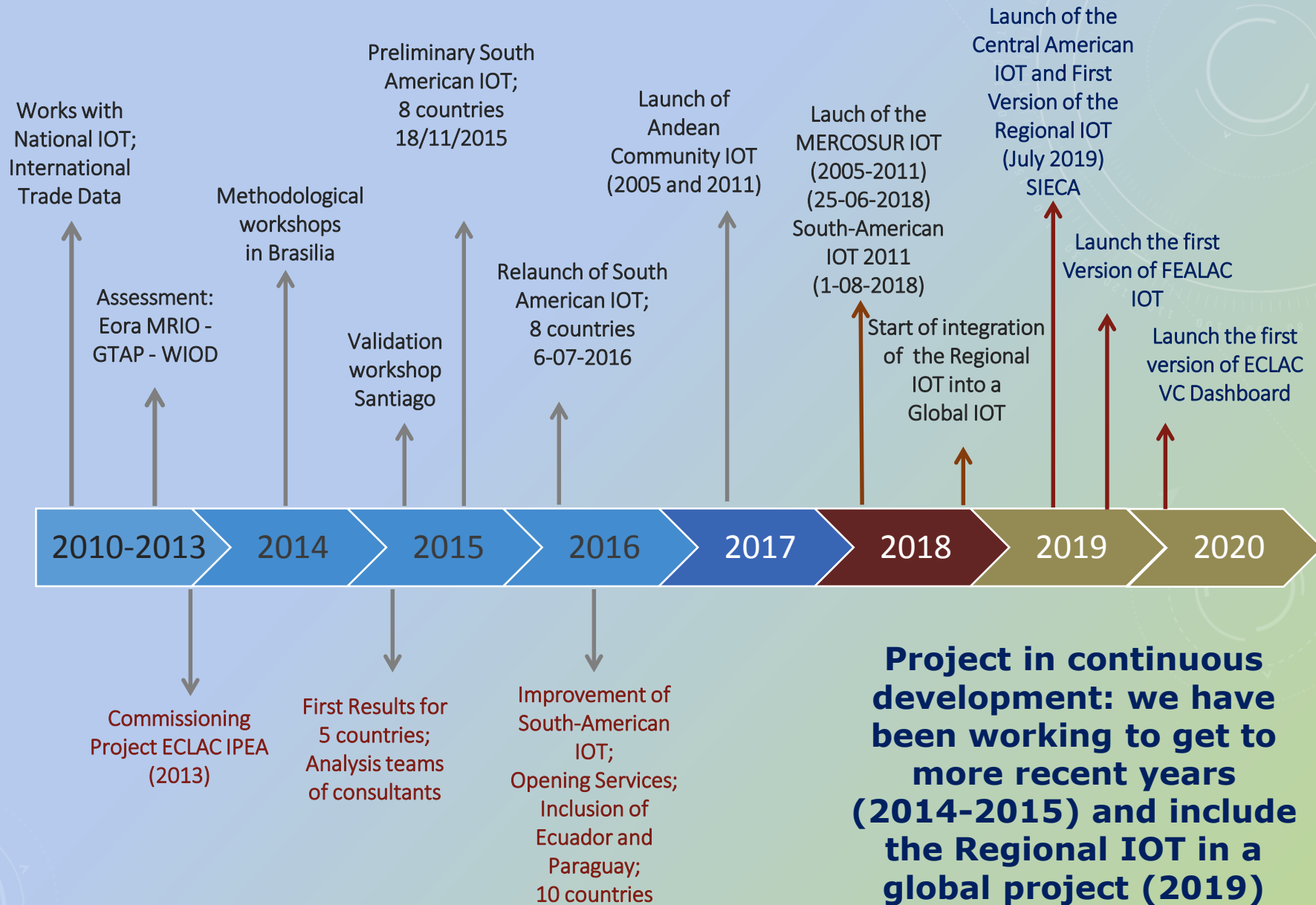


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Bangkok, 10th July 2019

# KEY MILESTONES IN LAC IOT



# National and Sub-regional IOTs in Latin America (18 countries)



Mexico IOT

Central America IOT



Andean Community IOT\*



Chile IOT\*

MERCOSUR IOT\*



18 National Matrices  
40 sectors  
Years: 2005\* and 2011

# Sectors selected for the harmonization of Latin American IOT:

## 40 sectors

Forty sectors selected to join a South American input-output matrix

Sector	Description	ISIC Code (Rev. 3)																													
s1	Agriculture and forestry	0111	0112	0113	0121	0122	0130	0140	0200												Agriculture, forestry, hunting and fishing (2)	Primary (2)									
s2	Hunting and fishing	0150	0500																												
s3	Mining (energy)	1010	1020	1030	1110	1120	1200												Oil and mining (2)												
s4	Mining (non-energy)	1310	1410	1421	1422	1429																									
s5	Meat and meat; dairy milk	1511	1512	1514	1520												Food, beverages and snuff (6)														
s6	Grinding, baking and pasta	1531	1532	1541	1544																										
s7	Sugar and confectionery products	1542	1543																												
s8	Other food products	1513	1549																												
s9	Drinks	1551	1552	1553	1554																										
s10	Snuff products	1600																													
s11	Textiles	1711	1712	1729	1730												Textiles, apparel and footwear (3)														
s12	Garments	1721	1722	1723	1810	1820	1911	1912																							
s13	Footwear	1920																													
s14	Wood and products of wood and cork	2010	2021	2022	2023	2029												Wood, pulp and paper (2)													
s15	Pulp, paper, paper, printing and publishing	2101	2102	2109	2211	2212	2213	2219	2221	2222	2230																				
s16	Coke, refined petroleum and nuclear fuel	2310	2320	2330												Chemicals and Pharmaceuticals (4)															
s17	Basic chemicals	2411	2412	2413																											
s18	Other chemicals (excluding pharmaceuticals)	2421	2422	2424	2429	2430																									
s19	Pharmaceutical	2423																													
s20	Rubber and plastic	2511	2519	2520												Rubber and plastic (1)	Manufacturing (29)														
s21	Nonmetallic minerals	2610	2691	2692	2693	2694	2695	2696	2699												Nonmetallic minerals (1)										
s22	Iron and Steel	2710	2731												Metals and metal products (3)																
s23	Non-ferrous metals	2720	2732																												
s24	Metal fabricated metal products (excluding machinery and	2811	2812	2813	2891	2892	2893	2899																							
s25	Machinery and equipment (excluding (excluding electrical n	2911	2912	2913	2914	2915	2919	2921	2922	2923	2924	2925	2926	2927	2929	2930													Machinery and equipment (5)		
s26	Office equipment (including computer equipment)	3000																													
s27	Machinery and electrical appliances	3110	3120	3130	3140	3150	3190	3210																							
s28	Radio, television and telecommunications equipment team	3220	3230																												
s29	Optical medical equipment and precision instruments	3311	3312	3313	3320	3330																									
s30	Motor vehicles, trailers and semi-trailers	3410	3420	3430												Vehicles and their parts and components (3)															
s31	Aircraft	3530																													
s32	Other transport equipment transport	3511	3512	3520	3591	3592	3599																								
s33	Other articles: recycling, furniture and other	3610	3691	3692	3693	3694	3699	3710	3720												Other manufacturing (1)										
s34	Electricity, gas and water water	4010	4020	4030																											
s35	Construction	4510	4520	4530	4540	4550																									
s36	Transport	6010	6021	6022	6023	6030	6110	6120	6210	6220	6301	6302	6303	6304	6309																
s37	Post and telecommunications	6411	6412	6420																											
s38	Finance and insurance	6511	6519	6591	6592	6599	6601	6602	6603	6711	6712	6719	6720												Services (7)						
s39	Services to businesses of all kinds	7010	7020	7111	7112	7113	7121	7122	7123	7129	7130	7210	7220	7230	7240	7250	7290	7310	7320	7421	7422	7430	7491	7492		7493	7495	7499			
s40	Other services	4100	5010	5020	5030	5040	5050	5110	5121	5122	5131	5139	5141	5142	5143	5149	5150	5190	5211	5219	5220	5231	5232	5233		5234	5239	5240	5251	5252	5259
		5260	5510	5520	7411	7494	7511	7512	7513	7514	7521	7522	7523	7530	8010	8021	8022	8030	8090	8511	8512	8519	8520	8531	8532	9000	9111	9112	9120	9191	
		9192	9199	9211	9212	9213	9214	9219	9220	9231	9232	9233	9241	9249	9301	9302	9303	9309	9500	9900											

Source: ECLAC on the basis of IOM and / or national SJT, considering on the work of the respective national teams.

Each of the National IOTs was reclassified to 40 Sectors

# The First Latin American (18) Input-Output Table

Andean Community IOT  
MERCOSUR IOT  
Central American IOT  
+  
Mexico  
+  
Chile  
+  
Dominican Republic

Subregional  
IOTs

National  
IOTs

18 National Matrices  
40 X 40

Years: 2011 and 2014 (ongoing)



# Eclac's Value Chain Dashboard

## 1. Selection of Parameters

- Year : 2005, 2011 and 2014
- 40 Sectors
- Reporters : 10 Countries (2005) , 18 countries (2011 & 2014)
- Partners : 10 extra regional partners (2005), 37 extra regional partners (2011 & 2014)

## 2. Selection of Set of Indicators

- Employment indicators
- Two set of value chain indicators
  - ✓ National linkages indicators
  - ✓ Regional linkages indicators

# Eclac's Value Chain Dashboard

## National indicators

### ✓ **Motivation :**

- ✓ The productive linkages are the relationships established between the sectors in the production process.
- ✓ What happens when the final demand for a good increases, be it for final consumption, exports or investment?
- ✓ Each participant in the production chain, as a supplier of intermediate inputs of the product  $j$ , will be affected by the increase in  $j$  production.
- ✓ How much will these other industries be affected? Well, it's going to depend on the degree to which all industries are connected. This is called backward linkages (BL)
- ✓ For the forward linkages (FL), we use the distribution coefficients  $B$  of the Gosh matrix

### ✓ **Main goal :** identify key sectors and their weight on products

# Eclac's Value Chain Dashboard

## National indicators

- Leontief Inverse
- Ghosh Inverse
- Backwards and forwards Linkages (FL & BL);
- Identify local value chains and relevant sectors (Drivers, driven, keys, independent)
- Import / Domestic Ratio



# Eclac's Value Chain Dashboard

- The Leontief inverse matrix  $(I - A)^{-1}$  is a multiplier that reports on how much the production of the entire economy has to increase to satisfy a increase in final demand of one sector, the backward productive linkages

$$x = (I - A)^{-1}y$$

- Ghosh Inverse is used as an alternative method of analysis of forward productive linkages.

Ghosh Inverse:

$$G = (I - B)^{-1}$$

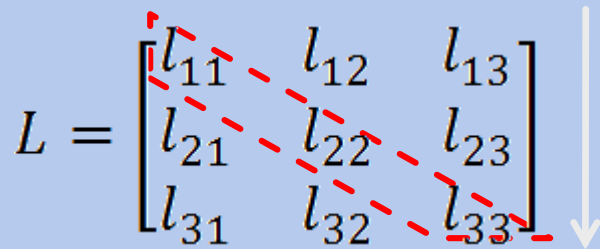
# Eclac's Value Chain Dashboard

## National indicators

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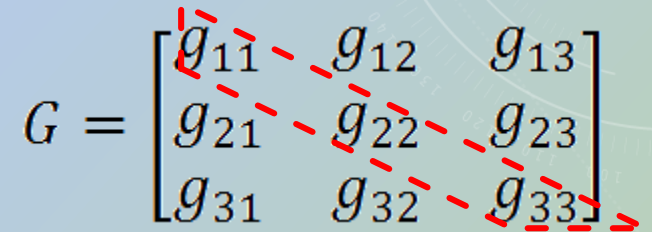
- Backward linkages (BL)

$$L = \begin{bmatrix} l_{11} & l_{12} & l_{13} \\ l_{21} & l_{22} & l_{23} \\ l_{31} & l_{32} & l_{33} \end{bmatrix}$$


$$L = (I - A)^{-1}$$

$$BL_j = \frac{\sum_{i=1}^N l_{ij}}{\frac{1}{N} \sum_{i=1}^N \sum_{j=1}^N l_{ij}}$$

- Forward linkages (FL)

$$G = \begin{bmatrix} g_{11} & g_{12} & g_{13} \\ g_{21} & g_{22} & g_{23} \\ g_{31} & g_{32} & g_{33} \end{bmatrix}$$


$$G = (I - B)^{-1}$$

$$FL_i = \frac{\sum_{j=1}^N g_{ij}}{\frac{1}{N} \sum_{i=1}^N \sum_{j=1}^N g_{ij}}$$

# Eclac's Value Chain Dashboard

	Backward linkages < 1	Backward linkages > 1
Forward linkages > 1	(II) <b>FL</b> Sectors	(I) <b>KEY</b> Sectors
Forward linkages < 1	(III) <b>Independents</b> Sectors	(IV) <b>BL</b> Sectors

# Eclac's Value Chain Dashboard

Year **All**  
Country **Argentina**

		2005	2011
s01	Agricultura y forestal	Impulsados	Impulsados
s02	Caza y pesca	Independientes	Independientes
s03	Minería (energía)	Independientes	Impulsados
s04	Minería (no energía)	Independientes	Independientes
s05	Carne y derivados	Impulsores	Impulsores
s06	Molinería, panadería y pastas	Claves	Impulsores
s07	Azúcar y productos de confitería	Impulsores	Impulsores
s08	Otros productos alimenticios	Claves	Claves
s09	Bebidas	Claves	Impulsores
s10	Productos de tabaco	Independientes	Impulsores
s11	Textiles	Independientes	Impulsores
s12	Confecciones	Impulsores	Independientes
s13	Calzado	Impulsores	Impulsores
s14	Madera y productos de madera	Independientes	Independientes
s15	Pulpa de madera, papel, imprenta	Claves	Independientes
s16	Coque, petróleo refinado y combustibles	Claves	Claves
s17	Productos químicos básicos	Independientes	Independientes
s18	Otros productos químicos (excluyendo farmacéuticos)	Independientes	Impulsores
s19	Productos farmacéuticos	Independientes	Independientes
s20	Productos de caucho y plástico	Claves	Independientes

Year **2011**  
Countries **Argentina, Brazil**

		Argentina	Brazil
s01	Agricultura y forestal	Impulsados	Impulsados
s02	Caza y pesca	Independientes	Independientes
s03	Minería (energía)	Impulsados	Independientes
s04	Minería (no energía)	Independientes	Independientes
s05	Carne y derivados	Impulsores	Claves
s06	Molinería, panadería y pastas	Impulsores	Claves
s07	Azúcar y productos de confitería	Impulsores	Impulsores
s08	Otros productos alimenticios	Claves	Claves
s09	Bebidas	Impulsores	Impulsores
s10	Productos de tabaco	Impulsores	Impulsores
s11	Textiles	Impulsores	Impulsores
s12	Confecciones	Independientes	Independientes
s13	Calzado	Impulsores	Impulsores
s14	Madera y productos de madera	Independientes	Impulsores
s15	Pulpa de madera, papel, imprenta	Independientes	Impulsores
s16	Coque, petróleo refinado y combustibles	Claves	Claves
s17	Productos químicos básicos	Independientes	Claves
s18	Otros productos químicos (excluyendo farmacéuticos)	Impulsores	Impulsores
s19	Productos farmacéuticos	Independientes	Independientes
s20	Productos de caucho y plástico	Independientes	Impulsores

# Eclac's Value Chain Dashboard

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- Import / Domestic Ratio

# Eclac's Value Chain Dashboard

## National indicators: Import / Domestic inputs ratio

It is used to compare the value of import and domestic inputs used in the production of a country  $p$ .

For the economy as a whole:

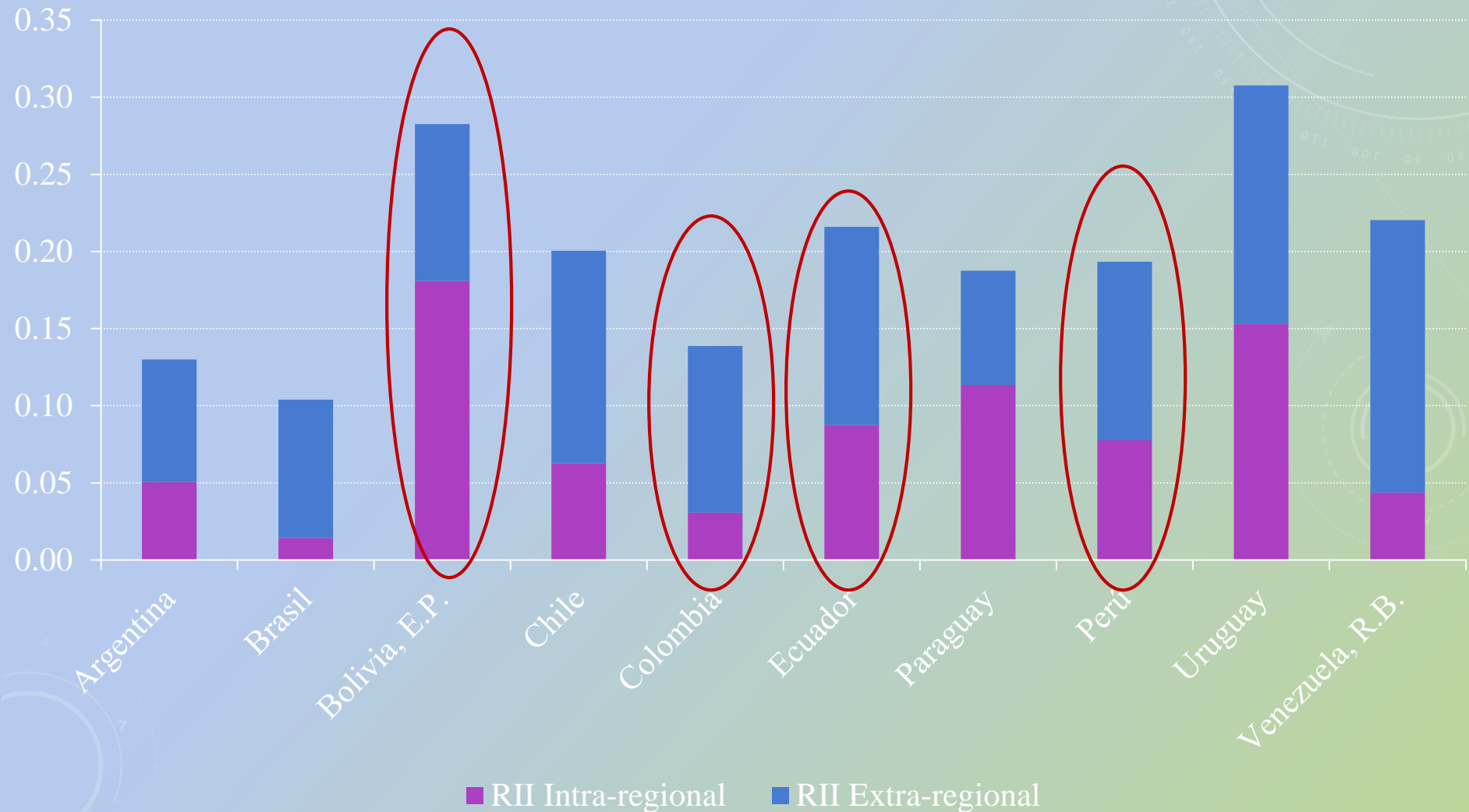
$$RII_p = \frac{\sum_{i=1}^N \sum_{j=1}^N Z_{ij}^M}{\sum_{i=1}^N \sum_{j=1}^N Z_{ij}^D}$$

By sectors :

$$rii_j = \frac{\sum_{i=1}^N Z_{ij}^M}{\sum_{i=1}^N Z_{ij}^D}$$

# Eclac's Value Chain Dashboard

National indicators: Import / Domestic inputs ratio





# Eclac's Value Chain Dashboard

## Regionals indicators

- Vertical specialization: Imports of intermediate goods needed to exports. Identify sectors
- Value added on exports
- Employment associated with exports

# Eclac's Value Chain Dashboard

Regionals indicators : Vertical specialization

Imports of intermediate goods needed to exports

- The vertical specialization allows us to identify how much we need to import to satisfy the gross value of production (or of one of its components, eg exports) :

$$EV2_p = A_p^M (I - A)^{-1} \hat{e}_p$$

Where  $A^M$  is the imported technical coefficients matrix NxN and  $\hat{e}$  is the vector Nx1 of gross (total) exports of the country p

# Eclac's Value Chain Dashboard

Regionals indicators : Vertical specialization

Imports of intermediate goods need to exports

$$EV1_A = \sum_{i,j=1}^N (A_{ij}^M \hat{e}_{ij}^{A,B})$$

- $EV1_A$  vertical specialization, total imports needed for satisfy total exports to country B

$$EV1_B = \sum_{i,j=1}^N (A_{ij}^{C,B} \hat{e}_{ij})$$

- La  $EV1_B$  vertical specialization, imports needed from country C to satisfy total exports

$$EV1_C = \sum_{i,j=1}^N (A_{ij}^{A,C} \hat{e}_{ij}^{C,B})$$

- $EV1_C$  vertical specialization, imports needed from country A for satisfy total exports to country B

# Eclac's Value Chain Dashboard

## Regionals indicators

- Vertical specialization: Imports of intermediate goods needed to exports. Identify sectors
- Value added on exports
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# Eclac's Value Chain Dashboard

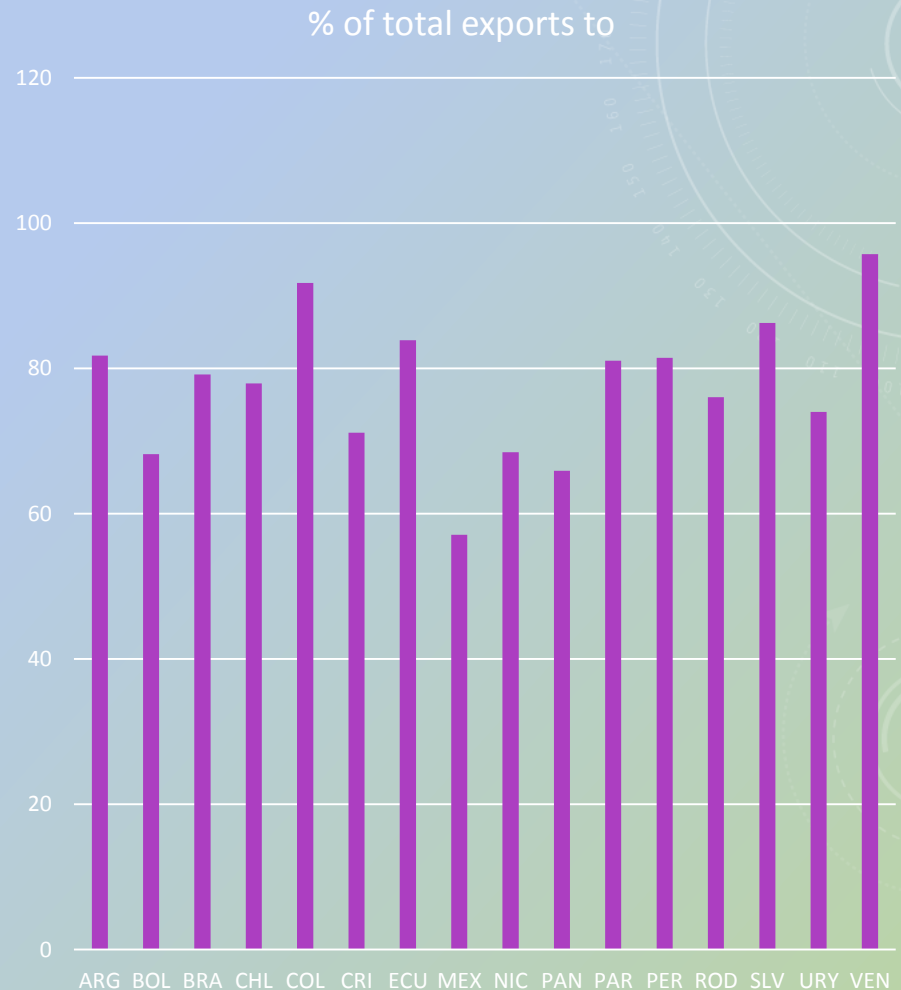
Regionals indicators : Value added on exports

$$VADe_p = \hat{V}_p (I - A^D)^{-1} \hat{e}_p$$

- Regional forward linkage, total domestic value added on export to a specify destination

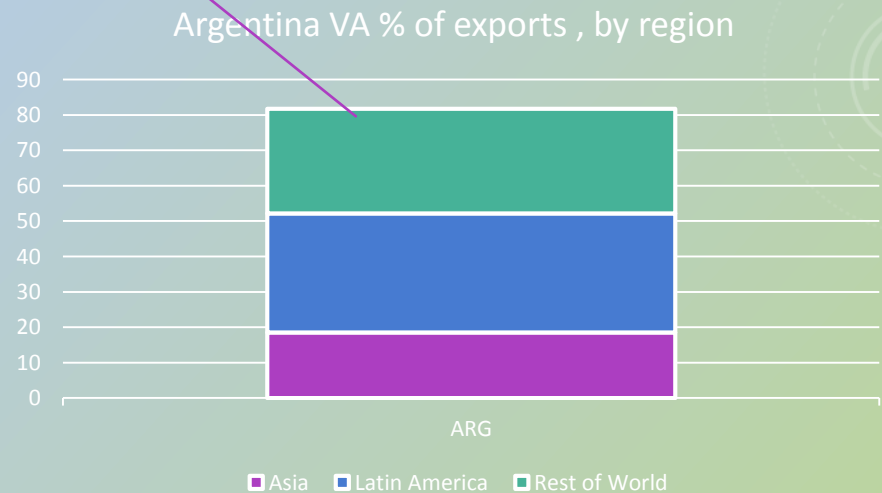
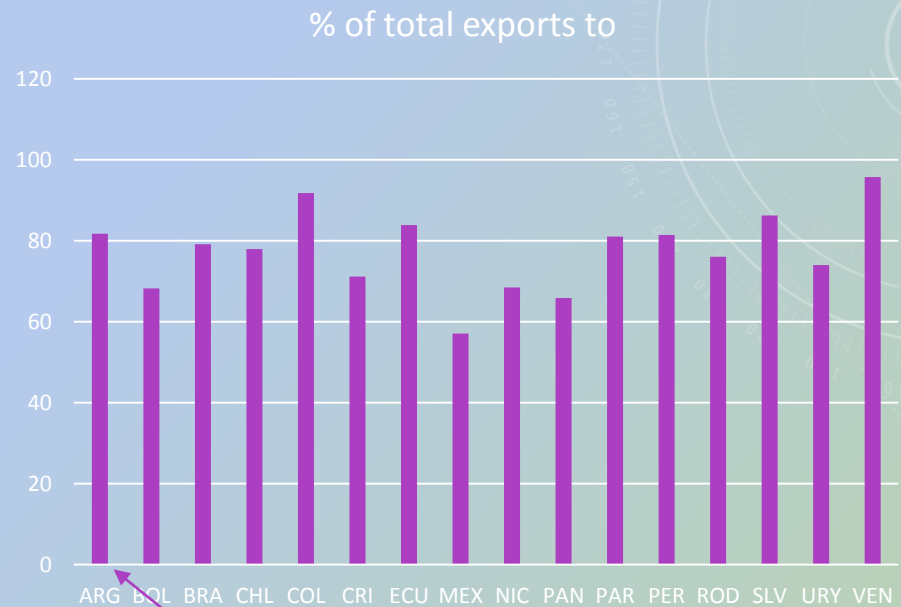
# Eclac's Value Chain Dashboard

WE CAN  
CHOOSE ALL  
THE REPORTERS  
COUNTRIES FOR  
ONE YEAR



# Eclac's Value Chain Dashboard

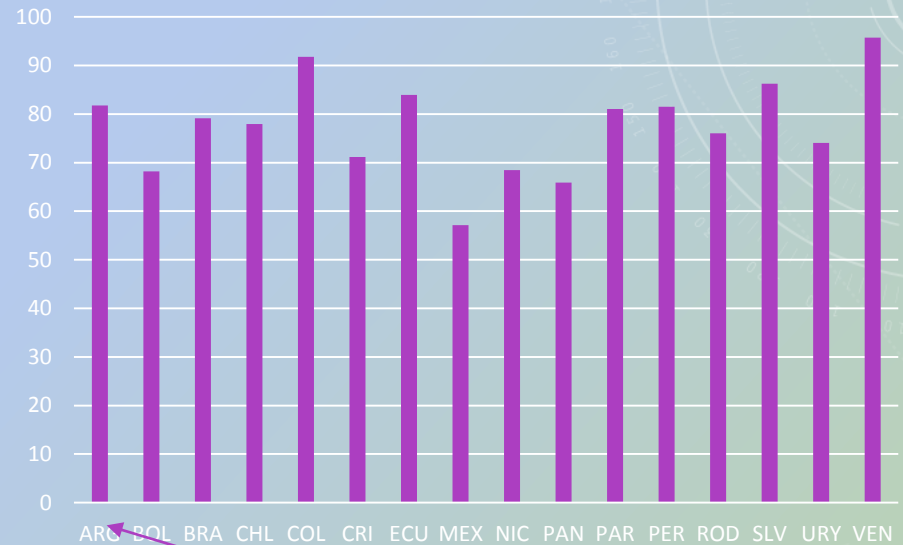
FOR ONE  
COUNTRY,  
DIFFERENT  
OPTIONS :  
DISAGGREGATE  
THE VALUE  
ADDED BY  
DESTINATION



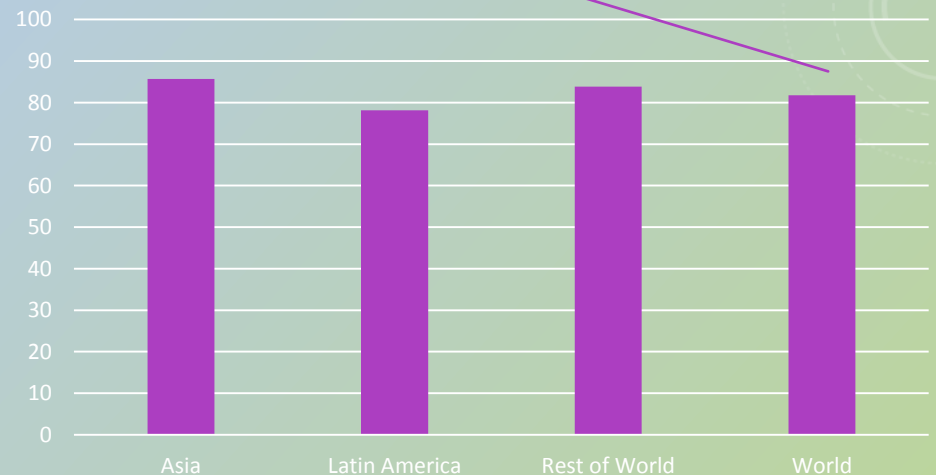
# Eclac's Value Chain Dashboard

FOR ONE  
COUNTRY,  
DIFFERENT  
OPTIONS :  
COMPARE THE  
VALUE ADDED  
AS % OF TOTAL  
EXPORTS  
BETWEEN  
REGIONS

% of total exports to world



% of total exports to the destination

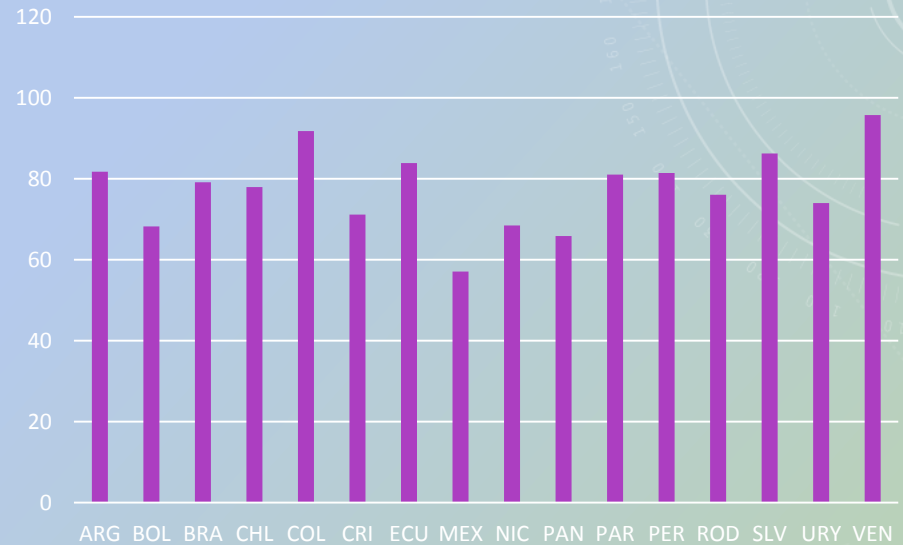




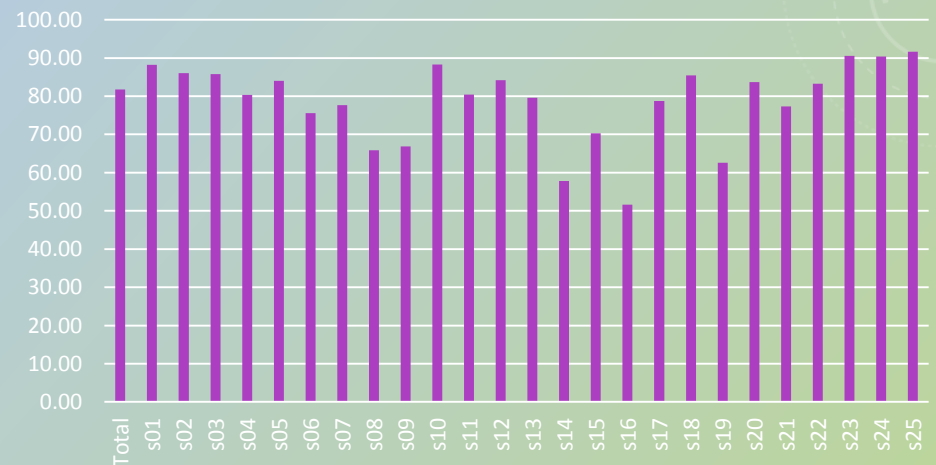
# Eclac's Value Chain Dashboard

FOR ONE  
COUNTRY,  
DIFFERENT  
OPTIONS :  
COMPARE  
VALUE ADDED  
AS % OF TOTAL  
EXPORTS  
BETWEEN  
SECTORS

% of total exports to world



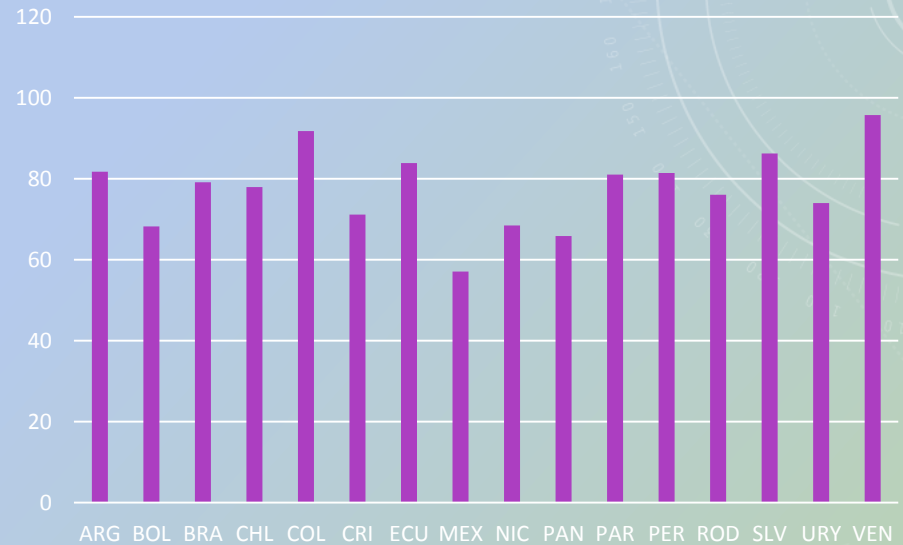
% of VA on total exports, by sector



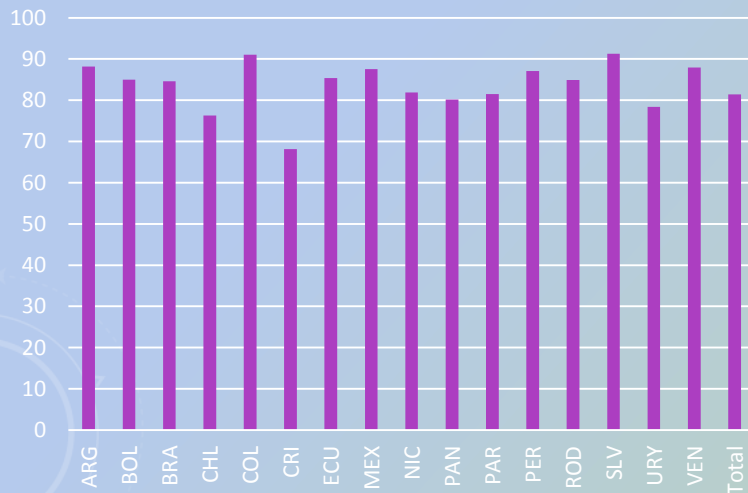
# Eclac's Value Chain Dashboard

FOR ONE COUNTRY,  
DIFFERENT OPTIONS :  
CHOOSE ONE  
SECTOR, BY COUNTRY

% of total exports to world



% VA , for S1 by total exports by country



% of VA on total exports, by sector



# Eclac's Value Chain Dashboard

## Regionals indicators

- Vertical specialization: Imports of intermediate goods needed to exports. Identify sectors
- Value added on exports
- Employment associated with exports

# Eclac's Value Chain Dashboard

## Regionals indicators : employment associated with exports

- Each sector has a given job requirement, for each year, to produce a specific amount of VBP. (CE)
- By pre-multiplying our employment multiplier by the exports of a country, we obtain export employment, those generated in the sector (direct) and those generated in other sectors (indirect)

$$Empleo\ exportador = \widehat{CE} (I - A)^{-1} \hat{e}$$

- The vector  $e$  of exports can satisfy different types of research requirements:
- Total exports from Country A to Country B
- Total Exports from Country A to a region of the world ( Latin America, Asia, FEALAC)

# From South American to Latin American Input-Output Table (2011 – 2014) and a project to build a Global IOT



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OECD, Paris, 27 June 2019