

Internal and International Vertical Specialization of Brazilian States An Input-Output Analysis

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Motivation

New measures of trade concentrate on the local value-added content of country's exports (WTO, OECD etc.).

However, without questioning on:

- Regional "origin" of this value-added in the domestic market
- Existence of an inter-regional domestic supply chain feeding the country's exports
- Consequences of the exports on the regional production.

Domestic regions may export directly but also, indirectly as suppliers to other exporting regions.

International Vertical Specialization vs. Domestic Vertical Specialization

<u>International Vertical Specialization</u>	<u>Domestic Vertical Specialization</u>
Decreasing trade and communication costs	Relatively good trade integration of the domestic markets
Heterogeneity across national markets (factor endowments and geographic location)	Imperfect factor mobility and different relative factor costs inside country
Trade liberalization of low-wage countries and proliferation of export processing zones	Varying intra-national transport costs and proximity to foreign markets relatively to domestic markets

Brazilian Case:

- High heterogeneity of Brazilian states and relative fragmentation in domestic market
- Low openness rate & Low import content of exports (TiVA)
 - « International supply chain » : specialization in early stages of the international supply chain ?
 - « Domestic supply chain » instead of « International supply chain » ?

Methodology: Input-Output Analysis

- Decomposing gross trade in value-added:

$$P^a = \sum_i V_i^a$$

P^a = gross value (P) of traded good a

i = origin of value-added

- Track the value chain through to the end of the production process
- Input-Output Analysis (Wassily Leontief)

Inverse of Leontief Matrix

$$x_i = \sum_{j=1}^n a_{ij}x_j + f_i$$

$$x = Ax + f$$

x_i : Output of industry i

f_i : Final demand

- **Leontief Inverse (L) :**

$$x = (I - A)^{-1}f = Lf \quad \bar{x} = \bar{f} + A\bar{f} + A^2\bar{f} + \dots$$

- Value-added (ε) generated in order to produce f :

$$\varepsilon = v'_c x = v'_c Lf$$

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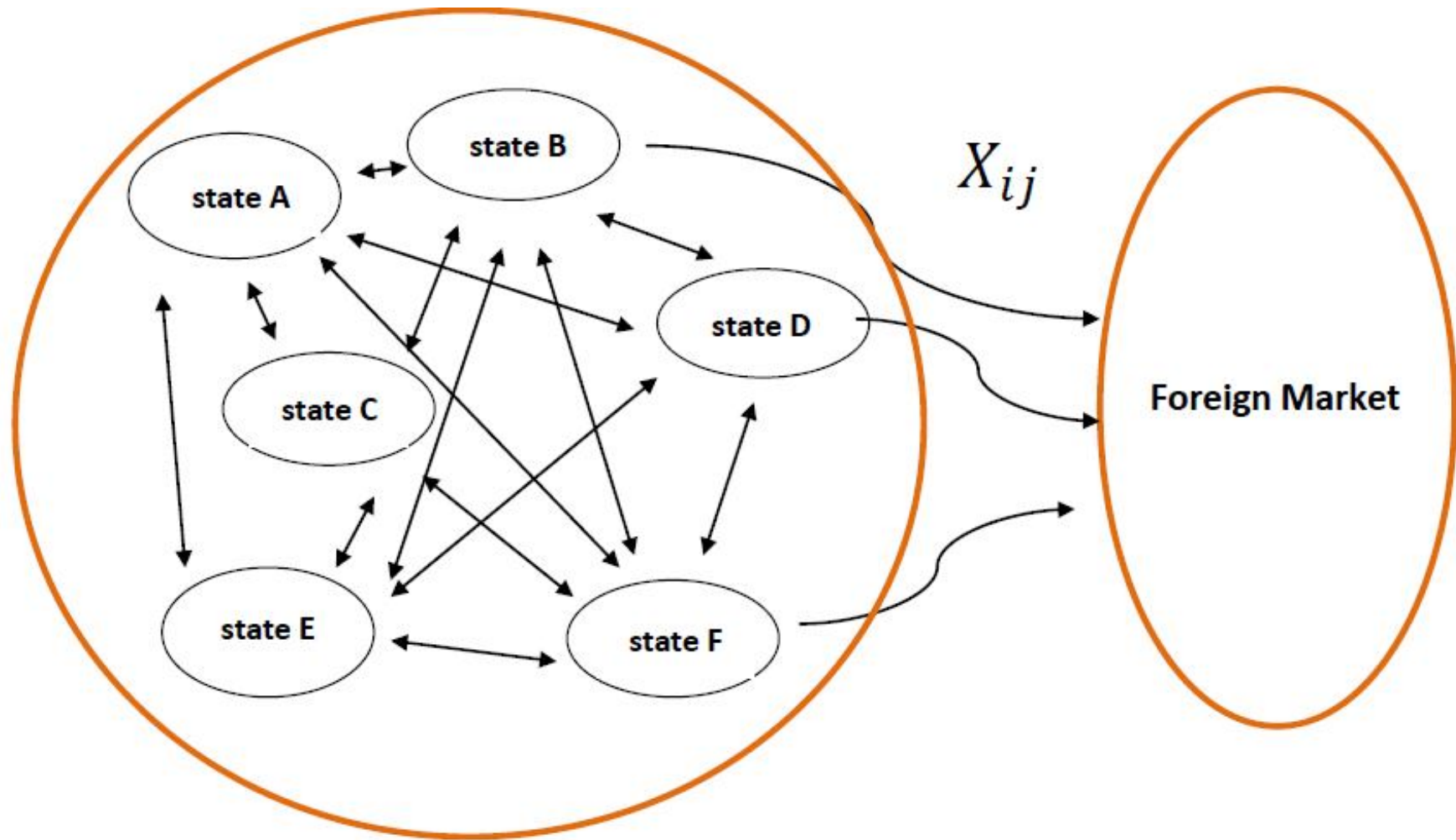
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Si tu es d'accord pour supprimer la partie indiquée dans le slide précédent, je vais essayer d'intégrer ces calculs très généraux dans le slide précédent...

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Inter-state IO Analysis

X_{ij} = exports from state i to country j



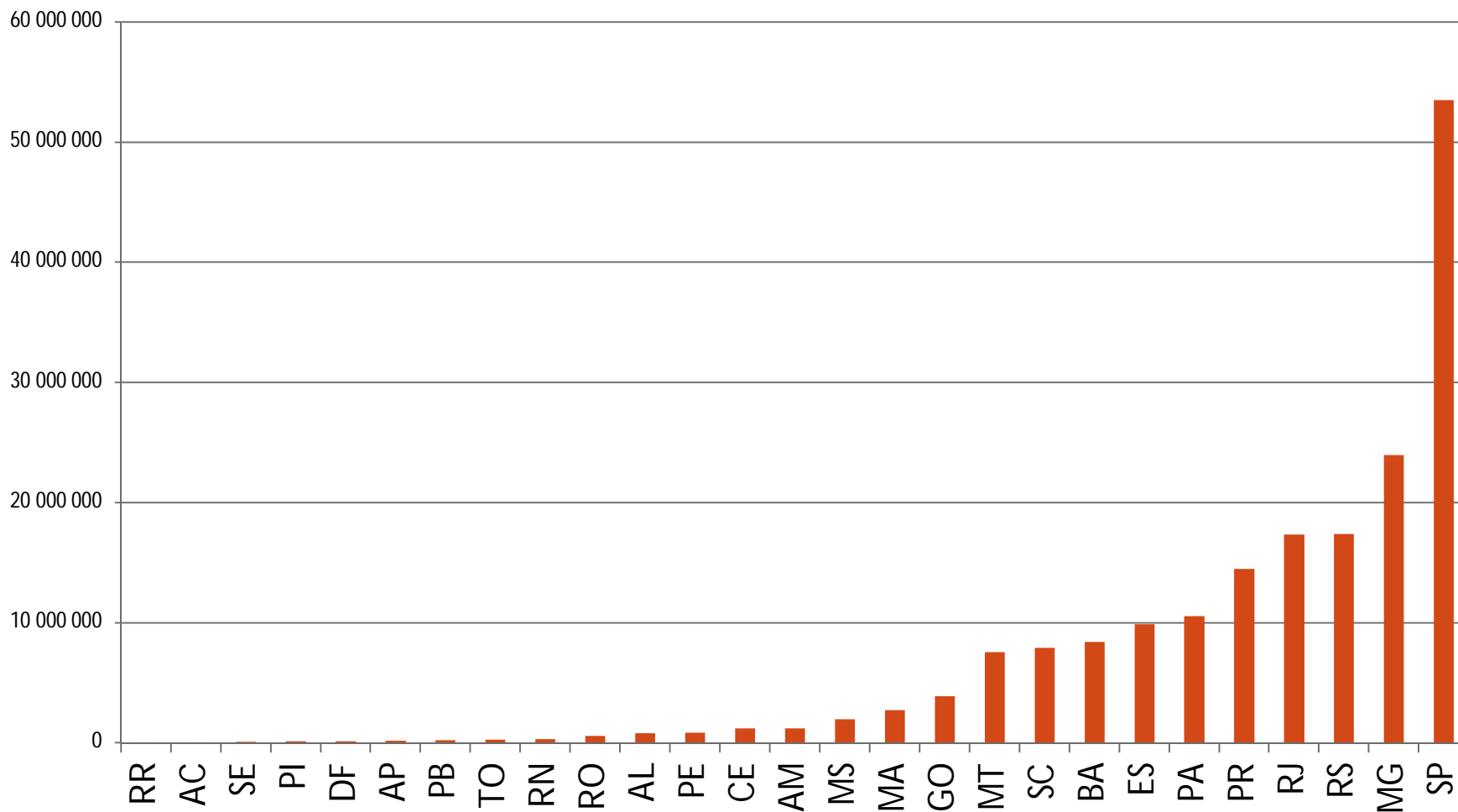
Database : Inter-State Brazilian IO Table

- Brazilian inter-state input-output system for 27 states for 2008 (J. Guilhoto and laboratory of NEREUS in USP)
 - Total output (Agriculture, Industry, Trade, Transport, Services, and Civil Construction surveys; *IBGE*)
 - Imports/Exports (*Ministry of Development, Industry and External Trade*)
 - Tax collection/Government spending (*Ministry of Finance and the State Secretaries of Finance*)
 - Household spending (Household and Household Consumption Patterns surveys, *IBGE*)
 - Payments to workers (*Ministry of Labor and the IBGE Household Survey*)
 - Value-added generated at the level of 17 industries, by state (Brazilian Regional Accounts; *IBGE*)
 - Investment (Level of the Civil Construction; *IBGE*)

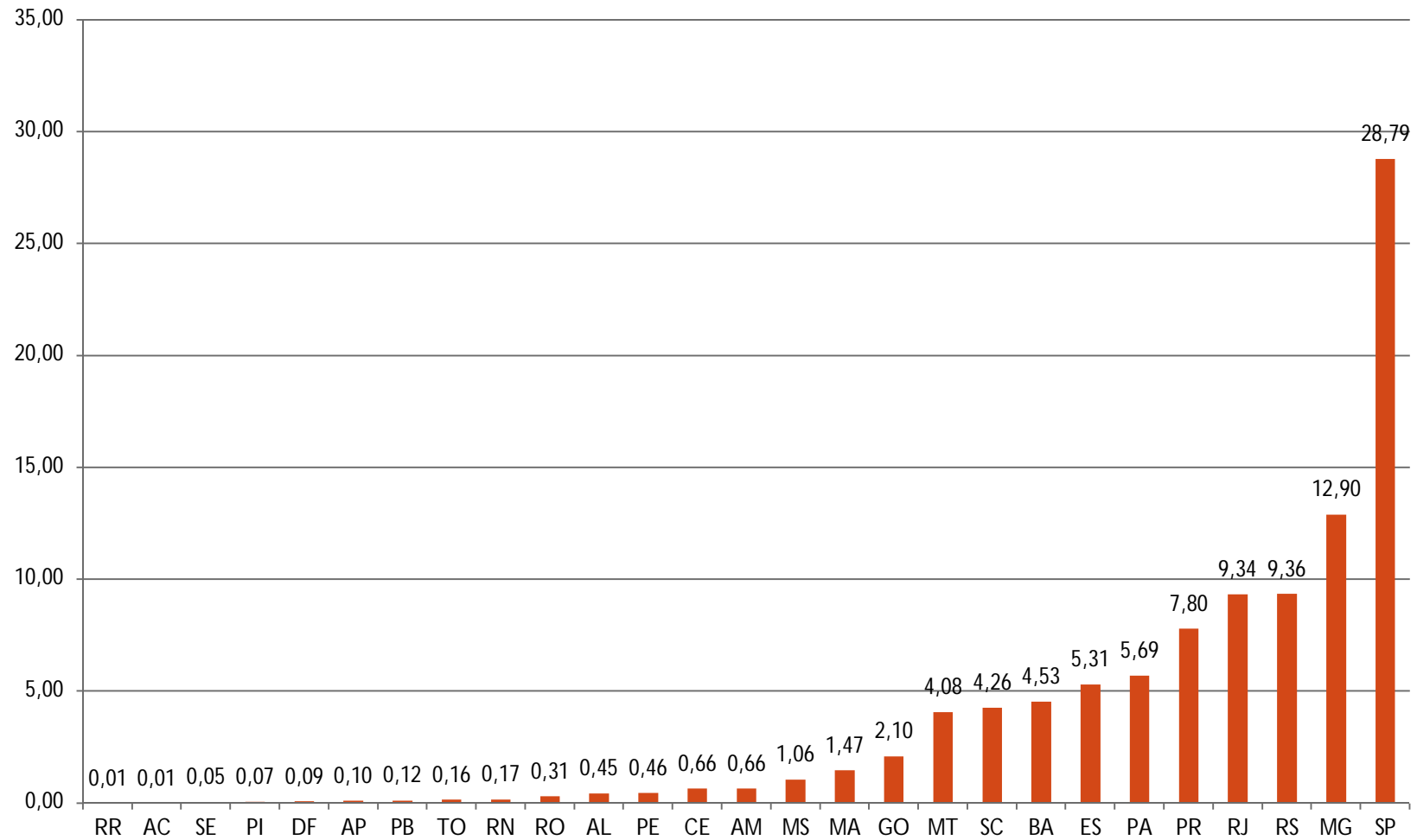
Brazilian States and Macro Regions



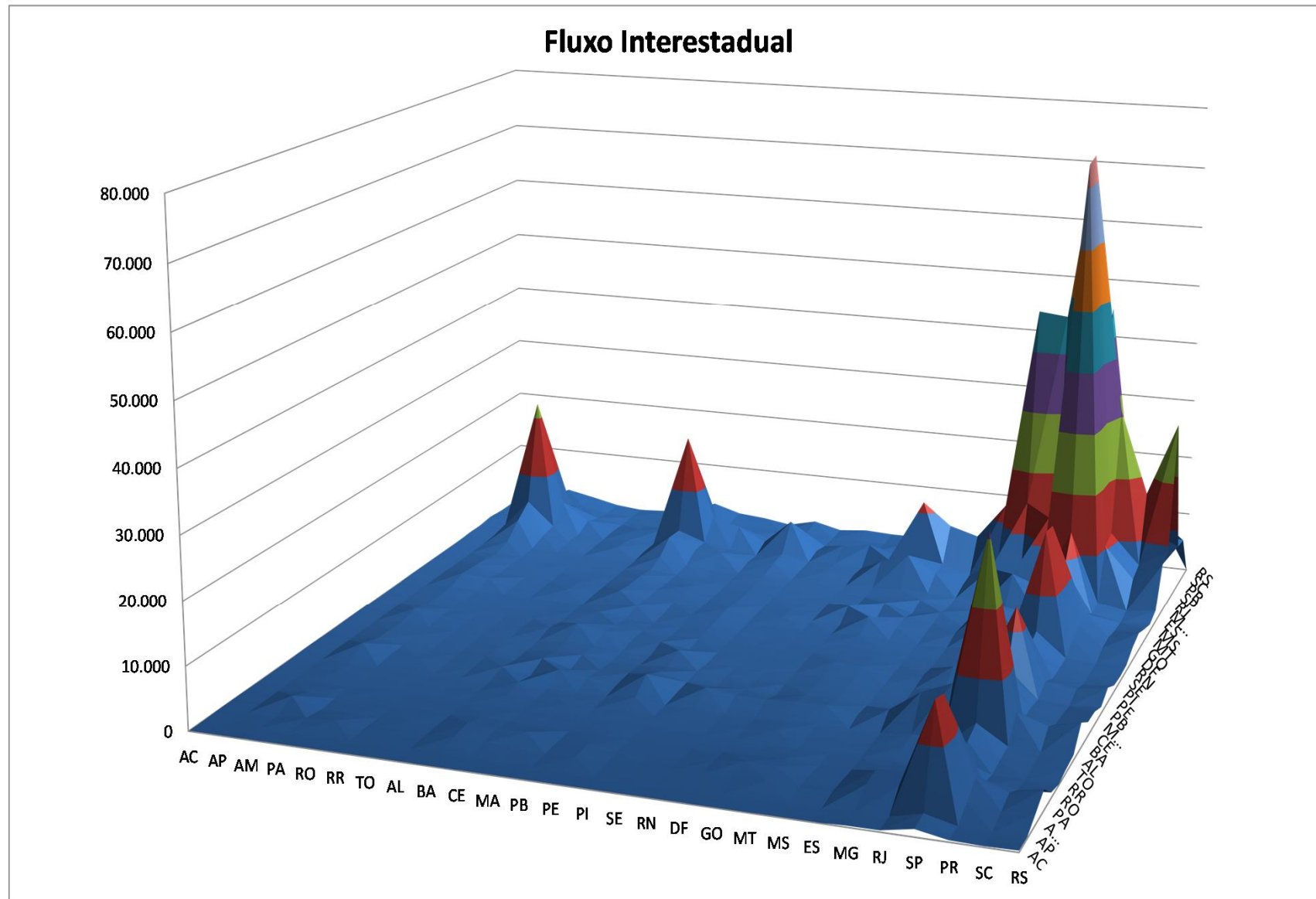
Brazilian State's Gross Export Values (1000 current US \$)



States' X share (%) in Brazilian Total Exports



Brazil Interstate Flows in gross value



Brazil Value Added Internal Trade Balance (US\$ Million)

Region	VA Trade Balance	
North		
Acre	-401	
Amapá	-1.014	
Amazonas	4.191	
Pará	-8.183	
Rondônia	-1.483	
Roraima	-250	
Tocantins	-534	-7.673
Central West		
Distrito Federal	-11.941	
Goías	-2.522	
Mato Grosso	2.634	
Mato Grosso do Sul	-1.251	-13.081
South		
Paraná	4.754	
Santa Catarina	704	
Rio Grande do Sul	-2.568	2.889

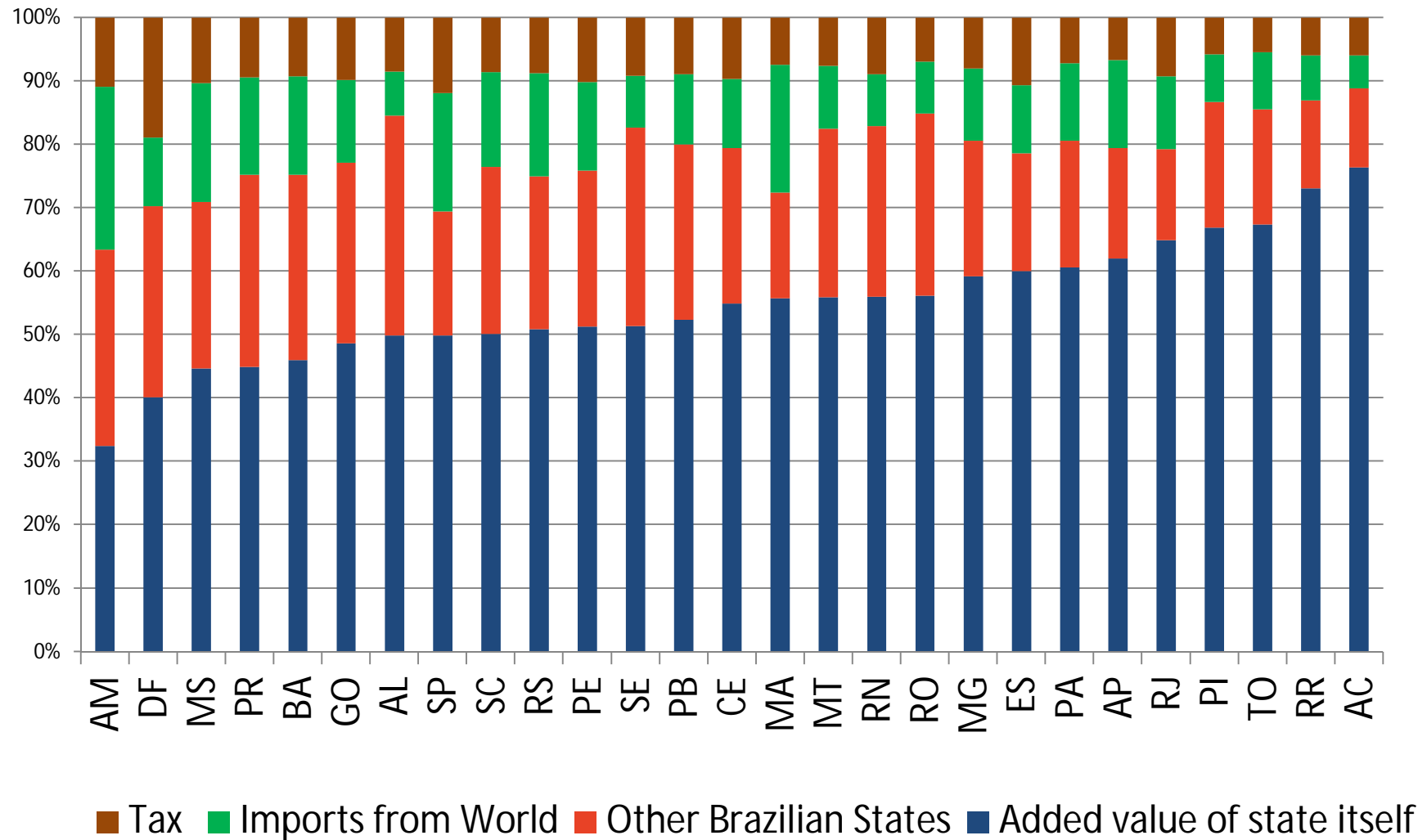
Region	Trade Balance	
Northeast		
Alagoas	-1.205	
Bahia	-11.730	
Ceará	-1.141	
Maranhão	-2.447	
Paraíba	-3.764	
Pernambuco	-6.239	
Piauí	-3.587	
Sergipe	-571	
Rio Grande do Norte	-2.115	-32.798
Southeast		
Espírito Santo	-1.161	
Minas Gerais	-10.861	
Rio de Janeiro	-11.699	
São Paulo	74.384	50.663

Brazil Regional Trade Surplus Share in the Value Added of the state /region(%)

Region	VA Regional Surplus	
North		
Acre	-12%	
Amapá	-30%	
Amazonas	20%	
Pará	-28%	
Rondônia	-17%	
Roraima	-10%	
Tocantins	-8%	-10%
Central West		
Distrito Federal	-21%	
Goías	-7%	
Mato Grosso	10%	
Mato Grosso do Sul	-8%	-10%
South		
Paraná	6%	
Santa Catarina	1%	
Rio Grande do Sul	-3%	1%

Region	VA Regional Surplus	
Northeast		
Alagoas	-13%	
Bahia	-21%	
Ceará	-4%	
Maranhão	-13%	
Paraíba	-30%	
Pernambuco	-19%	
Piauí	-45%	
Sergipe	-6%	
Rio Grande do Norte	-18%	-17%
Southeast		
Espírito Santo	-4%	
Minas Gerais	-8%	
Rio de Janeiro	-7%	
São Paulo	16%	7%

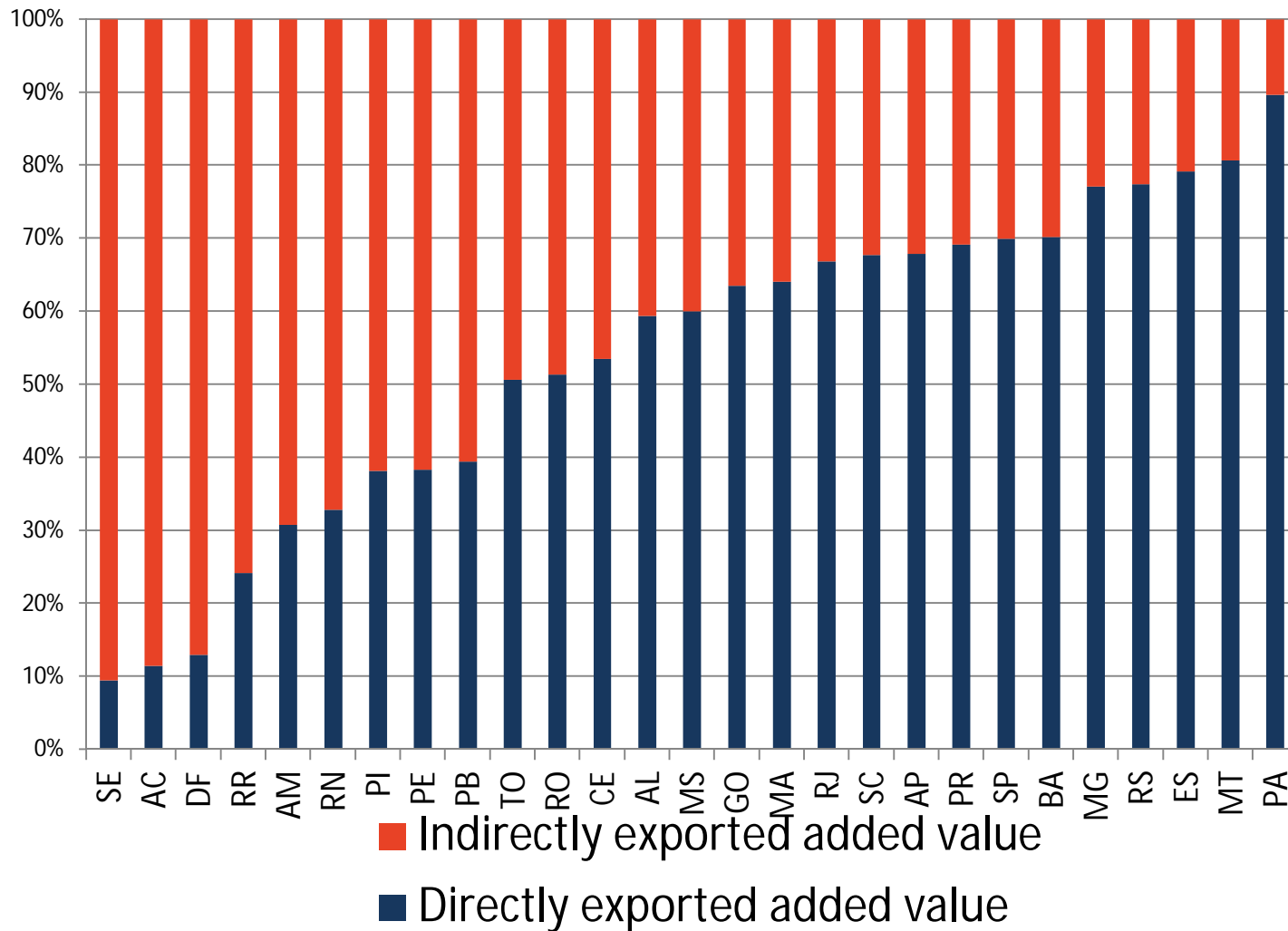
Breakdown of States' Gross Exports (2008)



Contents of States' Exports

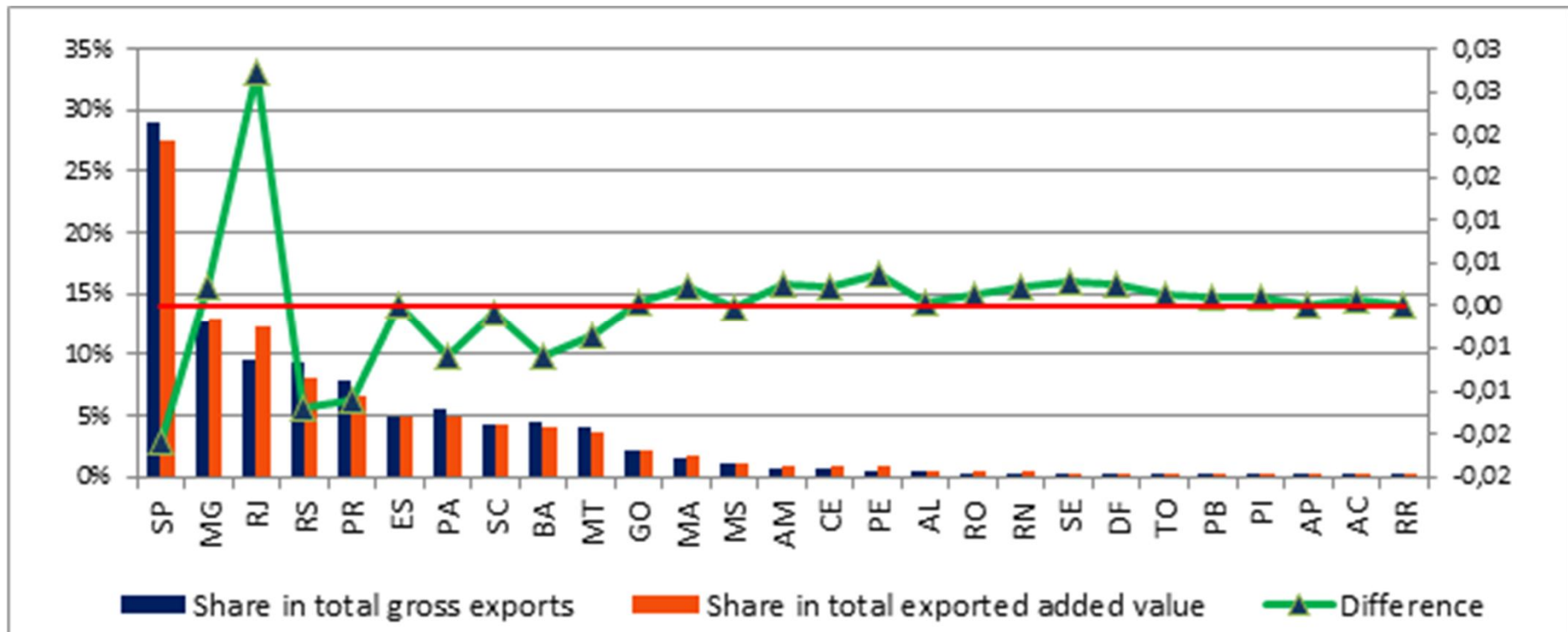
- In average, 54% of states' exports are produced by themselves while 24% is the domestic import content re-exported. The foreign import content in states' exports is around 12% on average.

Indirectly and Directly Exported Value-added of States (%)



On average, 54% of states' exported value-added is realized directly by themselves while 46% is exported indirectly, via other states

States' gross exports and value-added share in Brazilian total (%)



States' exports shares (%) in value-added terms and in gross terms are very similar, with the difference between two indicators generally being zero or close to zero.

Final Comments

- Direct and indirect value-added exported by Brazilian states
 - Inter-state Input-Output Table
 - Inter-linkages among states through their exports
 - Special status of the state of Amazonas (AM)
- If the level of vertical specialization is relatively low concerning international trade, we show evidence that inter-state trade is quite high for some Brazilian states
- With the exception of states that export natural resources, Brazilian states' exports are inter-linked by internal production chains, driven by the demand of rich southern and south-eastern states.

Final Comments

- Next Steps:
 - Better integrate the analysis of interstate flows with international flows
 - Study the relative importance of the main Brazilian exports countries to the States value added
 - Study how the sectoral value added is linked with the external trade.

Merci!

