

Trade Indicators Part II

Sectoral Indicators

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Introduction

- The indices described in the preceding session were all considering the overall pattern of trade.
- Often we want to drill down into the sectoral dimension. Patterns not apparent in the aggregate data may become clear in the more detailed data.
- Because of the increase in dimensionality when considering the sectoral dimensions of the trade flow array, indices become essential and numerous methods for examining various aspects of the sectoral pattern of trade have been proposed.
- We will concentrate on a few indices that are particularly useful in the context of preferential trading agreements.

Revealed Comparative Advantage

- The theory of comparative advantage underlies economists' explanations for the observed pattern of inter-industry trade.
- The Balassa index is defined in much the same way as the trade intensity index, but at the sectoral level. It is the ratio of the share of a given product in a country's exports to its share in world exports:

$$RCA_{ir} = \frac{X_{ir}/X_r}{X_{iW}/X_W}$$

- The numerator is the ratio of the value of trade in good i to total trade in country r , and the denominator is the corresponding ratio for the world as a whole.
- A country is said to have a revealed comparative advantage or disadvantage in a product if the ratio exceeds or falls short of unity for that product.

Application Example

- We will demonstrate using ASEAN trade data for 2014.
- For this application we need to download:
 - Exports/imports of the members of ASEAN to/from the world by sector and total.
 - Exports/imports of the world to/from the world by sector and total.
 - Exports/imports of the world to/from Laos PDR and Myanmar (to mirror).
- [Exploring the Code](#): Open the files 06_RCA.gms (the code) and 06_RCA_Data.gms (the data).

- Running the code should generate a text file with the results (it is too large to display).
- We see, for example, that Myanmar has a revealed comparative advantage in HS-1, while Viet Nam has a revealed comparative advantage in HS-7.

Complementarity

- This index summarizes the overall degree of complementarity on a regional basis.
- It is calculated between a given pair of countries, and measures the degree to which one country's import profile exports matches another's export profile. It is defined as:

$$C_{rp} = 1 - \sum_i \left(\left| \frac{M_{ip}}{M_p} - \frac{X_{ir}}{X_r} \right| \div 2 \right)$$

- In this expression M_{ip}/M_p is the share of good i in the total imports of the partner, and X_{ir}/X_r is the share of exports of good i in the exports of the reporter.
- The index is zero when no good exported by the reporter country is imported by the partner, and 1 when the export-import shares exactly match.

- *Ex ante*, higher index values are assumed to indicate more favorable prospects for a successful preferential trade arrangement between the two countries.
- Qualifications: An economy may not be able to expand production without increasing costs, high complementarity indices may be misleading if the countries are geographically distant, and relative size differences can be very important.
- *Ex post* an increase in the degree of complementarity indicates successful alignment of the trade structure.
- The level of data disaggregation should be considered carefully. The more aggregated the data, the higher the value of the index, in general.

- An index of export similarity can be constructed in a very similar way, we just need to replace the partner import share with their export share:

$$S_{rp} = 1 - \sum_i \left(\left| \frac{X_{ip}}{X_p} - \frac{X_{ir}}{X_r} \right| \div 2 \right)$$

- This metric can be used to identify competitors.
- Similar cautions apply.
- Note this type of index is one form of a general type called an 'overlap' index. Hence, there are a number different formulas for complementarity and similarity.

Application Example

- We continue using ASEAN trade data for 2014.
- **Exploring the Code:** Open the files `06_COMP.gms` (the code). Note that this file calculates both complementarity and similarity indices. The data file is the same as for the RCA index – `06_RCA_Data.gms`.

Table: Complementarity Index for ASEAN Members in 2014

	MMR	KHM	IDN	LAO	MYS	PHL	SGP	VNM	THA	BRN
MMR		0.11	0.28	0.22	0.27	0.28	0.28	0.16	0.32	0.19
KHM	0.09		0.09	0.08	0.09	0.10	0.06	0.09	0.07	0.11
IDN	0.47	0.38		0.45	0.54	0.53	0.58	0.42	0.56	0.43
LAO	0.21	0.17	0.27		0.28	0.25	0.21	0.22	0.25	0.24
MYS	0.56	0.38	0.63	0.60		0.73	0.78	0.64	0.72	0.50
PHL	0.47	0.34	0.44	0.47	0.61		0.58	0.57	0.53	0.47
SGP	0.55	0.37	0.60	0.61	0.77	0.69		0.62	0.69	0.52
VNM	0.49	0.38	0.45	0.47	0.59	0.55	0.54		0.51	0.46
THA	0.70	0.47	0.62	0.64	0.61	0.61	0.55	0.62		0.63
BRN	0.13	0.06	0.32	0.19	0.22	0.24	0.36	0.12	0.26	

- There is high complementarity between, for example, Thailand, and the import profile of Myanmar, among others.
- On the other hand, there is relatively low complementarity between the exports of, for example, Cambodia and Singapore.
- Note that high complementarity in one direction does not necessarily imply the same in the other.

Table: Export Similarity Index for ASEAN Members in 2014

	MMR	KHM	IDN	LAO	MYS	PHL	SGP	VNM	THA	BRN
MMR		0.10	0.36	0.31	0.28	0.17	0.22	0.22	0.18	0.22
KHM	0.10		0.15	0.15	0.09	0.10	0.06	0.27	0.13	0.01
IDN	0.36	0.15		0.33	0.63	0.40	0.42	0.44	0.45	0.33
LAO	0.31	0.15	0.33		0.26	0.25	0.20	0.28	0.21	0.14
MYS	0.28	0.09	0.63	0.26		0.63	0.74	0.56	0.54	0.27
PHL	0.17	0.10	0.40	0.25	0.63		0.61	0.56	0.54	0.07
SGP	0.22	0.06	0.42	0.20	0.74	0.61		0.50	0.53	0.24
VNM	0.22	0.27	0.44	0.28	0.56	0.56	0.50	0	0.53	0.09
THA	0.18	0.13	0.45	0.21	0.54	0.54	0.53	0.53		0.11
BRN	0.22	0.01	0.33	0.14	0.27	0.07	0.24	0.09	0.11	

- We see strong similarity between Singapore and Malaysia.
- Unlike the complementarity index, the export similarity index **is** symmetric – if the export profile of Singapore is similar to that of Malaysia, then the converse is also true

- To measure the degree of regional orientation in trade at the sectoral level, the regional orientation index is used.
- It measures the relative importance of intra-regional exports by sector. It is defined:

$$RO_{irB} = \frac{X_{irB}/X_{rB}}{(X_{irW} - X_{irB})/(X_{rW} - X_{rB})}$$

- The index measures the ratio of the share of exports of good i from country r in the total exports to region B , to the share of exports in the same product category to all other regions.

- An index of greater than one indicates a concentration of exports to regional markets.
- Examined pre- and post-PTA, the index helps to identify the extent to which the changes in country's trade flows at the sectoral level have coincided with the implementation of the PTA.
- Where large increases in the regional orientation index coincide with weakening revealed comparative advantage there may be evidence of trade diversion.

Application Example

- We continue using ASEAN trade data for 2014.
- For this application we need to download:
 - Exports/imports of the members of ASEAN to/from the world by sector and total.
 - Exports/imports of the world to/from the world by sector and total.
 - Exports/imports of the members of ASEAN to/from each other by sector and total.
- [Exploring the Code](#): Open the files 06_R0.gms (the code) and 06_R0_Data.gms (the data).

Results

- Running the code should generate a text file with the results (again, it is too large to display).
- An index value of zero means that the economy does not export anything in that product category to ASEAN, hence there is no regional orientation.
- When working with disaggregate data in this way, we are also going to get a lot of undefined operations (division by zero). The index could be undefined because the country exports in that product exclusively to ASEAN – this is an extreme case of regional orientation. Or it could be undefined because it exports to nothing at all in that category.
- There are numerous cases where the high regional orientation does not seem to correspond to a revealed comparative advantage.

- How have the values of these indices changed? Let's construct indices for 2004, 10 years before the results presented here.
- If you have time, you might also consider comparing these indices to other agreements (e.g., NAFTA).