

**ARTNeT- GIZ Capacity Building Workshop**  
**“Practical tools for Impact Assessment of Free Trade Agreements”**  
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**Session 2**  
**Trade indicators for evaluating the potential impacts of an FTA**

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## **Indicators to evaluate the potential economic effects of an FTA**

- They can be used at the initial stage of any trade policy decision-making process, including the decision on whether or not to join an FTA.
- These indices are indicative, but they do not control for factors that affect bilateral trade (which is done in the gravity model).

# Useful Indicators

- Which are the sectors most likely to have export potential?
  - Revealed comparative advantage (RCA)
  - Export specialization (ES)
- Are trade profiles of the potential FTA partners complement with ours?
  - Trade complementarity index (TCI)

## Comparative advantage

### a. Revealed comparative advantage

- The current resurgence of interest for industrial policy sometimes confronts trade economists with demands to identify sectors of comparative advantage
- The traditional measure is the Revealed Comparative Advantage (RCA) index (Balassa, 1965)

$$RCA_k^i = \frac{X_k^i / X^i}{X_k / X}$$

- $RCA$  is the ratio of product  $k$ 's share in country  $i$ 's exports to its share in world trade

Interpretation:

- A value of the  $RCA > 1$  in sector  $k$  means that  $i$  has a revealed comparative advantage in that sector
- A value of the  $RCA < 1$  in sector  $k$  means that  $i$  has a revealed comparative disadvantage in that sector
- Countries (regions) with similar  $RCA$  profiles are unlikely to have high bilateral trade intensities unless intra-industry trade is involved.

a. Revealed comparative advantage (ct'd)

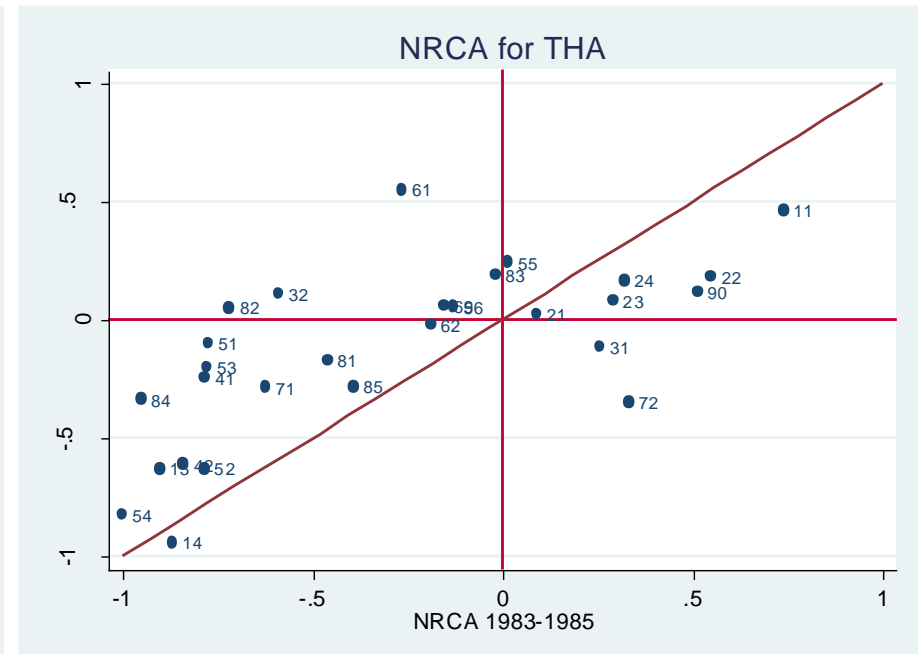
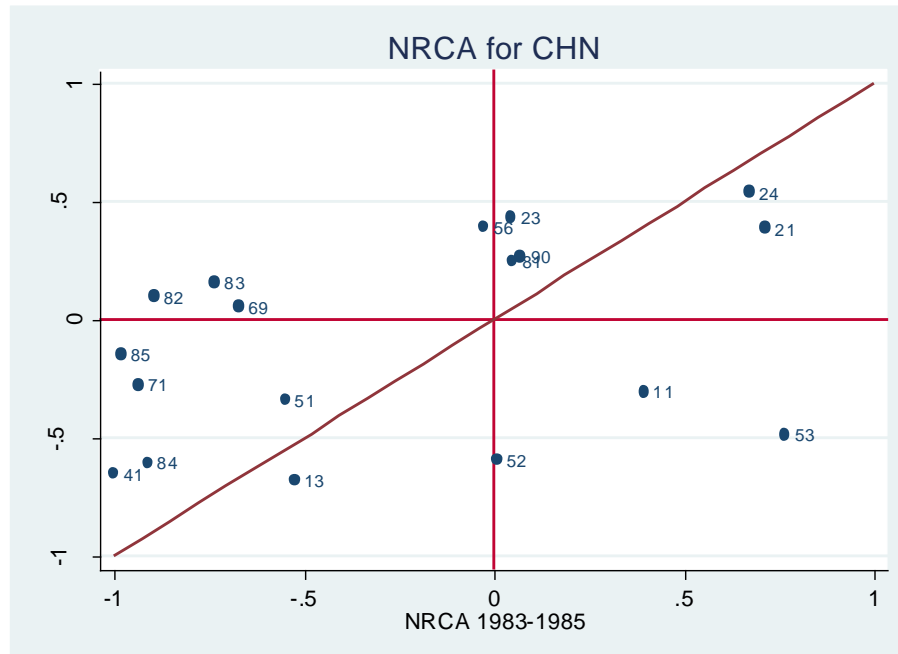
- A disadvantage of the RCA index is that it is asymmetric, i.e. unbounded for those sectors with a revealed comparative advantage, but it has a zero lower bound for those sectors with a comparative disadvantage
- A solution is to rely on a simple normalization proposed by Laursen (2000). The normalized RCA index, NRCA becomes:

$$NRCA_k^i = \frac{RCA_k^i - 1}{RCA_k^i + 1}$$

- By construction, NRCA is between -1 and 1
- RCA available at WITS
- In next slide, we present an illustration using the Trade, Production and Protection ([TTP](#)) database

## a. Revealed comparative advantage (ct'd)

Change in NRCA between 1980s and 2000s, China and Thailand ([Stata](#))



- Sectors above the main diagonal experienced an increase in NRCA
- Sectors above the main diagonal whose NRCA was  $< 0$  in 1983-85 and  $> 0$  in 2002-04 (second quadrant) moved from revealed comparative disadvantage to revealed comparative advantage

## b. Export specialization index

- The export specialization index is a modified RCA index

$$ES_k^i = \frac{X_k^i / X^i}{M_k^j / M^j}$$

- The denominator is the share of imports of product  $k$  in country  $j$ 's total imports
- $ES$  provides product information on revealed specialization in the export sector of a country not vis-à-vis the world, like RCA, but rather vis-à-vis specific markets or partners

Interpretation:

- The value of the index  $< 1$  indicates a comparative disadvantage and a value  $> 1$  represents specialization in this market.

## b. Trade complementarity

- Trade Complementarity Index (TCI) measures the extent to which two countries are "natural trading partners", in the sense that what a country exports overlaps with what the other country imports

$$TC_j^i = 100 \left[ 1 - \left( \sum_k |m_k^i - x_k^j| / 2 \right) \right]$$

Where  $m_k^i$  is sector  $k$ 's share in  $i$ 's total imports from the world and  $x_k^j$  is sector  $k$ 's share in  $j$ 's total exports to the world

Interpretation:

- The index is zero when no goods are exported by one country or imported by the other and 100 when the export and import shares exactly match



# **EMPIRICAL EXERCISES**

# To start

## 1) Running the directory definition

```
global input "D:\witada\ARTNeT\workshops\capacity building\2016-17 GIZ\Jan  
17\materials\Practical guide to TPA"
```

```
cd "$input"
```

## 2) Open a new do file

```
clear all
```

```
capture log close
```

```
set more off, perm
```

## 3) loading data

```
cd "$input/Chapter1/Datasets"
```

## Exercise 1: Computing NRCA index

Q1. Use data from TTP.dta to calculate the normalized RCA (NRCA) index for every year between 1983 and 1985 (included) and calculate the average for those three years. Do the same for 2002-4.

Q2. Comparing Mongolia and Japan NRCA for 2002-2004.

The RCA index of country  $i$  for product  $k$  is computed as

$$RCA_{ik} = (X_{ik} / X_i) / (X_k / X)$$

where

$X_{ik}$  = country  $i$ 's exports of good  $k$

$X_i$  = country  $i$ 's total exports

$X_k$  = good  $k$  world exports

$X$  = total world exports

/\* A disadvantage of the RCA index is that it is asymmetric, i.e. unbounded for those sectors with a revealed comparative advantage but with a zero lower bound for those sectors with a comparative disadvantage. One alternative is to rely on the simple normalization proposed by Laursen (2000). The normalized RCA index is given by:

$$NRCA_{ik} = (RCA_{ik} - 1) / (RCA_{ik} + 1) \quad */$$

## STATA Exercise 2: Computing Trade Complementarity Index (TCI)

Q1. Use data from BilateralTrade.dta to Trade Complementarity Index (TCI) for all countries in the dataset.

Q2. Compare the opportunity of Mongolia (MNG) to export to China (CHN), India (IND), Japan (JPN), and Thailand (THA) by constructing line plot and interpret the results.

Q3. Did exports from Mongolia actually go to the countries with high trade complementarity? Why or why not?

```
cd "$input/Chapter1/Datasets"  
use BilateralTrade.dta, clear
```

```
/* Complementarity between country a's import pattern and  
country b's export pattern is computed as  
  
TCIab = 100* (1- total(abs(m_a_k - x_b_k)/2|)  
  
where      m_a_k = country a's import share of good k  
           x_b_k = country b's export share of good k      */
```

Exercise 3: Downloading data from WITS to calculate Export Specialization Index (ES) of Mongolia all products at (HS 2-digit) in ASEAN markets and interpret the result

Bonus: you will earn extra points if you implement the calculation in STATA.

```
/*
```

```
The ES index of country i for product k is computed as
```

```
ESijk = (Xik / Xi) / (Mjk/Mj)
```

```
where
```

```
Xik = country i's exports of good k
```

```
Xi = country i's total exports
```

```
Mjk = country j's imports of good k
```

```
Mj = country j's total imports
```

```
*/
```



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Advanced Query ▾

Tariff and Trade Simulations ▾

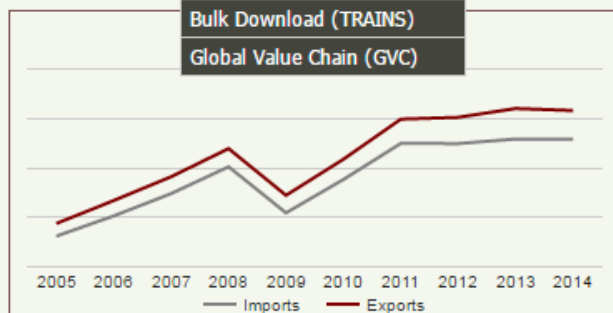
Results ▾

Utilities ▾

Support Materials ▾

**WITS**  
World Integrated Trade Solutions

Trade Data (UN Comtrade)  
Tariff and Trade Analysis  
Trade Outcomes Indicators  
Bulk Download (UN COMTRADE)  
Bulk Download (TRAINS)  
Global Value Chain (GVC)



\* Data from [wits.worldbank.org](https://wits.worldbank.org)

World Exports and Imports (2014)

World integrated Trade Solutions (WITS) gives access to international trade and protection related data and offers built-in analytical tools allowing users to assess the impact of tariff changes. WITS provide users with capabilities to retrieve and analyze trade and tariff data; convert data between different nomenclatures; customize country and product groups; calculate trade indicators and assess competitiveness of countries; visualize; and download data. WITS also includes simulation tool to calculate the impact of tariff changes on trade flows (trade creation and diversion), tariff revenues, and consumer welfare using partial equilibrium modeling tools.

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<b>Reporters:</b>	<b>Selected</b>	< < -Modify- > >
	Mongolia -- MNG ASEAN10 -- ASEAN	
<b>Products:</b>	<b>Selected</b>	< < -Modify- > >
	<b>HS 2012 (Selected Classification)</b> ALL1 -- Chapter (all 2-digit HS codes) Total -- Total Trade	
<b>Partners:</b>	<b>Selected</b>	< < -Modify- > >
	World -- WLD	
<b>Years:</b>	<b>Selected</b>	< < -Modify- > >
	2013 2014 2015	
<b>Trade Flow:</b>	<b>Selected</b>	< < -Modify- > >
	Imports Exports	
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