USING INTRA-INDUSTRY TRADE ANALYSIS TO BETTER UNDERSTAND NORTH AMERICAN TRADE AND TRANSPORTATION CORRIDORS

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Growing trade volumes are not a sufficient measure of regional economic integration.

Significant intra-industry trade is a characteristic. Intra-industry trade is trade within the same industry sector between trading partners. Counter to Ricardian and Heckscher-Ohlin trade theory, countries trade within industries with the same competitive advantages. May occur between advanced or developing countries.
Measuring Intra-Industry Trade

- Most commonly used tool to measure intra-industry trade is the Grubel-Lloyd Index (1975)

\[ B_i = \frac{\left( X_i + M_i \right) - |X_i - M_i|}{X_i + M_i} \times 100 \]

Where: \( X_i \) and \( M_i \) are the imports and exports of commodity \( i \)

- \( B_i \) is the value of intra-industry trade as a percentage of total trade

- Simple equation that provides an index value

- Typically calculated using detailed trade data
Measuring Intra-Industry Trade

- Grubel and Lloyd’s (1975) intra-industry trade summary measure

\[ IITB = \frac{\sum_{i=1}^{n} (X_i + M_i) - \sum_{i=1}^{n} |X_i - M_i|}{\sum_{i=1}^{n} (X_i + M_i)} \times 100 \]

- Calculation of index value across countries or industrial sectors
- Allows comparisons between countries or regions
U.S.-Mexico Intra-Industry Trade

- Grubel-Lloyd indices calculated using data from the United Nations COMTRADE database
  - Trade data for most nations in the world
- Data were at 3-digit SITC level
- Import data used for each trading partner
- Grubel-Lloyd indices can be calculated in Excel
- Much easier and faster to use SAS or some other programmable tool
U.S.-Mexico Intra-Industry Trade

U.S.-Mexico Grubel-Lloyd Indices for Total Trade/U.S. Trade Deficit with Mexico

- U.S. Trade Deficit with Mexico
- Grubel-Lloyd Index

Years: 1993 to 2008
Billions: -80.0 to $20.0
U.S.-Mexico Intra-Industry Trade

Distribution of 2006 3-Digit SITC Grubel-Lloyd Indices and Total Trade for Each Decile

- Frequency
- Total Trade

Billions

- $80.0
- $70.0
- $60.0
- $50.0
- $40.0
- $30.0
- $20.0
- $10.0
- $0.0
Intra-Industry Trade and Transportation Corridors

- High levels of intra-industry trade imply some level of stability in transportation corridors.
- Significant intra-industry trade typically occurs when there are existing inter-firm or intra-firm relationships.
- Usually involving manufacturing processes:
  - These relationships often require investments in capital and labor in both countries.
  - Takes advantage specialized labor skills and labor productivity.
- More difficult to shift trade corridors.
Intra-Industry Trade and Transportation Corridors

- Low levels of intra-industry trade imply that trade corridors are more likely to fluctuate.
- Trade is more likely based upon factor endowments.
- Fewer permanent relationships between producers and consumers:
  - Consumers may have many potential trading partners or may switch between them:
    - Cost, quality, availability, etc.
- Fluctuating trade corridors means transportation corridors can change.
Intra-Industry Trade and Transportation Corridors

U.S.-Mexico Grubel-Lloyd Indices for Trade in SITC 6/Export and Import Volumes

- U.S. Exports
- U.S. Imports
- Grubel-Lloyd Index

Bar chart showing the comparison of U.S. exports, imports, and Grubel-Lloyd index from 1983 to 2008, with a gradual increase in the values.
Sub National Intra-Industry Trade

- Grubel-Lloyd indices calculated for:
  - Ontario-Michigan
  - Ontario-Texas
  - Saskatchewan-North Dakota
  - Saskatchewan-Texas

- Data from Statistics Canada
  - Actual data located on Industry Canada website

- 3-digit NAICS level

- Import and export data used for the respective Canadian Province
Sub National Intra-Industry Trade

Ontario-Michigan Grubel-Lloyd Indices for Total Trade/ Export and Import Volumes

- Exports
- Imports
- Grubel-Lloyd Index

[Bar chart showing trade trends from 1992 to 2007 with labels for billions of dollars]
Ontario-Texas Grubel-Lloyd Indices for Total Trade/Export and Import Volumes

- Exports
- Imports
- Grubel-Lloyd Index

Billions


Sub National Intra-Industry Trade
Sub National Intra-Industry Trade

Saskatchewan-North Dakota Grubel-Lloyd Indices for Total Trade/Export and Import Volumes

- Exports
- Imports
- Grubel-Lloyd Index

Billions

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Sub National Intra-Industry Trade

Saskatchewan-Texas Grubel-Lloyd Indices for Total Trade/Export and Import Volumes

- Exports
- Imports
- Grubel-Lloyd Index

Billions

Years: 1982 to 2007

Graph showing the trends in exports, imports, and the Grubel-Lloyd Index from 1982 to 2007.
Current Data Deficiencies

- National level data for Grubel-Lloyd analysis
  - Easily available and free from U.S. Census Bureau and Industry Canada
  - United Nations COMTRADE – expensive
  - Not easily available from INEGI

- Sub national data for Grubel-Lloyd analysis
  - Only available for Canada-U.S. trade from Industry Canada
Current Data Deficiencies

- U.S. Bureau of Transportation Statistics Transborder Freight data
- Only available at the 2-digit SITC level
- Sub national U.S.-Canada data available
  - Suppression of some data
- Does not provide sub national detail on Mexican imports
- No easily accessible sub national data from INEGI
Concluding Comments

- Understanding intra-industry freight trends is important for freight planning but knowledge is frequently absent.
  - Better understanding of freight corridors beyond one’s own border.
  - May explain fluctuating freight volumes along some corridors and points of entry.
  - Opportunity to better target spending priorities.

- Unavailability of data is major hindrance to understanding intra-industry trade.
  - Funding and policy initiatives needed to provide the data to freight planners or release existing data.
References

QUESTIONS OR COMMENTS