The Role of Income in Agrifood Trade: A Progress Report

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Agenda

- Background
  - Objective
- Empirical Model
- Estimation Issues
- Data
- Preliminary Results
- Conclusions
Background

- Theoretical Considerations
  - Current Structure of Trade
    - Intra industry
    - Trade between countries with similar relative endowments
    - Product differentiation
  - Income growth differs across development spectrum
    - As income grows, structure of preferences change
GDP Growth across the Development Spectrum (%)
Fitted & Given Shares of Food Expenditure

![Graph showing fitted and given shares of food expenditure across various countries.](image-url)
Background

- Expenditure elasticities
  - Differ across development spectrum
Expenditure Elasticities across the Development Spectrum

Graph showing expenditure elasticities for Margarine, Sugar, Fruits, Cereals, and Fish across Low Income, Lower Middle Income, Middle Income, and High Income levels.
Expenditure Elasticities across the Development Spectrum

![Expenditure Elasticities Diagram](image-url)
Background

- Expenditure elasticities
  - Differ across development spectrum

- Objective
  - To estimate an empirical trade model that illustrates the role of income in trade of processed agri-food products.
Empirical Model

\[ \ln \text{imp}^k_{ij} = \alpha + \mu_i + \mu_j + \gamma_1 \ln \text{dist}_{ij} + \gamma_2 D\text{CB}_{ij} + \gamma_3 D\text{PTA}_{ij} + \gamma_4 \ln I_i + \gamma_5 \ln \theta_i + \gamma_6 D\text{CG}_k + \gamma_7 D\text{ED}_i + \epsilon_{ij}^k \]

\text{imp}^k_{ij} \text{ is real value of imports of country } i \text{ from country } j \text{ for commodities belong to sector } k; \\
\alpha \text{ represents intercept and } \mu_i \text{ and } \mu_j \text{ represent importer and exporter fixed effects; } \\
\text{dist}_{ij} \text{ represents distance in kilometers between the bilateral trade partners; } \\
D\text{CB}_{ij} \text{ is dummy, equal to one if bilateral partners share a common border and zero otherwise; } \\
D\text{PTA}_{ij} \text{ is dummy for preferential trade agreements between partner countries, equals to one when a PTA exits otherwise 0; } \\
I_i \text{ is the real per capita GDP of importing country } i \text{ (U.S. dollars); } \\
\theta_i \text{ is the income distribution within importing country represented by Gini index; } \\
D\text{CG}_k \text{ are eight dummies representing 9 commodity groups (meat, fish, dairy, cereals, vegetables, fruits, sugar and confectionaries, tea, coffee and mates and margarine); } \\
D\text{ED}_i \text{ are 3 dummies representing 4 levels of economic development of importing country i.e. low income, lower middle income, upper middle income and higher income; } \\
\ln \text{ represent logarithm; } \gamma \text{ represent parameters to be estimated; and } \\
\epsilon_{ij}^k \text{ is an error term assumed to randomly distributed with mean zero and variance } \sigma^2}
Estimation Issues

- **The Problem of Zeros (51% of Obs.)**
  - Drop zeros, replace with small numbers, Tobit model
  - Specification Bias

- **Heckman Selection Method**
  - Two Step
    - Step-1: Selection Equation (Probit model)
      - Commodity Specific model
    - Step-2: Outcome Equation (OLS regression)
  - IMR
Data

- 52 Countries (6 LI, 18 LMI, 12 UMI, 15 HI)
- 50 commodities (Nine commodity groups)
- 10 years (1990-2000)
- 5,52,389 observations
- SITC Rev. 3 at 4 digit level
- World Trade Analyzer of Statistics Canada
Preliminary Results

Growth in the Value of Imports between 1990 to 2000 (%)

- Beverages
- Margarine
- Tea, Coffee and Mates
- Sugar and Confectionaries
- Fruits
- Vegetables
- Cereals
- Fish
- Dairy
- Meat

Developed
Developing

0 50 100 150 200 250 300 350 400
Preliminary Results

- Heckman Selection method
  - Likelihood ratio test statistically accept Heckit

- PCI is statistically sig. and +ve
  - Imports increase sig. as income grows

- PCI is statistically different than 1
  - Import growth outpaces growth in income for cereals, fish and margarine
  - Income growth outpaces growth in import demand for meat, dairy, veg., fruits & tea products
  - Preferences are not homothetic
Preliminary Results

- Is the growth in import demand the same across the development spectrum?
  - Import growth for developing countries is higher than developed countries

- South-South, North-North and North-South Trade
  - Irrespective of dev. level, income is statistically different than one
  - Higher exp. elasticities were found for developing countries importing from developed countries
Conclusions

- Income plays an important role in agrifood trade
- Expenditure elasticities are not equal to 1
  - Preferences are overwhelmingly non-homothetic for agrifood products
- Developing countries are important
  - Growth in import demand outpaces growth in income
Thanks

Discussion