

# The Role of Income in Agrifood Trade: A Progress Report

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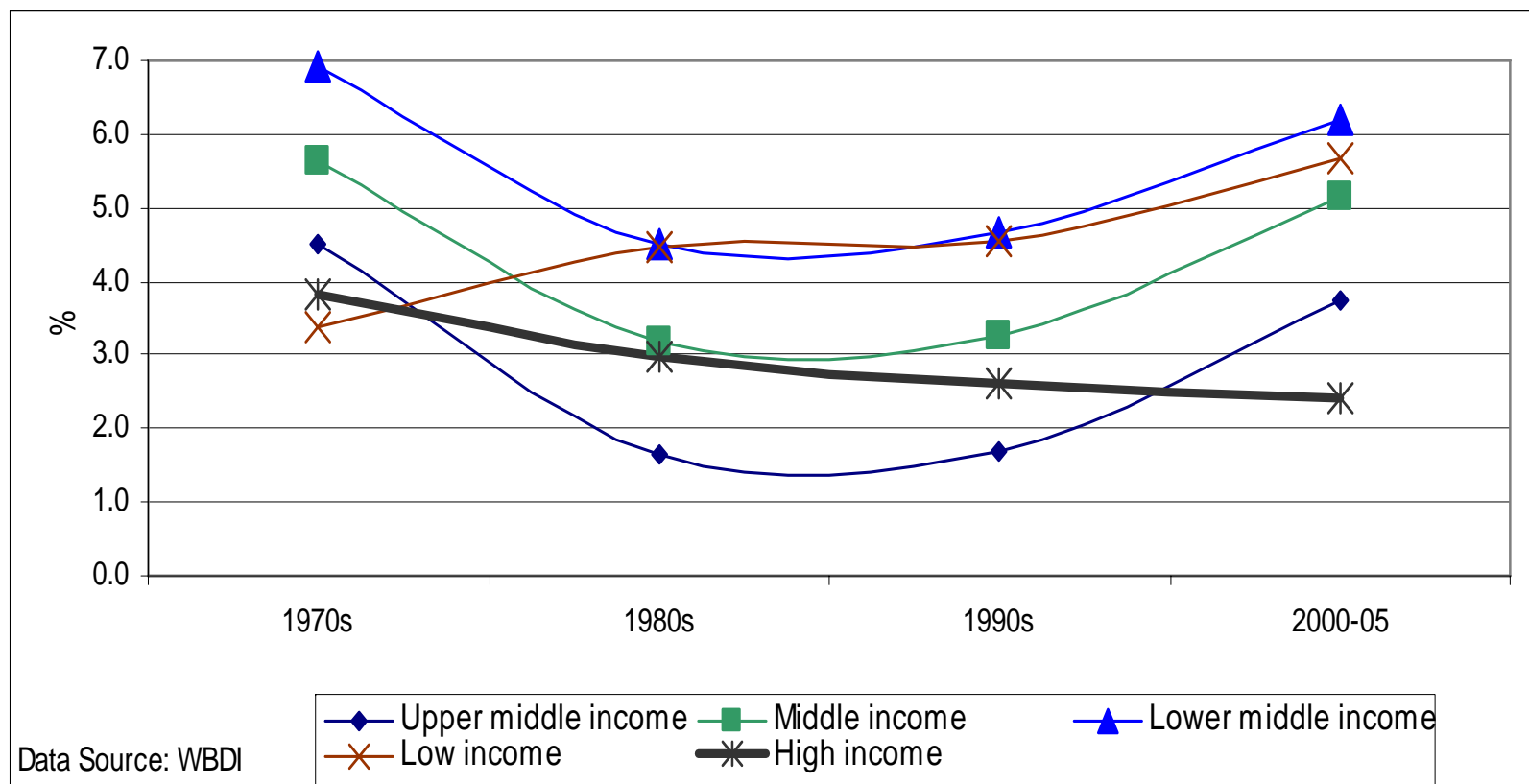
# Agenda

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

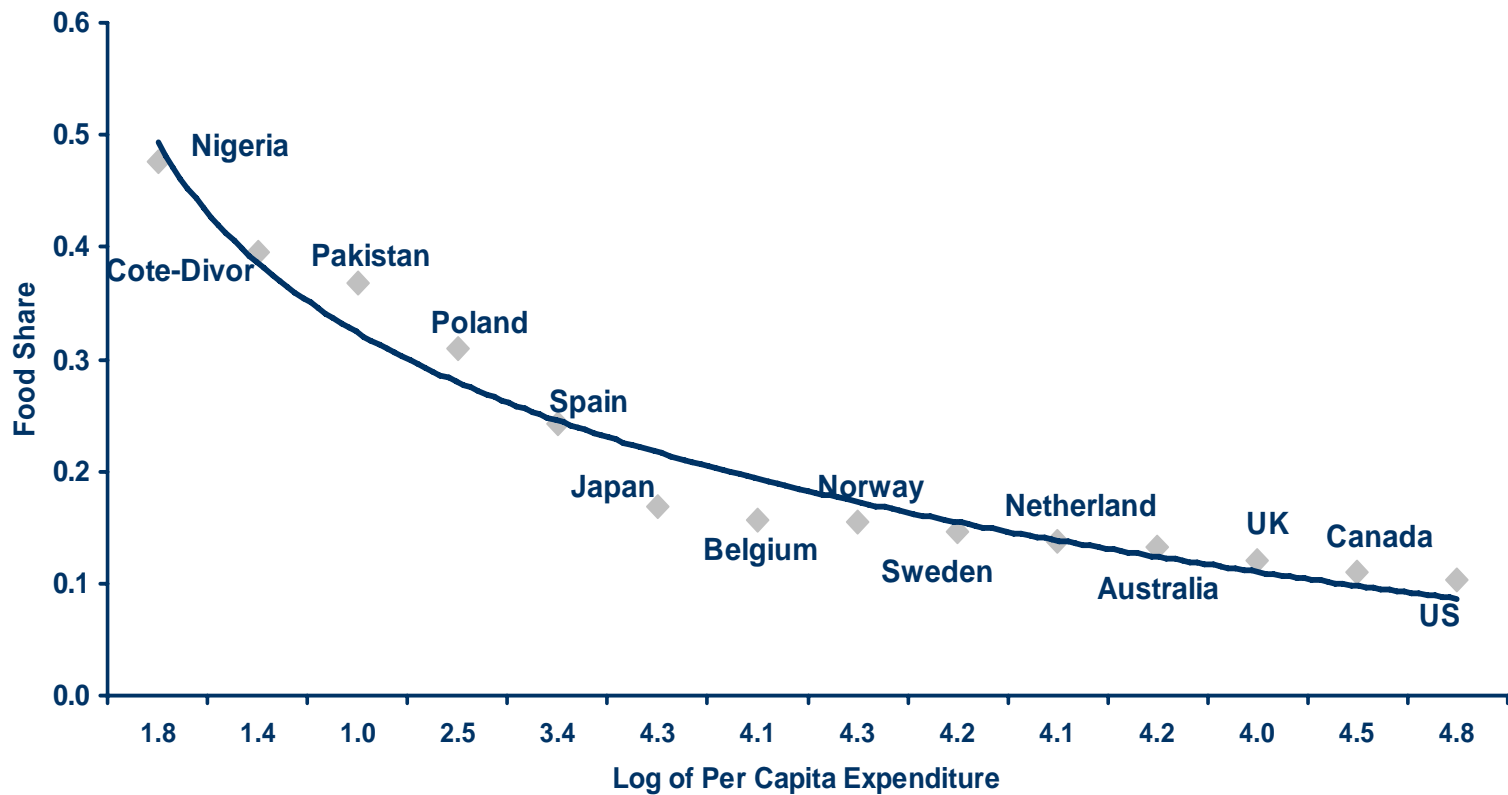
# Background

- 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 (%)



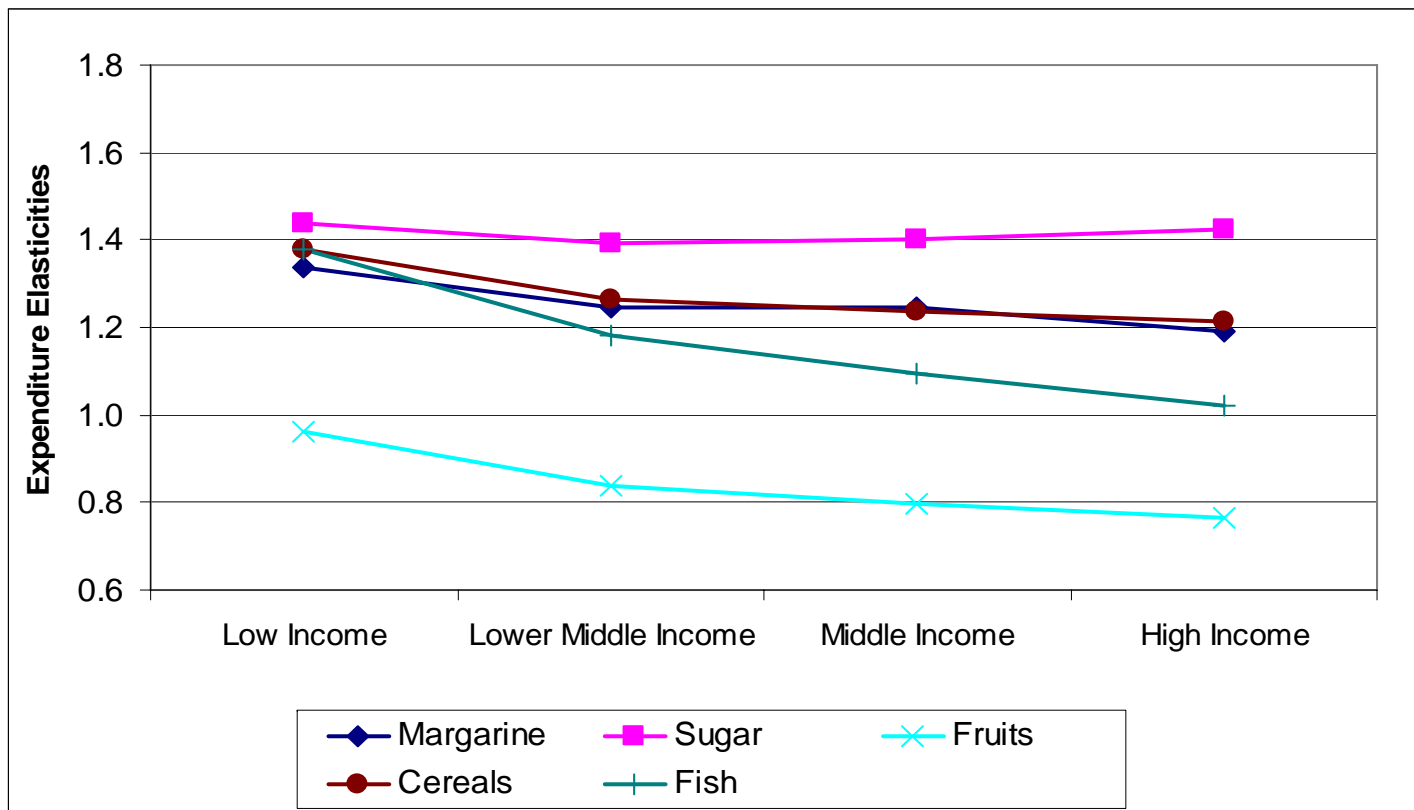
# Fitted & Given Shares of Food Expenditure



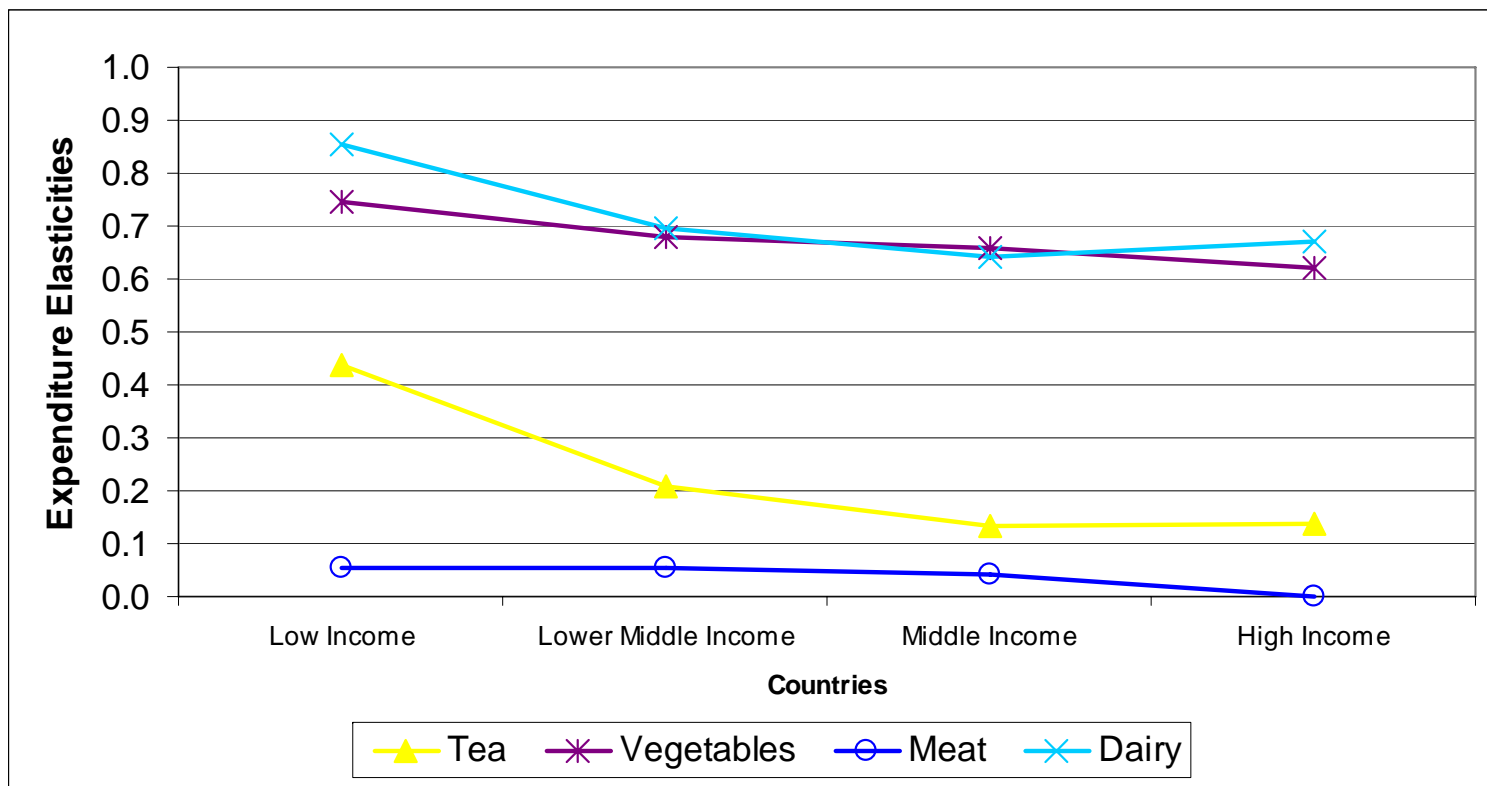
# Background

- Expenditure elasticities
  - Differ across development spectrum

# Expenditure Elasticities across the Development Spectrum



# Expenditure Elasticities across the Development Spectrum



# 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

$$\ln imp_{ij}^k = \alpha + \mu_i + \mu_j + \gamma_1 \ln dist_{ij} + \gamma_2 DCB_{ij} + \gamma_3 DPTA_{ij} + \gamma_4 \ln I_i + \gamma_5 \ln \theta_i + \gamma_6 DCG_k + \gamma_7 DED_i + \varepsilon_{ij}^k$$

$imp_{ij}^k$  is real value of imports of country i from country j for commodities belong to sector k;

$\alpha$  represents intercept and  $\mu_i$  and  $\mu_j$  represent importer and exporter fixed effects;

$dist_{ij}$  represents distance in kilometers between the bilateral trade partners;

$DCB_{ij}$  is dummy, equal to one if bilateral partners share a common border and zero otherwise;

$DPTA_{ij}$  is dummy for preferential trade agreements between partner countries, equals to one when a PTA exists otherwise 0;

$I_i$  is the real per capita GDP of importing country i (U.S. dollars);

$\theta_i$  is the income distribution within importing country represented by Gini index;

$DCG_k$  are eight dummies representing 9 commodity groups (meat, fish, dairy, cereals, vegetables, fruits, sugar and confectionaries, tea, coffee and mates and margarine);

$DED_i$  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;

$\ln$  represent logarithm;  $\gamma$  represent parameters to be estimated; and

$\varepsilon_{ij}^k$  is an error term assumed to randomly distributed with mean zero and variance  $\sigma^2$

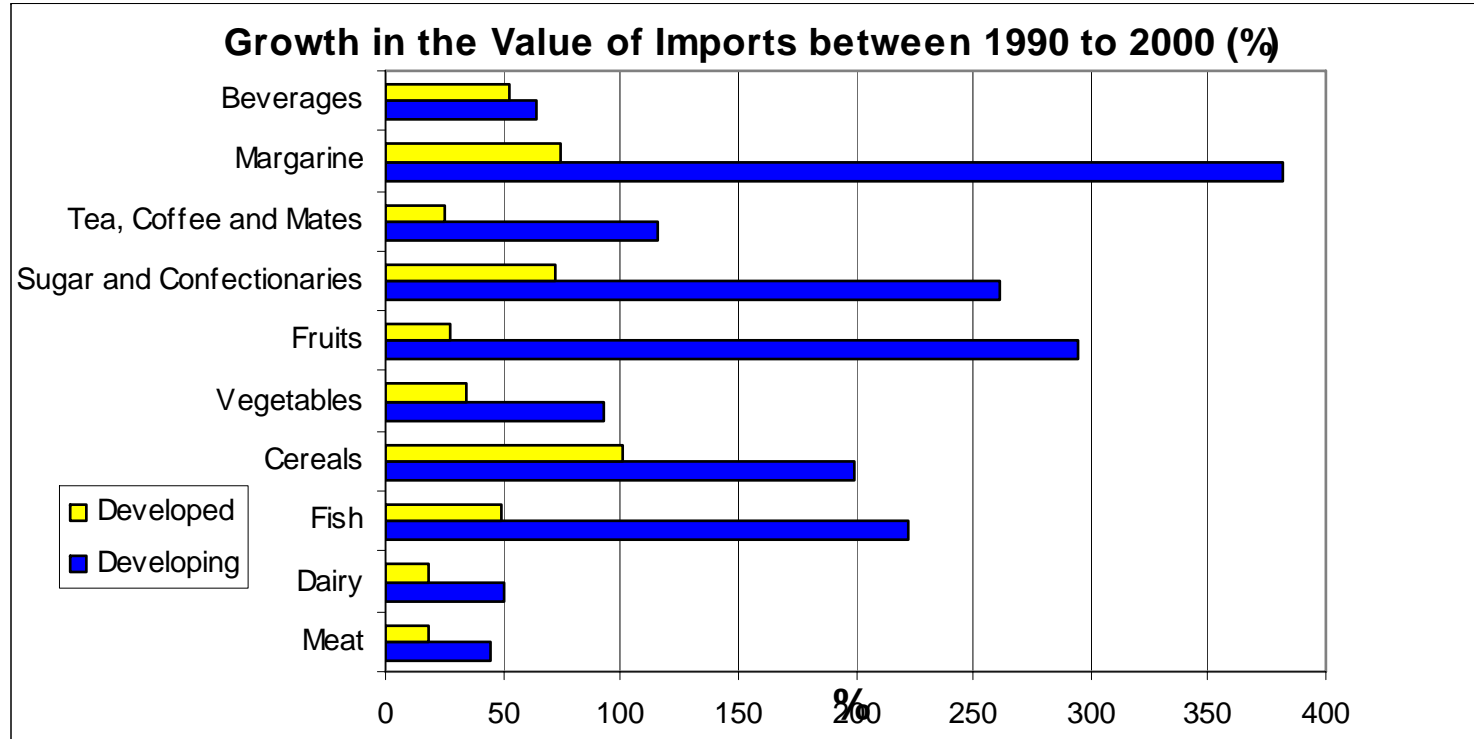
# Estimation Issues

- 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

- 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



# 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**