

Technical change in paddy rice production in LDCs

Green Revolution and Food Security

Context

- 2008 Food price increase
- Increasing food price volatility
- Increase in malnutrition
- Discussion of food security versus food sovereignty
- Focus on increasing agricultural productivity as means to address these issues in developing countries, for instance through R&D (e.g. World Development Report 2008)
- 8 percent of domestic household purchases on processed rice in LDCs (GTAP database)

Scenario

*5 percent shock to sectoral productivity
(aoall) in paddy rice sector of LDCs.*

No change in trade tariffs, etc

Paddy and processed rice sector

- 2 interlinked sectors paddy and processed rice
- Paddy rice
 - In LDCs 26 % of total land is allocated to paddy rice production
 - 25% of total paddy costs is made up by land
- Processed rice:
 - 65 % of total processed rice costs made up by paddy rice intermediate inputs
 - 97% is for domestic use and 3% is exported
 - Imports represent 1% of domestic production

Results (%)

	Domestic production	Exports	Imports
Paddy rice	+1.43	+1041.87	-23.66
Processed rice	+1.69	+261.04	-8.37
Other agriculture	+0.15 (Cereal) +0.55 (Wheat)	+0.15 (pfbev) +1.11 (LVS)	-0.38 (Fibers) +0.27 (Wheat)
Non agricultural	-0.39 (MacElct) +0.09 (OSR)	-0.53 (MacElct) -0.21 (TCs)	+0.05 (Chem) +0.37 (Wdpap)

Key findings:

- Expansion of production and trade balance of paddy rice and processed rice
- Expansion and increase of trade balance for of all agricultural sectors (USD 218 million)
- Contraction of all manufacturing and most services. Decrease in trade balance for all non-agricultural sectors (USD -317 million)

Rationale

Endowment	Price (pfe)	Endowment demand (qfe)
Land	-5.42 (paddy rice) -1.91 (OthAg)	-2.63 (paddy rice) + Agriculture
Unskilled labour	+0.11	+ Agriculture +/- Non agriculture
Skilled labour	+0.20	+ Agriculture - Non agriculture
Capital	+0.17	+ Agriculture - Non agriculture

Key findings:

- Paddy rice production becomes less profitable because of increasing supply
- Production increases but less than productivity shock
- Processed rice sector benefits from cheap intermediates (paddy price: -6.45%)
- Other agriculture benefits from cheap land price
- Price labour and capital increase because of increasing demand by agricultural sectors
- Non agricultural sector contracts because of rise in endowment price

Ghana case study

- Wants to become less dependent on imports of rice because of food security-price volatility
- Possible that there is strong preference for long grain high quality rice versus short broken domestic processed rice
- Our finding -8.37 % import of processed rice in LDCs
- Investigate if processed rice imports are sensitive to changes in parameters

Systematic Sensitivity Analysis

- Impact of variability/uncertainty of the Armington coefficient
- Preference for domestic versus foreign processed rice demand
- Armington: $ESUBD=2.6$ so relatively low
- Settings
 - Percent variation of +/- 50%
 - Triangular
 - Stroud quadrature (solves the model 2 times)

SSA Results

Change in the value of imports (CIF)	Model outcome	Mean	SD
Paddy rice	-23.66	-23.67	0.35
Processed rice	-8.37	-8.33	1.49
Change in the value of exports (FOB)	Model outcome	Mean	SD
Paddy rice	55.57	55.59	1.04
Processed rice	11.80	11.80	3.28
Change in the value of production	Model outcome	Mean	SD
Paddy rice	1.43	1.43	0.21
Processed rice	1.69	1.68	0.25

- Thank you!!
- Questions are welcome

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