# Exogenous Shocks and Stability: The Global Rice Market

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#### Background

- Rising food prices: a disruption of a long-term trend?
- Episodes of sharp volatility
- Serious impacts on poverty
- "Because rice is the most important source of calories for the world's poor, the world rice market turbulence was probably the most serious shock to world food security in the previous 25 years." (Dawe and Slayton, 2010)

#### Literature

- The food price spike in 2006-08 renewed interest in the workings of these markets.
- Questions: Why spike?
- Many explanations: Supply shocks, competition from biofuel, rising energy prices, depreciation of US \$, financial speculation, liquidity induced commodity boom....
- Questions: How do markets work ? Transmission of price shocks and price volatility across borders and commodities....

# This paper

- Question: how have rice trade and consumption coped with exogenous production shocks?
- Long-term view: consider not just the dramatic price spike in 2006-08 but for a period of about 50 years starting from 1960.
- We chose to study the rice market.
- Why?
- Of the major grains, the rice market is regarded as the most troubling .
- The market is thin and subject to destabilizing government policies.

## **Market Insulation Policies**

- Countries fear importing world price volatility into domestic markets. Especially so in poor countries where the poor can spend more than 50% of budget on food.
- In particular, if a rise in world price is anticipated, then exporting and importing countries would like to claim as much of world supplies as possible.
- Exporting countries would impose export restrictions such as minimum export prices or export ban.
- Importing countries would lower tariffs.
- These "market insulation" policies lead world prices to rise sharply and so this is an instance of a self-fulfilling prophecy.

## **Market Insulating Prices**

- Similar process works when world prices are anticipated to fall.
- As all countries increase net supplies to the world market, world prices fall.
- In either case, volatility in world prices is exaggerated by market insulation policies.

#### Consequence of market insulation

- Importers lose faith in global trade as it shrinks in exactly those circumstances when they need it.
- Exporters could also lose faith in global trade as their markets shrinks in exactly those circumstances when they need it.
- As a result, global trade remains at a low level. Thin volumes are a consequence of market insulation policies.

#### The Rice Market as the Archetype

- Rice typifies a market with relatively thin volumes of trade and country conduct of market insulation policies.
- Gilbert (2011): It is the rice market that must be seen as unreliable and not the markets for wheat and maize.
- Low income countries "can probably rely on being able to additional maize or wheat, if .....necessary but may justifiably be worried about being able to do so for rice".

# Why is the Rice Market Different?

- Wheat and maize trade driven by rich and land abundant countries such as the US, Canada, Argentina and Australia.
- Wheat: US, Canada and Australia export more than 50% of output
- Rice: The biggest exporter Thailand exports no more than 40% of its output but its share in world output is barely 5%.
- Major rice producing countries : Either deficient or marginal surpluses.
- Also have food security concerns for much of the population.



#### World Exports (as proportion of world output)

	1960-1993	1994-2011
Mean	3.82	7.16
Standard Deviation	0.56	2.14
Coefficient of Variation	14.66	29.89

### Data

- USDA data on country production, area, stocks from 1960-2010.
- For every country: smooth the yield series using the Holt-Winters double exponential method
- Deviation of the smooth series from the realized observation is the yield shock.
- We construct a domestic yield and a foreign yield shock which is a production weighted average of the yield shocks in the rest of the world.

## **Categorization of shocks**

- Negative shock: one standard deviation below the mean
- Positive shock: one standard deviation above the mean
- Mid-range shock: within one standard deviation of the mean

## Cross-tab of domestic and foreign shocks

	Foreign Yield Sh			
Domestic shocks	Negative	Mid-range	Positive	Total
Negative	116	311	88	515
	2.72	7.31	2.07	12.1
Mid-range	533	2,111	550	3,194
	12.52	49.59	12.92	75
Positive	94	363	91	548
	2.21	8.53	2.14	12.9
Total	743	2,785	729	4,257
	17.45	65.42	17.12	100

# Dependent Variable: % change in imports (as proportion of consumption)

Dummy Var	riables for Shocks	Coefficients	Standard Errors	t-value
Domestic	Foreign	1		1
Negative	Negative	0.398	0.131	3.03
Negative	Mid-range	0.286	0.113	2.52
Negative	Positive	0.636	0.141	4.51
Mid-range	Negative	0.140	0.109	1.29
Mid-range	Mid-range	0.183	0.102	1.78
Mid-range	Positive	0.112	0.109	1.03
Positive	Negative	-0.317	0.139	-2.28
Positive	Mid-range	0.057	0.112	0.51
Constant		-0.181	0.100	-1.8

Dopondont Variable: % change in rice					
Dependent variable: % change in rice					
consumption					
	Shock Variables	Coefficients	Standard Errors	t-value	
Domestic	Foreign	1		1	
Negative	Negative	-0.222	0.032	-6.94	
Negative	Mid-range	-0.186	0.027	-6.8	
Negative	Positive	-0.176	0.034	-5.1	
Mid-range	Negative	-0.107	0.026	-4.1	
Mid-range	Mid-range	-0.092	0.025	-3.74	
Mid-range	Positive	-0.107	0.026	-4.11	
Positive	Negative	-0.006	0.034	-0.19	
Positive	Mid-range	-0.025	0.027	-0.92	
Constant		0.131	0.024	5.44	

#### **Consumption Impacts**

- % change in consumption highest (positive) when domestic shocks are positive.
- % change in consumption lowest (negative) when domestic shocks are negative.
- Foreign shocks are irrelevant when domestic shocks are either positive or mid-range.
- But they matter when domestic shocks are negative.
- In this case, positive foreign shocks moderates the decline in consumption. Importance of trade?

More

- Consumption stabilization fails when domestic shocks are negative (happens 12% of the time).
- *A priori*, we would expect stabilization to fail only when domestic **and** foreign shocks are negative (3% of the time).
- Why cannot a country import more and stabilize fully when domestic shock is negative and foreign shock is positive?
- Are poor countries constrained by foreign exchange constraints or liquidity constraints?

#### An Extension

- Allow the impacts of domestic and foreign shocks to vary with domestic and foreign stocks (at the end of the previous year).
- In the regression, interact domestic and foreign shocks with domestic and foreign stocks.

# Findings

- Both domestic and foreign stocks help in increasing consumption in the scenario of negative domestic and negative foreign shocks.
- However, the effect of foreign stocks is statistically not significant.
- At its median value, domestic stocks can increase consumption by 1.3%
- The stock to consumption ratio would have to be as high as 40% to fully wipe out the adverse impact of domestic and foreign shocks.

- For poor countries, the principal problem is how to stabilize consumption when domestic shocks are negative.
- Trade works but works imperfectly even when foreign shocks are positive, negative domestic shocks decreases consumption.
- Financing and exchange rate constraints may be important here.
- Domestic stocks have played a greater role than foreign stocks.

### **Concluding Remarks**

#### Problems with domestic storage

- Expensive
- Excess stocks
- Captured by producer interests
- Reliance on domestic markets keeps rice markets thin

#### • How can rice markets get thicker?

- Surpluses small or negative in major producing countries
- India may not be a reliable supplier
- Prospects better for Vietnam
- Emergence of surplus in other countries will probably be necessary Myanmar, Cambodia..