

Rice trade and price volatility: Implications on ASEAN and global food security

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ASEAN Rice Trade Puzzle

✧ How does one promote rice trade in ASEAN when member states do not want to liberalize rice trade?

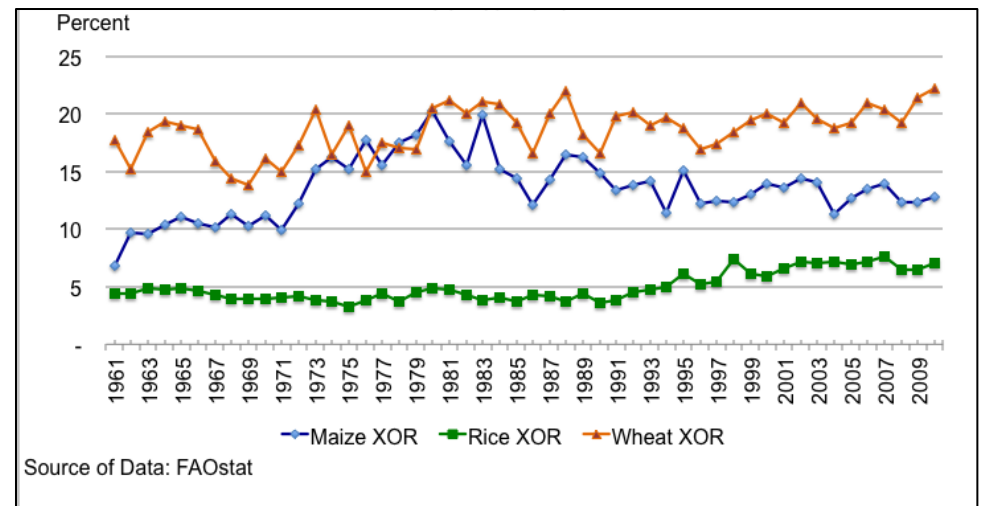
✧ Answer: talk about rice price volatility.



THE TECHNICAL WORKING GROUP PLANNING WORKSHOP OF AFSRB ON ADB PROPOSAL
3-4 MAY 2010, THAILAND

Why rice trade is thin

- ✧ Internal distortion in importing countries requiring domestic rice farmers to import competition
- ✧ Virtual self-insurance against a food insecurity risk with a thin trade in rice



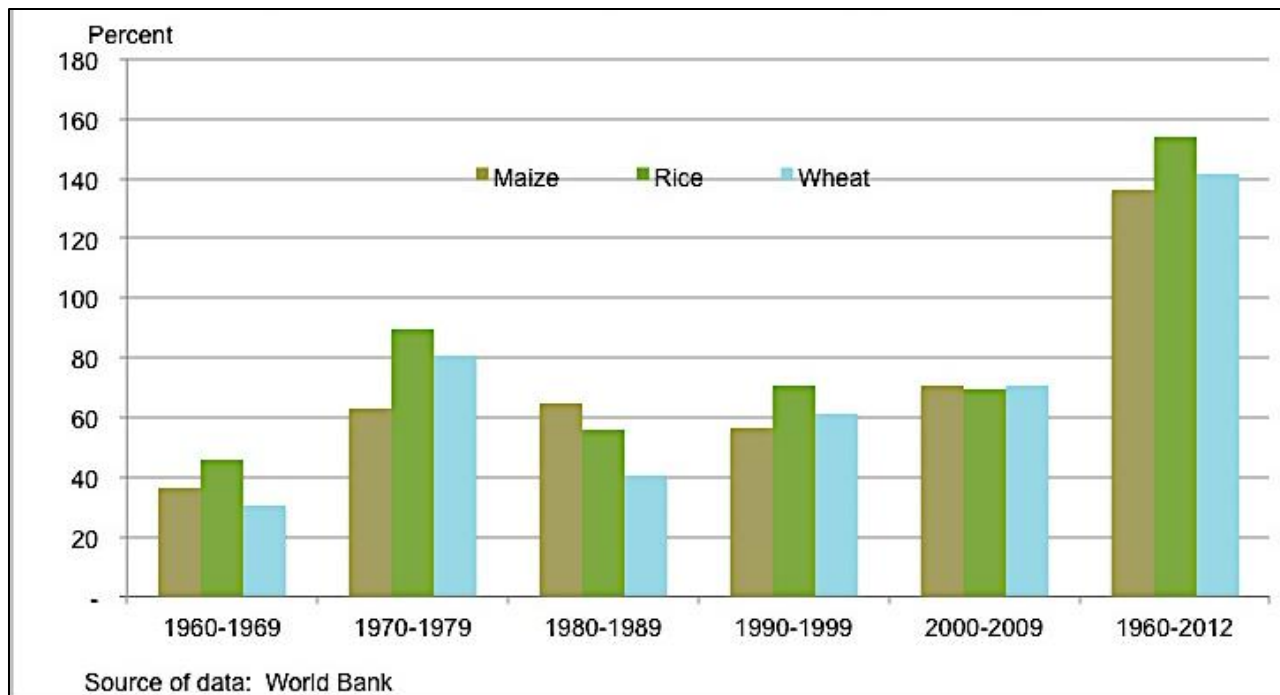
Relative cereal price fluctuations

- ✧ About 95% of price fluctuations are between + or – 20%
- ✧ Rice has most extreme fluctuations.

| Table 5. Frequency distribution of monthly cereal price fluctuations, Feb 1960 - May 2012 (in percent) | | | |
|---|-------|-------|-------|
| Categories of rates of monthly price changes | Maize | Rice | Wheat |
| >-0.3 or <=-0.2 | - | - | - |
| >-0.2 or <=-0.1 | 0.48 | 0.16 | 0.16 |
| >-0.1 or <=0 | 3.34 | 3.50 | 2.55 |
| >0 or <=0.1 | 48.09 | 45.70 | 49.84 |
| >0.1 or <=0.2 | 43.95 | 47.29 | 43.63 |
| >0.2 or <=0.3 | 3.98 | 2.23 | 3.03 |
| >0.3 or <=0.4 | 0.16 | 0.64 | 0.64 |
| >0.4 or <=0.5 | - | 0.16 | - |
| >0.5 or <=0.6 | - | 0.16 | - |
| >0.6 or <=0.7 | - | 0.16 | 0.16 |
| 0.7 | - | - | - |
| Total | 100 | 100 | 100 |
| Source of data: World Bank | | | |

Relative price volatility of cereals

✧ Rice has relatively the highest price volatility in most decades.



Tradability and price volatility of rice

✧ In case of rice, tradability is inversely correlated with average price volatility.

✧ The inverse relationship does not hold up in the case of wheat or maize.

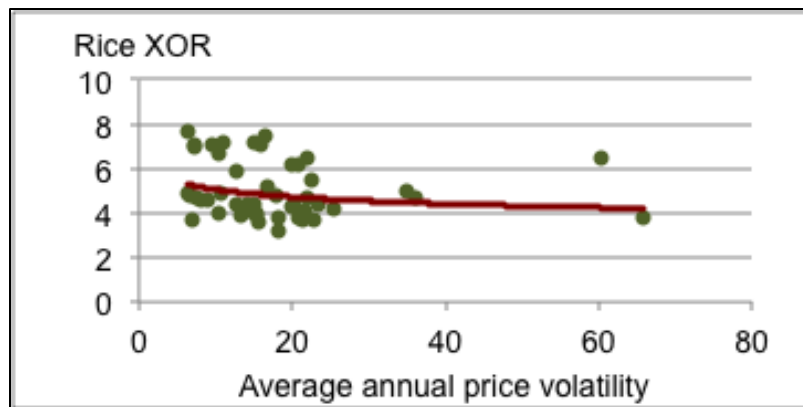


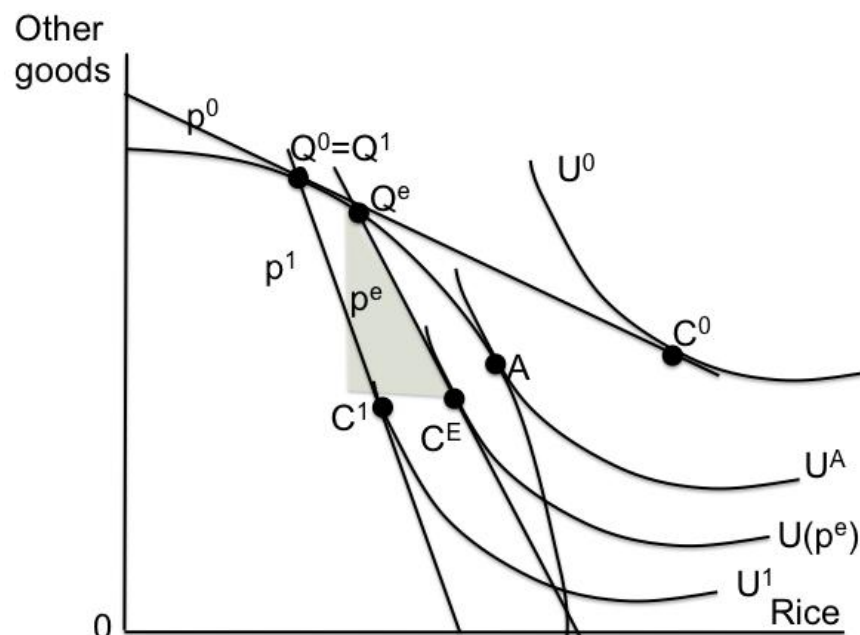
Table 6. Average Cereal Price Volatility and Export to Output Ratios: 1961 to 2010 (in percent)

| | Maize | | Rice | | Wheat | |
|-------------|------------------|-------|------------------|------|------------------|-------|
| | Price Volatility | XOR | Price Volatility | XOR | Price Volatility | XOR |
| 1961-1969 | 32.64 | 9.99 | 44.97 | 4.46 | 29.40 | 16.95 |
| 1970-1979 | 62.72 | 14.88 | 89.45 | 3.94 | 80.86 | 17.07 |
| 1980-1989 | 64.78 | 16.20 | 56.02 | 4.21 | 40.73 | 19.97 |
| 1990-1999 | 56.19 | 13.29 | 70.69 | 5.20 | 61.46 | 18.64 |
| 2000-2010 | 74.52 | 13.18 | 71.41 | 6.86 | 80.22 | 20.18 |
| 1961 - 2010 | 133.72 | 13.57 | 152.28 | 4.98 | 139.08 | 18.63 |

Source of Data: FAO for trade data; WB for prices

Effect of rice price volatility on trade

- ✧ Short run adjustment cost inhibits more output response.
- ✧ Extreme rice price volatility reduces rice trade.
- ✧ Self-sufficiency (U^A) can be preferred to $U(p^e)$, expected welfare.



Granger causality test

✧ Excessive price volatility appears to cause rice trade to be low.

Test #1: Price volatility Granger causes lower trade

Dependent variable: quant (Rice exports)

Log likelihood = -1.163e+11
0.0000

Prob > chi2 =

| quant | Coef. | Std. ERR, | z | Remarks |
|-------|-------|-----------|---|---------|
|-------|-------|-----------|---|---------|

Dependent variable: quant

| | | | | |
|--------------|----------------|-----------|-------|-----------------------------|
| quantlag | 0.3695033 | 0.0292251 | 12.64 | |
| quantlag2 | 0.0596144 | 0.0155061 | 3.84 | |
| exconstlag | - 0.0417605 | 0.0242242 | -1.72 | *significant at 10 % |
| exconstlag 2 | - 0.0539147 | 0.0402726 | -1.34 | insignificant |

Wald chi2(4) = 242.09

Prob > chi2 = 0.0000

Prob > chi2 = 0.0649* pairwise significant at 10%

Test #2: Low trade Granger causes price volatility

Dependent variable: extreme price volatility (exconst)

Log likelihood = -7602.101

Prob > chi2 = 0.0071

| quant | Coef. | Std. ERR, | z | Remarks |
|-------------|------------|-----------|-------|---------------|
| exconstlag | -0.0564815 | 0.0220887 | 0.011 | |
| exconstlag2 | 0.0596603 | 0.0201787 | 0.003 | |
| quantlag | 0.000671 | 0.0134203 | 0.960 | insignificant |
| quantlag2 | -0.0163969 | 0.0123545 | 0.184 | insignificant |

Wald chi2(4) = 14.89

Prob > chi2 = 0.0049

Estimates from a gravity model of rice trade

Table 2. Contribution of extreme rice price volatility to rice export volumes

| | Basic model | Alternative Extreme Volatility Measures | | |
|--|-------------|---|----------------|----------------|
| | | A ¹ | B ² | C ³ |
| ln GDP agriculture of exporting country | 0.66*** | 0.76*** | 0.73*** | 0.75*** |
| ln GDP per capita of importing country | -0.49* | -0.51* | -0.50* | -0.51* |
| ln population of exporting country | 0.6300 | 0.41 | 0.51 | 0.47 |
| ln population of importing country | 0.11 | 0.05 | 0.08 | 0.07 |
| time trend | 0.03* | 0.03* | 0.03* | 0.03 |
| standard deviation of 24 monthly price fluctuations | -0.08*** | 0.03 | 0.01 | 0.00 |
| standard deviation of 24 monthly prices one year lag | -0.06* | 0.01 | 0.00 | 0.01 |
| extreme volatility A ¹ | | -0.18*** | | |
| extreme volatility A one year lag | | -0.26*** | | |
| extreme volatility B ² | | | -0.18** | |
| extreme volatility B one year lag | | | -0.11 | |
| extreme volatility C ³ | | | | -0.16** |
| extreme volatility C one year lag | | | | -0.21*** |
| F-test: 2 Extreme Var: | | 0.00*** | 0.06* | 0.01*** |

F-Test results denote P-value that the 2 extreme variables jointly exceed zero.

Notes: *** significant at 1% ** significant at 5% * significant at 10%

¹ 97.5 % quantile estimated assuming that the rates of monthly price changes are normally distributed

² 97.5 % quantile estimated using a non-parametric generalized-additive-model of commodity price movements estimated using the spline-backfitted-kernel (SBK) estimator (see Martins-Filho, et al. (2009)

³ 97.5 % quantile estimated using the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) (Bollerslev, T., 1986)

Source: Labao, A. (2012)

✧ Volatility dampens rice trade

✧ Estimates from a gravity model of trade

✧ Excessive volatility reduces trade.

Reducing extreme rice price volatility: a framework

- ✧ Rice stocks
- ✧ Rice market information and intelligence
- ✧ Rice trade facilitation

Rice stocks

- ✧ Rice market vulnerable to extreme price volatility with low stocks to use ratios
- ✧ Reserves strengthen confidence of stakeholders in rice trade.
- ✧ Categories of rice reserves: emergency vs. smoothing intra- or multi-year price volatility (strategic reserves)
- ✧ Timmer suggests: reserves at four levels, private, country reserves (small importing), country reserves (large producing, importing), and international reserves.

Proposals on rice stocks

- ✧ Increase stocks to use ratios
- ✧ Information sharing about rice stocks.
- ✧ International food agency to coordinate the operations of the reserves, to gather and disseminate information about food stocks.
- ✧ Emergency reserves, von Braum and Torero suggests about 5 % of food aid flows.

What ASEAN may consider

- ✧ Determining the appropriate size of reserves
 - Strategic reserves depend upon the reliability of sourcing imports from sources, availability of substitutes, and the holding cost.
- ✧ ASEAN Plus 6 emergency rice reserves?
 - Bangladesh, India, and Pakistan

Market information and intelligence (1)

- ✧ Trade shocks are not fundamental explanations for the price bubble in 2008.
- ✧ Speculative herding behavior
- ✧ Importance of generating and disseminating accurate market information
- ✧ More important side is the interpretation of the information.
- ✧ Need for tools to analyze the impact of supply and demand shocks as well as policy changes.

Market information and intelligence (2)

- ✧ AFSIS as gathering basic statistics about the regional rice market.
- ✧ Need for sharing market intelligence (e.g. close to **real time** stocks to use ratios, trade flows, policy developments, supply and demand shocks, etc.)

Policy options for trade

- ✧ Coordinated investments to expand export capacity of ASEAN in Myanmar and Cambodia
- ✧ Reduced self-sufficiency targets for guaranteed rice imports
- ✧ Clear set of criteria on the ATIGA waiver (Article 24)
- ✧ A de-coupled Thailand's paddy pledging program
- ✧ Expanded coordinated rice policy action (w/ China, India, Pakistan?)

Rice trade forum

- ✧ ASEAN rice trade forum, platform for (1) **sharing market information and intelligence**, (2) **coordinating policy responses to crisis situations**, and (3) **negotiations among importers and exporters**.
- ✧ Continue the implementation of the Rice Trade Forum in ASEAN.



Thank you.

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