Does Government Operations in Staple Food Markets Reduce or Exacerbate Food Price Volatility? Evidence from East and Southern Africa

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What is the problem?

- Food production fluctuations lead to price instability
- Food price instability is a major problem
  - For farmers
  - For consumers
  - For governments
- In response to food price instability, some governments implement policies to control trade flows and/or price levels
Underlying question motivating our study

- Do government actions meant to stabilize food reduce food price instability and unpredictability?
Two main ways in which governments aim to stabilize food prices

1. Restrictions on trade
   - Export bans
   - Import bans/tariffs
   - Do not approve permits to import or export (a de facto ban)

2. Marketing board operations
   - Fixed buying and/or selling prices
   - Stock accumulation and release onto markets
Why might government actions fail to succeed in reducing instability?

- Government may announce intention to import but do so late, causing prices to shoot over import parity.

- Traders may desist from operating in certain smallholder areas out of uncertainty of government behavior (e.g., after government announces that it will buy at artificially high prices, but then runs out of funding to buy) → farmers lose access to markets that they otherwise would have had.
Discretionary (“ad hoc”) trade policies

- If government actions in markets are unpredictable, this tends to deter private sector from participating in the market.

- Strategic interaction between govt and traders can lead to unintended consequences (Abbink et al., 2011)

- Examples of discretionary government unpredictability: not announcing in advance
  - timing of export/import bans
  - timing of change in import tariff rates
  - when and where will marketing boards enter the market, at what price?
  - when will the Board stop buying, and what will the price be after that?
Fig 1: Maize prices vs. Import Parity
Lusaka, Zambia
Fig 2: Maize Prices vs. Import parity
Lilongwe, Malawi
Fig 3: Maize Prices vs. Import parity
Nairobi, Kenya

Tariff removed January 29, 2009

Nominal US$ per metric ton

Nairobi wholesale price
CIF from South Africa
Price Volatility/Instability - the unconditional variance in food prices over time, measured by the Coefficient of Variation

Price unpredictability - the unanticipated component of price instability, i.e., the conditional variance from a price forecast model.

Eg. A measure of unpredictability for the price in month \( t+1 \) could be represented by the forecast error between predicted and actual price.

\[
P_{t+1} - \hat{E}_t(P_{t+1}) = e_{t+1}
\]

\( e_{t+1} \), the forecast error, is the measure of unpredictability.
Data and Methods

- Conditional CV: the magnitude of one-month ahead forecast error, given known information on:
  - last month’s local & international maize price
  - local maize production index a proxy for rainfall index
  - normal seasonal price movements
  - Last month exchange rates
  - Interest rates (not included due to data problems)
  - Estimated ARCH-M models (Tests and results-updated paper)
Monthly retail/wholesale maize grain prices from 7 countries - January 1994 to December 2014

Countries
- Group A: Mozambique, Uganda, South Africa (open border policy)
- Group B: Malawi, Zambia, Tanzania (heavy restriction of trade)
- Borderline case: Kenya (initially restricting trade, progressively open border policy, especially since January 2005)
<table>
<thead>
<tr>
<th>Country</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanzania</td>
<td>Jan 1994 to Dec 2004 (Reform phase)</td>
<td>Jan 2005 to current (Beginning of on/off Export bans)</td>
<td>-</td>
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<tr>
<td>Zambia</td>
<td>Jan 1994 to Apr 2000 (Reform phase)</td>
<td>May 2001-Apr 2005 (FRA became one of the major players in the maize market)</td>
<td>May 2005- current (FRA ramping up its activities prior to an election)</td>
</tr>
<tr>
<td>Malawi</td>
<td>Jan 1994 to Mar 2005 (Reform phase)</td>
<td>April 2005 to current (ASIP Ag Input Subsidy Program)</td>
<td>-</td>
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<td>South Africa, Mozambique and Uganda</td>
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**Table 1: Timing of major different policy regimes**
Finding 1: Maize production growth

- Countries pursuing food price stabilization policies and food security objectives through direct state operations and fertilizer subsidies have failed to match maize production growth of countries with relatively stable maize marketing and trade policies (an exception – South Africa)
Fig 4: Maize Production Index, 1990-2013

Source: Data from FAOStat, 2015
Fig 5: Overall Maize Production Growth, 1993/94-2013/14

Source: Data from FAOStat, 2015
Finding 2: Price volatility and Predictability

- To some extent, maize grain prices are generally more volatile and less predictable in countries that pursue food price stabilization policies through direct state operations and restrict grain trade via ad-hoc domestic and trade policies compared to those with relatively stable and open border policies.

  - Malawi and Zambia have the highest degree of price volatility and uncertainty.
Fig 6: Unconditional Coefficient of Variation for Capital City Markets/major Consumption Centers
Fig 7: Conditional Coefficient of Variation for Capital City Markets/major Consumption Centers

Suspect WFP Local maize purchase program??
Fig 8: Conditional Coefficient of Variation Comparison: Lilongwe (Malawi) Vs. Maputo, Mozambique
Fig 9: Conditional Coefficient of Variation Comparison: Lusaka (Zambia) Vs. Maputo, Mozambique
Finding 3

- The more stable trade policy environment in Kenya between 2005 and 2008 appears to have contributed to the decline of both price volatility and market uncertainty.
  - Historical unconditional and conditional Coefficient of Variations (CVs) declined when Kenya entered into the East African Commission trading agreement in January 2005.
  - Kenya eliminated the variable maize import tariffs from Uganda and Tanzania (except for a 2.75% inspection fee).
Fig 10: Conditional Coefficient of Variation Comparison: Nairobi, Kenya
Despite theoretical rationale for price stabilization and controlling trade to stabilize food supplies, countries that rely on “maize without borders” generally have

- more stable prices
- higher cereal production growth

than countries actively intervening to stabilize prices.

While private trading systems will always result in some price variability, they tend not to cause the frequent food crises caused by ad hoc government actions that are commonly seen in the region.
THANK YOU