Proposed Approach to Analyzing World Food Program LRP Effects

David Tschirley
Bob Myers

Presented at WFP’s P4P M&E Technical Meeting,
Dupont Circle Hotel, Washington DC, 19-20 April, 2011
Outline

- Potential LRP effects
- Analytical approach
- Case studies
- Modeling
  - Structural approaches
  - VAR approaches
Potential LRP Effects
Increased Demand
Increased Demand

Effects on Prices, Expectations
Increased Demand

Effects on Prices, Expectations

Farm Level Supply Response

Downstream Supply Response
Increased Demand

Effects on Prices, Expectations

Farm Level Supply Response

HH Incomes, Assets

Downstream Supply Response

Food System Assets, Productivity, Responsiveness
Increased Demand

Effects on Prices, Expectations

Farm Level Supply Response

HH Incomes, Assets

Downstream Supply Response

Food System Assets, Productivity, Responsiveness
Increased Demand

Effects on Prices, Expectations

Farm Level Supply Response
- HH Incomes, Assets

Downstream Supply Response
- Food System Assets, Productivity, Responsiveness
Increased Demand

Effects on Prices, Expectations

Farm Level Supply Response
- HH Incomes, Assets

P4P

Downstream Supply Response
- Food System Assets, Productivity, Responsiveness

P4P
P4P and LRP

- To what extent have these supply responses to LRP been taking place without P4P?
- Depends on ability to increase productivity
  - Policy environment
  - Input & output market performance
  - Orientation and capacity of farmers
    - Extension systems
    - Access to credit
    - Access to productive assets
    - Other development programs/projects
Analytical Approach
Modeling

Increased Demand

Effects on Prices, Expectations

Farm Level Supply Response

HH Incomes, Assets

Downstream Supply Response

Food System Assets, Productivity, Responsiveness
Increased Demand

**Effects on Prices, Expectations**

- **Farm Level Supply Response**
  - **HH Incomes, Assets**

- **Downstream Supply Response**
  - **Food System Assets, Productivity, Responsiveness**

---

*Modeling*
**Case Studies**

- Increased Demand
- Effects on Prices, Expectations
  - Farm Level Supply Response
    - HH Incomes, Assets
  - Downstream Supply Response
    - Food System Assets, Productivity, Responsiveness
Increased Demand

Effects on Prices, Expectations

Farm Level Supply Response
HH Incomes, Assets

Downstream Supply Response
Food System Assets, Productivity, Responsiveness

Case Studies
Case Studies
Case Studies

• Use quantitative LRP time series data to set the context along with data on
  • Production
  • Prices
  • Food aid imports

• Examine developmental effects
  • Has LRP affected expectations of farmers (?), traders, and processors?
  • Has LRP moved to a more counter-seasonal purchasing pattern?
  • Quantifiable impacts on investment in processing
  • Contribution to development of modern market institutions
Case Studies (2)

- Examine performance on first order risks
  - Update analysis from Tschirley and Del Castillo on pricing performance
  - Closer examination of periods of potential adverse price impacts
- Record on trader default
- Record on food quality
  - Can we have access to all testing results – on accepted and rejected tenders – for aflatoxin?
  - This will help define the dimension of the food quality challenge in SSA
Case Studies (3)

- Key issue: how to select the countries?
  - Those where we can put together an analytical package?
    - Macro VAR on prices + household models + case studies
    - Requires data
    - Zambia, Mozambique, Kenya … others?
    - Very rich insights, but …
  - Those in which specific issues are of special importance
    - Suspicion of adverse price impacts
    - Concern with quality
    - Promotion of processing
    - … where data may not be all available to do the full package
Modeling
Macro (Market) Level Analysis

Objective:
Evaluate the effects of instrument variables:
   - LRP purchases
   - Food aid distributions

On performance variables:
   - Maize price levels
   - Maize price stability (including seasonality)
   - Maize production
   - Total crop production
Alternative Methodologies

1. **Structural Modeling**
   - Specify and estimate multi-market supply and demand model (incorporating effects of LRP and food aid)
   - Simulate effects of LRP
   - Requires data on many variables not readily available
   - Results tend to be driven by specification and assumptions

2. **Reduced Form (VAR) Modeling**
   - Specify and estimate reduced form VAR model
   - Simulate effects of LRP (and food aid distributions)
   - Requires fewer variables
   - Results more data driven
VAR Approach

We propose a VAR approach to help overcome data limitations and provide a more data-based estimate of LRP effects

Examples in the Literature:

• Jayne, Myers, and Nyoro, *Agricultural Economics*, 2005 (Effects if NCPB maize marketing policies on the level and stability of Kenyan maize prices)

• Abdulai, Barrett, and Hoddinott, *World Development*, 2005 (Effects of food aid on food production in Sub-Saharan Africa)
Two VAR Model Types

We suggest two separate VAR model types will be needed

- One using monthly data to examine the relationship between LRP and maize price levels and variability (separate country models)

- One using annual data to examine the relationship between LRP and the supply of maize, and of aggregate crop production, (possibly separate country models, possibly panel)
Micro (Household) Level Analysis

Objective:
Evaluate the effects of instrument variables:
- Price effects of LRP
- Food aid distributions

On performance variables:
- Household maize supply
- Household welfare and poverty
- Possibly household maize consumption
  - would require different data sets
Methodology

Structural household supply/factor demand and possibly consumption model

- Cross-sectional/panel data based on rural household surveys
- Investigate distribution of effects across household types
- Macro price effect results will be used as input
Examples of HH Modeling Approach

- Mghenyi, Myers, and Jayne, Agricultural Economics, 2010 (Effects of maize price increase on household welfare and poverty in Kenya)

- Abdulai, Barrett, and Hoddinott, *World Development*, 2005 (Effects of food aid on household input use in Ethiopia)
Country Coverage

We propose a three-pronged approach of:
- Prices VAR
- Household structural model
- Supply chain case studies

Applied to each of three countries for which we know required data are available (Zambia, Mozambique, Kenya)

The production VAR will also be applied to each of the three countries separately if possible, but data limitations will probably require a single panel (cross-country) study