Food Pricing Policies, Rural Poverty, and Income Distribution: Drawing Insights from the Case of maize in Kenya

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The maize pricing policy

- Prior to 1987/88 government controlled maize trading. Maize trading was monopolized by the National Cereals and Produce Board (NCPB)
- Reforms intensified in early 1990s leading to free maize distribution with minimal restrictions. NCPB remained active, reduced budget, buying for strategic reserves.
- Farmers were exposed to market forces led to reduced producer prices
- Reforms proved controversial. Lobbying by farmers in high productive maize regions (sellers of maize).
The maize pricing policy contd..

- Since 1999, NCPB announces maize purchases at support prices when market prices are low. Government budgeted Kshs 4.5 billion (US $ 68 million) for maize purchases last season.
- Why is this a problem?
- High prices do not benefit all – what about the poor who spend 28% of their income on maize purchases?
- The classic food price dilemma

Methods

- Household model  \( V = \psi(wT + b + \pi, p) \)
- Framework follows from Deaton (1989)
  \[ V = \text{utility value} , \quad w = \text{wage rate} , \quad T = \text{total time worked} , \quad b = \text{rental income} , \quad p = \text{price vector} , \quad \pi(p,u,w) = \text{households profit from farming/business} , \]  and \( u \) is a vector of input prices
Methods contd..

- Assume profit maximization in farming, rental, and wage employment then separate producer prices and consumer prices to get general representation

\[ V[\pi(p_p, u, w), p_c] \]

- Separate maize prices from other prices

\[ V[\pi(p_m, p_p, u, w), p_m, p_c] \]

Methods contd..

- Differentiating w.r.t. price of maize and invoking some lemma’s give

\[ dV = \frac{\partial V}{\partial \pi} (o_m - c_m)dp_m \]

- Product of marginal utility of households profit/income and change in income

- Assume common marginal utility then standardize to 1, which implies income changes are transformed to utility changes on a one to one correspondence.

Hence

\[ dV_i = (o_{mi} - c_{mi})dp_m = d\pi_i \]
Methods contd..

- Divide by initial incomes we get

\[ \frac{d\pi_i}{\pi_i^o} = (q_{mi} - l_{mi})d \ln p_m, \text{ where } q_{mi} = \left( p_m^o \times o_{mi} \right) / \pi_i^o \]

and

\[ l_{mi} = \left( p_m^o \times c_{mi} \right) / \pi_i^o. \]

Or

\[ \frac{d \ln \pi_i}{d \ln p_m} = (q_{mi} - l_{mi}), \text{ which could be interpreted as the maize price elasticity of income.} \]

- The elasticity measures the very short run (first-order) effects of the policy on incomes; similar to NBR in previous studies

Methods contd..

- Instead of CGE modeling, I consider second round adjustments in production, consumption, and rural wage markets; use Taylor’s series expansion to get second order approx. of equilibrium changes in income

\[ SOAC = (q_{mi} - l_{mi})dp_{m-\text{percent}} + \frac{1}{2}\left[ (q_{mi})e_{mz}^s - (l_{mi})e_{mz}^d \right] (dp_{m-\text{percent}})^2 + \frac{1}{2}\left[ e_{mz}^s (w_{sm} - wr_{mi}) \right] (dp_{m-\text{percent}})^2 \]

- Next, generate 2 income vectors; counterfactual incomes and incomes with effects of price supports
- And compare test which distribution has more poverty
Effects on Poverty

- Stochastic dominance ($D_\alpha$) equivalent to poverty dominance for FGT measures of poverty ($P_\alpha$) (Foster and Shorrocks 1988)
- Implies that if you have 2 income distributions; X and Y. first degree dominance of X => headcount ratio higher in Y, and second degree dominance => poverty gap measure higher in Y
- Motivation; allows poverty rankings based on a wide range of reasonable poverty lines – addresses the identification problem.
- Here, I consider the World Bank US $30 per month per person poverty line, and all other thresholds below it
Results:
Coastal lowlands region

The result shows that the number of the poor is increased in coastal lowlands region.

Similar results obtain for four other regions:
1. Western lowlands
2. Eastern lowlands
3. Western highlands
4. Central highlands
Results; western transitional

Western Transitional: First Order Poverty Dominance Curves (19.7% increase in price of maize)

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Results; western transitional contd..

Second Order Poverty Dominance: Western Transitional (19.7% increase in price of maize)
Results; high potential maize zone

High Potential Maize Zone: First Order Poverty Dominance Curves (19% increase in maize prices)

Contd...

Second Order Poverty Dominance: High Potential Maize Zone (19% increase in maize prices)
Results contd..

- Analysis considered price impact of 19.7% from recent study (Jayne et al 2005). Sensitivity analysis: results hold for price changes within 5% std deviation (15% and 25%)

- Assumed same supply and demand response across income levels. Results hold for up to 40% difference in elasticity between the highest and lowest income quintiles

Conclusions and discussion

- Maize pricing policy increases the number of the poor in Kenyan lowlands (coastal, eastern and western), and in Kenyan highlands (western and central)

- The policy may not increase the number of the poor in western transitional zone, but their income shortfalls are increased

- No impacts on poverty in high potential maize zone
Conclusions and discussion

- Proven alternative productivity enhancing policies
  - agricultural crop research and development (Oehmke and Crawford, 1996; Alston et al., 2000)
  - investments in physical infrastructure to reduce marketing costs (Antle, 1983)
  - well-structured extension programs (Evenson, 2001)