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# 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).
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## 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
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## Methods

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

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

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## 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  $dV_i = (o_{mi} - c_{mi}) dp_m = d\pi_i$

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## Methods contd..

- Divide by initial incomes we get

$$d\pi_i / \pi_i^o = (q_{mi} - l_{mi}) d \ln p_m, \quad \text{where} \quad q_{mi} = (p_m^o \times o_{mi}) / \pi_i^o$$

$$\text{and} \quad l_{mi} = (p_m^o \times c_{mi}) / \pi_i^o.$$

$$\text{Or} \quad \frac{d \ln \pi_i}{d \ln p_m} = (q_{mi} - l_{mi}), \quad \text{which could be}$$

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

$$SOAC = (q_{mi} - l_{mi}) dp_{m-\text{percent}} + \frac{1}{2} [(q_{mi}) \varepsilon_{mz}^s - (l_{mi}) \varepsilon_{mz}^d] (dp_{m-\text{percent}})^2 \\ + \frac{1}{2} [\varepsilon_{mz}^s (ws_{mi} - wr_{mi})] (dp_{m-\text{percent}})^2$$

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

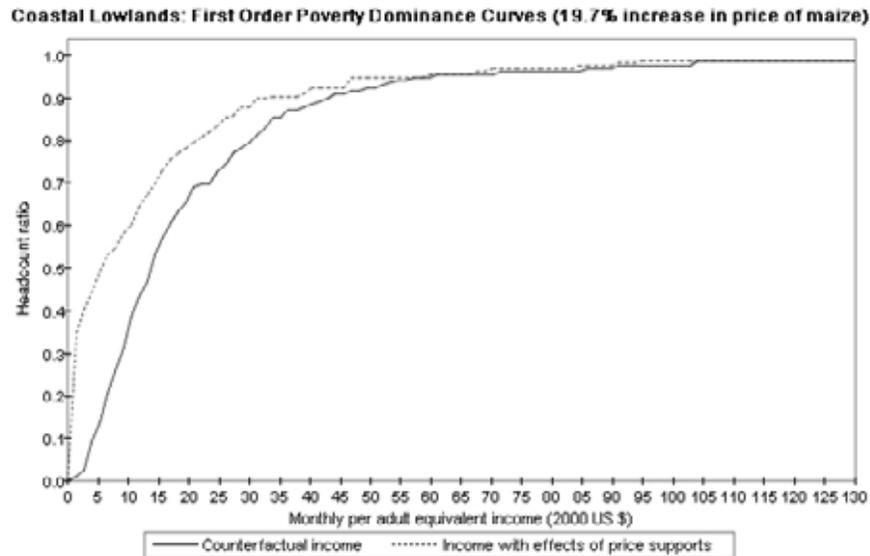
## Effects on Poverty

- 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  $\Rightarrow$  headcount ratio higher in Y, and second degree dominance  $\Rightarrow$  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

## Map of Kenya



## Results: Coastal lowlands region

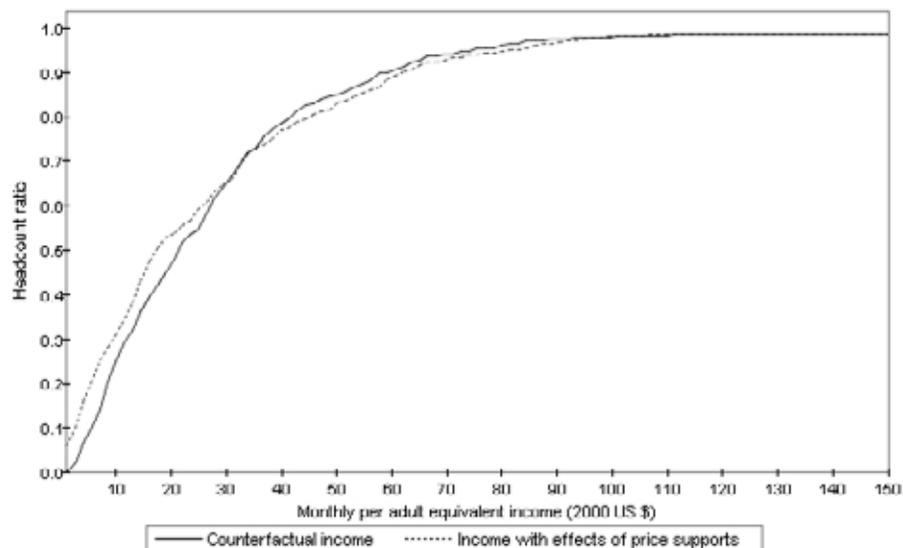


## Results contd..

- 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

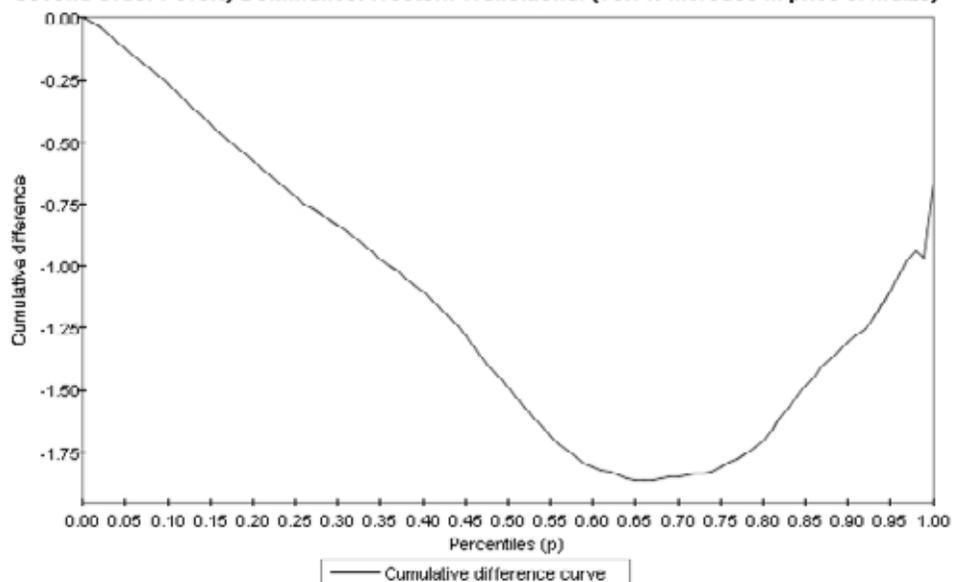
# Results; western transitional

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



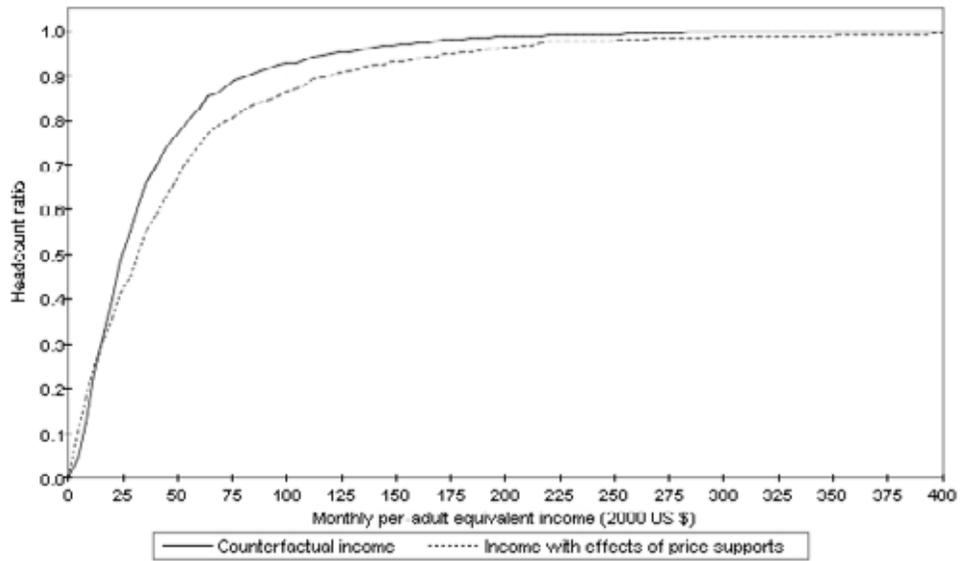
# Results; western transitional contd..

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



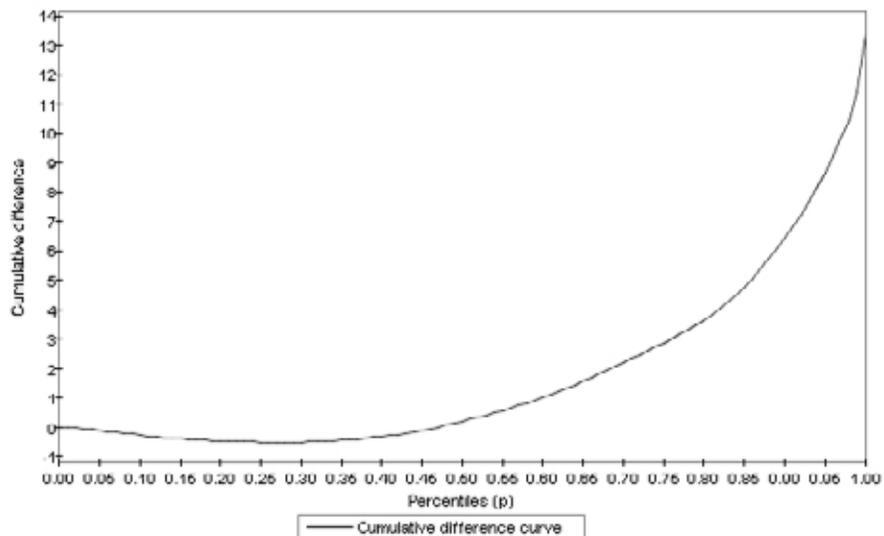
# Results; high potential maize zone

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



# Results; high potential maize zone contd..

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



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## 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
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## 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
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## 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)
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