Food Price Heterogeneity and Income Inequality in Malawi: Is Inequality Underestimated?

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Outline

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Motivation 1

- Food prices maybe regressive in the sense that the poor compared to the non-poor pay more for food (e.g. Attanasio and Frayne, 2006; Beatty, 2010; Gibson and Kim, 2013).

- Reasons for this poverty penalty (see e.g. Muller (2002) and Mendoza (2011))
    - Serving the poor may be more costly
    - The poor face greater liquidity constraints$\Longrightarrow$buy food in small quantities$\Longrightarrow$not enjoy quantity/bulk discounts$\Longrightarrow$ leads to higher unit prices
    - Liquidity constraints and a lack of proper postharvest storage facilities or a combination of both $\Longrightarrow$ the poor to buy food at suboptimal periods
    - Higher search costs $\Longrightarrow$poor paying more for food

Motivation 2

- A poverty penalty in food purchases has implications on the measurement of income inequality.
- Engel's Law$\implies$inequality augmenting effect of regressive food prices may even be more pronounced in a context where the majority are poor.
- With regressive food prices, nominal income inequality may underestimate the extent of income inequality.
- Rao (2000); Günther and Grimm (2007); Muller (2008)) find evidence of substantial gains in accuracy by deflating income or consumption more precisely.

Fact

Muller (2008), deflation of welfare using regional or national level price indices in developing countries is the norm rather than the exception.

Motivation 3

- Official inequality measures in Malawi deflate consumption using regional CPI.
- Don't control for the poverty penalty in the food market
- Closes this gap in knowledge by focusing on two issues:
  1. Establishes whether or not the poor pay more food in Malawi.
  2. Consequences of the poverty penalty on the levels of and trends in measured income inequality in Malawi.
- Why is this important?
  - Shed some light on why despite impressive economic growth figures poverty has only barely declined in Malawi:
    - poverty-inequality-growth literature (e.g. Ravallion; 2001)
  - Poverty reducing effects of future growth
    - Initial inequality vs. poverty (e.g. Fosu; 2009)

Growth, Poverty, and Inequality in Malawi

Area	2005	2011
GDP growth	6.2[a]	7.5[b]
Poverty headcount		
National	52.4	50.7
Rural	55.9	56.6
Urban	25.4	17.3
Gini Coefficient		
National	0.390	0.452
Rural	0.339	0.375
Urban	0.484	0.491

[a] Average GDP growth for 2004-2007, [b] average GDP growth for 2008-2011.

Source: NSO (2005, 2012a, 2012b)

Data

- Second and the Third Integrated Household Surveys (IHS2 and IHS3) conducted by the National Statistical Office (NSO).
- IHS2, 11280; IHS3, 12271
- 115 and 124 food items in IHS2 and IHS3
- The quality of conversion factors is critical, Verduzco-Gallo and Ecker (2014) find that official conversion factors have inconsistencies and errors
- Beck et al. (2014) provide a detailed comparative analysis of the two food aggregates.
- Total quantity of food consumed $=$ purchased food $+$own production$+$gifts.
- focus on purchased food only$\Rightarrow$poverty penalty

- poverty penalty as a form of consumption-related inequality in prices $\Rightarrow$ concentration indices of price indices.
- Alternatively regression based (Muller, 2002; Beatty, 2010).
- I use unit values as proxies for prices. A household specific Laspeyres price index for household i in area $g = rural, urban$, which purchases a food item $l \in L$, is given by

$$P_{ig}^{LA} = \frac{\sum_{l=1}^{L_i} p_{lg}^i q_{lg}^0}{\sum_{l=1}^{L_i} p_{lg}^0 q_{lg}^0} \tag{1}$$

where p_{lg}^i is the price of a food item paid by a household,

$$q_{lg}^0 = \frac{1}{N_g} \sum_{i=1}^{N_g} w_{ig} q_{lg}^i \tag{2}$$

is a weighted mean quantity of a food item for area g

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$$p_{lg}^0 = \frac{1}{N_g} \sum_{i=1}^{N_g} w_{ig} p_{lg}^i \qquad (3)$$

is a weighted mean price of a food item for area g.

- Interpretation:
  - $C_g < 0 \implies$ poverty penalty
  - $C_g > 0 \implies$ no poverty penalty
  - $C_g = 0 \implies$ no food price inequalities

- The magnitude of C_g = strength of the poverty penalty
- The presence of a poverty penalty $H_0 : C_g = 0$ vs. $H_a : C_g < 0$.

Methods- measurement of inequality

- Measurement of inequality: Gini coefficient, and generalized entropy class of inequality indices (Theil's L and Theil's T)

New consumption aggregate	Official consumption aggregate
1. nominal per capita consumption expenditure	1. nominal per capita consumption expenditure
2. real per capita consumption expenditure (official CPI)	2. real per capita consumption expenditure (official CPI)
3. real per capita consumption expenditure (household specific price index)	

Results 1-Poverty penalty

- Concentration indices for all the survey periods, and areas are negative
- The null that a concentration index is zero is rejected in a favour of the alternative that it is negative.
- The concentration indices are smaller (i.e. more negative) for rural households than for urban households
- poverty penalty was declining overtime

Results 2-Poverty penalty

Price Index	IHS2			IHS3		
	National	Rural	Urban	National	Rural	Urban
Laspeyres	-0.0276***	-0.034***	-0.0098***	-0.0104***	-0.0166***	-0.0004***
	(0.0024)	(0.0028)	(0.0032)	(0.0017)	(0.0021)	(0.0001)
	[-2.07]	[-2.55]	[-0.74]	[-0.78]	[-1.25]	[-0.03]

Results 3-Inequality

- Percentage change in consumption following deflation for each percentile
- Deflation leads to decreasing consumption for all years and locations, the decline is more substantial for the poorest households.
- Deflation leads to a 27.8% drop in consumption for households in the first percentile
- 99th percentile, the results show that deflation reduces nominal consumption by 8.9%
- The tails of the consumption distribution are differentially impacted by deflation

Results 4-Inequality

Price Index used	IHS2			IHS3		
	National	Rural	Urban	National	Rural	Urban
	Gini coefficient					
None	0.4403	0.3957	0.4894	0.4852	0.4166	0.5233
	(0.0216)	(0.0244)	(0.0274)	(0.018)	(0.0151)	(0.0216)
Official CPI	0.434	0.400	0.4952	0.4776	0.4189	0.5208
	(0.0215)	(0.0242)	(0.0288)	(0.0173)	(0.0156)	(0.0215)
Laspeyres	0.4654	0.4182	0.5239	0.5139	0.4464	0.5438
	(0.0192)	(0.0198)	(0.0253)	(0.0163)	(0.0133)	(0.0027)

Results 5-Inequality

- measured inequality based on the new consumption aggregate is much higher than that based on the official consumption aggregate.
  - Gini coefficient is underestimated by 10.4% for IHS2, and by 5.7% for IHS3.
  - more evident for rural areas than for urban areas
- household-specific price deflator is used on the new consumption aggregate
  - extent of the underestimation ranges from 3.9% to 7.1% for the Gini coefficient
  - The poverty penalty leads to a quantitatively substantial understating of inequality in Malawi.
- official inequality statistics grossly understate the inequality problem.

- Contamination by quality effects (Gibson and Kim, 2013); unit values might reflect purchase of goods of higher quality (Attanasio and Frayne, 2006).
- The unit values v_{ig} can be decomposed as follows (Deaton ,1988, 1997)

$$\ln v_{ig} = \ln p'_{ig} + \ln m_{ig} \qquad (4)$$

- The demand for quality is:

$$\ln m_{ig} = \delta' W^q_{ig} + \alpha \ln x_{ig} + \varepsilon_{ig} \qquad (5)$$

$$\ln v_{ig} = \delta' W^q_{ig} + \alpha \ln x_{ig} + \zeta_{ig} \qquad (6)$$

where $\zeta_{ig} = N\left(0, \sigma^2_{\zeta_g}\right)$.

- This means that $\omega_{ig} = \exp\left(\zeta_{ig}\right)$ captures the unit value component which is not explained by quality.

- $C_g < 0 \implies$ poverty penalty
- Inequality is still underestimated by official inequality figures.
- Difference before and after adjusting for quality→economically insignificant and statistically insignificant

Conclusion

- Nominal inequality underestimates "real" inequality
- Inequality figures understate the inequality problem in Malawi.
- Robust to purging the unit values of quality effects.
- High inequality levels may partly explain the puzzle of high economic growth which has led to marginal poverty reduction in Malawi