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Analysis of the Farm-to-Retail Maize Marketing Margins in Zambia

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Motivation

Most studies of rural grain markets in Africa typically regard farmers as price takers

- Both Farm-Gate Prices (FGP) and farm-to-retail marketing margins (MM) are considered exogenous to the farmer

FGP reflect market conditions in the particular village and time of sale

- MM is the difference between this exogenous FGP and the Retail Price (RP) in the nearest market center

MM varies across space and time according to traders' transport and storage costs and the degree of non-competitive behavior in these markets (all still exogenous to the farmer)

…Motivation

Anecdotal evidence in survey data suggests the existence of wide variability in FGP among farmers in the same villages and time of sale

We Posit that household-specific factors may be important in explaining variations in price, hence farm/retail price spreads commonly analyzed in agricultural economics.

Different sources of variation in MM would call for different policy actions

Objectives

This study identifies the extent to which MM and FGPs received by smallholder farmers in Zambia are indeed exogenous.

- The difference between the RP and the FP offered to small-scale farmers in their villages, and decomposes this farm-to-retail marketing margin into spatial, temporal, and household-specific factors;
- Underlying sources of variation in the size of the household-specific marketing margins and the degree to which each factor affects the size of the marketing margin;
- The implications of these findings for policy actions to promote farmers' incomes from participation in maize markets

Data

- Nationally-representative cross-sectional household data (Rural Agricultural Livelihoods Survey (RALS12)) and monthly retail data covering a covers a 12 month period, from May 2011 to April 2012.
  - Collected by Zambia's Central Statistical office (CSO) and the Indaba Agricultural Policy Research Institute (IAPRI).
  - Only households that sold their maize to assembly traders (second main transaction channel from FRA) were considered.
- Sample size to 579 households -Restricted to areas where maize trade flowed from the farm to the retail center (surplus areas- lower price to higher price).

Methods

- A variation of Marketing Cost Model was used and estimated using Ordinary Least Squares (OLS) regression

$$MM_{itj} = RP_{itj} - FP_{itj}$$

Where : $MM_{ijt} = X_{tij}\beta + \varepsilon_{jt}$

X_{tij}= (spatial (district), temporal (month), household specific characteristics)

Findings

Bivariate relationships

- About 75% of the farmers sold their maize produce at the farm gate.
- For those that did travel to sell to assembly traders, their average distance was 4.5km per maize sale transaction.
- Average of seven (7) assembly traders entering a village.
- Mean marketing margins of ZMK195.703 (USD0.04) per kg of maize sold.

Bivariate relationships

Description of Variable	Mean
Dependent variables	
Market Margin (Zambian kwacha, ZMK)**	195.7
Farm-gate Price (ZMK)	822.7
Explanatory variables	
Age of Household head (years)	44.8
Sex of household head (=1 if male, 0 female)	0.8
Household head Education level (years)	5.8
Household commercialization index (%)	39.3
Off farm participation (1=Yes)	0.6
Household Kinship ties dummy,1=yes 0=no	0.48
Farm size (Ha)	4.0
Number of Traders Entering a Village	6.9
Distance to nearest Boma (Km)	46.0
Access to price information-agric commodity(1=yes)	0.8
Month of Maize Sale	7.7
Retail Price Per Kg (ZMK)	1018.4

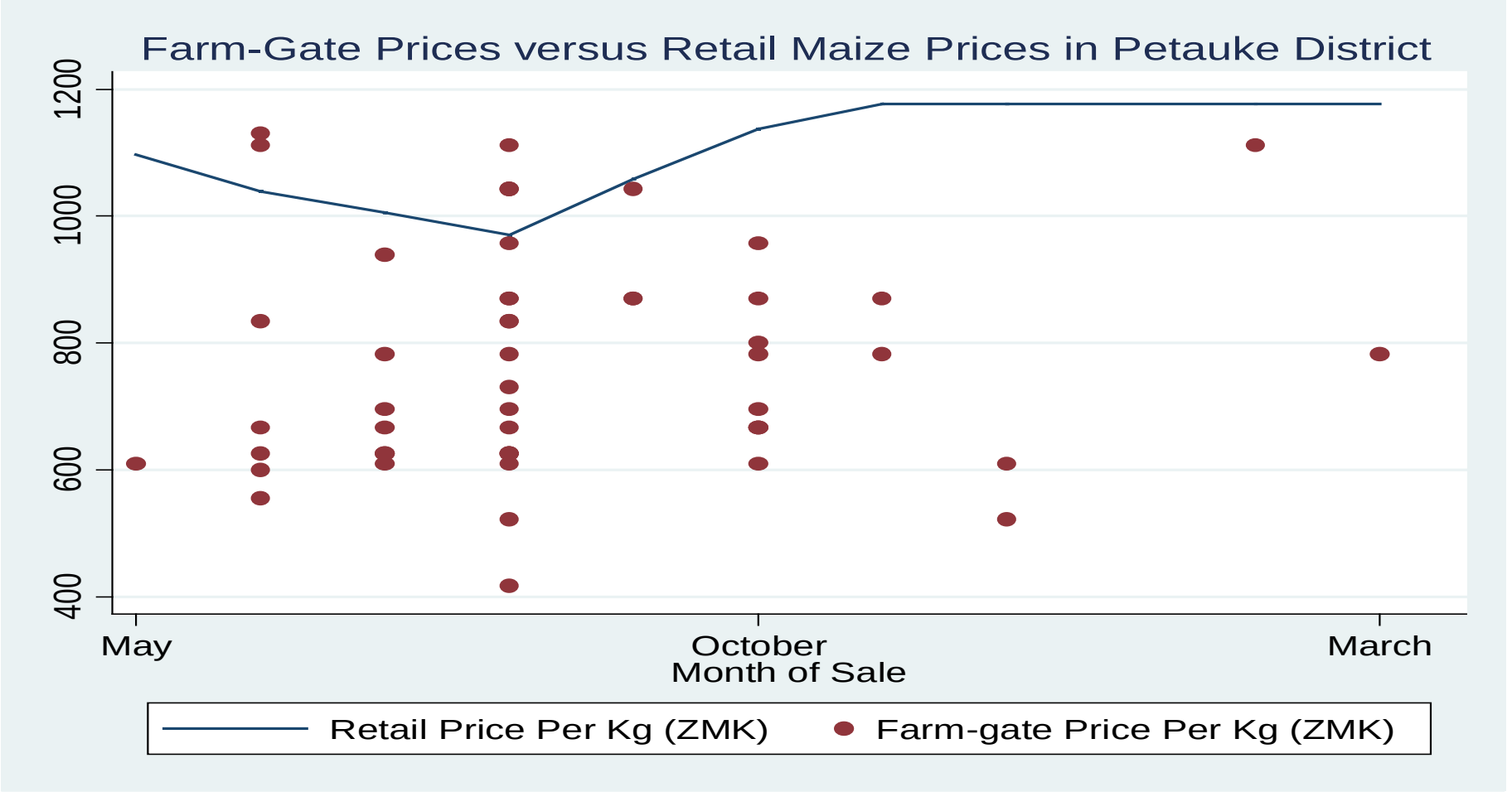
Spatial Price Variation

Province	Observations	Marketing Margin (ZMK)
Central	109	189.29
Copperbelt	47	192.88
Eastern	165	268.95
Luapula	34	264.97
Lusaka	19	225.32
Muchinga	13	151.77
Northern	74	208.82
North Western	48	73.64
Southern	63	66.02
Western	7	118.07

Temporal Price Variation

Month	Observations	Farm-gate Price (ZMK)	Retail Price (ZMK)	Quantity Sold for all transactions (Kg)	Marketing Margin (ZMK)
2011					
May	19	696.93	1052.1	549.76	355.18
June	66	709.99	908.56	1671.68	198.58
July	93	772.86	929.46	995.36	156.59
August	174	837.68	1004.45	1329.05	166.77
September	61	869.56	992.93	749.11	123.37
October	69	868.7	1119.81	901.32	251.1
November	30	845.21	1164.22	522.18	319.01
December	24	908.43	1091.91	522.94	183.49
2012					
January	24	930.52	1185.46	734.13	254.94
February	15	868.34	1100	889.33	231.66
March	3	811.59	1176.47	345	364.88
April	1	695.65	1058.82	287.5	363.17

Inter-Household Price Variation



Factors Affecting the Household-Specific Marketing Margins

Variables	Model 1	Model 2	Model 4	se
Age of Household Head in years			0.0806	(0.829)
Sex (1=Male)			1.168	(31.19)
Household head education			1.557	(3.300)
Farm size			-1.167	(3.547)
Household commercialization index (%)			0.0741	(0.610)
Off farm participation (1=Yes)			27.95	(29.14)
Kinship ties (1=yes)			84.28***	(28.30)
Number of Traders Entering a Village			0.465	(1.919)
Distance to nearest boma (Km)			0.0139	(0.635)
Price information (1=Yes)			-73.94**	(36.90)
District dummies included	Yes	Yes	Yes	
Month dummies included		Yes	Yes	
Constant	279.4***	388.4***	400.9***	(105.0)
	(55.19)	(98.34)		
Observations	579	579	579	
R-squared	0.273	0.332	0.384	
Adj.R-squared	0.208	0.257	0.291	

Factors Affecting the Household-Specific Marketing Margins

- Spatial factors (72%)
- Temporal factors (16.7%)
- Household-specific factors (11.3%)

- Factors that were found to significantly affect the size of the marketing margin
  - Kinship ties to either the chief or village elders (+ ZMK84.28***)
  - Access to price information (-ZMK73.79**)

Factors Affecting the Household-Specific Farm-gate Price

Variables	Model 1	Model 2	Model 3	Model 4	se
Age of Household Head in years				-0.473	(0.737)
Sex (1=Male)				17.94	(27.77)
Household head education				1.347	(3.141)
Farm size				-0.741	(3.376)
Household commercialization index (%)				-0.0494	(0.568)
Off farm participation (1=Yes)				-3.361	(26.34)
Kinship ties (1=yes)				-64.34**	(26.47)
Number of Traders Entering a Village				-0.139	(1.846)
Distance to nearest boma (Km)				0.158	(0.617)
Price information (1=Yes)				72.70**	(34.01)
Retail Price Per Kg (ZMK)			0.0960		(0.106)
District dummies included	Yes	Yes	Yes	Yes	
Month dummies included		Yes	Yes	Yes	
Constant	805.9***	833.8***	716.5***	798.6***	(105.0)
	(41.25)	(75.67)	(158.7)		
Observations	579	579	579	579	
R-squared	0.244	0.287	0.289	0.319	
Adj.R-squared	0.176	0.207	0.207	0.227	

Factors Affecting the Household-Specific Farm-gate Price

- Spatial factors (75.2%)
- Temporal factors (12%)
- Household-specific factors (12.8%)

- Factors that were found to significantly affect the size of the marketing margin
  - Kinship ties to either the chief or village elders (-ZMK64.34**)
  - Access to price information (+ZMK72.70**)

Policy Options

- Given the importance of spatial factors in explaining variations in farm-gate prices and marketing margins, improving road infrastructure in areas where marketing margins are high could significantly improve farm-gate prices.

- Policies should be aimed at providing timely price information to farmers.

- Assist smallholder farmers in ensuring they are able to market grain at the times when it is most profitable and this can be achieved by investing in storage facilities that farmers can use for instance warehouses.

Thank You