Reassessing the Concept and Measurement of Market Access: Evidence from Zambian Maize Markets

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Presentation Outline

Study Motivation

Literature on Smallholder Access to Markets

Data and Methods

Some Results

Summary & Conclusion

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Study Motivation

- Smallholder access to markets and agricultural support services remains a major policy concern for policy makers

- National agricultural policies especially for staple crops are designed in response to **perceived** market failure and poor access

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Study Motivation

Widespread perception:

- private traders and input suppliers are not able to service rural farmers especially those in the remote areas
- farmers face long physical distances to find buyers for their farm produce
- The degree of competition is limited

Rationale used by most government in Africa to directly invest in marketing board infrastructure to provide a market for smallholder farmers and correct these market failures

See Minten and Kyle 1999; Kherallah et al 2002; Dorward et al 2004; Minot 2008; Chamberlin and Jayne 2012; Diao et al. 2013).

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Literature on Smallholder Market Access

Strand #1. Price transmission or spatial/temporal market efficiency analysis

- extent and speed of adjustments between prices in various markets.
  - Partial transmission - raises concerns about potential non-competitive behavior among market intermediaries.
    - reasonably high degree of price transmission, both spatially and temporally (Chirwa, 1999; Loy and Wichern, 2000; Tostao and Brorsen, 2005; Abdulai, 2007; Burke 2012; Myers 2013)
    - Low degree of correlation between world markets to inland domestic markets in Africa (eg Minot 2011)
    - analyses provide virtually no evidence about farmers' market access conditions.

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Literature on Smallholder Market Access

Strand #2. Studies focusing on identifying factors influencing farmers' participation in markets

- Barrett's (2008) review of market participation studies: concludes that farmers' limited resource endowments and the unavailability of more productive technologies suitable to varied agro-ecological conditions constrain production and hence ability to produce a marketable surplus
- Factors associated with transport and transaction costs are sometimes statistically significant but typically explain a very small part of the variation in market participation (see also Mather *et al*. 2011).
- Data issues – most surveys do not collect the right information to assess smallholder market access

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Literature on Smallholder Market Access

Strand #3. Use of survey data to assess the relationship between village's proximity to towns or roads and agricultural production, productivity or market participation

- finds that farm-gate prices and hence production tend to decline as transport costs rise between the farm and urban markets.
- Since von Theunen (1826), it has been well accepted that, even in the most efficient of markets, farmers in more remote areas would receive somewhat lower prices than those in less remote areas.
- definition of "market access" is **under-conceptualized and often employed in an *ad hoc* manner in empirical studies** (see Chamberlin and Jayne 2012).

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Objectives of study

1

To evaluate farmers' access to markets for maize a strategic commodity in Africa to which market failure is commonly attributed.

2

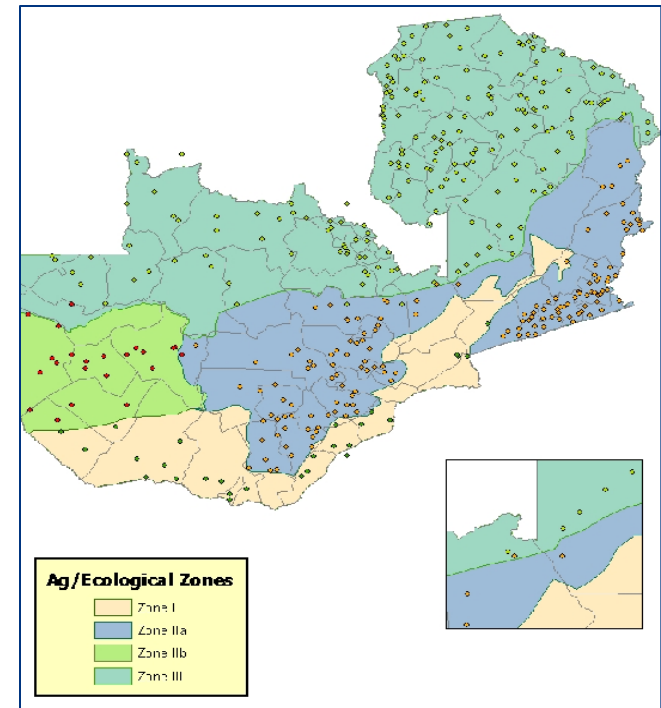To conceptualize market access as being multidimensional and related to:

- the number of buyer options available to farmers
- the distance traveled by farmers to the point of sale
- the price received by farmers.

****Do not ignore the role of intermediaries****

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Data and Methods

- Nationally representative 2010 and 2011 Crop Forecast Surveys (collected by CSO and MAL annually) - Over 14 000 households

- Three year panel data – National representative Supplemental Survey Data to Post Harvest Survey (Collected by MSU/FSRP in collaboration with CSO) – 4362 Households

- Rural Agricultural Livelihood survey 2012 (IAPRI in collaboration with CSO) - 8400 households

Ag/Ecological Zones
- Zone I
- Zone IIa
- Zone IIb
- Zone III

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Data and Methods

von Thunen's (1826) famous theory conceptualized market access in explicitly spatial terms

- The proximity between a location in a particular market catchment area and the urban center.
    - Taking as given the price at a central reference market, a farmer's market access conditions might be conceptualized as the marketing margin (MM_{ijt}) between the farm-gate price (PF_{jt}) received by farmer i in period t and the central market j wholesale price (PW_{jt}) in period t.

$$MM_{ijt} = PW_{jt} - PF_{it} = f(NB_{it}, D_{it}) + e_{it} \qquad (1)$$

margins are generally unobserved or subject to great measurement error

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Data and methods

- descriptive statistics on how both NB_{it} and D_{it} vary by conventional measures of market access such as distance to the nearest district town

- NB_{it} and D_{it} dependent variables in econometric analyses to identify the factors associated with farmers' market access conditions.

- For cases in which farmers sell to market intermediaries, we expect that

    $\partial MM / \partial NB < 0$

    $\partial MM / \partial D > 0$

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Econometric Analysis

Econometric issues

- households not selling maize must be dropped from the analysis due to missing information on distance travelled.
- the distance travelled by farmers to sell their maize has a highly skewed distribution - large number of cases lumped at zero.
- The decision to sell grain on the farm produces a zero value for the distance variable, we model this as a corner solution and not a censored observation.
- ******Use Cragg's (1971) double-hurdle model, a bivariate generalization of the Tobit model*****

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SOME FINDINGS

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Not everyone sells maize

	---------Year-----------	
	2007	**2010**
Households selling maize	32.2	39.6
Households not selling maize	**67.8**	**60.4**

Sources: Zambia: MACO/CSO Crop Forecast Surveys 2007, 2010

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Private buyers of maize among small and medium-scale farmers

Dominant buyer

Becoming Any important buyer

Sources: Zambia: MACO/CSO Crop Forecast Surveys 2010, 2011

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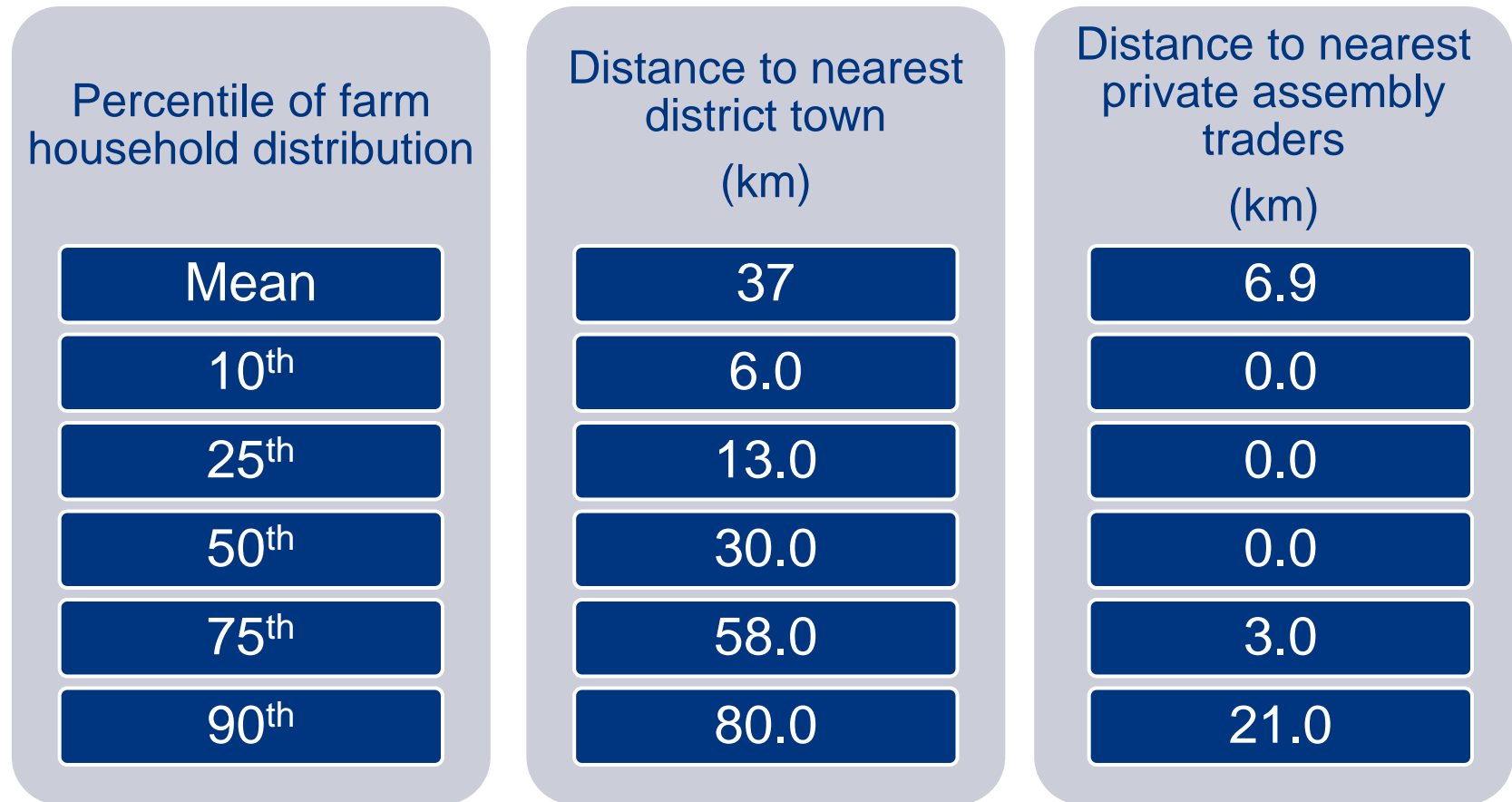# Some measures of market access

Distance to the nearest district town

Number of buyers coming into village to buy maize

Distance to the largest maize sale transaction to private assembly traders

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Distance to nearest largest maize sale transaction to private assembly traders

Percentile of farm household distribution	Distance to nearest district town (km)	Distance to nearest private assembly traders (km)
Mean	37	6.9
10th	6.0	0.0
25th	13.0	0.0
50th	30.0	0.0
75th	58.0	3.0
90th	80.0	21.0

Sources: Zambia: MACO/CSO Crop Forecast Surveys 2011

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Results consistent across different surveys

Distance to the nearest --- (in Km)	Survey, year	Percentile of farm household distribution					
		Mean	10	25	50	75	90
		--------------Km distance---------------					
Km distance to nearest district town	SS 2004	34.9	9.5	16.0	29.9	47.9	71.0
	SS 2008	34.1	9.8	15.4	28.7	46.0	69.2
	CFS 2010	37.1	6.0	13.0	30.0	58.0	80.0
Km from farm to location of largest maize sale transaction to private assembly traders	SS 2004	5.74	.0	.0	.0	4.0	19.0
	SS 2008	10.72	.0	.0	.0	4.0	25.0
	CFS 2010	8.99	.0	.0	.0	2.0	24.0
	CFS 2011	6.88	.0	.0	.0	3.0	20.0

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"How many private traders come into this village to buy maize from farmers?"

3 to 15 traders

7 — Among Sellers
5 — Among Non-sellers

Sources: Zambia: MACO/CSO Crop Forecast Surveys 2011

Is the Distance Travelled to Assembly Traders Influenced by Volume of Maize?

Bags of maize sold	Number of households	Mean (Km)	Percentile of farm household distribution				
			10th	25th	50th	75th	90th
< 5 bags	45,370	2.9	0	0	0	1	9
5 - 25 bags	105,134	6.2	0	0	0	3	18
25 - 50 bags	20,796	11.4	0	0	1	11	25
> 50 bags	19,839	14.5	0	0	1	10	46
All	**191,138**	**6.9**	**0**	**0**	**0**	**3**	**20**

Sources: Zambia: MACO/CSO Crop Forecast Surveys 2011

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Is the Distance Travelled to Assembly Traders Influenced by Distance to the Nearest District Town?

Quartile group of distance to district town	Mean (Km)	Percentile of farm household distribution					% of FRA Purchases
		10th	25th	50th	75th	90th	
1- Accessible	3.6	0	0	0	1.6	8	57.2
2- Mid accessible	6.8	0	0	0	3	25	7.2
3- Mid inaccessible	7.3	0	0	0	3	35	19.7
4-Inaccessible	10.8	0	0	0	3	60	15.9
All	7.1	0	0	0	2	23	100

Sources: Zambia: MACO/CSO Crop Forecast Surveys 2011

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Factors affecting distance traveled from farm to point of maize sale

VARIABLES	Km distance to assembly traders			Km distance to Millers, breweries and other buyers[b]
	Probit	Lognormal	APEs[a]	OLS
	(A)	(B)	(C)	(D)
Household head characteristics				
Male headed household (=1)	-0.121	0.213	0.665	-3.591
	(0.080)	(0.152)	(0.210)	(12.67)
Age of household head (years)	0.000	-0.008**	-.0514***	-0.267
	(0.002)	(0.004)	(0.001)	(0.24)
Education level of head (=1; no education is reference)				
Primary (1-7 years)	0.153	0.015	1.018	-20.756
	(0.098)	(0.204)	(0.299)	(26.299)
Secondary (8-12 years)	0.270**	0.161	2.680*	-28.710
	(0.105)	(0.212)	(0.034)	(26.587)
Post-Secondary (> 12 years)	0.179	0.634**	5.224	-42.773
	(0.150)	(0.289)	(0.000)	(30.136)
Market access variables:				
Number of maize buyers operating in village	-0.001	-0.006*	-0.043**	-0.092
	(0.002)	(0.003)	(0.014)	(0.387)
Km to nearest district town	-0.001	0.004*	0.020**	0.832***
	(0.001)	(0.002)	(0.038)	(0.194)
Km to FRA buying depot	0.004**	0.012***	0.102***	0.322
	(0.002)	(0.003)	(0.000)	(0.351)
Quantity and timing of sales variables				
Quantity maize harvested (Mt)	0.897***	1.834***	17.401***	49.363***
	(0.211)	(0.330)	(0.000)	(15.916)
Aug/Sept/Oct	0.048	0.000	2.194***	-35.861*

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Summary & Conclusion

Distance from the farm to the nearest urban area is a poor predictor of:

- the distance travelled by farmers to the point of maize sale.
- the number of traders operating in farmers' villages.

The notion that state operations in remote rural areas are typically necessary to provide smallholder farmers with viable access to strategic grain markets is seriously questioned.

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Summary & Conclusion

The majority of farmers selling maize to a private trader did so right on their farms or in their village even in the most remote and isolated areas

- Long distances traveled by about 10% of the smallholder population to sell maize is generally not indicative of severe market access problems
- Reasonable degree of competition among village level grain assembly traders exists.

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Summary & Conclusion

Market intermediation by traders bridge the geographic distances between farmers and urban markets weakening the link between geographic location and market access.

So called "Briefcase Traders" play a key role in providing a market for farmers in remote and isolated areas

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Recommendations

Serious efforts to encourage market development and to ameliorate market failure will require an increased commitment to investment in public goods

- more widespread use of grades and weight measures
- strategic investment in road, rail and port infrastructure
- research and development of crop varieties
- agricultural extension systems to raise smallholders' productivity to enable them to produce a surplus in the first place.

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THANK YOU

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