Are Agricultural Traders Colluding? Testing the Degree of Competition Among Maize Traders in Kenya

Researchers:

Lauren Falcao Bergquist

Michael Dinerstein

Sector(s): Agriculture

Fieldwork: Innovations for Poverty Action (IPA)

Location: 6 counties within a 50-kilometer radius of Bungoma, Kenya

Sample: 60 open-air markets

AEA RCT registration number: AEARCTR-0000682

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Partner organization(s): National Science Foundation (NSF), UK International Development

Agricultural traders and intermediaries operating in rural markets in Africa play a defining role in the price and availability of staple commodities like maize. Researchers conducted three randomized evaluations to measure the degree of competition among wholesale maize traders, understand the implications for social welfare, and test whether new traders could make a market more competitive. Researchers found that traders did not pass through much of a randomly administered cost reduction by lowering prices to consumers and, instead, colluded with other traders to maximize their profits. Incentives to encourage traders to enter new markets resulted in trader entry but did not have a meaningful effect on market prices.

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Prices of staple crops in rural markets is a key policy concern for food security and agricultural livelihoods. Well-integrated agricultural markets can tackle both sides of this food-price policy dilemma, by pulling crops out of surplus areas (to boost prices received by farmers) and pushing food into deficit areas (to reduce prices faced by consumers). Agricultural traders and intermediaries play a defining role in these markets. Leveraging their market power, traders can influence the price and quantity of goods sold at market. For example, when traders collude, or coordinate among themselves to set a common price, they can elect to reduce the value passed onto farmers and consumers, resulting in higher prices to consumers and lower prices for agricultural goods paid to farmers. In competitive markets, price gaps could be purely due to high transactions costs and policies that reduce these costs would yield savings that traders would pass on to farmers and consumers. However, if markets are imperfectly competitive, policies aiming to address commodity prices may need to explicitly target enhanced competition among traders and intermediaries and reduce barriers for newcomers to enter the market to reduce the potential for collusion. Understanding the degree to which traders can influence market prices, implications for social welfare, and whether market entry incentives can make markets more competitive can inform policies with the potential to improve competition, thereby benefiting both farmers and consumers. However, more research is needed to understand how traders in these markets operate and what could prevent markets from being competitive. Can providing incentives to traders and consumers shed insight on the presence of market influence by traders, can new traders increase competition in a market, and how does increasing market competition

affect welfare?

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Staple crops, like maize, are important for income generation and food security in Kenya, where household expenditure on maize was about 9 percent overall and 14 percent among households in the lowest income bracket in 2015. Maize is produced across Kenya and Uganda and purchased by traders who store, transport, and then sell it in markets. These traders sell the maize to a variety of consumers, including households, grain millers, other traders, and larger companies.

Traders eligible to participate in the evaluations mainly worked in open-air markets across six counties near Bungoma, Kenya. The average trader completed some secondary school, and only 58 percent kept written records. Most traders were a one-person business, and only 37 percent had an employee. Traders often worked in the same market every week, and only 6 percent said that they did not know other traders in the market very well. While only 30 percent of traders reported engaging in an explicit price agreement with other traders, 72 percent of traders worked in markets where at least one trader reported the existence of a price agreement in a given day.



Sacks of grains in an open air market in Kenya.

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Researchers partnered with Innovations for Poverty Action to conduct three randomized evaluations to assess the level of competition among wholesale traders in Kenyan maize markets. In collaboration with the Directors of Trade for six counties in

Western Kenya, researchers identified sixty eligible markets (forty markets within 50 kilometers of Bungoma and twenty markets outside this radius).

During a period of twelve weeks from March to July —which constitutes the "lean season" when traders sell maize to consumers in the region—researchers randomly assigned markets to schedules alternating between the following three interventions. Each intervention targeted to traders lasted for four weeks.

1. *Value pass-through:* To assess how much value traders pass through to consumers, researchers randomly offered traders in program markets a subsidy per 90kg bag of maize sold. Of the sixty markets in the study, all traders in 45 markets were offered a low subsidy of KES 200/bag (US$ 1.98), representing 7.5 percent of the average price per kilogram of maize, and fifteen markets were offered a high subsidy of KES 400/bag (US$ 3.96), representing 15 percent of the average price per kilogram of maize. When introducing the subsidy, traders were asked to describe some of the major costs they faced. The subsidy was framed as a reduction of these costs. Enumerators monitored sales of each trader throughout the day and transferred the subsidy to traders through mobile money payments twice a day.

   At the same time, researchers estimated how much of the subsidy traders would have passed along to consumers if they had been colluding by measuring the impact of reducing prices on consumers' demand for maize. Researchers randomly selected markets during weeks when they were not assigned to one of the other two interventions and offered consumers random levels of price reductions. At the beginning of each market day, enumerators acquired trader's consent to follow their transactions and speak to their consumers. Consumers were offered random discounts ranging from KES 0 to KES 400 (US$ 0 to 3.96) per 90kg bag of maize purchased. They then selected the quantity they wanted to purchase at that discount. The pass-through and the consumer demand evaluations together were used to assess the degree of competition among agricultural traders.
2. *Trader competition:* To estimate the effect of new traders entering markets on competition, researchers randomly selected three traders from a list of eligible traders surveyed during their previous pilot study. Eligible traders had never before worked in that market. Researchers contacted eligible traders by phone to invite them to enter a new market and randomly offered one of three subsidy options for selling in the new market: KES 5,000 (US$ 49), KES 10,000 (US$ 99), or KES 15,000 (US$ 148). Traders were offered the amount each day they visited a new market and received a payout via mobile money the same day if they arrived with at least fifteen bags of maize and stayed for at least one hour to sell the maize.
3. *Comparison*: In weeks when markets were not participating in one of the above interventions, they were assigned to serve as a comparison group for the other markets participating in the trader competition and value pass-through interventions.

Throughout the study period, researchers conducted surveys to collect data on prices and quantities sold, transactions, price negotiations between consumers and traders, payment methods used, traders' profits, revenues, and costs, their relationships to other traders in the market, and whether traders knew of price agreements in the market.

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Traders did not pass through much of experimental cost reduction via a discount to consumers, suggesting that traders – perhaps tacitly -- coordinate with other traders to maximize their profits. Researchers also found that market entry had a limited effect on prices.

Value pass-through and consumer demand experiment: Traders who were offered either the high or low maize subsidy reduced the price per kilogram of maize offered to consumers by 22 percent, suggesting that traders absorbed more of the surplus afforded by the subsidy, rather than passing it onto consumers through a price reduction. This rate does not vary substantially between

traders, meaning that many traders reduced the price per kilogram by the same margin.

Given the demand estimates from the demand experiment, the researchers estimate that traders would have passed on 20 percent of the subsidy if they were colluding, and much more if they were competing. Taken together, these two experiments suggest that traders collude.

Trader competition: Traders' willingness to enter new markets increased with the size of the subsidy they were offered. Forty-two percent of traders who were offered the high subsidy took it up, while 28 percent of traders offered the medium subsidy and 12 percent of traders offered the lowest subsidies took them up. Researchers also found suggestive evidence that having an existing contact in the new market increased take up.

In terms of market entry, traders entered new markets during 38 percent of all intervention days when subsidies were offered, and more than one new trader entered a market in 26 percent of market days. When a trader entered a new market, the price of maize offered to consumers in that market decreased by KES 0.28 (US$ 0.003), or about 1 percent, suggesting limited impact on prices. There were bigger effects on price when a trader without an existing contact entered the market, but it was hard to convince these traders to enter.

Welfare: The researchers estimate the consequences of this market structure for the division of surplus generated by trader sales to consumers. Consumers receive 18 percent of the total surplus, while traders get about 82 percent. However, the typical trader captures a fairly small fraction of his revenue as profits. There was substantial variability in traders' profit margins, where some traders sold very large quantities of maize at high price mark-ups. Specifically, participating traders' average daily profits were approximately KES 13,000 (US$ 127.41), while 8 percent of traders earned more than KES 40,000 (US$ 392.04) in daily profits. Researchers suggest that while the typical trader is not making large profits, the typical consumer is being served by a trader who is earning large profits.

Taken together, these results suggest that traders exhibited a high degree of power in determining prices at market by coordinating – perhaps tacitly -- with other traders. Policies that seek to address market structures or the prices of staple goods should target markets where there are larger-scale, high-margin traders.

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