Research Note
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Characterising Competition in the Market for Agricultural Inputs in Kenya

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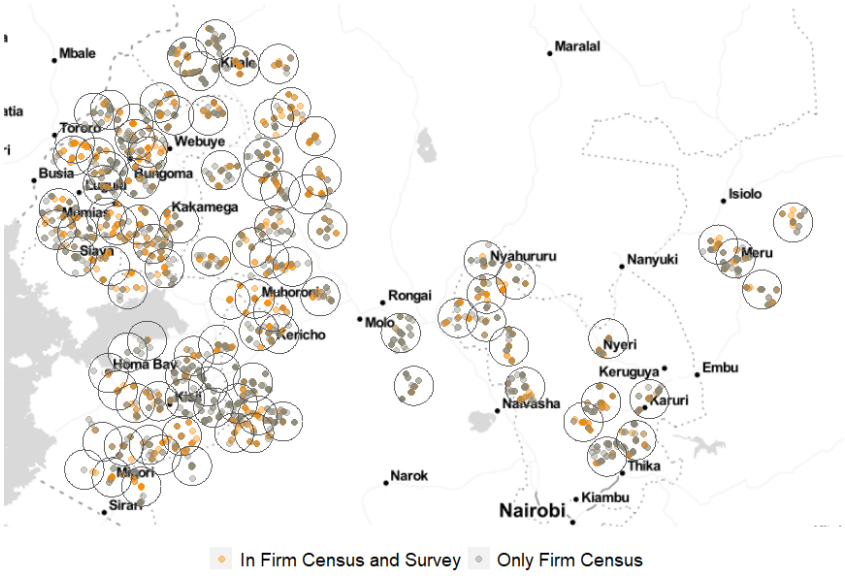
Poor product quality plagues developing country markets, especially for goods like agricultural inputs where quality is only revealed after a farmer has used them. We focus on the market for agricultural inputs, since these are experience goods that are consumed infrequently. Further, consumers' perceptions about product quality are important drivers of demand. We study a new quality-focused chain entering rural Kenyan markets, with shop locations randomised over time. We collected two rounds of data from surrounding areas, including a firm census of all agro-dealers, a survey of agro-dealers, and quality assessments from mystery shopping. In this research note, we explore our firm data to characterise the firms operating in these markets and check our assumptions about quality concerns.

Introduction

Low and unreliable product quality is common in developing country markets, particularly for experience goods, where quality is revealed after consumption (Nelson, 1970). Lack of trust and incomplete information can prevent firms from supplying higher-quality goods, which in turn stunts both firm and industry growth (Jensen and Miller, 2018). We focus on the market for agricultural inputs, an experience good consumed relatively infrequently and where consumers' perceptions about product quality in the market are important predictors of demand.

Figure 1: Map of study area



Each circle is a catchment area with a 10 km radius.

Several studies report quality issues in these markets (Langyintuo et al., 2010; Bold et al., 2017; Ashour et al., 2019; Michelson et al., 2021; Tjernström and Lybbert, 2019). The absence of quality regulation and an incomplete information environment weaken consumer demand, which in turn can lead to decreased sector competitiveness. The goal of our overall project is to understand how these issues affect the incentives for agro-dealers to offer, and for consumers to demand,

quality inputs. Further, we will study the extent to which competition can drive better market-level outcomes in this important setting.

In this research note, we use our firm-level data to paint a broad picture of the market, the firms within these markets, and various indicators of competitiveness.

Context and Methodology

We collaborated with One Acre Fund (1AF), a non-profit organisation delivering agricultural services like training, input credit, and insurance to over 1.5 million households in nine Sub-Saharan African countries. Due to the bundled program's intensity, they decided to roll out their own chain of high-quality inputs to agro-dealers in Kenya, specialising in hybrid seeds and fertilizers. 1AF selected 100 markets in which to open stores and agreed to randomise the rollout of these stores. We randomised markets into “early” and “late” windows in a matched-pair design, matching on population density, distance to major road, altitude, and number of nearby agro-dealers. 1AF opened stores in 50 randomly selected markets between June and August 2021, and the remaining 50 were opened between November and December 2021. Both of these opening windows align with the agricultural calendar.

We collected three different types of data in two rounds, aligned with the relevant agricultural seasons. First, we conducted a firm census in an extended catchment area around each proposed location. Within a 10 km radius of the proposed location, we recorded the name and exact location of all agro-dealers operating at the time of the survey, and took photos of the store front. Second, using that census, we randomly selected 10 incumbent stores within each catchment area to be visited by covert shoppers. Two mystery shoppers purchased 2 kg of DAP fertilizer and hybrid maize seeds from each store, with different “roles”. One shopper asked to buy the agro-dealer’s “most recommended” inputs while the other requested the “cheapest” inputs. To assess the quality of inputs purchased by the mystery shoppers, we partnered with the Cropnuts lab in Nairobi to test seed germination rates and the chemical composition of fertilizer samples. Finally, we administered a detailed survey to these sampled stores, where we asked about their competitors, input purchases and sales, and business practices.

Figure 2: Sample of photos of agro-input stores from the census

Main Findings

Our data collection enables us to characterise the market for agricultural inputs in rural Kenya and to check our assumptions about quality concerns and the broader competitive environment. This includes within- and across-market price and quality dispersion, as well as firm business practices and competitive attitudes.

Firm and market characteristics

First, we describe the nature of agricultural input markets in our data. As discussed above, we conducted a census of all agricultural input shops operating within a 10 km radius of 1AF proposed shop locations. We describe these as catchment areas. The median catchment area in our sample had 43 agricultural input sellers operating during the second-round census[1]. The median firm in the census is located just 40 meters from its nearest competitor and 87 meters from the next closest firm.

Our firm survey allows us to learn more about how firms operate in the market for agricultural inputs. Travel costs mean that the effective set of competitors a given firm faces may be relatively small. We directly asked firm operators about their perceptions about the number of direct competitors they face. The median firm reports just 2 direct competitors and estimates that their most important competitor is located 300 meters away. Comparing this to our census, we observe that the median firm has 5 competitors operating within that radius; this suggests that firms may not perceive some nearby shops as competitors, may perceive differentiation among shops, or may simply not be aware of all nearby shops.

Most firms in our data are highly specialised in the sale of agricultural inputs, with the median firm reporting that 80% of their sales come from selling agricultural inputs. The median firm reports weekly sales of 25,000-50,000 KSh (140-280 GBP) and more than 90% of firms operate year-round. Firms operate relatively formally, with more than 90% of firms reporting that they keep records of stocks, and most firms track costs and profits in a written but informal way. About half of firms report offering credit to some clients. More than 65% have paid employees, and the median owner willing to share details on their wage bill pays 8000-10000 KSh (45-56 GBP) in monthly wages. About a third of the firms in our sample are owned by women, and the median owner is 42 years old.

One key characteristic of these markets is the nature of vertical relationships between firms and suppliers. Given that many of these firms operate in remote, rural areas, they may face few options for upstream suppliers. Two nearby firms may be supplied by the same supplier, which may limit the incentives as well as the ability to compete or differentiate on quality dimensions. If a 1AF shop opens nearby, firms' ability to respond may be determined by the availability of upstream suppliers willing and able to supply quality inputs.

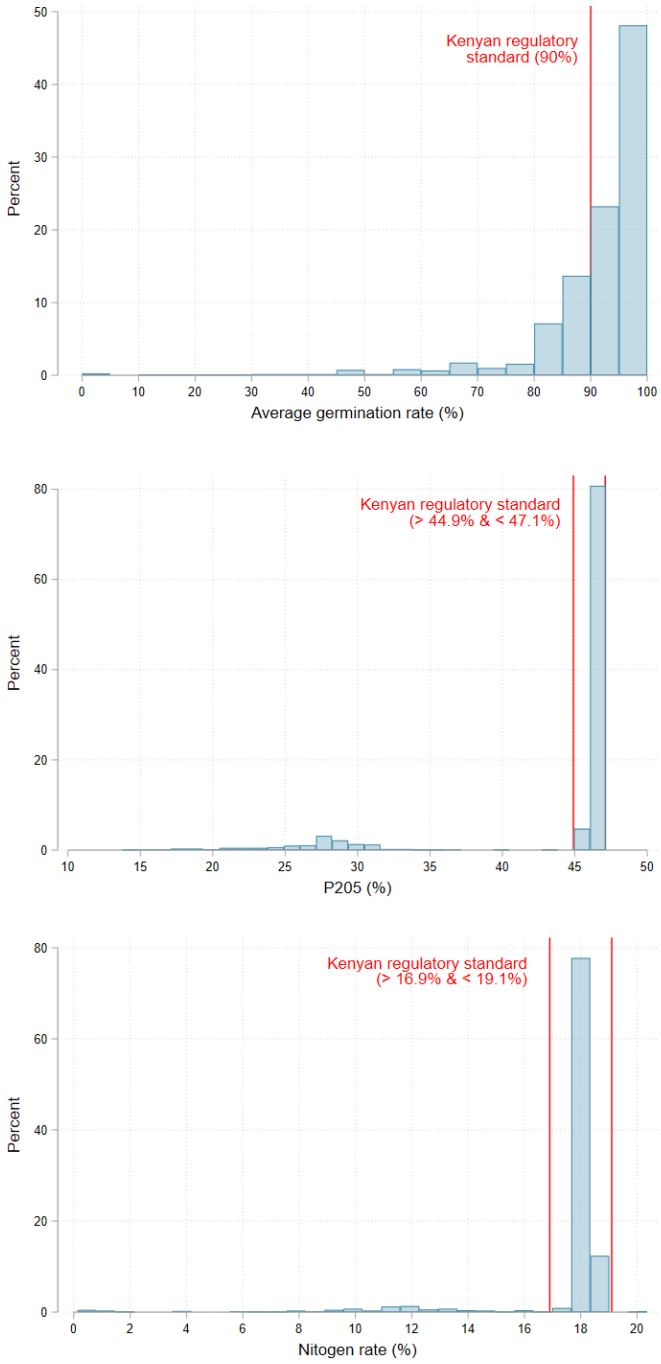
In our data, the median firm reports that they get their stocks from 3 upstream suppliers. Suppliers are often shared across firms: within the median catchment area, 40% of firms share at least one supplier. The market is also served by a number of large suppliers who operate across markets: the five most common suppliers in our data each supply 5-10% of the firms in our sample and are present in 15-45% of catchment areas.

[1] This slightly understates the number of firms within 10 km of some shop locations, because some 1AF shop locations are less than 20 km apart. We assign each firm in the census to a single catchment area based on relative distance.

Quality and pricing: you get what you pay for

Next, we turn to an exploration of quality and pricing by firms. Overall, we find that quality concerns are relevant in these markets, and perhaps especially so for seeds. Across all tested samples, 27% of seeds and 8% of fertilizer samples fall outside of the quality standards established by Kenyan regulators. Figure 3 shows the distribution of seed and fertilizer quality.

Figure 3: Seed and fertilizer quality and standard compliance

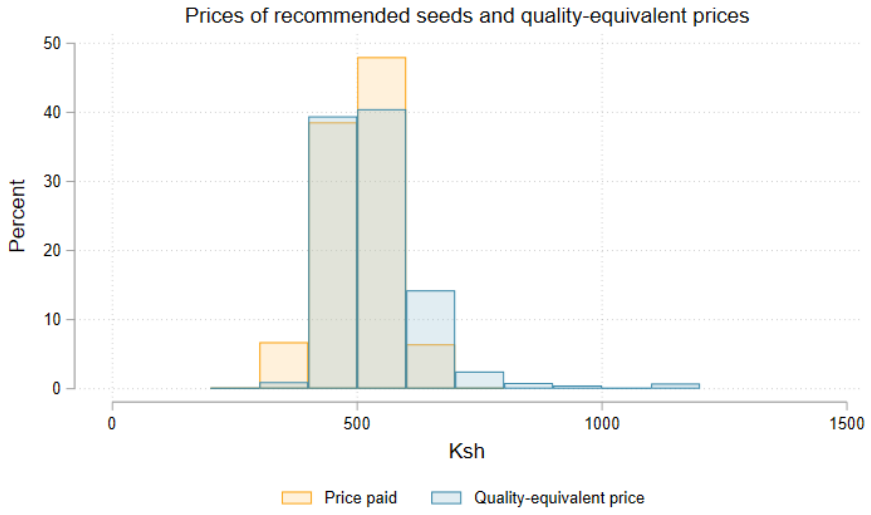


Our mystery shoppers were given a script with instructions to request either the cheapest or most recommended seed variety. Each store was visited by mystery shoppers of both types. Recommended varieties germinate more reliably on average and are significantly more likely to comply with minimum

regulatory standards for certification (90% germination). However, for both types of purchases, there is a long tail of samples with rates well below the minimum standard, which would result in catastrophically low yields for a smallholder farmer who purchased that pack.

Figure 4: Distribution of seed prices and quality-equivalent prices when accounting for germination rates

Source: seed samples from two rounds of mystery shopping. Quality-equivalent prices are divided by the germination rate.

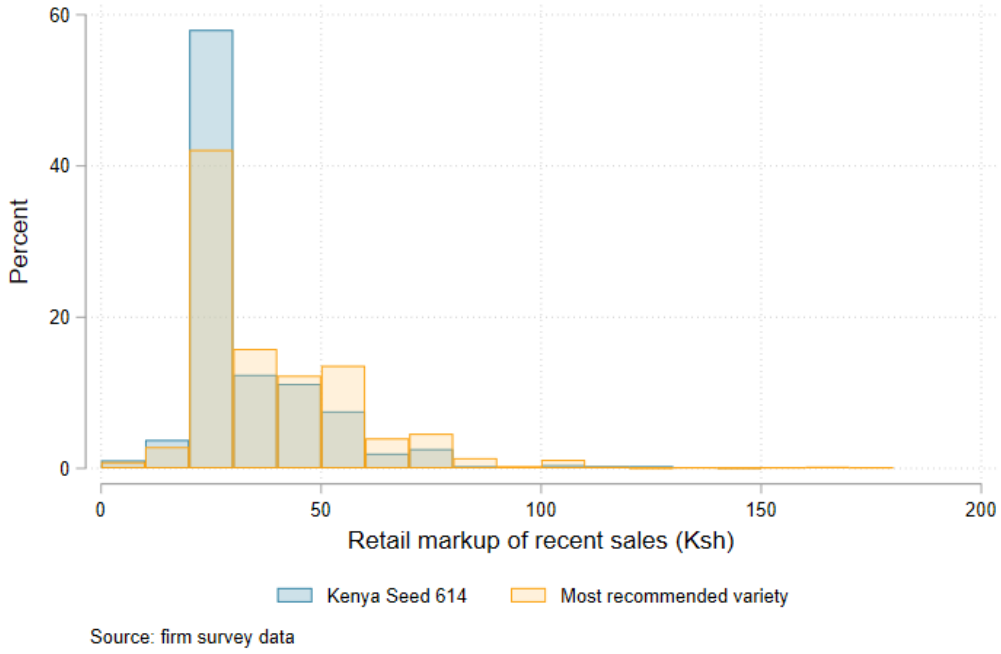


Source: seed samples from two rounds of mystery shopping. Quality-equivalent prices are divided by the germination rate.

Next, we document the distribution of prices and markups. Figure 4 shows the distribution of prices for cheapest and recommended seeds. The median recommended seeds cost mystery shoppers 25% more than the median cheapest seeds. Given the germination rates we observe in our quality testing, it is also possible to calculate a "quality-equivalent" price – the amount of money buyers would need to pay to get the equivalent to a seed pack that germinates at 100%. Figure 4 shows the distribution of these quality-equivalent prices. Due to the relatively higher quality of recommended seeds, the median quality-equivalent price difference between recommended and cheapest varieties is 17%.

Our firm survey included questions about wholesale and retail prices, allowing us to directly compare stated firm markups. Figure 5 shows the distribution of markups for two examples: a standardised, widely available seed pack (Kenya Seed 614) and whatever seed variety the firm would most recommend. Perhaps unsurprisingly, firms recommend varieties where they earn a higher markup on average. But it is worth noting that even for a standardised good, retail markups vary widely: more than half of the sample earns about 20 KSh per sale, but the 75th percentile firm earns 85% more per sale.

Figure 5: Retail markups



Source: firm survey data

Our firm survey also included qualitative questions about firms' pricing strategies. Firms generally report that they would not change their fertilizer prices if their nearest competitor raised or lowered their prices, but a subset of firms report they would increase prices in response to a competitor increasing their prices (with no corresponding decrease if a competitor's price decreased). Nearly half of firms report they would either switch suppliers or switch the brands of their stock if a competitor significantly increased the quality of their products.

Policy Impact

Our findings suggest that there are valuable insights to be drawn from relatively low-cost data collection efforts, which could provide governments with more information on the variability in quality between different stores in rural areas. Regulators could more easily assess the extent and causes of poor fertilizer quality, which can have negative impacts on crop yields and soil health. Improving data collection efforts to assess quality could also help strengthen quality control and enforcement mechanisms, which could in turn improve the awareness and trust of farmers in fertilizer products.

We have communicated our preliminary results to regulators in Kenya, who are interested in ensuring firms supply quality inputs to farmers in local markets. We have also shared these results with our partners at One Acre Fund, including characterising the nature of quality problems in markets. We will continue to communicate research results with them as we refine our understanding of the impacts of their shops programme. We anticipate that our findings will influence subsequent decisions by One Acre Fund as they continue to expand their programme in Kenya and additional countries.

Moving Forward

Next, we will prepare an academic paper analysing the results of the randomised rollout of the 1AF shops. We also plan to organise a workshop in the future to engage specifically with Kenyan regulators, policymakers, and input suppliers on the results of our project and the implications for policy.

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