

# Building Agricultural Market Linkages

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## Access to agricultural markets is crucial for welfare



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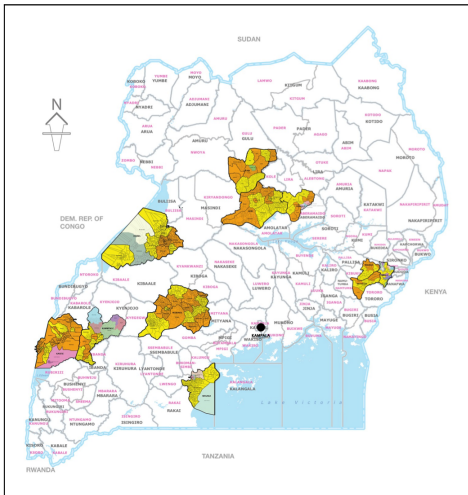
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- Increasing attention to other trade costs: difficulty for sellers and buyers to find each other (search costs)

# A mobile marketplace for agriculture

- Kudu: an SMS-based marketplace for agriculture trade
- Buyers and sellers post quantity, desired price, and location
- Matching algorithm identifies specific trades that are feasible, then directly connects buyers and sellers
- Users sent price data via SMS every two weeks



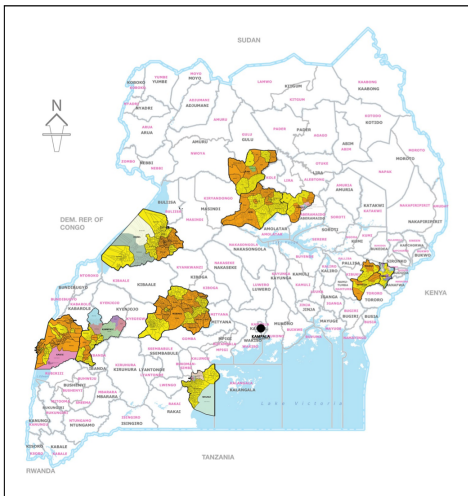
# Study design



- RCT covering 12% of Uganda
  - Includes 110 subcounties
  - Sampled 2-3 largest trading centers in each subcounty

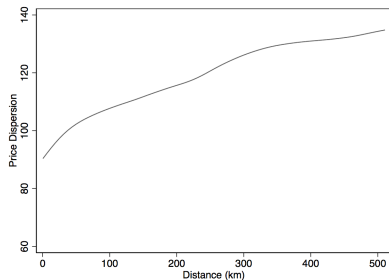
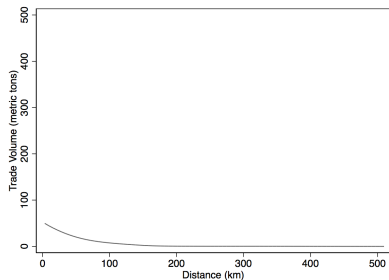
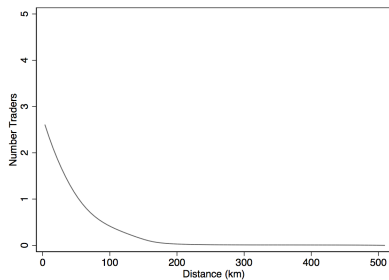
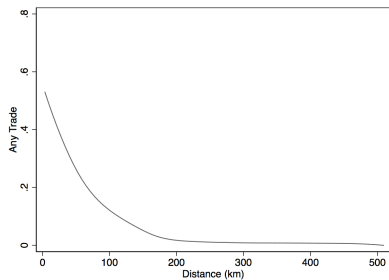


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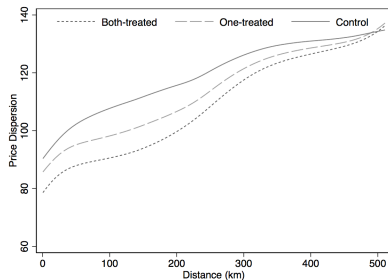
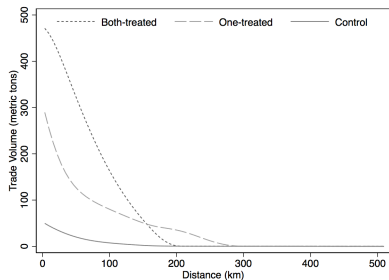
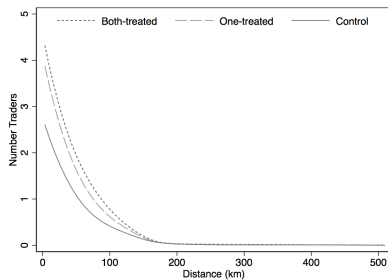
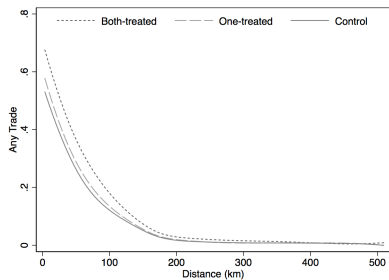


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  - Includes 110 subcounties
  - Sampled 2-3 largest trading centers in each subcounty
- Household surveys (3,000 HHs)
- Trader surveys (1,400 traders)
- High-frequency price surveys (260 markets)

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- Farmers:
  - 24% of HH tried to platform
  - 2% successfully transacted on the platform (necessary for benefits?)
  - On average, 10% increase in farmer revenue (but hard to measure)
  - Increases in revenues among farmers most likely to use the platform (larger farmers)

## Policy implications

- Marketplace platforms become more valuable the larger they are, but getting to scale can be difficult
  - No mechanism to collect commissions on transactions
  - To break-even with user-fees, would have to charge  $\sim 4000$  UGX for each bid or ask
  - Could sell price information, but to generate reliable and sufficient data, it would have to operate at a massive scale
- However, the welfare effect seems potentially large, so building them at public expense could be an efficient way of improving rural welfare
- Incorporating these platforms into existing extension services could also help scale-up



## Conclusion

Thank you for your time and comments!

# Appendix

## Usage statistics

- 4,000 unique sellers
- 3,000 unique buyers
- Over 50,000 asks and bids
- 1,300 completed transactions; 7,300 tons of grain; \$2.3 million in value
- 80% of treated traders tried the platform (22% successfully transacted)
- 24% of HH tried to platform (2% successfully transacted)

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## Unstructured Supplementary Service Data (USSD) access

**(00:47:58) Kudu:**

Welcome to Kudu! Please reply with:

1. Buy
2. Sell
3. Price Information
4. Block Farmer / Trader
5. Language / Orulimi / Leb

**(00:48:16) User: 2 (Sell)**

**(00:48:16) Kudu:**

What crop would you like to sell?

1. Maize
2. Nambale beans
3. Black beans
4. Mixed beans
5. Other
0. Back

**(00:48:25) User: 5 (Other)**

**(00:48:25) Kudu:**

Enter crop

0. Back

**(00:48:39) User: GNUTS**

**(00:48:39) Kudu:**

Select option below or enter 0 and try again

1. Groundnuts
2. Goats
3. Piglets
4. Eggplant
0. Back

**(00:48:46) User: 1 (Groundnuts)**

**(00:48:46) Kudu:**

Enter quantity in Kgs

0. Back

**(00:48:58) User: 700**

## Unstructured Supplementary Service Data (USSD) access

**(00:48:58) Kudu:**

Enter unit price (per Kgs)

0. Back

**(00:49:07) User:** 4200

**(00:49:07) Kudu:**

Sell 700 Kgs of Groundnuts for 4200/= per Kgs?

1. Submit

2. Main menu

0. Back

**(00:49:17) User:** 1 (Submit)

**(00:49:17) Kudu:**

Your sell of 700 Kgs of Groundnuts for 4200/= per Kgs has been placed on the market.

You can call 0780997402 for help.

## Web access

# Sell Produce

Highlighted fields are Required

**Produce**

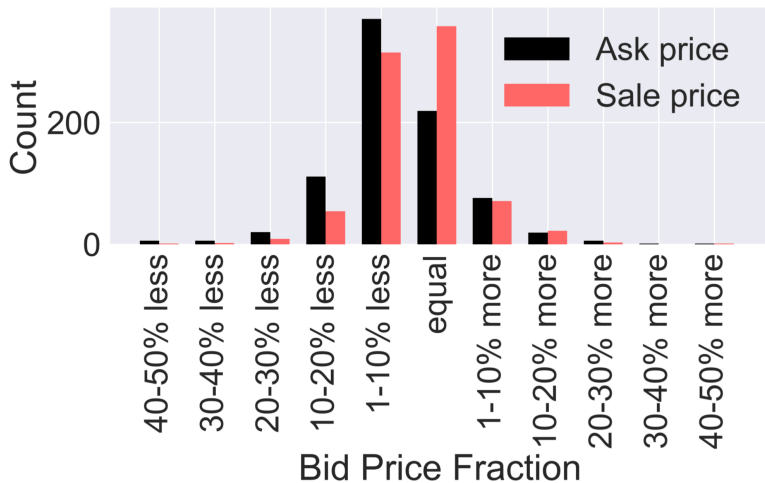
  
**Quantity**

**Price (UGX)**

## Kudu matching algorithm

- Kudu assigns each possible (ask, bid) pair a score representing the “gains from trade”
- “Gains from trade” = quantity x (bid price - ask price) - transport costs
- Transport costs estimated using OpenStreetMap data (to calculate the distance between parish centroids, along different road types) and estimates of travel cost per km of each road type
- Allows consideration of some trades with negative gains (to allow for negotiation)
- When Kudu “clears,” considers all bids and asks and proposes a feasible set of trades that maximize the total gains from trade

## Ask bid spread





## Travel time of successful trades

