Access to Markets and Technology Adoption in Africa

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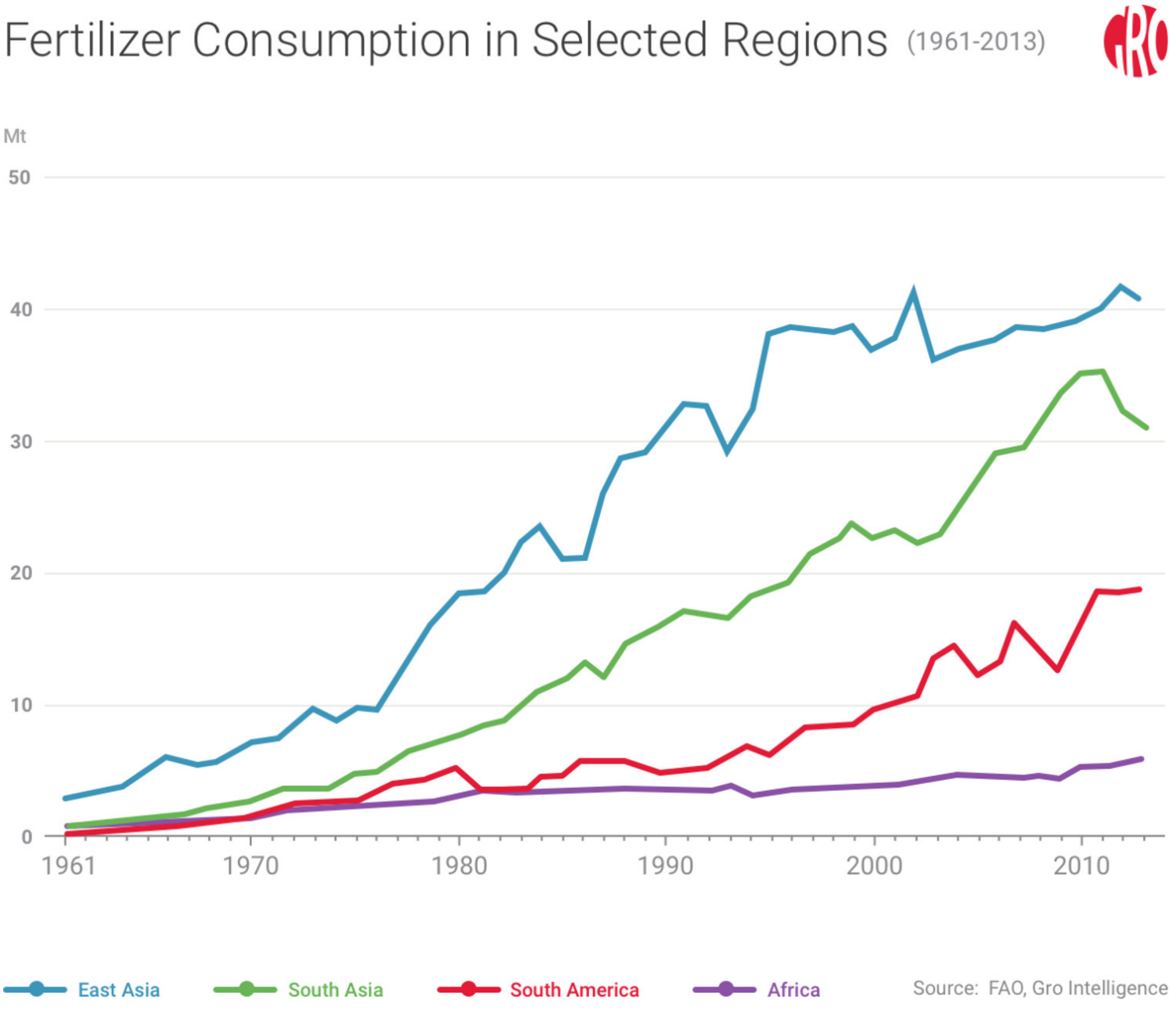
Low Rates of Technology Adoption in Africa



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- Role of market isolation in reducing profitability of adoption?

Isolated Markets and GE Effects

- Agricultural markets in SSA are fragmented and localized
  - Imperfect co-integration over space (Rashid and Minot 2010)
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1. Does it increase farmers' market access?
2. If so, does greater market access encourage farmer investment?

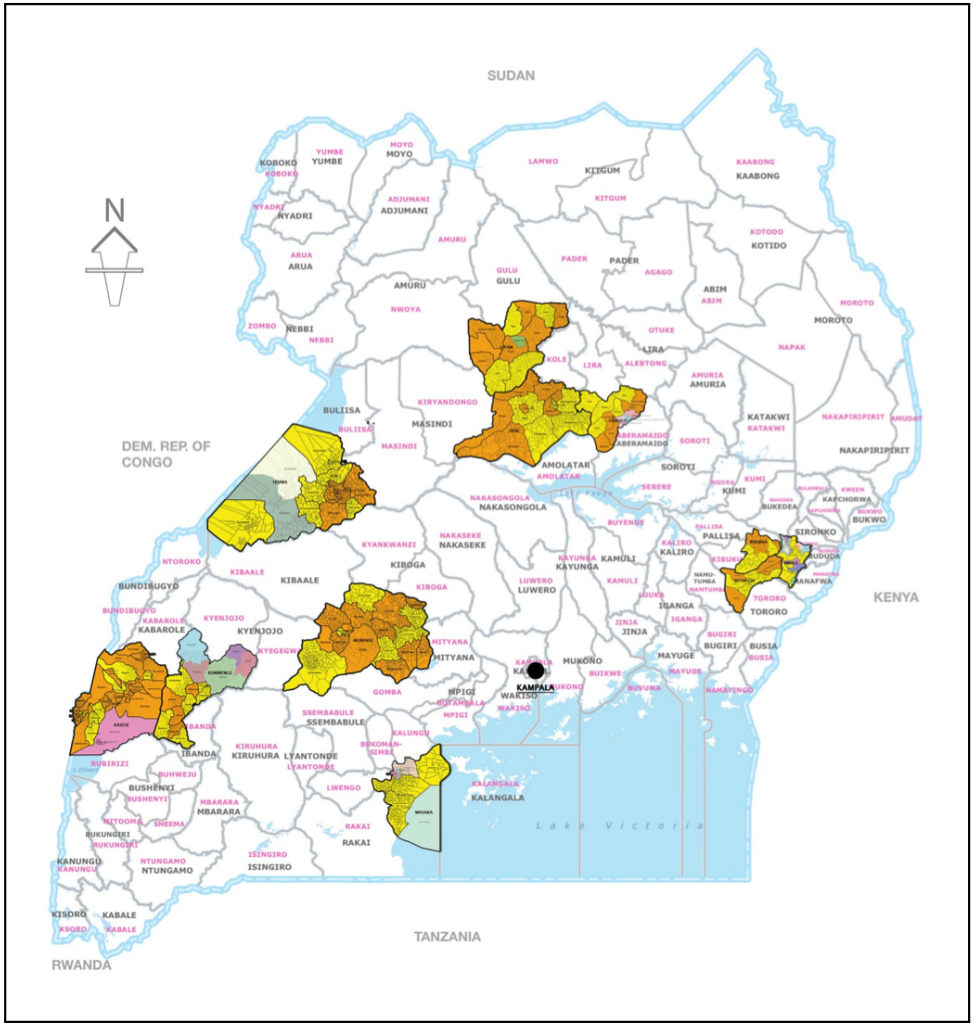
A Mobile Marketplace for Agriculture

- Kudu: an Alibaba-like marketplace for agriculture trade in Uganda
- Buyers and sellers post quantity, desired price, and location
- Matching algorithm identified specific trades to achieve global optimum, then directly connects buyers and sellers
- Users sent price data via SMS every two weeks

In-Village Support Services

- AgriNet: one of the largest private sector brokerage firm in Uganda
- Establish in-village agents, who recruit and support farmers & buyers on Kudu
- Agents given access to line of credit to facilitate bulking
- Buyers offered a Transaction Guarantee: AgriNet will reimburse transport costs if quality/quantity not as specified on Kudu

Study Design



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  - Randomization at sub-county level (110 sub-counties)
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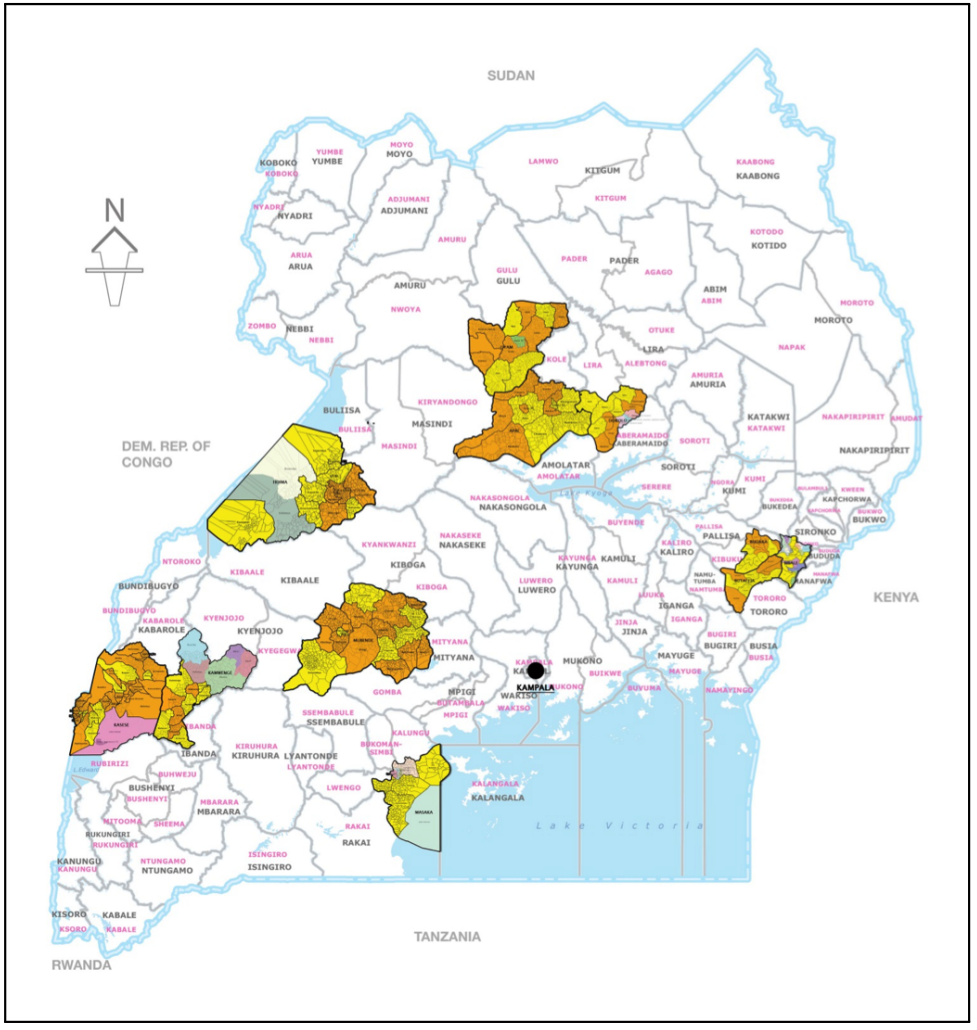

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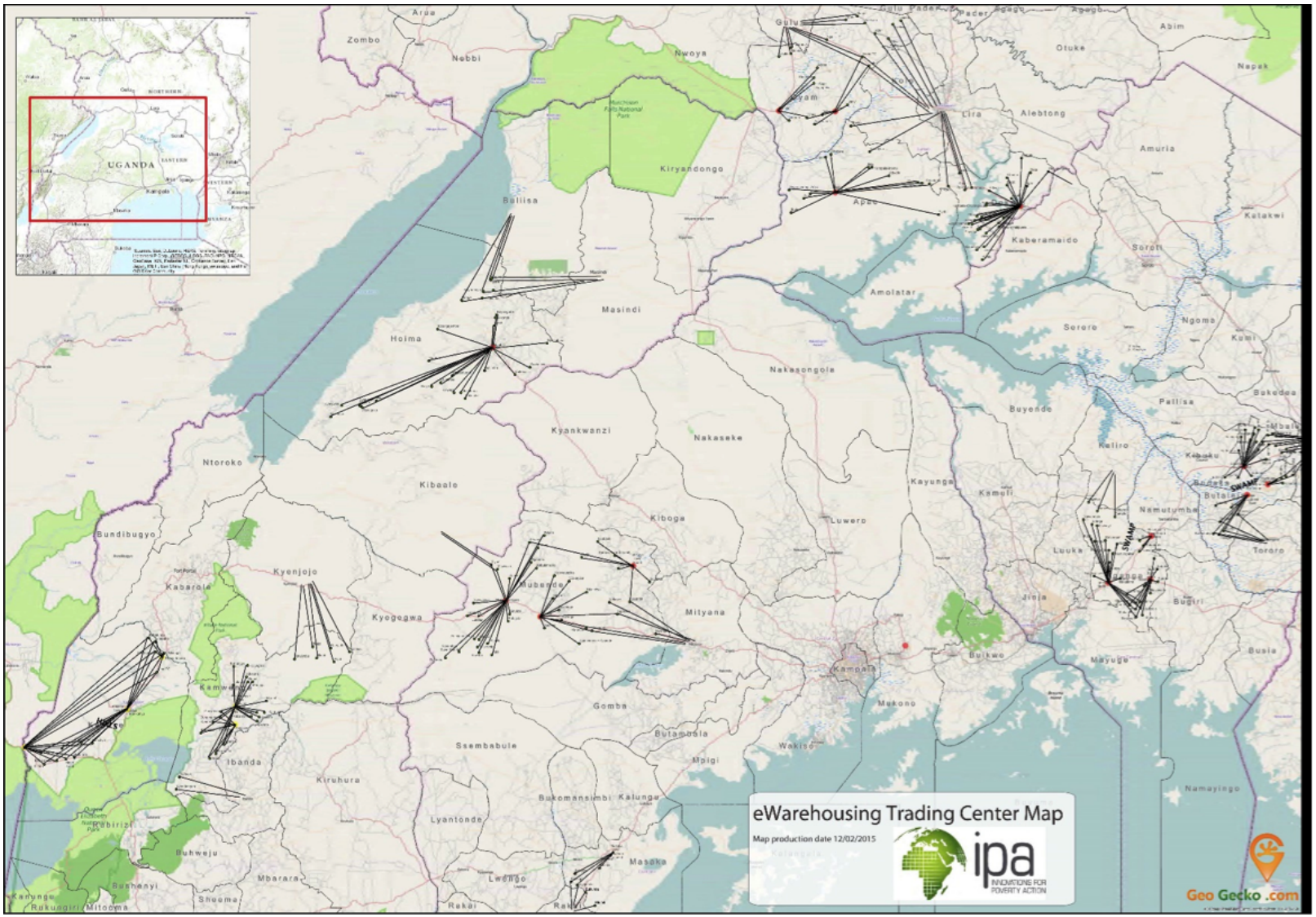
  - Sampling 2-3 largest trading centers in each sub-county
- Household surveys (3,000 HHs)
- Trader surveys (1,400 traders)
- High-frequency price surveys (260 markets)

Study Markets: Spokes and Hubs

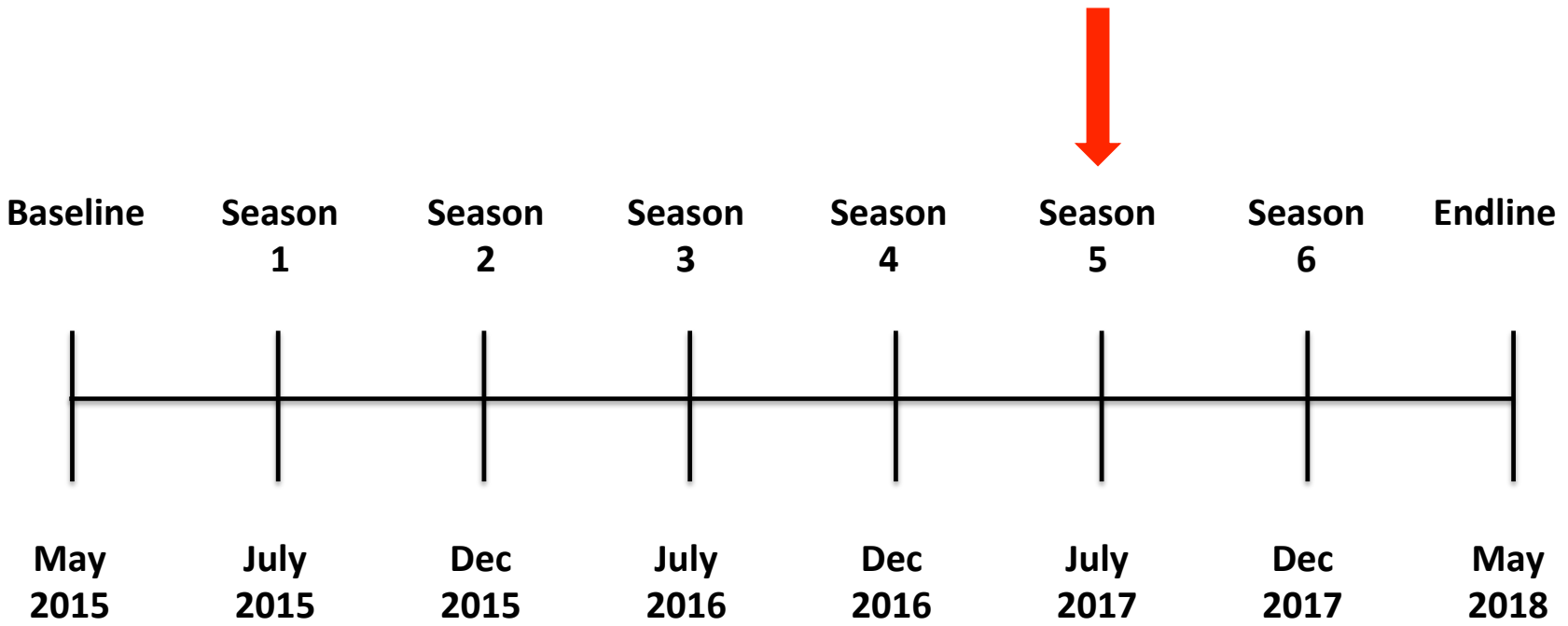


Sub-Experiments

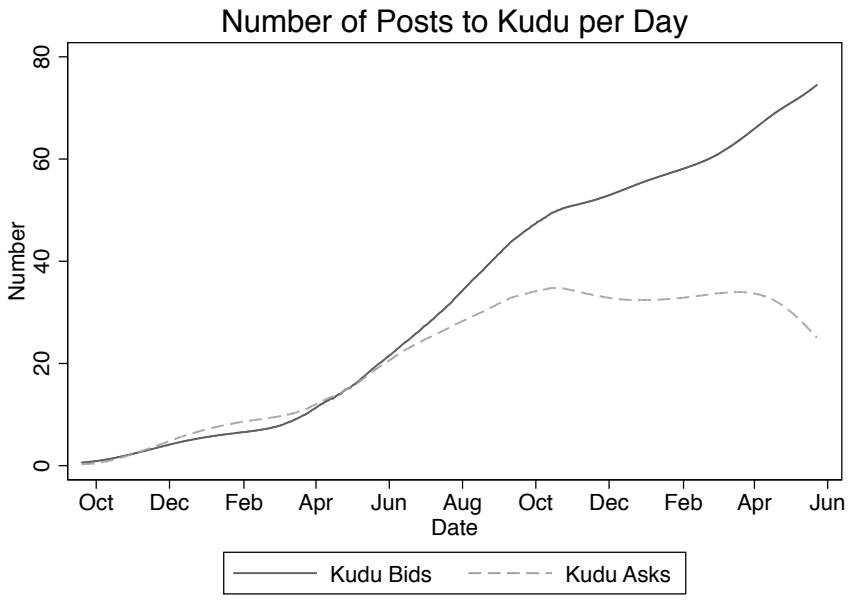
Sub-experiments to test specific constraints:

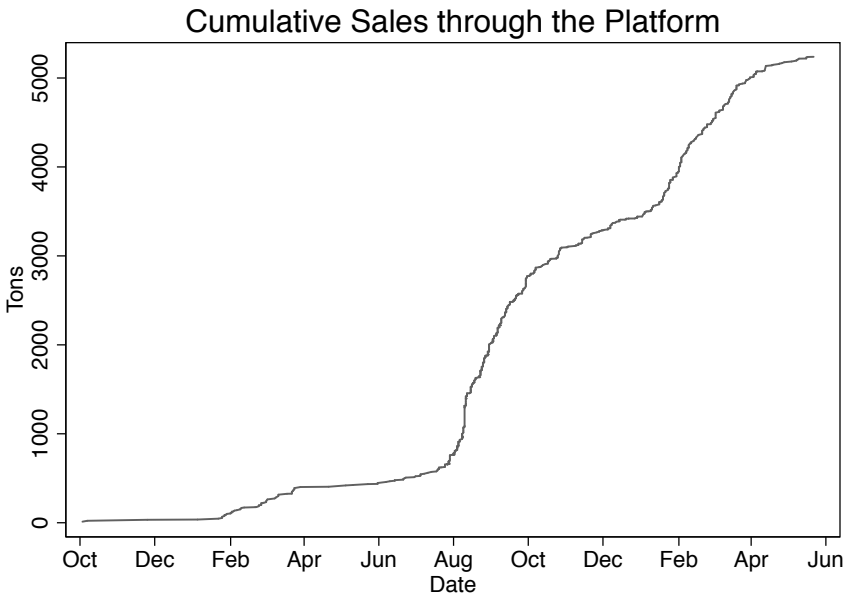
- Search costs:
  - SMS price information sent to a random 75% of households in treated sub-counties
- Credit/aggregation constraints:
  - Access to trading credit randomized at the AgriNet agent level
- Contractual risk:
  - Transaction guarantees randomized at the buyer level

Project Timeline



Introducing the Platform





- Steady growth in bids & asks (except last harvest, when drought dampened supply)
- Sales concentrated during the active parts of the post-harvest season

Initial Results

Results coming next year (after endline):

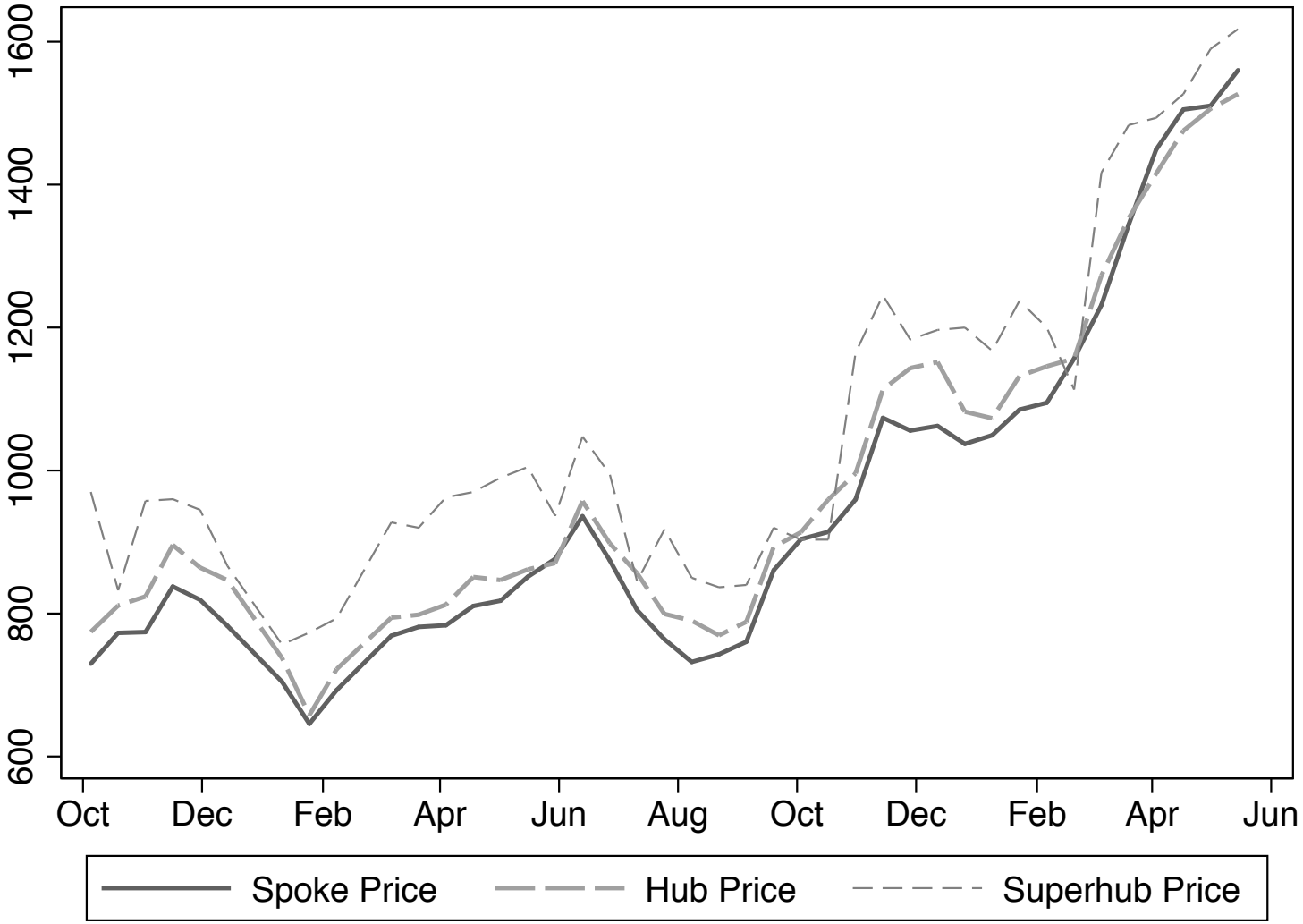
- Farmer revenue, welfare, and agricultural investment
- Trader search, area of operations, and profits

For now, our price data can help us to understand the market structure:

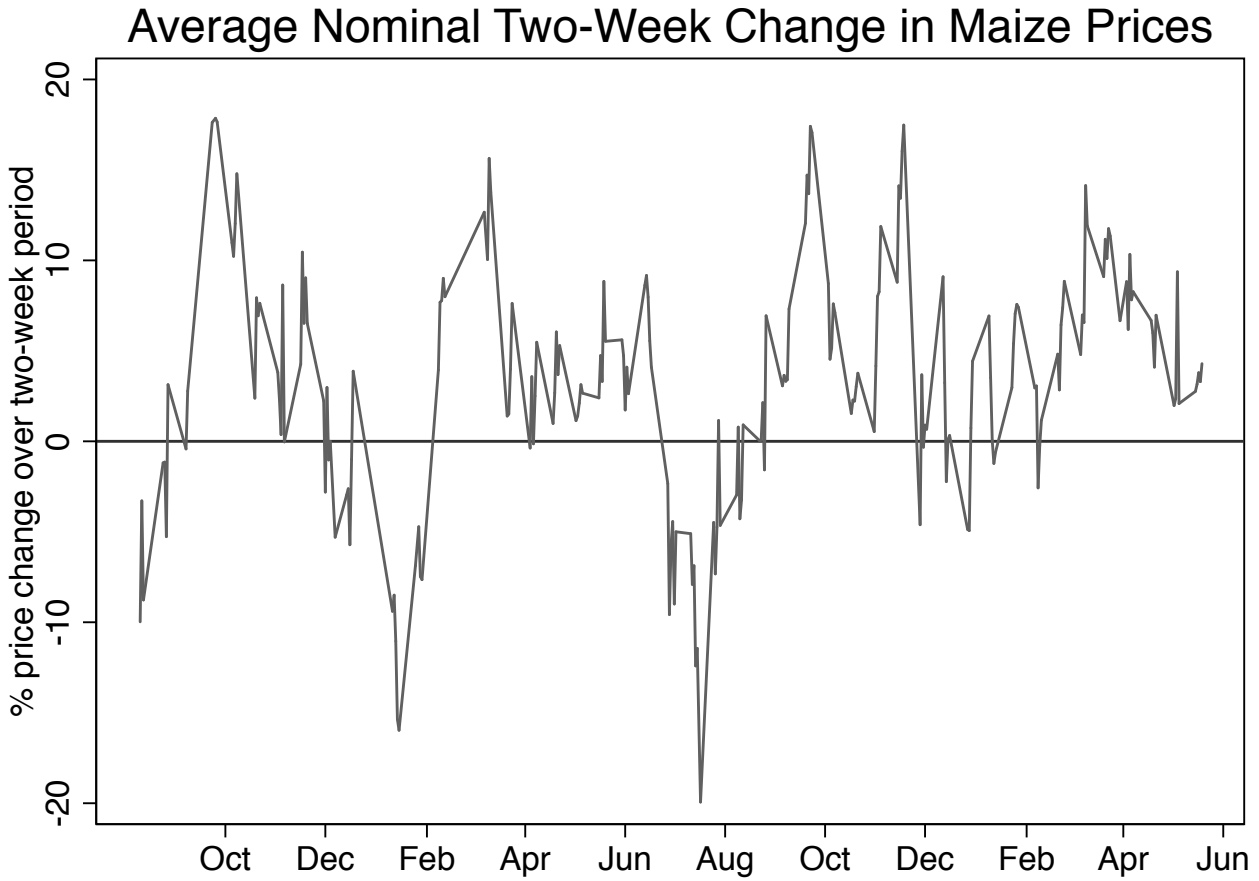
- Cross-time variation (storage & credit)
- Cross-space variation (transport & search costs)

We can also look at preliminary results on market prices and integration

Market Price Data



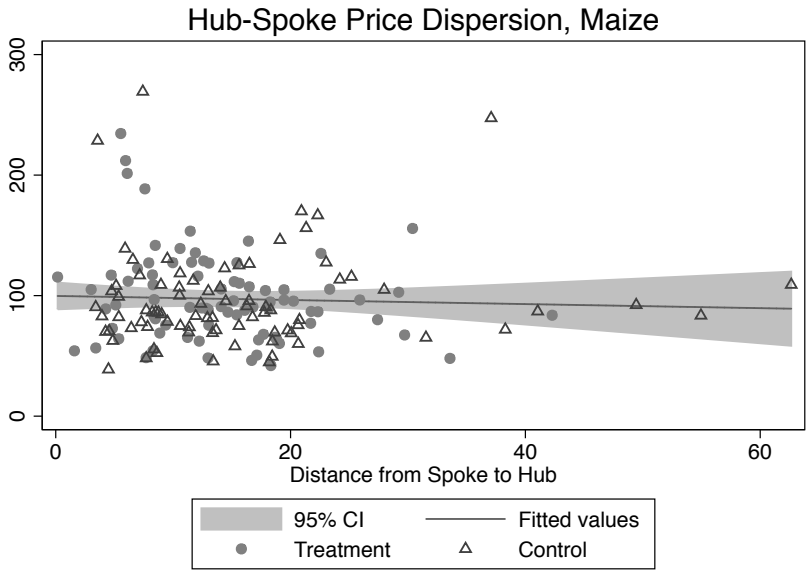
Temporal Fluctuation in Maize Prices

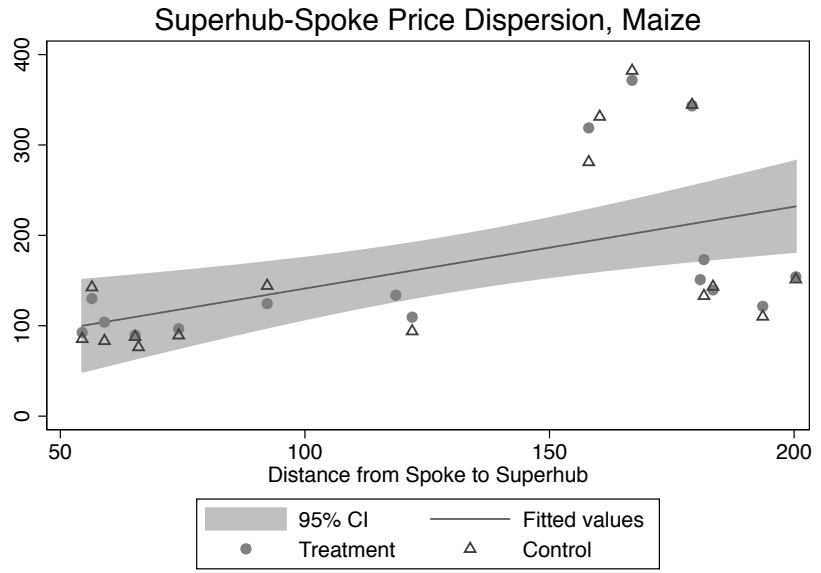


Price fluctuate rapidly. Changes of 5-10% in a two-week period are common.

Lots of opportunities for temporal arbitrage (but also some risk!)

Spatial Variation in Maize Prices





- Average dispersion 90 UGX/Kilo (10%) even for markets only 10-15 km apart!
- What drives this dispersion?
  - In local markets, not distance (distance not strongly determinative of price dispersion)
  - In regional markets, distance more strongly predictive of dispersion

Initial Results on Price Levels

	Maize	Beans	Bananas	Tomatos
Treated	-12.52	-5.186	-69.89	-5.514
	(17.30)	(38.86)	(605.4)	(6.354)
Treated*Hub	19.03	-84.03	1461.7	-8.003
	(20.28)	(101.7)	(2365.5)	(14.16)
Hub	20.39	117.2	992.1	15.60
	(15.72)	(83.19)	(1574.1)	(10.02)
Mean DV	914.2	2179.2	14782.1	182.4
N	8149	6167	6924	8768

$\Rightarrow$ No evidence of level effects on prices

Initial Results on Price Dispersion

	Maize	Beans	Tomato	Bananas
One Market Treated	-0.0643***	-0.0223	-0.0886***	-0.102***
	(0.024)	(0.032)	(0.029)	(0.035)
Both Markets Treated	-0.149***	-0.0184	-0.133***	-0.131***
	(0.027)	(0.036)	(0.033)	(0.041)
Constant	1.471***	3.841***	6.455***	5.979***
	(0.046)	(0.049)	(0.055)	(0.060)
Observations	451,521	244,610	445,400	269,502
R-squared	0.009	0.011	0.002	0.011

$\Rightarrow$ Initial evidence from base specification of reductions in price dispersion

Conclusion

- Multi-pronged intervention designed to:
  - Reduce search costs
  - Ease credit constraints and facilitate bulking
  - Reduce contractual risk
- Goal of increasing market integration and thereby enhancing incentives for farmers to invest & increase production
- Preliminary results:
  - Some evidence that we are triggering increases in market integration, decreases in market price dispersion
  - Results on farmer- and trader-impacts coming next year