The Return to Capital for Small Retailers in Kenya

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Outline

- Estimate rates of return for small retailers in Kenya
  1) Bulk discounts from distributors
  2) Stockouts of phone cards
- Examine heterogeneity across firms, within firms
  - Credit constraints?
  - Optimization failure

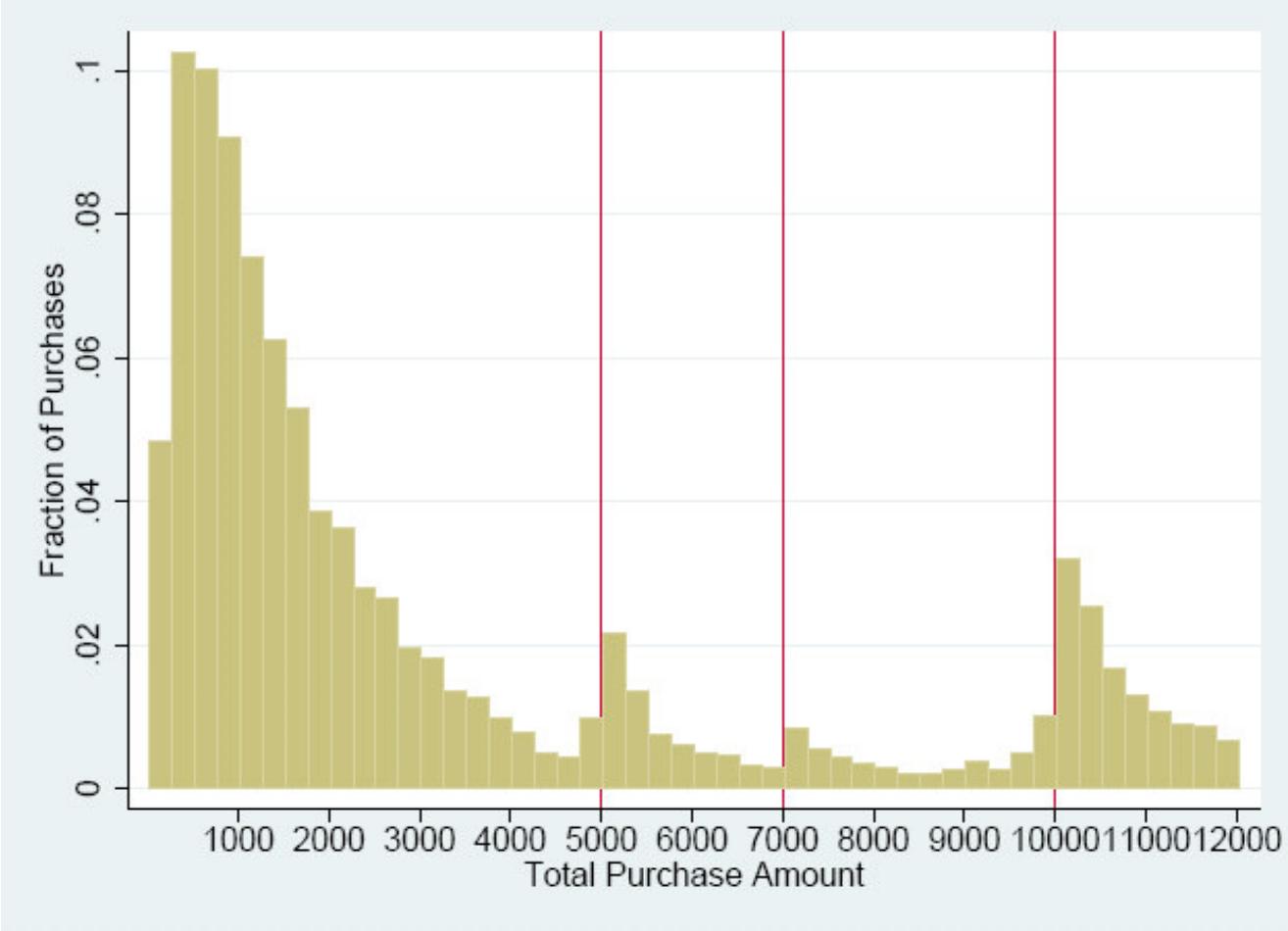
Context

- Retail shops in western Kenya
  - In small towns and rural market centers
  - Carry a small set of household goods
- Retailers purchase from:
  - Distributor who delivers on regular schedule
  - Wholesalers
  - Other suppliers (coke, phone cards, etc)
- Fixed wholesale, retail prices for all goods in our data

I) Bulk discounts

- Retailers received discounts based on total purchase amount:
  - 0.5% discount on purchases > 5,000 Ksh (~ $67)
  - 1% discount on purchases > 7,000 Ksh (~ $93)
  - 1.5% discount on purchases > 10,000 Ksh (~ $133)
- Substantial relative to typical retail markup of 10%
- Data on purchases 2005-2009 from a major distributor of over 100 household goods - cooking fat, soap, detergent, soup mix, etc.
- Low depreciation

I) Bulk Discounts: Data



- *Rough bound on interest rates:* If a shop does not buy enough to obtain a discount, this implies that the cost of financing the incremental purchase is greater than the benefit from the discount.

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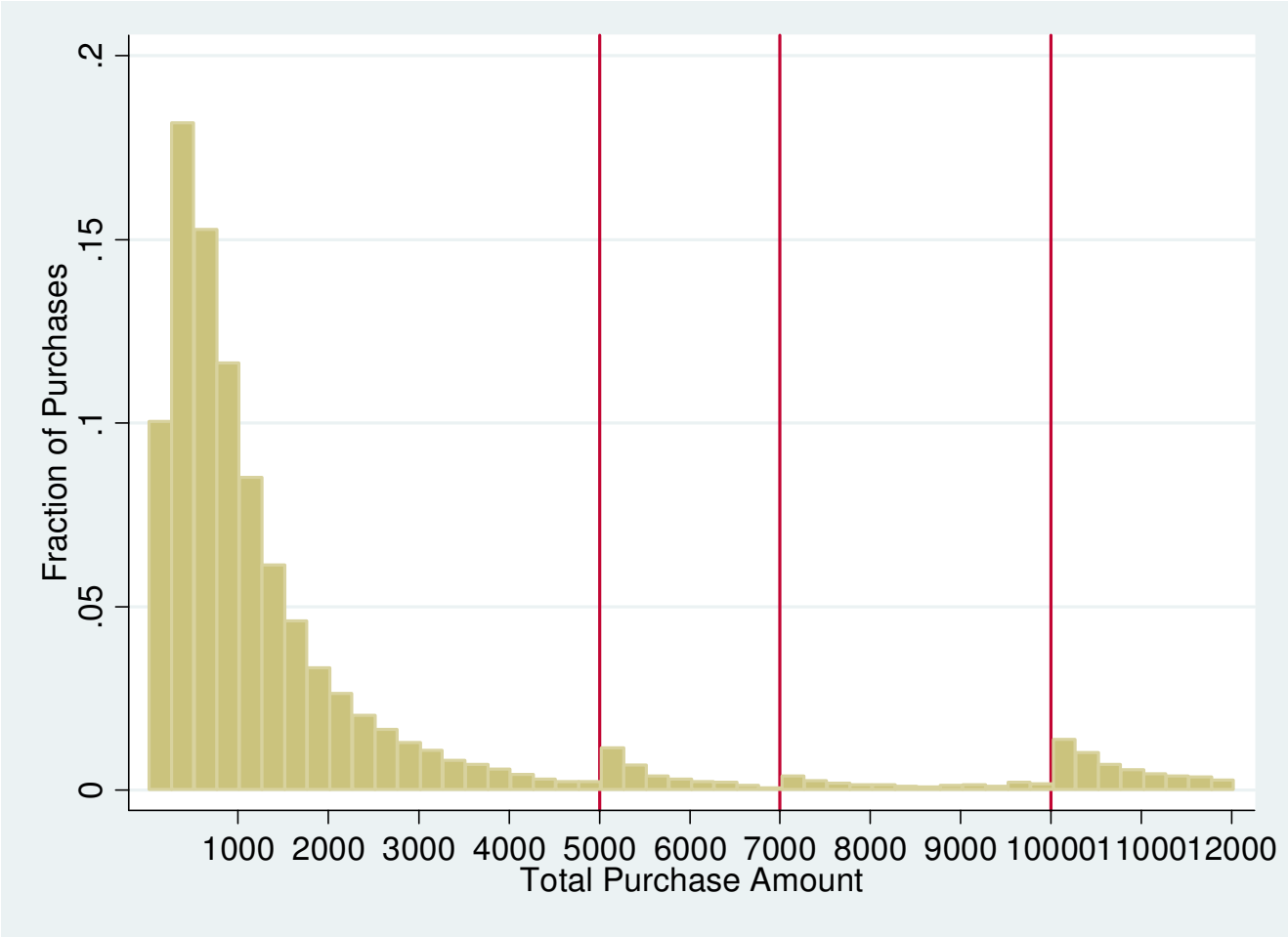

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I) Bulk discounts

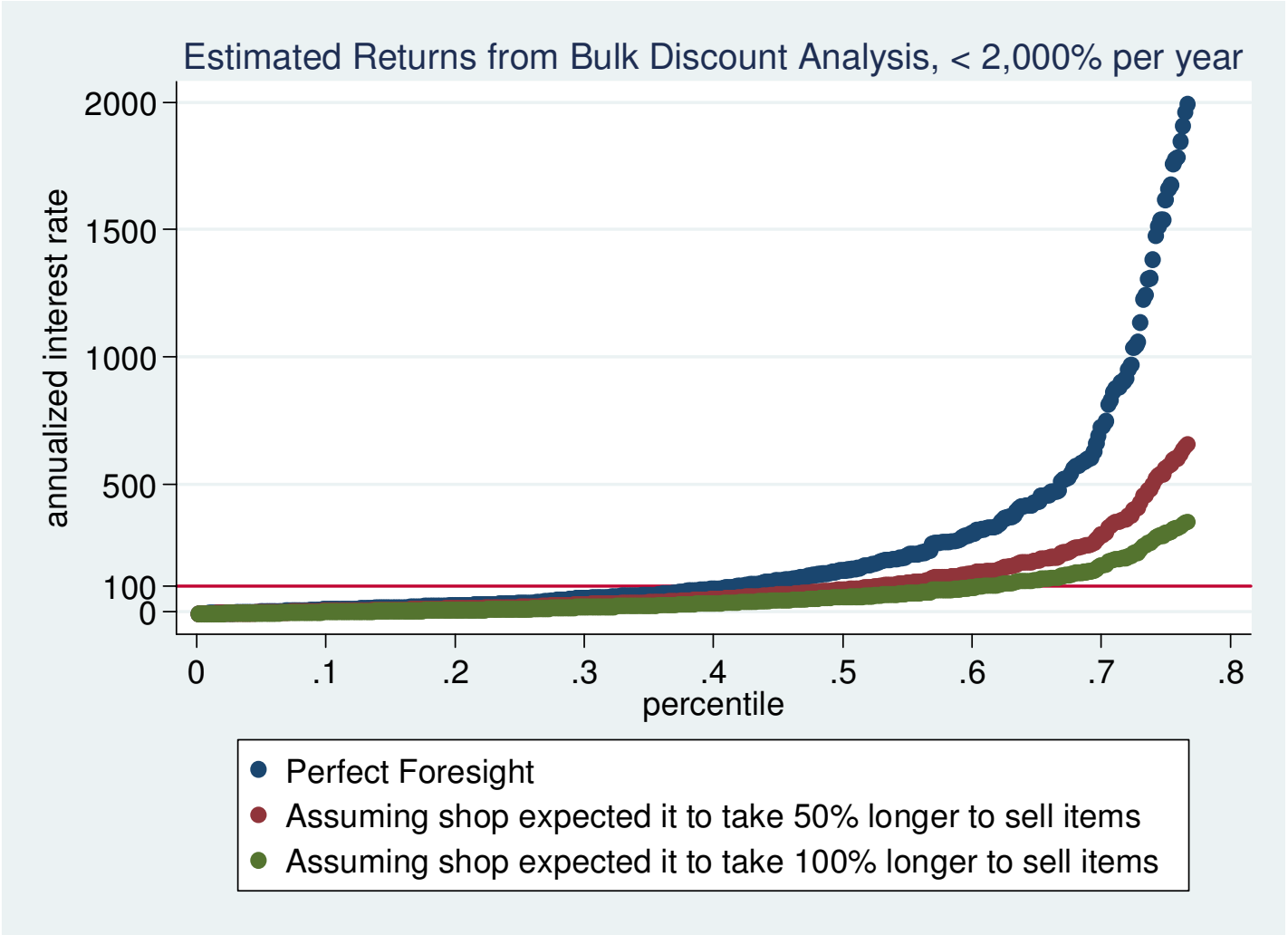
- Any firm that does not buy enough to qualify for bulk discount reveals itself to prefer paying a higher price in order to tie up less working capital
- Restrict analysis to shops that buy at least 5000Ksh in first month and use data of subsequent purchases
  - Likely bigger shops: shops at about the 80th percentile of total purchases
- Calculate bounds on return to capital using data on subsequent purchases

I) Bulk Discounts: Results

- Under baseline perfect information assumption, median shop has rate of return of 162% annually
- If roughly adjusted to unforeseen demand shocks median shop would have an annual rate of return of 56% to 87% annually

I) Bulk Discounts: Results

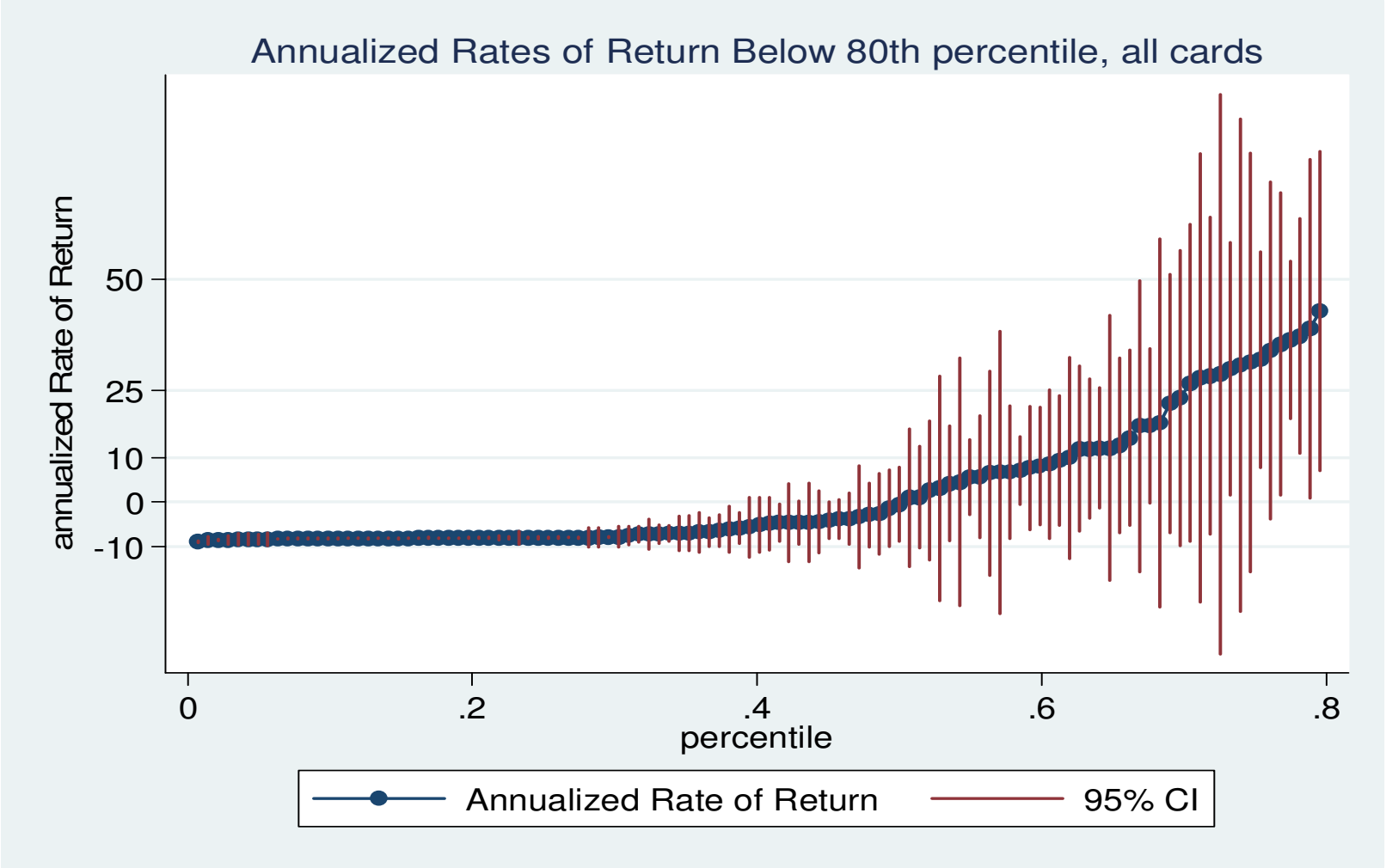
- Rough adjustments to perfect foresight assumption:



II) Stockouts of Phone Cards

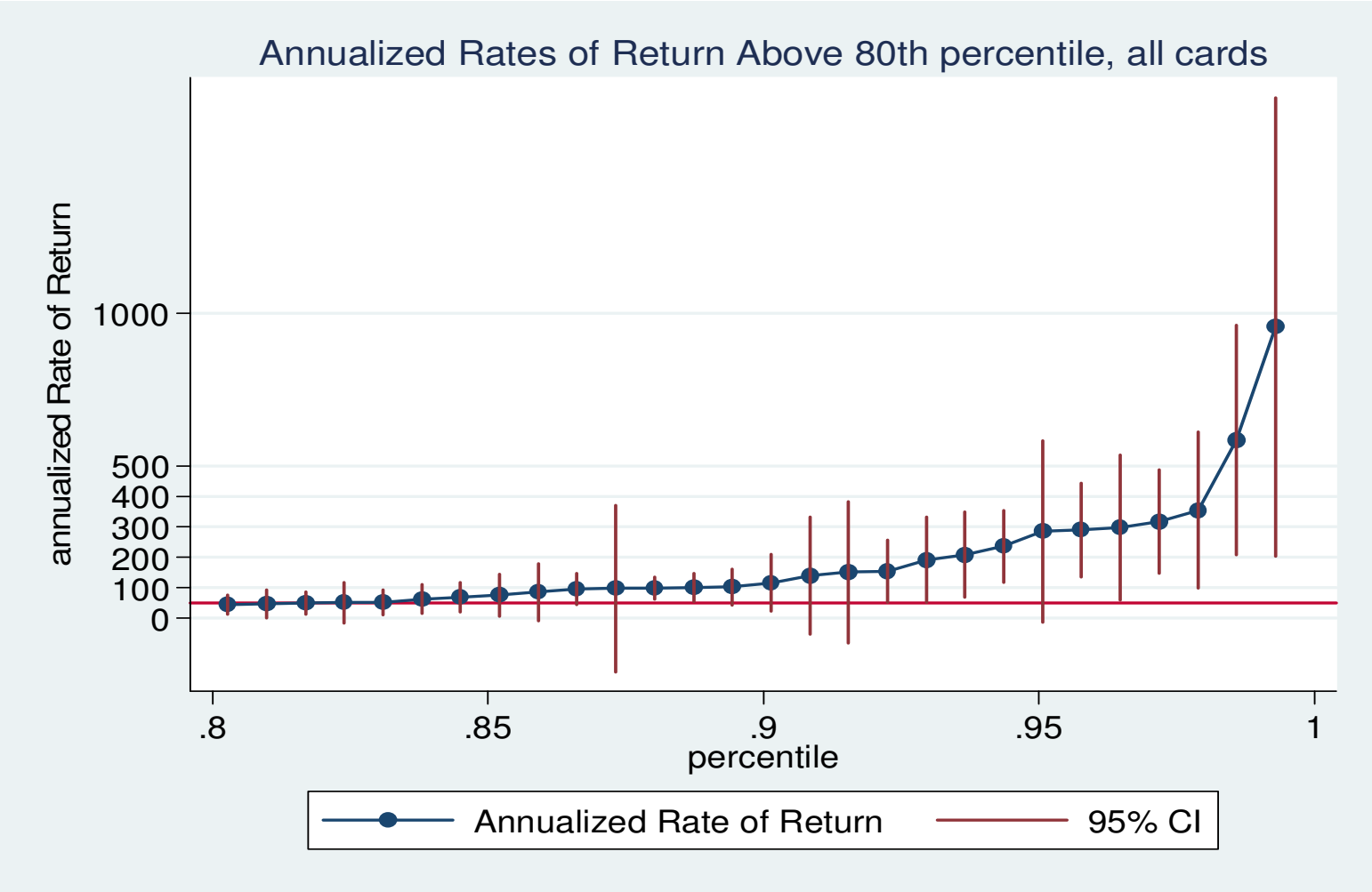
- A second approach looks at stockouts of scratch-off phone cards
- An additional unit of inventory would tie up working capital but generates additional sales
- We measure lost sales due to “stockouts” (instance in which a customer asks for a product which is out of stock)
- Likely lower bound because phone card sales
  - May generate other sales
  - Have low storage and depreciation costs
  - Have no substitutes

II) Stockouts: Results
(below 80th percentile)



95% CI shown in red

II) Stockouts: Results
(above 80th percentile)



95% CI shown in red

Interbrand correlations of returns

	(1)	(2)	(3)
	Annualized Return on Safaricom	Annualized Return on Safaricom	Dummy for Return on Safari > 50
Annualized Return on Celtel	0.297	0.021	
	(0.022)***	(0.027)	
Dummy for Return on Celtel > 50			0.297
			(0.083)***
Controls for Card Denomination/Brand	N	N	N
Observations	89	78	89
R-squared	0.68	0.01	0.13
Spearman Correlation	0.55	0.46	0.00
Correlation	0.82	0.09	0.00
Mean of Independent Variable	415.803	4.988	0.171
Mean of Dependent Variable	68.35	21.68	0.21
Sample	All	Only those with returns < 75% per year	All

Notes: Column 1 excludes 1 individual with rate of return > 50,000 per year.

II) Stockouts of Phone Cards

- Average marginal rate of return/shop: 39% per year
- 18% have return > 50%
- Evidence of heterogeneity across shops in rates of return, even within towns
- Reject equality of the estimated *r* across shops (at 1 percent)

What explains heterogeneity in returns?

1) Credit constraints
2) Optimization failures

Analysis of correlates

- How do returns correlate across different cell phone brands?
  - Firms with extremely high returns on one brand are more likely to have extremely high returns on the other.
  - Less correlation for lower returns
  - Suggest high return “types”
- How do returns and shop owner demographics and shop characteristics correlate?
  - Preliminary analysis: no significant correlation

Correlations with Shop, Owner Characteristics

Notes: report (annualized) regression coefficients from regression of interest rate on these independent variables.

	Independent Variable Characteristics		Regression on annualized returns		Regression on dummy for whether return > 50	
	Mean	SE	Coeff	SE	Coeff	SE
Years Education	10.9204	(3.22)	-3.2430	(3.57)	0.0106	(0.01)
Years Shop Open	6.4596	(6.48)	1.0955	(1.81)	-0.0017	(0.01)
Other income last week	21.7439	(83.99)	0.0654	(0.14)	0.0004	(0.00)
Value of durable goods owned	2627.1500	(5974.91)	0.0006	(0.00)	0.0000	(0.00)
Value of animals owned	814.0836	(1063.89)	-0.0049	(0.01)	0.0000	(0.00)
Got bank loan in past year	0.0973	(0.30)	-11.4157	(38.77)	-0.0561	(0.11)
Got MF loan in past year	0.1947	(0.40)	-4.4198	(29.03)	-0.0065	(0.08)
has bank account	0.6637	(0.47)	-5.9728	(24.33)	0.0151	(0.07)
ROSCA contributions in past year	95.0140	(164.35)	-0.0248	(0.07)	0.0001	(0.00)
If needed 1,000Ksh, take out of inventory	0.2743	(0.45)	56.5309	(25.20)**	0.1161	(0.07)
If needed 10,000Ksh, take out of inventory	0.2124	(0.41)	50.6596	(27.70)*	0.0318	(0.08)
Total startup costs	897.6158	(1470.03)	0.0003	(0.01)	0.0000	(0.00)
Building startup costs	81.1548	(261.36)	0.0401	(0.04)	-0.0001	(0.00)
Inventory startup costs	724.7650	(1432.81)	-0.0011	(0.01)*	0.0000	(0.00)
Other startup costs	55.4684	(95.44)	0.0052	(0.12)	-0.0002	(0.00)

Time trend: Learning (I)

Regression of daily interest rate on these independent variables

	(1)	(2)	(3)	(4)	(5)
Days Since first Visit at Shop	-0.050	-0.052	-0.040	-0.075	-0.075
	(0.006)***	(0.006)***	(0.004)***	(0.022)***	(0.022)***
Days since Project Start	-0.055	-0.06	-0.051	-0.187	-0.187
(July 2005)	(0.006)***	(0.007)***	(0.013)***	(0.027)***	(0.027)***
Days Since first Visit at Shop					0.035
* New Sample					(0.023)
Days since Project Start					0.136
(July 2005) * New Sample					(0.03)***
Dummy for New Sample					-34.844
					(11.012)**
Controls for Card Denomination/Brand	N	Y	N	N	N
Observations	10283	10283	8451	1832	10283
Mean of Dependent Variable	14.63	14.63	10.75	34.22	14.63
Sample	Both	Both	New	Old	Both

Notes: report (annualized) regression coefficients from regression of daily interest rate on these independent variables. Std. errors calculated by delta method.
p-value for test that Days Since first Visit at Shop + Days Since First Visit at Shop * New Sample <0.001

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Future work: non-experimental

- Look for monthly cycles in stockouts of shop owners with monthly wage income in family
- Test behavior across markets with more or less competitors?

Future work: experimental

- Potential randomized evaluations of:
  1) $100 Grant
  2) Information
     - Provide marginal returns for own shop, as measured by our study
  3) Credit intervention
  - directly provide short term trade credit through distributor
  - Vouchers for loans of 1000 Ksh, 20% APR, term=2 weeks
  - After 2 weeks, penalties begin to accrue
  4) Variation in bulk discount cutoffs
- Outcome: administrative data on bulk discounts

Summary

- Marginal rates of return to inventories are:
  - Very high for some retailers
  - Heterogeneous, even locally
- Biggest question: Are shop owners limited by credit constraints or are they failing to optimize?
- Evidence suggests not just credit constraints
  - Low correlation of returns w/ background characteristics
  - Learning