

## **"Returns to Capital" Panel**

### **The Return to Capital for Small Retailers in Kenya: Evidence from Inventories**

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Standard textbook models suggest risk-adjusted rates of return should be equalized across activities within firms, and across firms. In general, measuring rates of return is difficult, but we take advantage of the characteristics of the retail industry to create bounds on the rate of return to inventories in a set of retail firms in rural Kenya. We collected two types of data and use two separate empirical strategies to estimate and bound the marginal rate of return to capital in this sector.

Our first method makes use of administrative data on whether firms purchased enough to take advantage of quantity discounts offered by their suppliers. The distributor offers discounts to retail shops of up to 1.5% based on the total purchase amount. Relative to a typical markup of 10 percent, these discounts are substantial. This analysis does not allow us to estimate the interest rates, but allows us to bound the marginal rate of return. The advantage however, is that these are administrative data and there is thus less of a concern about selection into the sample. A rough first-pass implementation of this strategy suggests a lower bound on rates of return of 142 percent per year for a median shop. However, this assumes perfect information and these rates may be sensitive to unforeseen demand shocks. Making a very rough adjustment for this, we calculate that a median shop would have an annual rate of return of at least 76 to 49 percent at some point during the year. We hope to refine this estimate in the future.

The second approach involves surveying shops on a regular basis to measure the number of stockouts – lost sales due to insufficient inventory – that shops experience. This estimate also allows us to calculate the number of additional sales that firms would capture if they incrementally increased their inventory, and to calculate a rate of return to a marginal increase in inventory. In our preliminary analysis, we find unexploited inventory investments which would yield a lower bound on the average annual real marginal rate of return of 33 percent, with 16 percent of shops having rates of return over 50% per year. These rates are well above rates of return to debt and equity both in Kenya and in international markets. We reject the hypothesis that the bounds on marginal rates of return are equal across shops (at 1 percent).

These results suggest that returns to inventory capital in the Kenyan retail sector are likely far greater than returns to investment in developed country equity markets, and suggest that these returns likely differ significantly across firms. However, while these estimates suggest high rates of return for the firms in this sample, several questions about the interpretation of our results remain unanswered. In particular, are these significant unexploited profit opportunities a result of substantial credit constraints at the firm level? Or are they reflective of behavioral or other biases? If firms are unable to realize profit opportunities because they are credit constrained, then microfinance or other credit provision programs could have substantial growth impacts. If, however, our estimated rates of return are symptomatic of behavioral biases, training programs could might help. We plan to address these questions directly in a series of surveys and field experiments in our future work.

First, we would like to examine the effect of access to credit by providing loans to firms, and assessing how these loans impact investment behavior. We will work with a distributor of retail goods to provide trade credit to firms. We will randomly assign firms to receive a limited amount of credit, and observe whether this helps them get over the bulk discount threshold and take advantage of bulk discounts more frequently. If so, this could suggest that credit market imperfections may play a role in explaining why profitable investment opportunities can go unexploited. We could also measure which types of firms default on their debts and how credit contract design influences repayment. This could help us understanding why trade credit is not already more widespread in a context where significant unexploited profit opportunities seem to exist and allow us to explore the sources of high and variable rates of return in this population.

Second, we propose to provide a randomly selected subset of shops with information about the rates of return that could be achieved by marginally increasing their inventory or taking advantage of bulk discounts, and offer another random sample of shops a one time grant of phone cards. We will also provide some shop keepers with a mental accounting tool to help them put aside money for phone card purchases. We will then measure post-intervention investment behavior and inventory.

Third, we also want to examine the interaction between information provision and credit access by including a group that receives both information and access to trade credit

Fourth, we plan to explore the extent to which labor market problems and dispersion in the ability of entrepreneurs underlie the high and likely heterogeneous marginal rates of return. To examine the sources of heterogeneity in rates of return we plan to link both bounds on rates of return and responsiveness to interventions with background data on baseline characteristics, including psychological measures and measures of entrepreneurial potential, such as education, business and cultural background, risk aversion, present bias, cognitive ability, beliefs and personality traits.

Finally, we plan to characterize entry and exit of firms in this industry, and to explore issues of industrial organization and the extent to which labor market imperfections explain why inefficient firms survive in equilibrium. To this end, we are currently collecting high-frequency censuses of retail businesses in these market centers to monitor the entry and exit of firms, to determine which types of firms are the most likely to exit the sector, and to attempt to examine how firm survival varies with background characteristics of the firm and its owner, and with access to credit.