

Final report

Credit
constraints,
trade credit
and firm
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Zambia

Lorenzo Casaburi
Jonas Hjort

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Credit constraints, trade credit and firm growth across interlinked markets in Zambia

Lorenzo Casaburi (Stanford) and Jonas Hjort (Columbia)

Final Report –March 31, 2016

1. Introduction

The pilot project funded by IGC focused on the relationship among trade credit, value chain relationships and firm growth in the fish farming industry in Zambia. Partnering with a large fish wholesaler, Lake Harvest Zambia (henceforth LH), the researchers explored the relationships between the wholesaler and its clients, focusing on several determinants of the clients' purchase choices, including credit provision, product quality and supplier reliability.

In the pilot phase of the project, we completed two key activities (in partnership with IPA Zambia): i) we obtained and analyzed administrative data from the LH covering production, deliveries, and prices, among others; ii) we conducted a pilot survey on a random subsample of LH clients, which included questions on suppliers, profits, access to credit.

The analysis following these pilot activities enabled us to gather a better understanding on key issues in the value chains relationship, including credit demand and supply and wholesaler reliability. We shared the results with LH and proposed several options to continue the collaboration, including potential randomization designs we discuss in subsequent sections of this report. Unfortunately, in the current phase, LH is planning to move toward a more structured wholesale distribution network with separate retail presence. In light of this, we could not find a common ground for further collaborative activities in the medium term.

2. Analysis of Administrative Data

LH has shared a wealth of administrative data with us. These include, among others, detailed records of production and sales from several of their depots across the country. The data include granular information on key variables such as client name, transaction date, quantity sold, prices, and a binary indicator for whether trader credit was provided by the wholesaler to

the client. The current data span from 2010 to May 2014. However, some of the variables are only available for 2013 and 2014, so we restrict the analysis to this period.

The database contains information on whether the client obtained trade credit for the specific purchase (and on the amount provided). We notice the prevalence of trade credit increases from 2013 (12%) to 2015 (25%). We observe a positive but small correlation between client sale volume and share of purchases with trade credit (**Table 1, column 1**). We also note that in a firm fixed effect regression, a client is more likely to receive trade credit from LH after a decrease in sales in the previous order (**Table 2, column 2**). Specifically, a standard deviation reduction in the volume of previous sales raises the likelihood of receiving trade credit in the following sale by 8%. This is suggestive of the idea that the supplier uses the provision of trade credit to help its customers cope with negative shocks in demand, in order to increase its sales. On the other hand, only 30% of the clients have received at least trade credit at least once and, among these clients, the share of sales with trade credit is only 35%. This suggested the possibility the clients' had unmet demand for trade credit, which motivated the survey we describe below.

Another key aspect of the relationship concerns the reliability of the suppliers' delivery. The database offered a unique opportunity to investigate this question because it provided information both on the amount of fish the client had requested (and that the supplier had agreed to provide) and then on the actual amount delivered. We find that in 23.6% of the cases, the amount supplied is less than the amount scheduled. Conversations with LH management suggested that most of these discrepancies were driven by availability of fish in given days.

Finally, we explore how the wholesaler responds to previous episodes of unmet demand that may have undermined its perceived reliability. First, we find suggestive, though imprecise, evidence that unmet demand in the previous transaction increases the amount LH agrees to supply to that client in the subsequent transaction (**Table 2, column 1**). Second, buyer fixed effect regressions show that the likelihood a certain client received trade credit increases following an episode of unmet demand (**Table 2, column 2**). While obviously these results

cannot be interpreted causally, they suggest that the wholesalers adopt specific measures to overcome the potential drawbacks that follow an episode of unmet clients' demand.

3. Survey

In the last quarter of 2015 and the first quarter of 2016, we conducted a pilot survey with a sample of clients purchasing fish from LH. The goal of the survey was to gather additional insights on issues such as the choice of suppliers, access to credit, and business challenges. To run the survey, we hired a Research Assistant who helped in the design and data collection. We attach a printed version of the survey (which was administered on tablets).

As a preliminary step for the survey we collected basic information from LH clients by asking a small set of questions to clients at the time they came in to purchase fish in the LH depot. These questions supplemented administrative data from LH and concerned contact details, location and type of business (e.g. restaurant, retailer, etc.). By merging with recent sale volume data we identified a pool of about 80 regular clients, which included both larger businesses and local market retailers. We drew a random sample of 20 clients to be targeted for the pilot survey and we succeeded in conducting interviews with 15 of these. In addition, we revisited a subsample of these clients to ask some open ended follow-up questions based on the findings of the survey.

The first result concerns demand and potential benefits for credit. We find that 73.3% of the respondents believed that buying on credit could help grow their businesses. However, the follow-up open ended questions seemed to suggest that traders do not see this as a central issue and trade credit access is not a factor that attracts them to buy from a particular supplier, compared to the availability of quality fish, competitive wholesale price, consistency in supply and a less congested depot. A few of the traders interviewed in this follow-up survey also report they may dislike purchasing on credit from the supplier since that would make them feel they are employees of the supplier. Notice that, the reported lack of interest for trade does not imply other forms of credit would not be beneficial for the business. The survey suggests indeed the presence of credit constraints: Only 40% of the clients applied for a loan in the last

12 months, possibly due to expected difficulties in obtaining loans because of lack of collateral. Consistent with this hypothesis, of those who applied for a loan, the success rate was only 50%.

Second, we notice that these clients source fish from a range of suppliers. For instance, only 26% of the respondents report they purchase all the fish from Lake Harvest. In the follow-up open ended survey, the clients mention that supply reliability, fish quality, waiting time, and customer relationships are key factors driving their choice of suppliers.

Finally, following up on a point made by several clients during the first round of interviews, we also investigated about clients' demand for bulk discounts. We asked farmers a set of hypothetical questions about how much extra quantity they would buy in response to several bulk discount scenarios. With the obvious caveat that these questions were hypothetical, the results suggest a highly elastic demand to these price reductions. Based on this survey evidence, we explored several options for randomized controlled trials based around the concept of bulk discounts. Client or depot level randomization of bulk discounts could potentially give insights both on the actual demand elasticity and on the impact of these discounts on clients' firm growth. Unfortunately, at this stage, LH is not interested in piloting these designs with his clients.

4. Next Steps

The pilot activities – the analysis of the LH administrative records and the pilot survey – revealed several insights on the dynamics of the supplier/buyer relationship, including the role of trade credit and supplier reliability. Based on the current development at LH, it is unlikely we will collaborate on joint randomized experiments. However, we are currently attempting to collect additional (i.e. more recent) administrative data on quantity LH planned to sell and actually sold to specific clients and on trade credit provision. These additional data may help extend the analysis described in this report.

Tables

Table 1: Buyer Size and On-Credit Purchases

	(1)	(2)
Amount Purchased (100kg)	0.029*** [0.001]	
Lagged Amount Purchased (100kg)		-0.005** [0.002]
Buyer FE	No	Yes
Mean Dep.Var.	0.216	0.216
Observations	6598	5895

Notes: The dependent variable is a dummy that takes value one if the buyer purchases fish on credit in the specific transaction. Column 1 reports the cross-sectional relation. Column 2 reports results from a regression with buyer fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 2: Unmet Demand and On-Credit Purchases

	(1) Amount Allocated	(2) Purchase on Credit
Lagged Unmet Demand	2.039 [1.355]	0.007** [0.003]
Buyer FE	Yes	Yes
Mean Dep.Var.	206.498	0.216
Observations	5895	5895

Notes: The dependent variable in column (1) is the amount LH allocates to the client in the specific transaction. The dependent variable in column (2) is a binary indicator equal to one if the purchase is on credit. *Lagged Unmet Demand* is the difference between the amount LH allocated and the difference the buyer purchased in the previous transaction (equal to zero if negative). Both columns include buyer fixed effect.. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

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