

Financial and Management Constraints: Characterizing which Firms are Affected

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Motivation

- Facts about **employment** in Sub-Saharan Africa (World Bank, 2012):
 - Micro and small enterprises (MSEs) are an important **source of employment**
 - Demographic shifts will lead to **increases in the labour force**, jobs will be needed in the future
- **Key policy question:** do MSEs have the potential to grow and contribute to job creation?
- Growing body of literature provides empirical evidence that some firms do have **high returns to capital** and **may realize these returns** by investing in their business. (e.g. De Mel et al., 2013, WBER; McKenzie and Woodruff, 2008, WBER)
- ⇒ **What prevents micro and small enterprise owners from investing into their business?**

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Constraints to Firm Development

- The **current literature** concerned with the development of microenterprises mainly focuses on the following three constraints:
 1. **Credit Constraints:** insufficient access to loans
 2. **Saving Constraints:** insufficient accumulation of savings
 3. **Managerial Constraints:** lack of financial knowledge and business skills
- Numerous randomized controlled trials (**RCTs**) have been implemented that aim at **relaxing these constraints** by providing
 1. Microcredits, cash, in-kind grants (e.g. Banerjee et al. 2015; De Mel et al., 2011; Berge et al. 2015; Fafchamps et al. 2014)
 2. Bank accounts, saving reminders (e.g. Dupas and Robinson, 2013; Karlan et al., 2016, Prina, 2015)
 3. Financial knowledge and business training, consulting services (e.g. Karlan and Valdivia, 2011; Drexler et al., 2014; Bruhn et al. 2015; Giné and Mansuri 2018)

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Heterogeneous Effects

- Several studies find **effects of RCTs** only for subgroups:
 - Provision of bank accounts only effective for market vendors not for other **occupation** studied (e.g. Dupas and Robinson, 2013)
 - No effect of training on business performance for **female** participants (e.g. Berge et al., 2015)
 - A simplified rule of thumb training compared to standard training is more effective for the group with the **lowest human capital** (e.g. Drexler et al., 2014)
- Implications and open questions:
 - ⇒ Heterogeneous treatment effects are common.
 - ⇒ Trainings or interventions should be targeted to client characteristics!
 - ⇒ Which type of entrepreneurs or businesses are affected by which constraints?

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Research Questions and Contributions

This paper analyzes the following **questions**:

- Which constraints are relevant for firm investment at the **intensive margin**, amount of investment?
- Which **subgroups** are affected by which **constraints**?

This paper further **contributes** to:

- The understanding on how entrepreneurs invest (in which type of investment, how much).

Data

- Survey on micro and small enterprises (MSEs) in Kampala, Uganda
- Panel covers 500 MSEs yearly, 2012-2017
- MSEs operate in manufacturing (45%), retail (37%), services (18%)
- Information on
 - business owner characteristics
 - financial literacy
 - household information (assets, household members)
 - cognitive ability, attitudes, behaviour
 - firm characteristics
 - complete list of business equipment, inventory
 - costs, sales, profits, savings, loans
 - labour
- Final estimation sample consists of 235 microenterprises and 940 observations (balanced panel)

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Number of Enterprises and Investments

Table: Number of Enterprises

	(1) 2013	(2) 2014	(3) 2015	(4) 2016
N	235	235	235	235
Investment	116	169	146	140
Additional	109	151	135	124
Replacement	16	44	24	43

- Between **49%-72%** of business owners **invest** into the business in each wave
- **Type of investment: Most** investments are **additional** rather than replacement investments

Total Capital Stock and Investment

Table: Mean Value of Capital Stock and Investments

	(1) 2013	(2) %	(3) 2014	(4) %	(5) 2015	(6) %	(7) 2016	(8) %
Total Capital Stock	2347.17		2249.37		2418.78		2131.35	
Investment	391.90	24	329.21	24	317.72	22	213.54	25
Additional Investment	395.46	23	309.75	22	327.02	21	218.40	25
Replacement Investment	147.20	19	201.48	19	93.28	14	65.44	11

All values are in 2012 US Dollar.

- Value of **investment** amounts to **22%-25%** of total capital stock
- Investments are driven in number and value by additional rather than replacement investments.

How to Operationalize Constraints?

- Each single constraints is measured using a set of items
- The items are selected based on the existing literature:
 1. **Credit constraints (formal/informal)** (Bigsten et al., 2003; Dinh et al., 2010)
 - Credit **unconstrained**: obtained full amount of credit, no need for credit, interest rates are too high.
 - Credit **constrained**: applied and got rejected; do not apply for credit because of the following reasons: expected rejection, unfamiliarity of application process, lack of knowledge about credit source, feeling uncomfortable.
 2. **Saving constraints**
 - No bank account (Dupas and Robinson 2013)
 - Unprotected savings (Beck et al. 2017)
 3. **Managerial constraints**
 - Lack of knowledge in financial literacy/numeracy (Lusardi and Mitchell, 2014)
 - Lack of business practices (McKenzie and Woodruff, 2015)

How to Measure the Impact of Constraints on Investment?

- Identification of items with predictive power.
- Correlation between each single item and investment value ([Appendix](#))

Table: Mean of Items with Predictive Power

	Share
Credit Constraint (CC)	
Informal Credit Constraint	.33
Saving Constraint (SC)	
No bank account	.27
Unprotected savings	.36
Managerial Constraint (MC)	
Interest rates	.52
Compound interest	.49
Inflation	.14
No record keeping	.34

- Constraints are measured as unweighted average of all standardized item.

Estimation

The following random effects model is estimated:

$$\ln I_{i,t} = \beta_0 + \beta_1 \mathbf{CC}_{i,t} + \beta_2 \mathbf{SC}_{i,t} + \beta_3 \mathbf{MC}_{i,t} + \beta_4 \mathbf{x}'_{i,t} + \mathbf{e}_i + u_{i,t}$$

$$\mathbf{x}'_i = [S_{i,t} \quad F_{i,t} \quad Y_{i,t}]$$

- $I_{i,t}$: Investment value
- Credit Constraint ($\mathbf{CC}_{i,t}$): Informal credit constraint
- Saving Constraint ($\mathbf{SC}_{i,t}$): No account, unprotected
- Managerial Constraint ($\mathbf{MC}_{i,t}$): Interest rates, compound interest, inflation, record keeping
- Control Variables \mathbf{x}'_i :
 - **Socio-Economic Characteristics** (S_i): sex, marital status, age, education, business experience, cognitive ability, growth aspiration
 - **Firm Characteristics** (F_i): firm age, initial capital, own account worker, industry, tax registration
 - **Year Dummies** (Y_i)

Main Results - Constraint Index

Table: Random Effects Estimation Results: Log Investments (> 0)

	(1)	(2)	(3)	(4)
Informal Credit Constraint	-.261* (0.146)	-.129 (0.149)	-.095 (0.153)	-.090 (0.155)
Saving Constraint Index	-.540*** (0.116)	-.444*** (0.115)	-.365*** (0.117)	-.363*** (0.116)
Managerial Constraint Index	-.211 (0.129)	-.154 (0.134)	-.109 (0.138)	-.119 (0.139)
Obs.	571	571	571	571
<i>Control variables</i>				
Socio-economic characteristics		✓	✓	✓
Firm characteristics			✓	✓
Year dummies				✓

- A one standard deviation increase in saving constraints is associated with a reduction in investments by approx. 36 percent

Main Results - Items

Table: Random Effects Estimation Results: Log Investments (> 0)

	(1)	(2)	(3)	(4)
Credit Constraint				
Informal Credit Constraint	-.277* (0.15)	-.146 (0.151)	-.102 (0.156)	-.098 (0.157)
Saving Constraint				
NoBank	-.679*** (0.21)	-.483** (0.213)	-.298 (0.209)	-.297 (0.209)
Unprotected	-.464** (0.209)	-.433** (0.205)	-.429** (0.208)	-.421** (0.21)
Managerial Constraint				
Interest	-.143 (0.171)	0.028 (0.173)	0.045 (0.17)	0.059 (0.17)
Compound interest	-.267* (0.155)	-.337** (0.153)	-.274* (0.155)	-.315* (0.163)
Statement: high inflation, living cost	0.161 (0.245)	0.157 (0.246)	0.113 (0.253)	0.127 (0.253)
No record keeping	-.326 (0.205)	-.242 (0.204)	-.167 (0.204)	-.185 (0.204)
Observations	571	571	571	571
<i>Control variables</i>				
Socio-economic characteristics		✓	✓	✓
Firm characteristics			✓	✓
Year dummies				✓

Heterogeneity - Socio Economic Characteristics

Table: Heterogeneity

	Constraint		
	Credit	Saving	Managerial
Socio-economic characteristics			
female	-	-	-
education	+	-	-
age	+	-	+
married	-	-	-
cognitive ability	-	-	-

- A lower **educational level** is associated with a higher negative impact of credit constraint on investments
- An increase in the business owners age is associated with a lower negative impact of **managerial constraints** on investment.

Heterogeneity Results - Firm Characteristics

Table: Heterogeneity

	Constraint		
	Credit	Saving	Managerial
Firm characteristics			
firm age	-	-	+
ownaccount worker	-	+	+
record keeping	-	-	+
initial capital	-	+	+

- Hypothesis:

- Positive association between firm size and business practices. (McKenzie and Woodruff, 2017)
- Younger and smaller firms are more likely to be credit constrained (Bigsten et al., 2003)

Take Aways

- **Descriptives** show that investment rates are relatively stable over time. Total investments are driven in number and amount by additional rather than replacement investments.
- Overall, the analysis identifies **saving constraints** as a relevant obstacle for the investment amount of micro and small enterprises in Uganda.
 - This effect is **driven by unprotected savings** rather than a lack of access to a bank account.
- While the managerial constraint index shows no influence, one managerial item seems to be associated with lower investments (implication?)
- Regarding the question on which **subgroups** are affected by which constraints:
 - Credit constraints are prevalent among the group of lower educated business owners ⇒ lifting credit constraints seems crucial in the group of lower educated
 - Managerial constraints are prevalent among younger business owners ⇒ managerial training should be targeted to younger entrepreneurs

A Comment on Methodological Issues

- Unlike RCTs this paper relies on panel data.
 - **Causal conclusions** very limited
 - **Endogeneity** \Rightarrow Testing for endogeneity bias
 - Constraints are **self-reported** \Rightarrow Concerns of under/over reporting?
 - Analysis currently based on a balanced panel and surviving firms only

Additional Tables

Correlations: Investment - Credit/Saving Items

Figure: Log Investment > 0

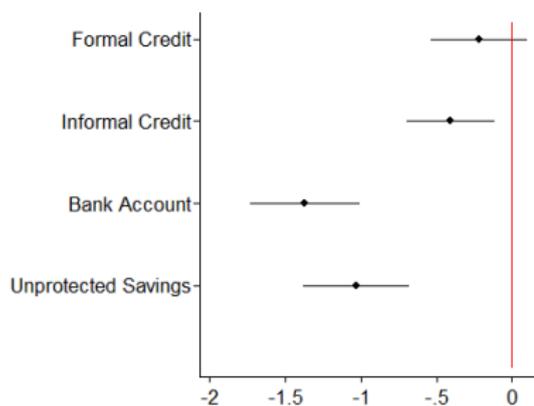
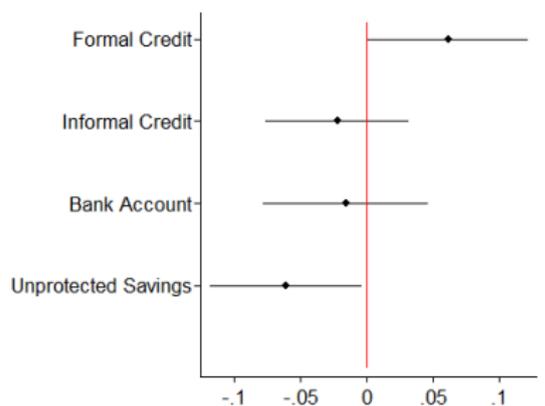


Figure: Investment (yes/no)



Simple estimations of investment on items Point estimate and confidence intervals based on simple ordinary least squares estimates.

Correlations: Investment - Financial Literacy Items

Figure: Log Investment > 0

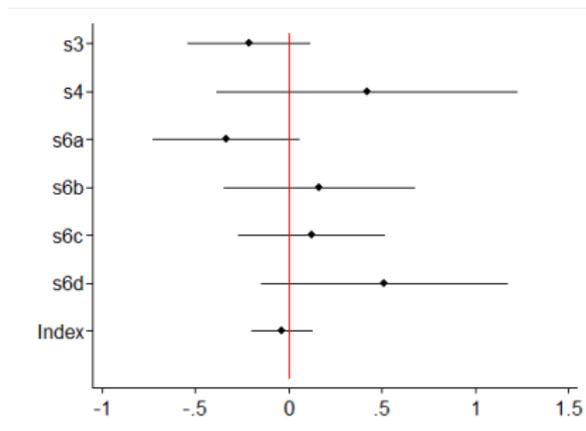
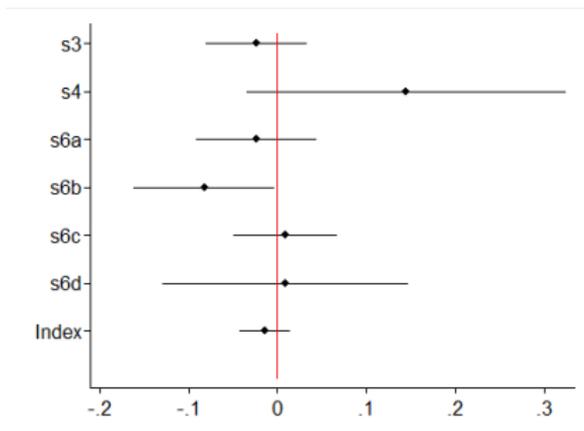


Figure: Investment (yes/no)



Simple estimations of investment on items Point estimate and confidence intervals based on simple ordinary least squares estimates.

Correlations: Investment - Numeracy/Record keeping Items

Figure: Log Investment > 0

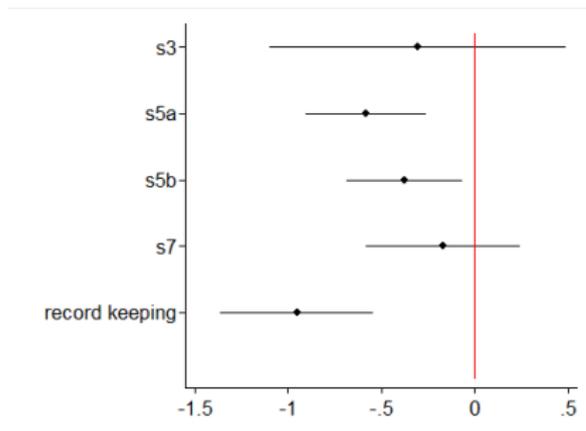
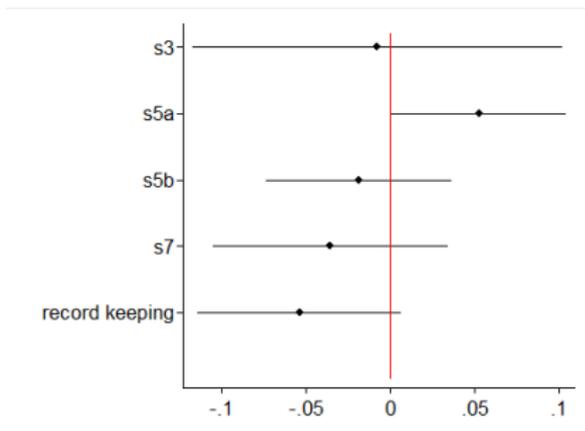


Figure: Investment (yes/no)



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Distribution Constraint Index

Figure: Informal Credit Constraint

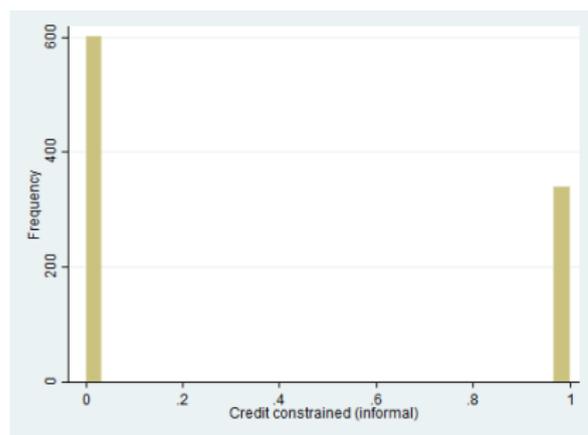
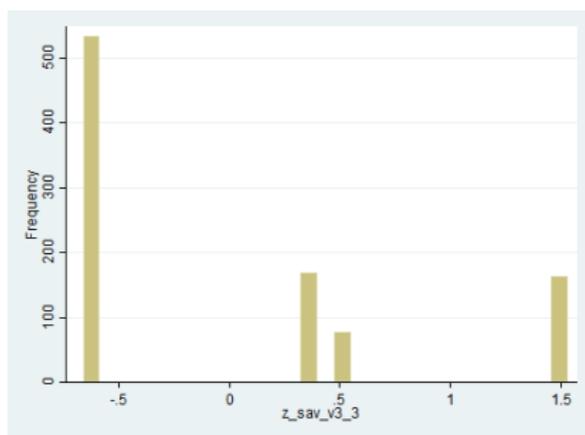
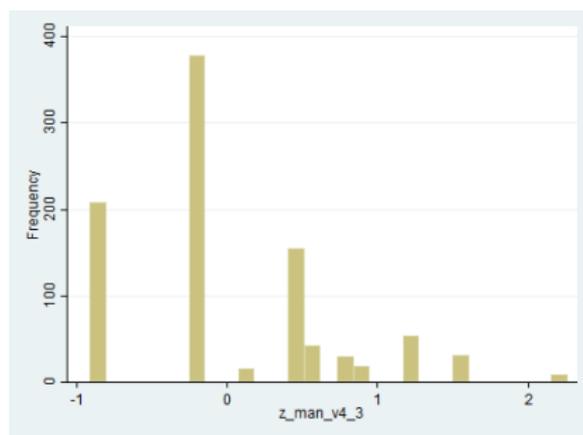


Figure: Saving Constraint Index



Distribution Constraint Index

Figure: Managerial Constraint Index



Frequency of Investments

Table: Frequency of Investments

	n	share
0	14	6%
1	36	15%
2	66	28%
3	73	31%
4	46	20%
	Σ 235	

Estimation Results: Investment (yes/no)

Table: xtLogit: Dummy Investments

	(1)	(2)	(3)	(4)
Informal Credit Constraint	-.075 (0.159)	-.002 (0.163)	-.008 (0.163)	-.044 (0.167)
Saving Constraint Index	-.138 (0.099)	-.112 (0.105)	-.113 (0.106)	-.117 (0.109)
Managerial Constraint Index	-.061 (0.113)	-.125 (0.118)	-.115 (0.118)	-.097 (0.123)
Obs.	940	940	940	940

Estimation Results: Investment (yes/no)

Table: xtLogit: Dummy Investments

	(1)	(2)	(3)	(4)
Informal Credit Constraint	-0.120 (0.16)	-0.030 (0.164)	-0.039 (0.163)	-0.068 (0.168)
NoBank	0.027 (0.213)	0.099 (0.221)	0.108 (0.225)	0.092 (0.231)
Unprotected	-0.305* (0.175)	-0.272 (0.177)	-0.263 (0.176)	-0.268 (0.18)
Interest	0.285* (0.16)	0.249 (0.168)	0.274 (0.167)	0.186 (0.173)
Compound interest	-0.083 (0.157)	-0.092 (0.159)	-0.041 (0.158)	0.07 (0.164)
Statement: high inflation, living cost	-0.274 (0.24)	-0.357 (0.242)	-0.346 (0.24)	-0.352 (0.247)
No record keeping	-0.213 (0.186)	-0.245 (0.191)	-0.317* (0.192)	-0.294 (0.197)
Obs.	940	940	940	940

Questions on Managerial Constraints

- S5a:
 - Suppose you put 100,000 UGX into a savings account with a guaranteed interest rate of 2% per year. You do not have to pay fees, you do not make any further payments into this account and you do not withdraw any money. How much would be in the account at the end of the first year, once the interest payment is made? **102,000; Do not know; Refused, Wrong/irrelevant**
- s5b
 - How much would be in the account at the end of five years? Would it be: **More than 100,000; Exactly 100,000; Less than 100,000; Do not Know, refused**
- s6b
 - High inflation means that the cost of living is increasing sharply **True, False**
- Record keeping
 - Do you keep financial records in your business? **yes/no**