Gender and Credit Access:

Evidence from Bundling Agricultural Insurance and Credit in Ghana

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Motivation

Women farmers across the developing countries lack access to agricultural resources.

- Multiple market failures impede high-return investments:
  - inability to provide adequate collateral
  - high covariant risk associated with rain-fed agricultural production

Male farmers seen as less trustworthy than women (Buchan et al., 2008; Croson & Buchan, 1999).

- less creditworthy, lower repayment records.

Motivation

- Microfinance:
  - Social collateral
  - Traditionally high rates of repayment (for females)

- Index insurance has the potential to expand credit access:
  - Payouts based on an objective index
  - Limits transaction costs
  - Avoids moral hazard and adverse selection.
  - Potentially cost-effective

- Integrating index insurance into agricultural credit markets may improve credit access.

Two ways of bundling insurance

- “Micro-insured” loans: borrowers acquire a personal index insurance contract (bundled with loans) to which they are the beneficiary.

- “Meso-insured” loans: borrowers acquire an index insurance contract (bundled with loans) but lender is the beneficiary

Hypotheses

P1 – For female farmers, micro-and meso-insured loan application rates will be significantly and marginally higher than uninsured loans.

P2 – For male farmers, uninsured loan application rates will be marginally higher than micro-insured loan and almost indifferent to meso-insured loans.

P3 – While both females and males will experience a higher probability of approval for both micro- and meso-insured loans, females will experience a higher net likelihood of approval for micro-insured loans than males.

Data

- Data comes from a randomized control trial project in northern Ghana.
  - 779 farmers from 258 farmer groups divided across the Northern, Upper East, and Upper West regions.
  - Female farmers make up 47% of the sample.
  - 3 growing seasons across 3 years, baseline (2015), follow-up 1 (2016), & follow-up 2 (2017).

Table 1 – selected farmer characteristics

Variables	**Males**		**Females**		
	Mean	SD	Mean	SD	P-value
Saving (1 = yes)	0.63	0.48	0.72	0.45	0.00
Outstanding Debt (1 = yes)	0.19	0.39	0.21	0.41	0.42
Default (1 = yes)	0.16	0.36	0.16	0.37	0.58
Land cultivated with maize (acres)	3.39	4.64	2.38	1.73	0.00
Number of Plots used	3.05	1.13	2.95	0.94	0.19
Number of cattle	4.71	8.09	3.26	5.56	0.00
Agricultural income (Ghana Cedis)	1525	977	1293	925	0.00
Remittance income (Ghana Cedis)	108	219	91	185	0.22
Household size	9.10	3.39	7.66	3.05	0.00
Previous borrower (1 = yes)	0.70	0.46	0.77	0.42	0.04

Table 2 - Mean t-test comparisons of outcome variables

Variables	Non-insured loan	Micro-insured loan		Meso-insured loan	
Panel A - Females					
Loan received – baseline	0.7232	0.7727		0.7218	
Apply – baseline	0.9464	0.9545		0.9548	
Approve – baseline	0.7641	0.8095		0.7559	
Loan received - Follow-up 1	0.4821	0.7500	***	0.6842	***
Apply - Follow-up 1	0.7321	0.8636	***	0.8195	
Approve - Follow-up 1	0.6585	0.8684	***	0.8348	***
Panel B – Males					
Loan received – baseline	0.6938	0.6976		0.5714	**
Apply – baseline	0.8979	0.9069		0.8333	
Approve – baseline	0.7727	0.7692		0.6857	
Loan received - Follow-up 1	0.5510	0.6511	*	0.6667	*
Apply - Follow-up 1	0.7755	0.8372		0.7619	
Approve - Follow-up 1	0.7105	0.7778		0.8750	***

Empirical model

- $Y_{it} = \alpha + \gamma M1 + \ \mu M2 + \lambda R_t + \ \theta(M1 * R_t) + \ \beta(M2 * R_t) + \delta X_{it} + \ \varepsilon_{it}$

Y_{it}, Main outcome variables binary in nature

- farmers received the loan
- they applied for the loan
- they were approved for the loan.

$M1$ & $M2$, two binary, primary determinant variables:

- micro-insured loans and
- meso-insured loans

R_t, an indicator function representing each of the three rounds of survey.

θ and β, relationship between micro- and meso-insured loans and outcome variables

X_{it}, a vector of respondent characteristics that may impact the outcome variable

Table 3 – LPM for Loan-Received Variable

VARIABLES	Female DID	Male DID	Female FE	Male FE
micro-insured loan#follow-up1	0.218*	0.096	0.218*	0.096
	(0.118)	(0.124)	(0.117)	(0.123)
micro-insured loan#follow-up2	-0.041	0.057	-0.041	0.057
	(0.127)	(0.119)	(0.126)	(0.118)
meso-insured loan#follow-up1	0.203*	0.238*	0.203*	0.238**
	(0.117)	(0.120)	(0.116)	(0.120)
meso-insured loan#follow-up2	0.162	0.152	0.161	0.152
	(0.124)	(0.122)	(0.123)	(0.121)
Constant	0.832***	0.816***	0.789***	0.657***
	(0.074)	(0.082)	(0.042)	(0.029)
Observations	1,129	1,206	1,129	1,206
Bank dummies	YES	YES	--	--
Number of grpID	--	--	125	133

Table 4 – LPM for Loan application variable

VARIABLES	Female DID	Male DID	Female FE	Male FE
micro-insured loan#follow-up1	0.123	0.053	0.123	0.053
	(0.095)	(0.093)	(0.095)	(0.092)
micro-insured loan#follow-up2	-0.107	-0.107	-0.110	-0.107
	(0.117)	(0.110)	(0.116)	(0.110)
meso-insured loan#follow-up1	0.079	0.051	0.079	0.051
	(0.099)	(0.105)	(0.099)	(0.105)
meso-insured loan#follow-up2	0.129	0.058	0.126	0.058
	(0.114)	(0.124)	(0.113)	(0.123)
Constant	1.137***	1.133***	0.952***	0.881***
	(0.068)	(0.076)	(0.022)	(0.025)
Observations	1,129	1,206	1,129	1,206
Bank dummy	YES	YES	--	---
Number of grpID	--	--	125	133

Table 5 – LPM for Loan approval variable

VARIABLES	Female DID	Male DID	Female FE	Male FE
micro-insured loan#follow-up1	0.174	0.089	0.189	0.045
	(0.125)	(0.123)	(0.125)	(0.126)
micro-insured loan#follow-up2	0.123	0.206	0.223	0.233
	(0.132)	(0.136)	(0.137)	(0.142)
meso-insured loan#follow-up1	0.239**	0.295**	0.256**	0.252**
	(0.119)	(0.120)	(0.120)	(0.122)
meso-insured loan#follow-up2	0.171	0.222	0.208*	0.167
	(0.115)	(0.145)	(0.119)	(0.150)
Constant	0.678***	0.687***	0.831***	0.723***
	(0.082)	(0.078)	(0.045)	(0.028)
Observations	885	891	885	891
Bank dummies	YES	YES	--	--
Number of grpID	--	--	122	127

Results summary

- Micro- and meso-insured loans associated with increased likelihood of loan received and loan approval for female farmers.
- Only meso-insured loans associated with increased likelihood of loan received and loan approval for male farmers
- No statistically significant results for loan applications

Implications

- Offer differentiated products (females versus males)to increase credit access across the board for smallholders.

- Holistic policies that protect farmers from defaulting, help with their consumption smoothing, and build trust among the banks and farmers.

- Supply side: a larger loan applicant pool decreases a bank's risk
  - could eventually lead to lower interest rates on agricultural loans

- A favorable environment to adopt technology via greater access to credit.

Thank you!

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