Mitigating Shocks Through Credit Market: Evidence from Rural Bangladesh

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Selected Paper prepared for presentation at the 2022 Agricultural & Applied Economics Association Annual Meeting, Anaheim, CA; July 31-August 2

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Background

- Negative income or asset shocks in developing countries perpetuate poverty and cause volatility in consumption for smallholders.
- Negative income or asset shocks can be idiosyncratic or covariate.
- To deal with negative shocks farmers can take credit from formal or informal sources.
- Inter-village borrowing can become difficult in case of covariate shocks such as droughts and floods.
- Farmers find it easier to rely on informal credit sources in case of idiosyncratic shocks.
- Mobarak and Rosenzweig (2013) investigates informal risk sharing in caste-based networks in India. Castes with higher informal coverage invest less in risky productive activities.
- Fafchamps and Lund (2003) find that informal credit mechanism is an inefficient tool of risk-sharing at village level.

Research Objective

- How does share of credit from informal or formal sources change after an idiosyncratic income shock or covariate income shock?
- Do smallholders in Bangladesh leverage informal risk sharing when there is an idiosyncratic shock?

Data

- We use Bangladesh Integrated Household Survey available for farming households from 323 villages (Rounds 2012, 2015 and 2019) to:
  - Classify income shocks into covariate and idiosyncratic shocks.
  - Calculate share of credit from formal and informal sources.

Difference-in-Difference (De Chaisemartin and d'Haultfoeuille (2020))

- We also use De Chaisemartin and d'Haultfoeuille (2020)'s Difference-in-Differences method that enables us to average the heterogeneous treatment effects across all groups g and time periods t:

$$\delta^s = E\Big[\frac{1}{N_S}\sum_{(i,g,t):t\geq 1, D_{g,t}\neq D_{g,t-1}} [Y_{i,g,t}(1) - Y_{i,g,t}(0)]\Big] \tag{1}$$

- We can estimate using the Difference-in-Differences estimator for households that switch into the treatment $DID_{+,t}$ as shown below:

$$\begin{aligned} DID_{+,t} = &\sum_{g:D_{g,t}=1, D_{g,t-1}=0} \frac{N_{g,t}}{N_{1,0,t}}(E(Y_{g,t}) - E(Y_{g,t-1})) \\ &- \sum_{g:D_{g,t}=D_{g,t-1}=0} \frac{N_{g,t}}{N_{0,0,t}}(E(Y_{g,t}) - E(Y_{g,t-1})) \end{aligned} \tag{2}$$

- We can estimate the treatment effect for households that switch out of the treatment $DID_{-,t}$ as shown below:

$$\begin{aligned} DID_{-,t} = &\sum_{g:D_{g,t}=D_{g,t-1}=1} \frac{N_{g,t}}{N_{1,1,t}}(E(Y_{g,t}) - E(Y_{g,t-1})) \\ &- \sum_{g:D_{g,t}=0, D_{g,t-1}=1} \frac{N_{g,t}}{N_{0,1,t}}(E(Y_{g,t}) - E(Y_{g,t-1})) \end{aligned} \tag{3}$$

- Using $DID_{-,t}$ and $DID_{+,t}$, we can find the average treatment across all groups, as shown below:

$$DID_M = \sum_{t=1}^{T}\Big(\frac{N_{1,0,t}}{N_s}DID_{+,t} + \frac{N_{0,1,t}}{N_s}DID_{-,t}\Big) \tag{4}$$

Results- Full Sample

Dependent variable: Share of credit used from formal sources

	Treatment Effect	Std. dev	N	No. of switchers	t-stat	p-val
Idiosyncratic shock (Overall ATE)	-0.00136	0.0105	6623	3226	-0.129	0.897
Idiosyncratic shock (Switchers in)	-0.00347	0.0173	3594	1478	-0.201	0.841
Idiosyncratic shock (Switchers out)	0.000417	0.0171	3029	1748	0.0244	0.981
Covariate shock (Overall ATE)	-0.0181	0.0293	6623	810	-0.618	0.537
Covariate shock (Switchers in)	0.00403	0.0289	5997	252	0.140	0.889
Covariate shock (Switchers out)	-0.0281	0.0394	626	558	-0.714	0.475

Dependent variable: Share of credit used from informal sources

	Treatment Effect	Std. dev	N	No. of switchers	t-stat	p-val
Idiosyncratic shock (Overall ATE)	**0.0541**	0.0148	6623	3226	**3.647**	**0.000265**
Idiosyncratic shock (Switchers in)	**0.0660**	0.0144	3594	1478	**4.570**	**4.87E-06**
Idiosyncratic shock (Switchers out)	**0.0440**	0.0217	3029	1748	**2.0255**	**0.0429**
Covariate shock (Overall ATE)	0.0371	0.0414	662	3 810	0.896	0.370
Covariate shock (Switchers in)	**0.073**	0.0345	5997	252	**2.126**	**0.0335**
Covariate shock (Switchers out)	0.0207	0.0539	626	558	0.384	0.701

Results- Households with Outstanding Loans

Dependent variable: Share of credit used from formal sources

	Treatment Effect	Std. dev	N	No. of switchers	t-stat	p-val
Idiosyncratic shock (Overall ATE)	**-0.0414**	0.0172	3812	1875	**-2.411**	**0.0159**
Idiosyncratic shock (Switchers in)	**-0.0525**	0.0208	1960	851	**-2.528**	**0.0115**
Idiosyncratic shock (Switchers out)	-0.0323	0.0215	1852	1024	-1.502	0.133
Covariate shock (Overall ATE)	-0.0147	0.0335	3812	498	-0.440	0.660
Covariate shock (Switchers in)	-0.0415	0.0395	3403	138	-1.050	0.294
Covariate shock (Switchers out)	-0.00444	0.0468	409	360	-0.0949	0.924

Dependent variable: Share of credit used from informal sources

	Treatment Effect	Std. dev	N	No. of switchers	t-stat	p-val
Idiosyncratic shock (Overall ATE)	**0.0354**	0.0144	3812	1875	**2.460**	**0.0139**
Idiosyncratic shock (Switchers in)	**0.0527**	0.0251	1960	851	**2.100**	**0.0358**
Idiosyncratic shock (Switchers out)	0.0210	0.0232	1852	1024	0.904	0.366
Covariate shock (Overall ATE)	0.0239	0.0370	3812	498	0.646	0.518
Covariate shock (Switchers in)	0.0495	0.0411	3403	138	1.203	0.229
Covariate shock (Switchers out)	0.0141	0.0487	409	360	0.289	0.773

Concluding Remarks

- Households use informal credit to deal with idiosyncratic shocks
- Moving forward, we plan to work on the following issues:
  - Our outcome variables are zero-inflated.
  - Solve problems of potential endogeneity at village level.
  - A household once treated is inherently different from a household that is never treated.

Acknowledgements

This research is partially supported by the Post-Harvest Loss Innovation Lab with funding from USAID as part of Feed the Future, the U.S. Government's global hunger and food security initiative.

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