University of Groningen

Does Microfinance Make Households More Resilient to Shocks? Evidence From the Cyclone Phailin in India

Calis, Thijmen; Gangopadhyay, Shubhashis; Ghosh, Namrata; Lensink, Robert; Meesters, Aljar

Published in:
Journal of International Development

DOI:
[10.1002/jid.3301](https://doi.org/10.1002/jid.3301)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2017

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Calis, T., Gangopadhyay, S., Ghosh, N., Lensink, R., & Meesters, A. (2017). Does Microfinance Make Households More Resilient to Shocks? Evidence From the Cyclone Phailin in India. *Journal of International Development*, 29(7), 1011-1015. <https://doi.org/10.1002/jid.3301>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

SHORT NOTE

DOES MICROFINANCE MAKE HOUSEHOLDS MORE RESILIENT TO SHOCKS? EVIDENCE FROM THE CYCLONE PHAILIN IN INDIA

THIJMEN CALIS¹, SHUBHASHIS GANGOPADHYAY^{1,2,3}, NAMRATA GHOSH²,
ROBERT LENSINK^{1,4*} and ALJAR MEESTERS¹

¹*Faculty of Economics and Business, University of Groningen, Groningen, The Netherlands*

²*India Development Foundation, Gurgaon, India*

³*Gothenburg University, Gothenburg, Sweden*

⁴*Development Economics Group, Wageningen University, Wageningen, The Netherlands*

Abstract: This research note examines the relevance of microfinance as a means to cope with natural disasters, using the event of the cyclone Phailin, which struck India in 2013. The results indicate that microfinance helps reduce the negative effects of extreme weather-related shocks. In light of the somewhat disappointing outcomes suggested by several recent rigorous impact studies, this research paints a more positive picture of the importance of microfinance as an insurance mechanism to deal with weather-related risks. Copyright © 2017 John Wiley & Sons, Ltd.

Keywords: microfinance; natural disasters; shocks; India

JEL Classification: C93; G21; O10

1 INTRODUCTION

This research note seeks to examine the relevance of microfinance for coping with natural disasters by considering the impact of cyclone Phailin in two regions in the state of Odisha in India.¹ When cyclone Phailin struck land in October 2013, it prompted heavy flooding,

*Correspondence to: Robert Lensink, Faculty of Economics and Business, University of Groningen, Groningen, The Netherlands.

E-mail: b.w.lensink@rug.nl

¹See, for example, Becchetti and Castriota (2011), Berg and Schrader (2012), Fernando (2013), and Matul and Tsilikounas (2004) for other studies related to microfinance in times of disasters.

affecting more than 12 million people and forcing the evacuation of slightly more than half a million people. Households in Nayagarh all had to be evacuated because of the danger of the cyclone. Although Phailin was the biggest storm to hit India in 14 years and the second-strongest cyclone ever to hit India, less than 50 people died because of the disaster. Still, it caused immense human suffering on a vast scale. In the aftermath, almost all households experienced food shortages and increased commodity prices. Not all districts in Orissa were hit by Phailin though; the Sambalpur district, located to the northwest of Nayagarh, escaped virtually unscathed.

Advantageously, we have detailed data about households living in the regions in the state of Odisha that have not been affected by the cyclone (Sambalpur) as well as the region that has been affected by the cyclone (Nayagarh). These datasets enable us to identify precisely the effect of a microfinance programme following a natural disaster, as well as compare the impact of microfinance in regions that are or are not hit by a natural disaster.

2 METHODOLOGY

We conducted a survey in Sambalpur and Nayagarh in October 2012 before the cyclone was even anticipated. The occurrence of this natural disaster within a year of our data collection opened the scope of the research, enabling us to examine whether microfinance helps people cope with natural disasters. Therefore, we organised a second survey in early 2014.

The households sampled for the analyses represent two groups, as detailed in Table 1, per region. The first group contains members of the MFIs or the treatment group. The other group does not contain households that are members of an MFI, so they represent the control group.

Table 1. Sample groups and sample size

Group	Disaster region (Nayagarh)	Disaster region (Nayagarh)	Nondisaster region (Sambalpur)	Nondisaster region (Sambalpur)
	Baseline	End-line	Baseline	End-line
1. Members of MFI (<i>T</i>)	650	649	300	300
2. Control group (<i>C</i>)	200	400	300	300
Sample size	850	1049	600	600
Total sample baseline	1450			
Total sample end-line	1649			
Total sample	3099			

Notes: In the end-line, we were able to survey an additional 200 households in the control group in Nayagarh. One of the households in the treatment group was not willing to provide information about expenditures (used to calculate our dependent variable), so we dropped it from the analyses. The total observations over the two periods therefore equal 3099.

Our study is a quasi-natural experiment that uses a natural disaster as a (near) random ‘treatment’. We use a triple difference methodology to determine whether microfinance membership makes households resilient to shocks.² The model is specified as

$$\log Y_{i,t} = \beta_0 + \beta_1 M_{i,t} + \beta_2 T_{i,t} + \beta_3 D_{i,t} + \beta_4 M_{i,t} \times T_{i,t} + \beta_5 M_{i,t} \times D_{i,t} + \beta_6 M_{i,t} \times D_{i,t} \times T_{i,t} + \beta_7 D_{i,t} \times T_{i,t} + e_{i,t} \quad (1)$$

where $\log Y$ is the income outcome variable, proxied by the log of consumption expenses per month for a household in period t ; M is an indicator variable that captures whether the household is a member of an MFI (1) or not (0); D is a binary region dummy variable, equal to 1 for Nayagarh (cyclone affected) and 0 for Sambalpur (not affected by the cyclone); and T is a time dummy that takes a value of 1 for the end-line (after the flooding) and 0 for the baseline (before the flooding). As the shock occurred after the baseline in Nayagarh, for reasons of convenience, we can rewrite Equation (1) as

$$\log Y_{i,t} = \beta_0 + \beta_1 M_{i,t} + \beta_2 T_{i,t} + \beta_3 D_{i,t} + \beta_4 M_{i,t} \times T_{i,t} + \beta_5 M_{i,t} \times D_{i,t} + \beta_6 M_{i,t} \times S_{it} + \beta_7 S_{it} + e_{it} \quad (1a)$$

where S is a binary dummy with a one for households affected by the shock. The marginal impact of the cyclone equals

$$\frac{d \log y}{dS} = \beta_6 M_{it} + \beta_7$$

where β_6 reflects whether, for households with microfinance, the marginal effects of the cyclone differ from the marginal effect of the cyclone on households without microfinance. Hence, β_6 indicates whether microfinance membership changes the impact of a cyclone or, in other words, whether microfinance makes households more resilient to shocks.

Note that we can also interpret β_6 differently, which becomes clear if we consider the marginal impact of microfinance. This equals

$$\frac{d \log y}{dM} = \beta_1 + \beta_4 \times T_t + \beta_5 \times D_{i,t} + \beta_6 D_{i,t} \times T_{i,t} = \beta_1 + \beta_4 \times T_t + \beta_5 \times D_{i,t} + \beta_6 S_{i,t},$$

Thus, β_6 also indicates whether the marginal effect of microfinance for households hit by the cyclone is significantly higher than the marginal effect of microfinance in normal periods, controlling for a possible time effect (unconditional and interacted with microfinance membership) and a possible region effect (unconditional and interacted with microfinance membership). Hence, β_6 indicates both whether microfinance membership makes households resilient to a cyclone and whether the marginal impact of microfinance in case of a cyclone differs from the marginal impact of microfinance in normal periods. It is mathematically impossible to differentiate between the two interpretations.

To control for characteristics that may affect the outcome variable and enhance precision, we also include control variables. Specifically, we add an indicator of the age of the household head (age_hhead), the size of the household (Hhsize) and two indicators of household occupation (Selfempl, which indicates whether more than 50 per cent of the

²We also use a fixed-effects household model, which gave similar results.

Table 2. Regression results

Variables	(1)	(2)
<i>M</i>	0.1633 (0.039)***	0.1805 (0.033)***
<i>T</i>	0.3596 (0.037)***	0.3109 (0.031)***
<i>D</i>	0.0742 (0.044)*	0.1743 (0.037)***
MT	−0.0835 (0.055)	−0.0651 (0.047)
MDT = MS	0.1259 (0.076)*	0.1334 (0.064)**
TD = <i>S</i>	−0.2417 (0.058)***	−0.2757 (0.048)***
MD	−0.1102 (0.056)**	−0.1729 (0.047)***
age_hhead		−0.0019 (0.001)***
Hhsize		0.1579 (0.006)***
Selfempl		−0.2262 (0.033)***
Labour		−0.3950 (0.032)***
Constant	7.6907 (0.025)***	7.3609 (0.052)***
Observations	3099	3099
<i>R</i> ²	0.059	0.326
Number of hhpanel		
<i>p</i> -value Wald test <i>M</i> + MD = 0	0.19	0.82
<i>p</i> -value Wald test <i>M</i> + MT = 0	0.05	0.001

****p* < 0.01.

***p* < 0.05.

**p* < 0.1.

Notes: Robust standard errors are in parentheses. The dependent variable is log *Y* or the total (log of) monthly consumption expenditures (in Indian rupees). Age Hhead is the age of household head; Hhsize is the size of the household; Selfempl is a dummy variable = 1 if the household head is self-employed in agriculture or nonagriculture, and 0 otherwise; and Labour is a dummy variable = 1 if the household head is in agricultural or other labour, and 0 otherwise.

household's income comes from income earned by various self-employed members, and Labour, or whether more than 50 per cent of the household's income is from paid labour).³

3 RESULTS AND CONCLUSIONS

The regression results are in Table 2. The results suggest positive time effects (significant coefficient for *T*), a negative impact of the cyclone on income (significant negative coefficient for TD), and a smaller average marginal effect of microfinance membership

³A table with descriptive statistics can be obtained on request.

in the end-line compared with the baseline (significant negative coefficient for MT). We also identify a positive region effect (coefficient for D is positive and significant), such that in the baseline, average income is greater in Nayagarh than in Sambalpur. Because of the negative effect of the cyclone though, in the end-line, nonmicrofinance members in Nayagarh have lower average incomes than nonmicrofinance members in Sambalpur. In addition, the results point at a positive marginal impact of microfinance membership, although only for Sambalpur in the baseline (and end-line). The average impact of microfinance in Nayagarh instead is insignificant, as is indicated by the p -value of the Wald test for $M + MD = 0$. Most importantly, the results indicate that microfinance membership makes households resilient to shocks, as indicated by the significant positive coefficient for MS. Alternatively, this result suggests that the marginal impact of microfinance is much greater after a disaster than it is during normal periods.

With our data, we cannot rigorously test why MFI membership improves resilience, but it seems likely that better access to funds and increased savings are prime reasons. In light of the somewhat disappointing results related to the impacts of MFI suggested by several recent impact studies, our study provides a more positive view of the importance of MFI as an insurance mechanism that helps people in poverty cope with weather-related risks.

REFERENCES

- Becchetti L, Castriota S. 2011. Does microfinance work as a recovery tool after disasters? Evidence from the 2004 tsunami. *World Development* **39**: 898–912.
- Berg G, Schrader J. 2012. Access to credit, natural disasters, and relationship lending. *Journal of Financial Intermediation* **21**: 549–568.
- Fernando PJS. 2013. Disaster management measures of microfinance institutions in Sri Lanka. *Sri Lanka Journal of Advanced Social Studies* **2**: 91–120.
- Matul M, Tsilikounas C. 2004. Role of microfinance in the household reconstruction process in Bosnia and Herzegovina. *Journal of International Development* **16**: 429–466.