



POTSDAM INSTITUTE FOR
CLIMATE IMPACT RESEARCH

Crowding-in or crowding-out: The effect of humanitarian aid on households' investments in climate adaptation

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Motivation

Climate change and rural livelihoods

- Extreme weather events are an increasing challenge worldwide
- Impacts concentrated in countries dependent on agriculture
- Strengthening the resilience is crucial to
 - i) alleviate immediate hardship
 - ii) enable sustainable development and prosperity
- SDG 13: Urgent action to combat climate change and its impacts

Existing instruments

- **Forecast-based Financing (FbF):** Provides payouts to vulnerable households before a disaster occurs
- **Agricultural index insurance:** Allows customers to hedge against weather risk and insure themselves against disaster-induced damages
- Lack of knowledge on potential feedbacks of different existing instruments

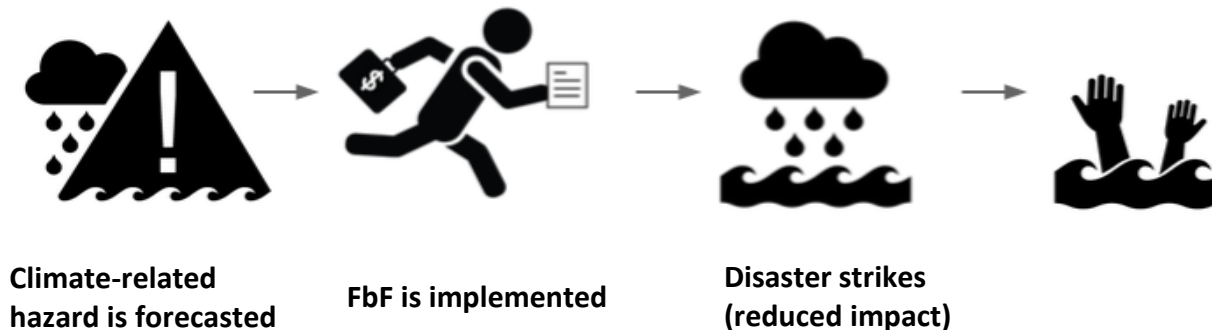
Fig. 1: SDG 13.1



Forecast-based Financing (FbF)

Humanitarian assistance in the context of weather disasters

- FbF is a novel tool that utilizes meteorological forecasts to act early, before a disaster
 - If risk projections exceed a pre-defined threshold, pre-defined humanitarian assistance is distributed
 - Tool aims to make humanitarian assistance more effective
- 70 FbA initiatives in 35 countries, covering more than 7.6 million people, pre-agreed financing volume of 138 million USD (Anticipation Hub 2023)

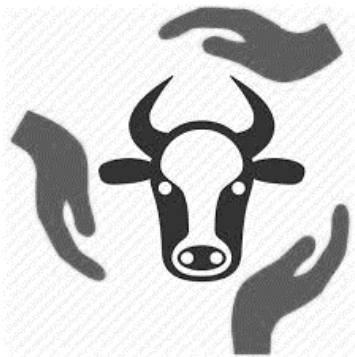


Source: German Red Cross (2017)

Agricultural index insurance

Index insurance in the context of weather disasters

- Risk management tool providing agricultural households with financial protection against production losses and natural disasters
 - Index insurance has several advantages over indemnity-based insurance
 - Flexibility: Applied to i.e., crops, livestock, forestry, aquaculture
- Research has shown that index insurance can be beneficial for insurance holders (Bertram-Huemmer & Kraehnert 2018; Carter et al. 2016; Hill et al. 2019; Karlan et al. 2014)



FbF and index insurance

FbF

- No decision from household required: Provided by NGO
- No (direct) costs to the households
- Programs mostly target poorest
- Based on forecasted risk, early payout
- Basis risk depending on forecast

Index insurance

- Purchasing decision is taken by the household
- Requires premium payments by households
- Open to all households
- Payouts (mostly) based on realized risk
- Basis risk depending on trigger

Potential feedback effects of FbF and Index insurance

- Charity hazard describes...

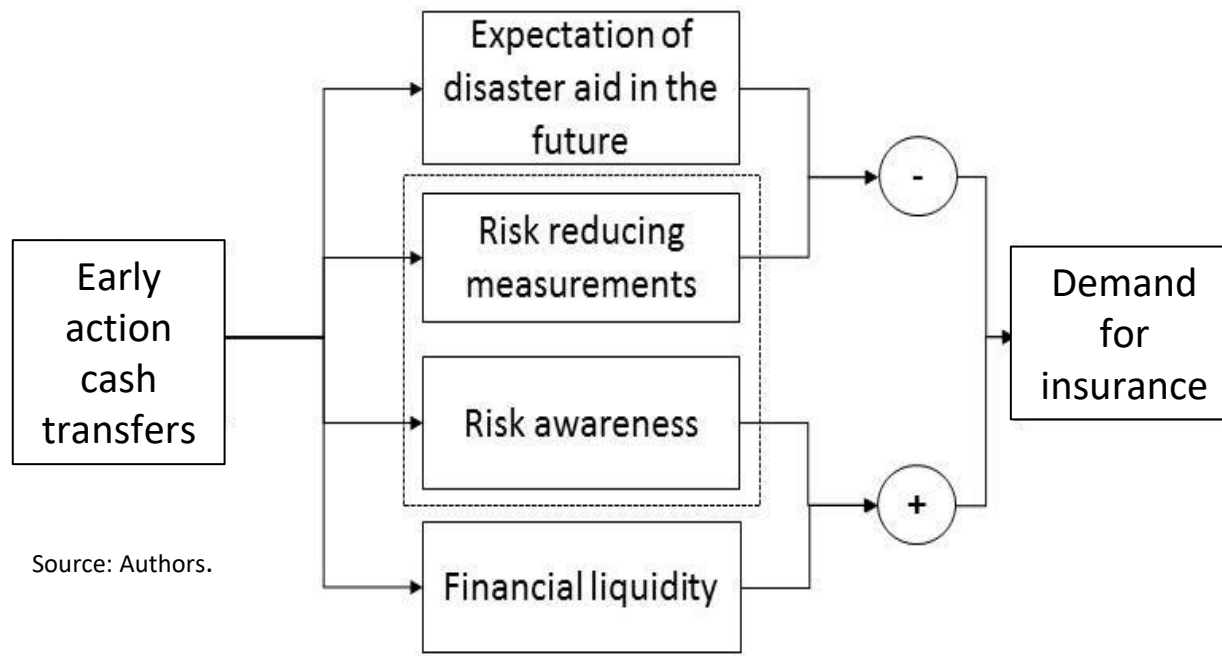
“the tendency of individuals not to insure themselves against possible natural disasters because they believe help will be available, e.g. from friends, family, the municipality, charities or state emergency programs”

Browne and Hoyt (2000)

Feedback effects of FbF and Index insurance

Aim of our research

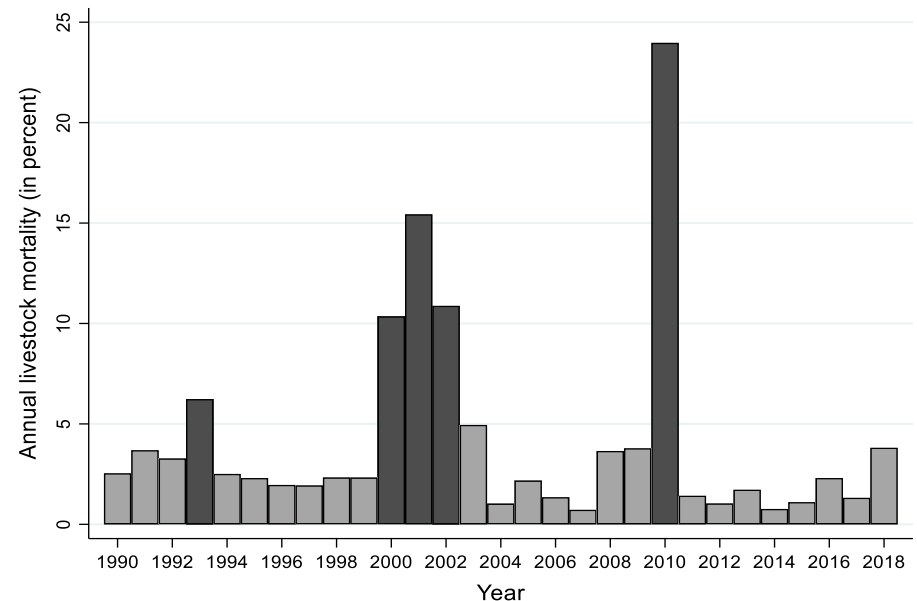
- Guiding question: What is the effect of FbF on households' investments in climate adaptation measured as the uptake of Index-Based Livestock Insurance?
- From a theoretical perspective, interdependency of both tools is ambiguous:



Study context: Rural Mongolia

Context

- National Statistics Office has strong capacities for data collection
- More than 50% of population is employed in agriculture (NSO 2021)
- Extensive livestock production by nomadic pastoralists that often live as self-supporters
- Risk to production constituted by extreme weather events (Goodland et al. 2009)
 - Aggregated national-level livestock mortality figures reaching up to 23% in recent decades



Source: Own calculations, Livestock Census Mongolia

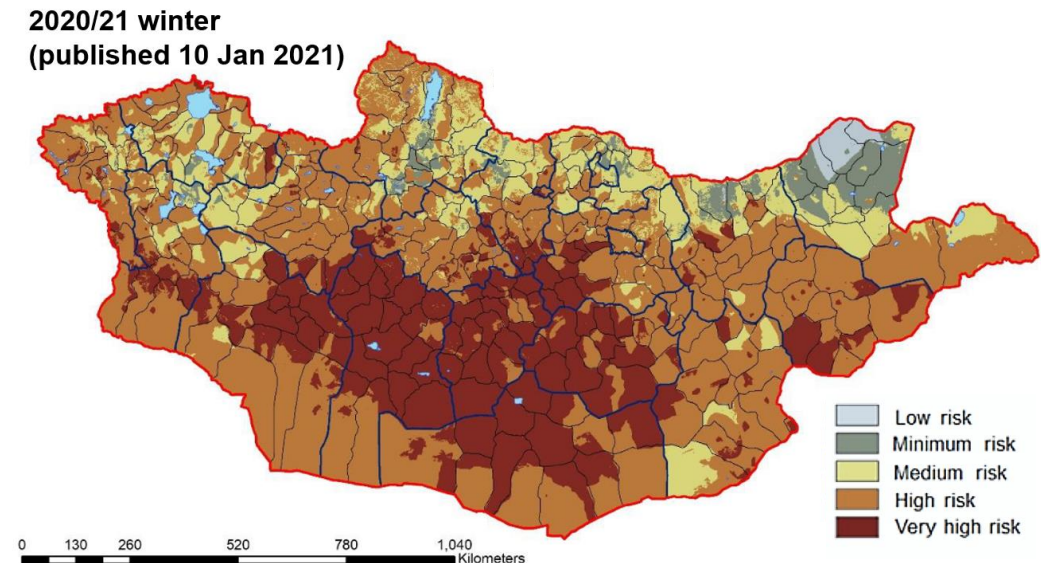
Study context: Rural Mongolia cont.

Since 2012, **Index-Based Livestock Insurance (IBLI)** is offered to pastoralist

- Trigger for payouts: District-level livestock mortality rate of a given species exceeds the threshold of 6%

Since 2017, **Forecast-based-Finance (FbF)** programs are implemented in the country by various actors such as Red Cross and FAO

- Risk Maps published by Mongolian government are used as trigger



Source: Mongolian Government

Study context: Intervention design

CashEval project

- Cash transfer program funded by the German Foreign Office and implemented by People in Need and the authors
- Intervention mirrors existing programs in Mongolia

Coping with Shocks in Mongolia Panel Survey (Kraehnert et al. 2022)

- Sample of 829 households fulfilling three eligibility criteria
 1. Household participates in wave 4 of the survey that provides baseline data before the intervention
 2. Household owns livestock
 3. Household lives in area with a forecasted high risk of extreme winter

Random selection of recipient households at sub-district level of three western provinces in Mongolia:

Treatment Group

~ 200 EUR

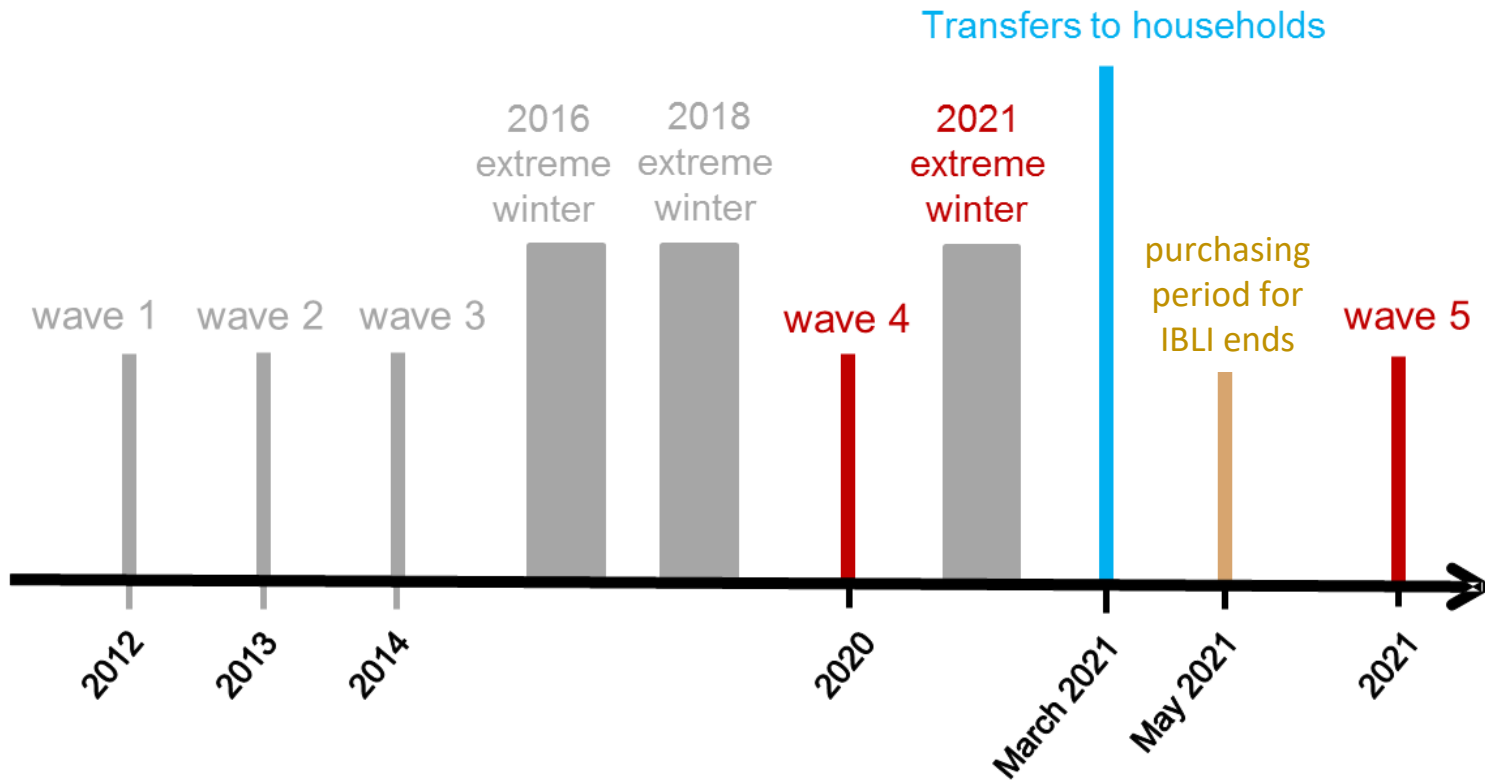
378 household
in 51 sub-districts

Control Group

No transfer

452 households
in 57 sub-districts

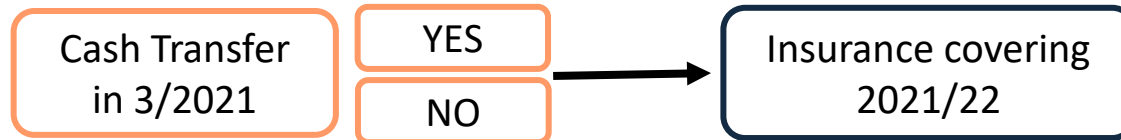
Study context: Timeline of the project



Source: By the authors

Empirical strategy

Research question



Empirical model

$$IBLI_h = \beta_0 + \beta_1 treatment_h + \beta_2 X_{h,s} + \delta_m + \varepsilon_{hsm}$$

- $IBLI_h$: uptake of index-based livestock insurance (data: customer database MongolianReinsurance)
- $treatment_h$: receipt of FbF
- $X_{h,s}$: household- and sub-district level controls (e.g., IBLI uptake 2020, loan uptake, aggregated Is mortality)
- δ_m : Interview month fixed effects

Results

Findings

- Receipt of FbF increases likelihood of purchasing IBLI by 5%
- Effect driven by re-purchasers
- No difference between more/less affected households

Dep. Variables	IBLI uptake 2021 (1)	IBLI uptake 2021 (3)	IBLI uptake 2021 (3)
Treatment (FbF)	0.048* (0.028)	-0.008 (0.031)	0.065** (0.033)
Treatment (FbF) * IBLI uptake in 2020		0.162*** (0.046)	
Treatment (FbF) * Ls mortality (sub-district)			-0.359 (0.412)
IBLI uptake in 2020	0.198*** (0.025)	0.119*** (0.031)	0.194*** (0.024)
Ls mortality 2020/21(sub-district)	0.856 (0.200)	0.044 (0.035)	0.029 (0.037)
Covariates	YES	YES	YES
Adjusted R-squared	0.19	0.21	-2.809***
Observations	811	811	(0.521)

Note: Average marginal effects from logit regressions with standard errors, clustered at the sub-district level and reported in parentheses with * p < 0.1, ** p < 0.05, *** p < 0.01.

Source: Coping with Shocks in Mongolia Household Panel Survey (waves 4-5), Mongolia Livestock Census and Mongolian Reinsurance database.

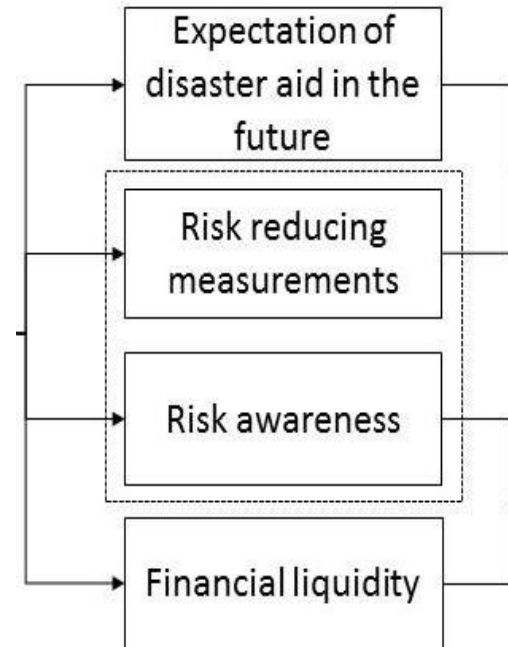
Extended analysis

Channels

- Risk awareness: Cash transfer have significant risk signaling effect
 - Receipt of cash transfers increases expectation of next to be harsh
- Cash constraints: No detectable effect of cash transfers on self-reported cash constraints

Robustness Test

- Results hold when limiting the sample to households that re-call the correct amount of cash transfer in endline survey (panel wave 5)
- Results hold for controlling of shock intensity at different administrative levels



Conclusions

Main results

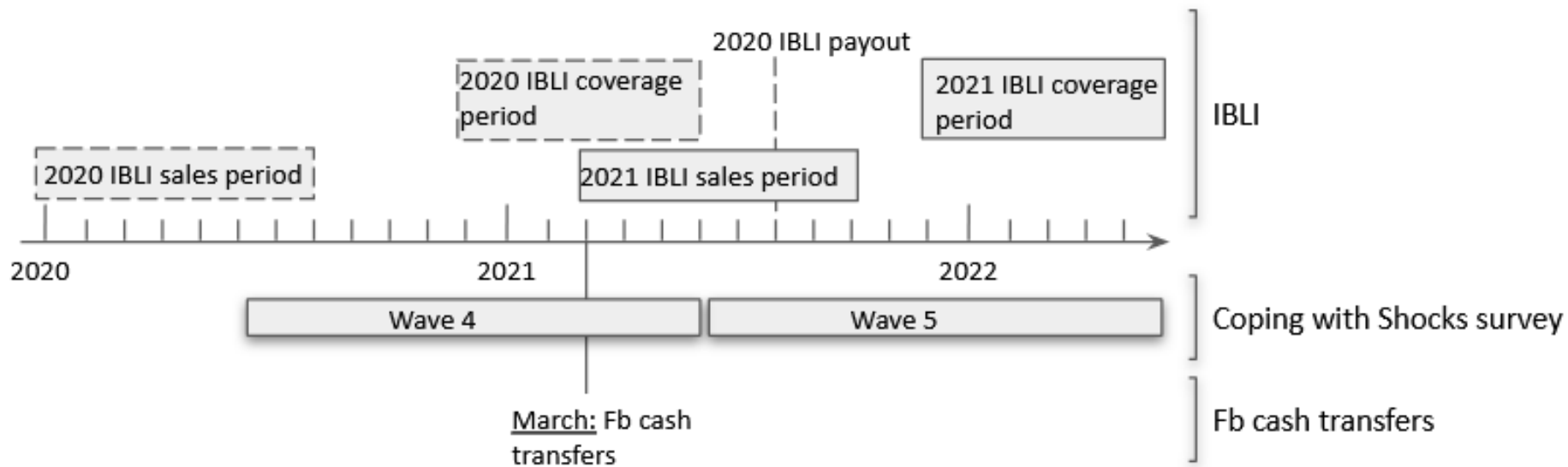
- Receipt of FbF did not crowd out households' investments in climate adaptation
 - The receipt of FbF increased index insurance uptake among pastoralist households on average by 5%
 - The effect is driven by re-purchasers
 - Results suggest that increased risk awareness is a potential mechanism through which FbF affects insurance uptake

Policy implication:

- Climate adaptation instruments should not be considered in isolation
- A combination of different adaptation strategies can create synergies

THANK YOU

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Source: Author.

Variables	Logit (marginal effect) Harsh winter	OLS Cash constraints	OLS Total income (log)
	(1)	(2)	(3)
Treatment (FbF)	0.109** (0.054)	0.426 (0.336)	-0.011 (0.060)
Covariates	YES	YES	YES
Constant	-0.860 (0.924)	3.983*** (0.559)	9.528*** (0.116)
Adjusted R-squared	0.32	0.12	0.07
Observations	496	129	796