

# THE EFFECT OF RISK PERCEPTION ON THE DEMAND FOR INDEX INSURANCE IN MONGOLIA

Authors L. Mogge and K. Krähnert

PIK Research Department II Climate Resilience

FutureLab on Inequality, Human Well-Being and Development

## INTRODUCTION

- Index insurance offers a low-cost solution to insure rural households in developing countries against extreme weather events.
- Despite enthusiasm among policy makers, demand for index insurance remain low.
- Empirical studies show that prices, marketing strategies, basis risk, and having received insurance payouts help to explain demand.
- Our paper contributes to that research by providing evidence that households' risk perceptions affect index insurance take-up.

## CONTEXT

- The geographic focus of our paper is Mongolia where extreme winters cause mass livestock mortality threatening the livelihood of rural herding households (Fig. 1).

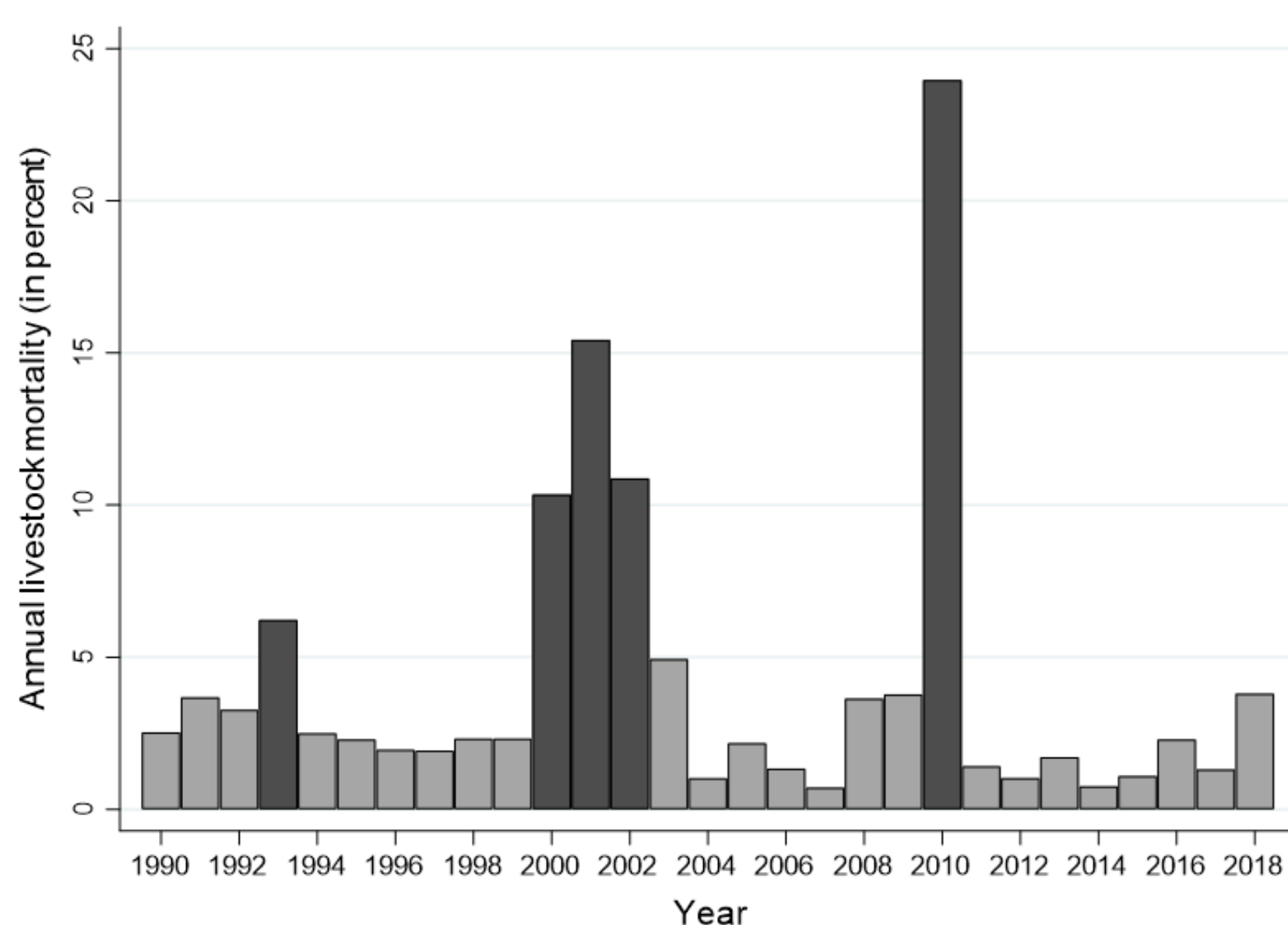


Fig. 1 Annual livestock mortality in Mongolia.

- In 2006, an index-based livestock insurance product (IBLI) was introduced to reduce herding households' vulnerability:
  - Households can buy IBLI policies to insure different animal species during a sales period between April and June.
  - The index is the district-level livestock mortality of a species during the winter months.
  - Policy holders receive a payout when the district-level livestock mortality rate of the insured species exceeds 6 %.
- Demand for Index insurance has grown since its introduction, though with a temporary decline between 2013 and 2015 (Fig. 2).

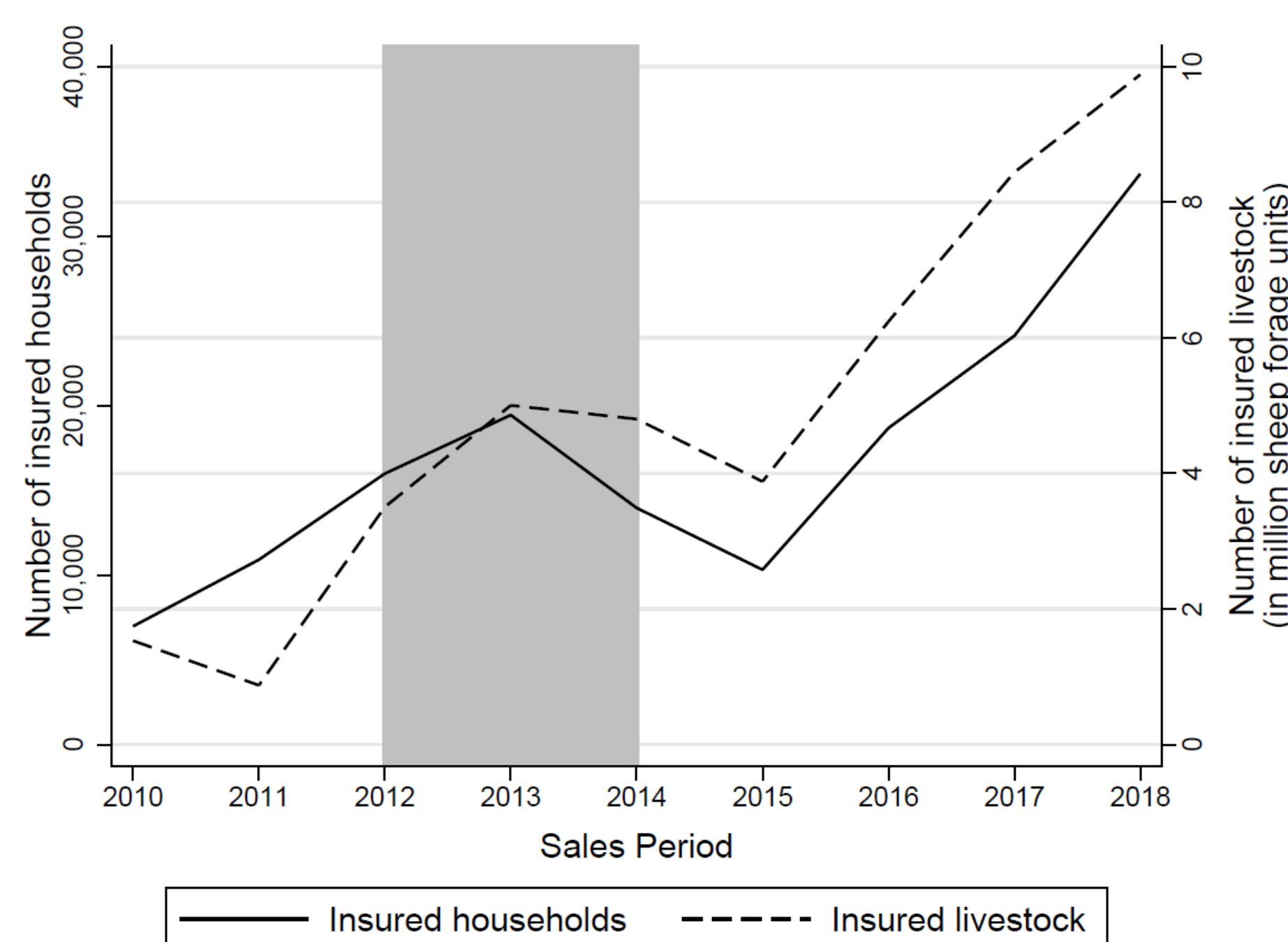


Fig. 2 Insured households and insured livestock.

## DATA

- We use three waves of the *Coping with Shocks in Mongolia Panel Survey*. The survey contains information on households' insurance purchases in the sales periods 2012, 13, and 14. We consider two main samples:
  - A balanced sample of 924 households that own livestock in all panel waves.
  - A balanced sample of 458 households for whom we have information on weather expectations in all panel waves.

## IDENTIFICATION STRATEGY

- We use a fixed-effects model to estimate the effect of *Risk Perception* on *IBLI* uptake:

$$IBLI_{idt} = \beta_1 RP_{idt} + \beta_2 X_{idt} + \alpha_i + \lambda_t + \varepsilon_{idt}$$

## MEASURING RISK PERCEPTIONS

- To approximate the effects of risk perception we employ two variables which speak to two separate research hypotheses.
  1. We explore if exposure to realized (past) weather risk increases uptake of IBLI.
    - Realized weather risk is proxied by small animals' mortality rates on the district level, which is exogenous to household characteristics.
  2. We analyze if surveyed expectations regarding next winter's weather risk affect purchase decisions.

## DETERMINANTS OF DEMAND: (I) REALIZED WEATHER RISKS

- A 1 percentage point increase in small animal mortality in the winter preceding the IBLI sales period leads to a 1-2 percentage point increase in the likelihood of a household purchasing IBLI (Table 1).
- Results are similar when using logit regressions instead of OLS and when considering aggregated nation-wide data.
  - Since mortality rates in our sample are largely below 6 %, we rule out that our finding is driven by insurance payouts.
  - We argue that the underlying channel is an heightened risk awareness of households exposed to harsher winters.

## (II) WEATHER EXPECTATIONS

- Expecting a harsh winter is associated with a 6 percentage points higher likelihood that a household purchases IBLI (Table 1).

Dep. Var.: Household purchased IBLI	(1)	(2)	(3)
Small animal mortality (district)	0.01** (0.00)	0.02** (0.01)	0.02** (0.01)
Expects harsh winter			0.06** (0.03)
Household FE	Yes	Yes	Yes
Household controls	Yes	Yes	Yes
Wave FE	Yes	Yes	Yes
R <sup>2</sup>	0.02	0.02	0.03
Number of households	924	458	458
Observations	2,772	1,374	1,374

Note: Robust standard errors in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Source: Coping with Shocks in Mongolia Household Panel Survey, waves 1-3.

Table 1 Effect of risk perception on IBLI uptake.

## CONCLUSION

- The awareness of risks from extreme weather events is linked to index insurance demand.
- With more frequent extreme winters due to climate change, demand might increase if households update their risk assessment.
- Reversely, households may lose their interest in buying insurance after a mild winter.