

# DOES INSURANCE IMPROVE RESILIENCE?

## Measuring the Impact of Index-Based Livestock Insurance on Development Resilience in Northern Kenya

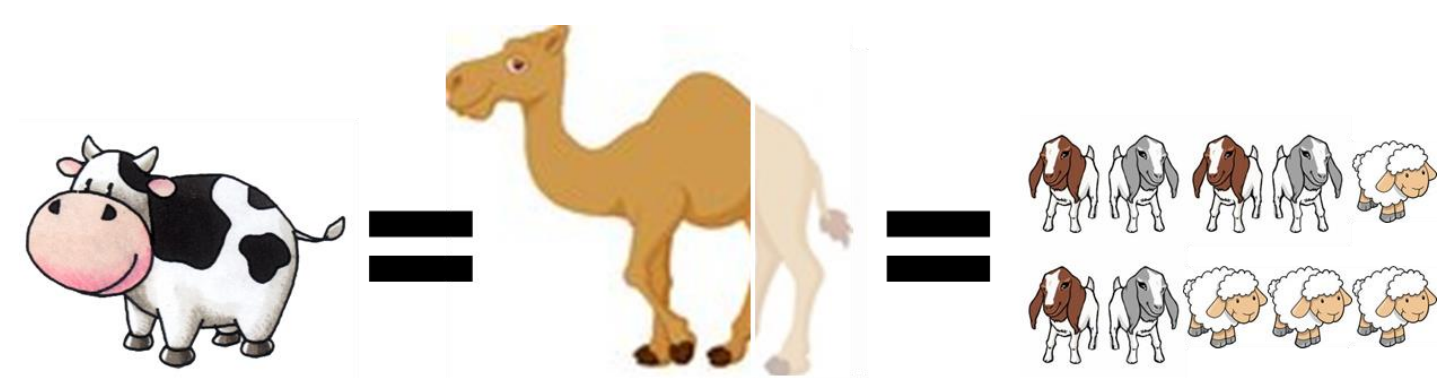
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### Background

Many people in Northern Kenya and Africa's arid & semi-arid lands (ASALs) are nomadic/semi-nomadic **pastoralists**. African pastoralists:

- are considered to be among the poorest and most-vulnerable populations in the world (Rass 2006)
- have few other livelihood options & are incredibly vulnerable to weather shocks, such as drought, which can decimate animal populations (Chantarat et al. 2013)
- accumulate large herds, as income increases in herd size and large herds serve as self-insurance in the face of shock (McPeak 2005)

Herds are often aggregated for research purposes into **tropical livestock units (TLU)**:



Governments and humanitarian agencies have been focused on **resilience-building** to help vulnerable communities in the ASALs manage climate shocks since the 2011 drought in the Horn of Africa and the 2012 drought in the Sahel.

### Model

Step 1: Parameterize individual HH (child) well-being distributions for TLU (MUAC) in each season (round)

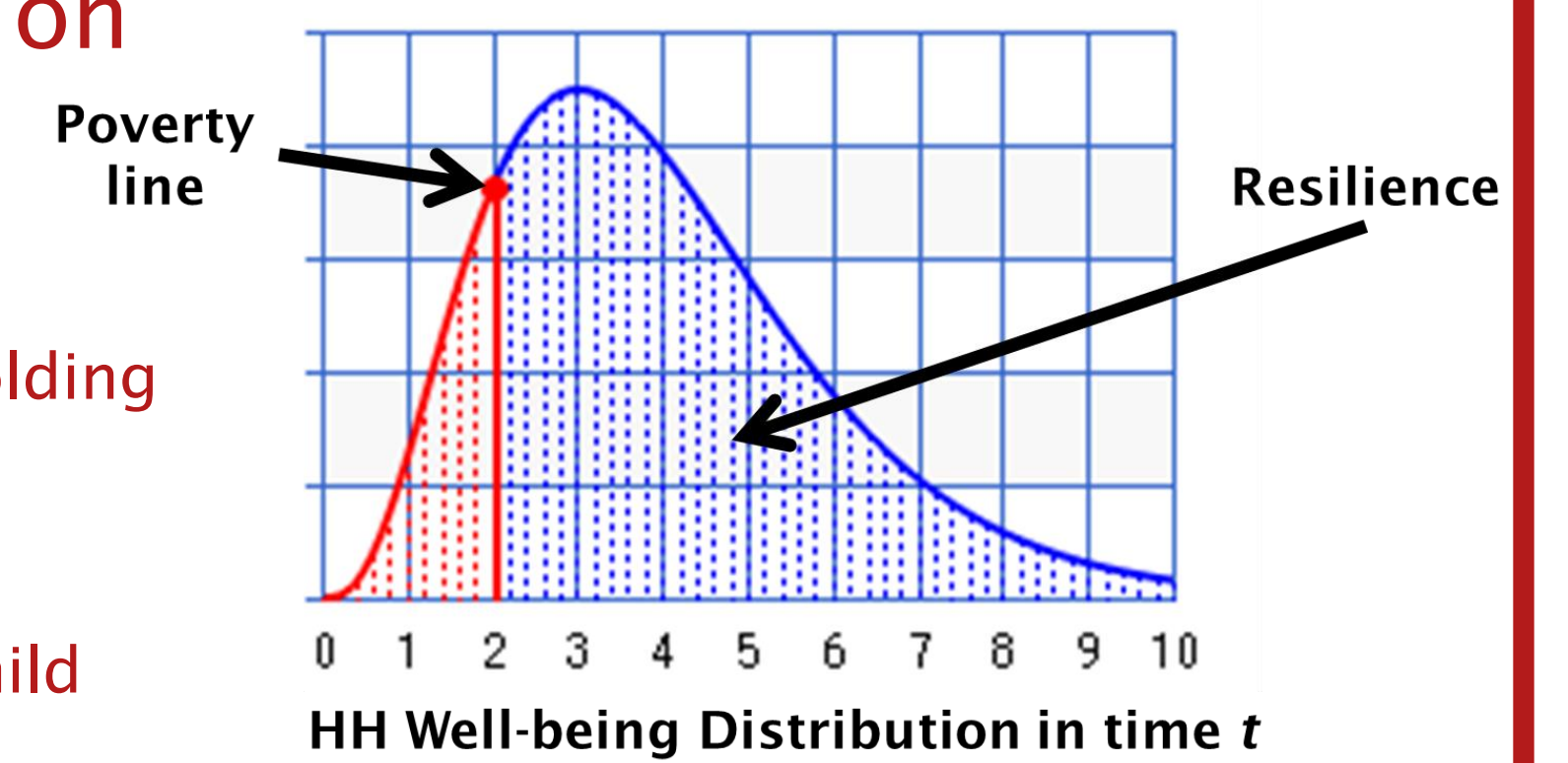
- predict mean and variance of well-being for each HH (child) in each period
- use predicted moments to calculate parameters for well-being distribution

Step 2: Calculate HH (child) resilience for given  $\underline{W}$

- select normative well-being threshold  $\underline{W}$  (basically a poverty line)
- estimate probability that a HH (child) will reach / surpass  $\underline{W}$  (i.e., the integral of the distribution to the right of the poverty line,  $\underline{W}$ )

Step 3: Estimate impact of IBLI on resilience

- we take advantage of a random insurance subsidy (coupon) to identify impacts of holding insurance
- for the given poverty line  $\underline{W}$ , estimate the impact of IBLI on HH TLU resilience and child MUAC resilience using 2SLS



Step 4: Explore IBLI impact for various  $\underline{W}$  thresholds

- recalculate IBLI impact coefficients for different poverty lines

### Research Question

The index-based livestock insurance (IBLI) project was piloted in Marsabit, Northern Kenya beginning in January 2010.

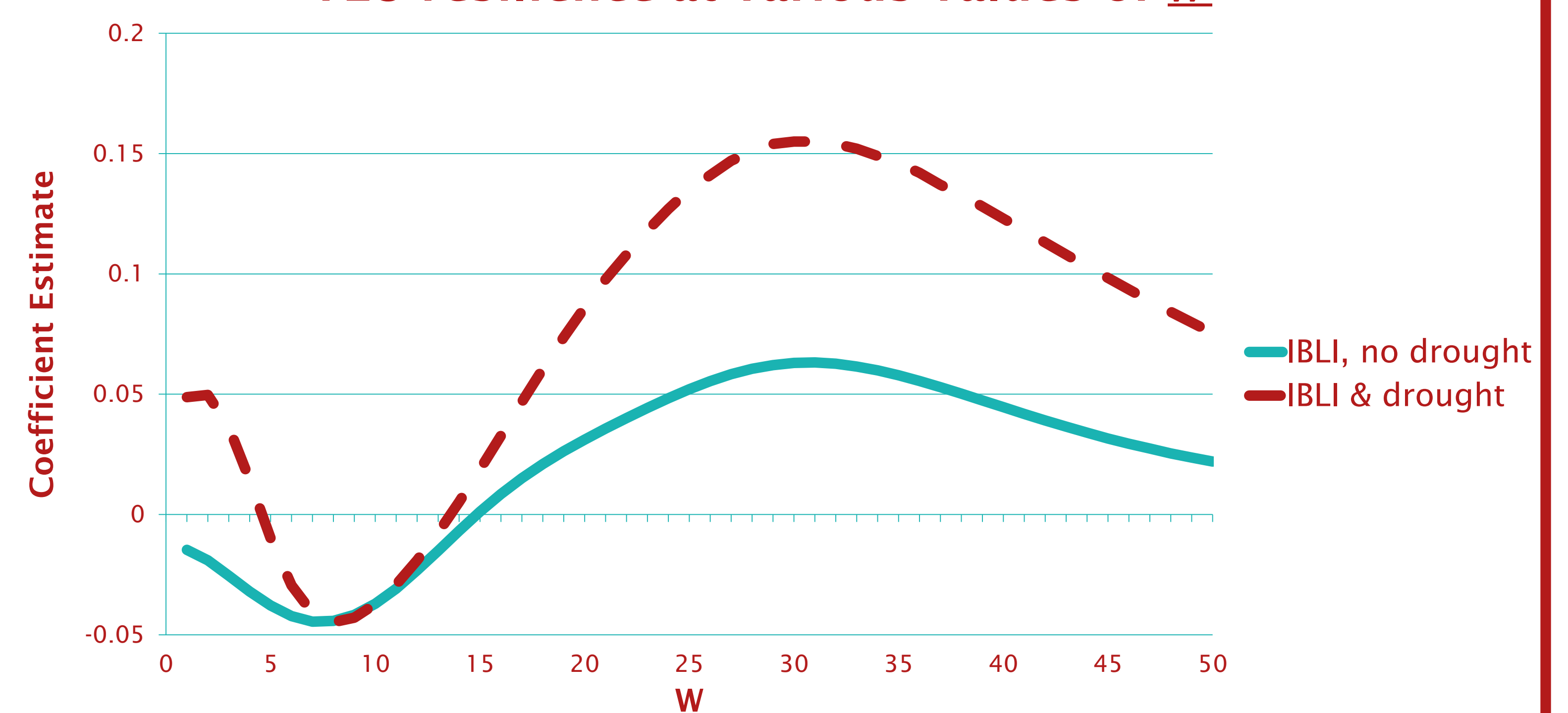


What is the impact of IBLI on resilience in Marsabit?

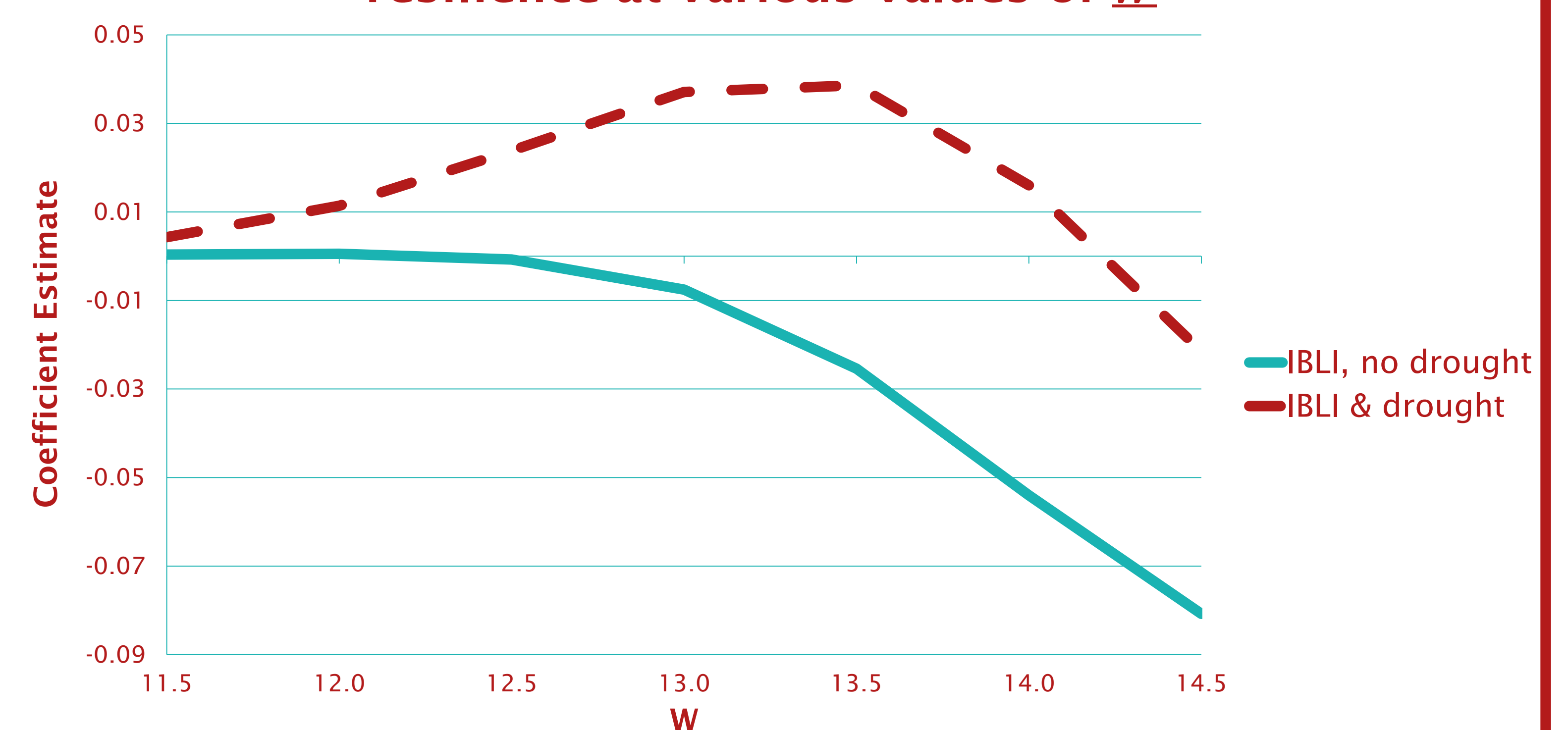
- in terms of livestock (TLU) holdings
- in terms of child anthropometric health, measured as mid-upper arm circumference (MUAC)

### Results

2SLS Coefficient Estimates of IBLI on TLU resilience at various values of  $\underline{W}$



Binomial MLE Coefficient Estimates on MUAC resilience at various values of  $\underline{W}$



### Data

The data were collected by a consortium led by the International Livestock Research Institute (ILRI), in collaboration with private insurance providers, using a multi-year impact evaluation strategy (ILRI 2013).

- household (HH) surveys on 924 randomly selected HHs in Marsabit County, Kenya
- includes demographic variables as well as data on livestock holdings and production, risk and insurance, livelihood activities, expenditure and consumption, assets, and savings and credit
- five rounds (over ten seasons) of the annual survey have been administered each October-November, beginning in 2009
- normalized difference vegetation index (NDVI) estimates derived from satellite data are used to predict livestock mortality (PLM)
- when PLM is greater than 15%, the insurance product pays out

### Conclusion

- Holding an IBLI contract in the previous season increases a household's TLU resilience—whether a drought occurred or not—when we consider the probability of having more than 15 TLU, although the household's resilience is increased more if the previous season was a drought season. The positive impacts of past season insurance on TLU resilience are statistically significant for thresholds of 20 TLU and above; the impact is maximized at just above 30 TLU, which is close to the poverty trap threshold previously identified (Barrett et al. 2006).
- With regards to child health, we see a positive association between past season IBLI holdings and resilience during droughts. However, during non-drought season there is a negative association between insurance and future MUAC resilience for higher thresholds of child well-being. There appears to be no relationship between past season's IBLI holdings and probabilities of subsequently becoming severely acutely malnourished in non-drought years.