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Harsh winter shocks and distress sales: Consumption and asset smoothing among livestock farmers in Kyrgyzstan

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One cow - no poverty trap

- Ainura, 48 years old, widow with 3 children
- When her husband died, she used their only cow for her husband's funeral.
- She could not get another one
- Suffered from chronic food insecurity
- Stuck in the poverty trap
- Poverty trap is min asset threshold below which accumulation is not possible
- If there is a “poverty trap” from which people cannot escape, then what Ainura's story suggests?
 - Existence of poverty trap?
 - Sale or protection of an asset?
- She claims that even one cow can help her a lot in life and get out of the trap.



Literature review

- Owning a cow can make a big difference for poor households (Balboni et al., 2022).
- Theoretically, risk averse household is expected to sell animals in case of shocks (Deaton, 1991).
- The sale of livestock has long been considered as an indicator of smoothing consumption in the case of drought (Fafchamps et al., 1998; Hoddinott, 2006; Carter & Lybbert, 2012, Kazianga and Udry 2006; Mogues, 2011, Carter et al., 2007).
- This study complements the existing literature by focusing on harsh winter days to provide evidence for two different smoothing regimes consistent with poverty trap.

Research Questions

How do households respond differently to harsh winter shocks?

We expect that forward-thinking poor people use an asset protection strategy (asset smoothing) to avoid the poverty trap while the rich-asset households use a consumption smoothing strategy by selling their livestock?

Research Hypothesis

Aynura's story shows the existence of a "poverty trap" in Kyrgyzstan then the important hypothesis to test will be that

Rich and poor households react differently to harsh winter days.

This is an important statement to test because the discovery of behavior such as consumption smoothing and asset smoothing is indicative of a poverty trap in CA.

Data

1. Quantitative Data

- **“Life in Kyrgyzstan (LiK)”**

- LiK is a panel survey conducted annually between 2010 and 2013 and again in 2016
- The data are representative at the national level
- 3000 households and 8000 individuals over time

- **Temperature data (NASA - “MERRA-2”)**

- Daily data on temperature from 1982 to 2020 is merged with LiK
 - Purpose: Calculation of the duration of harsh winter days

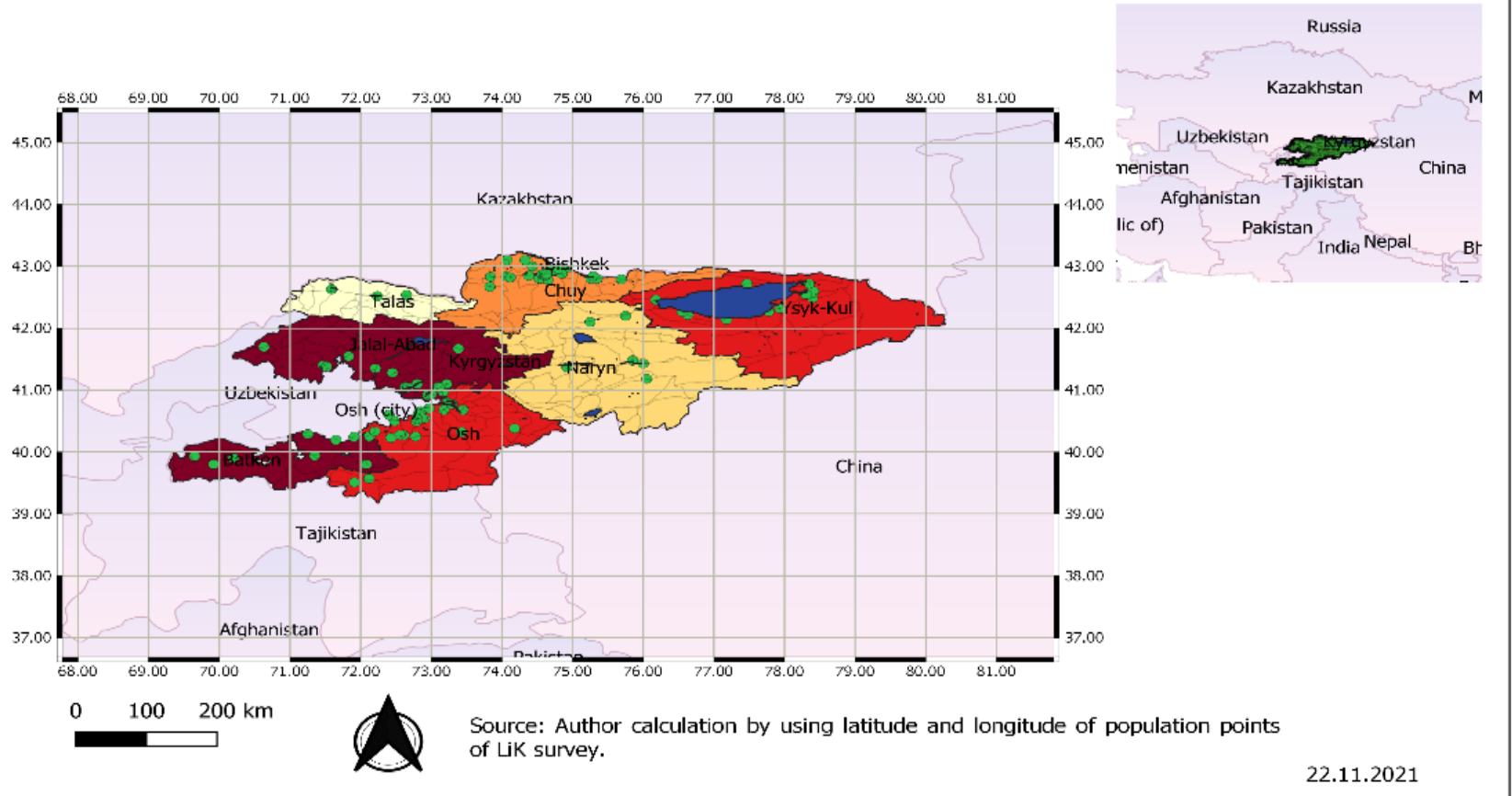
2. Qualitative Data

- **Interview with livestock keepers (semi-structured interviews)**

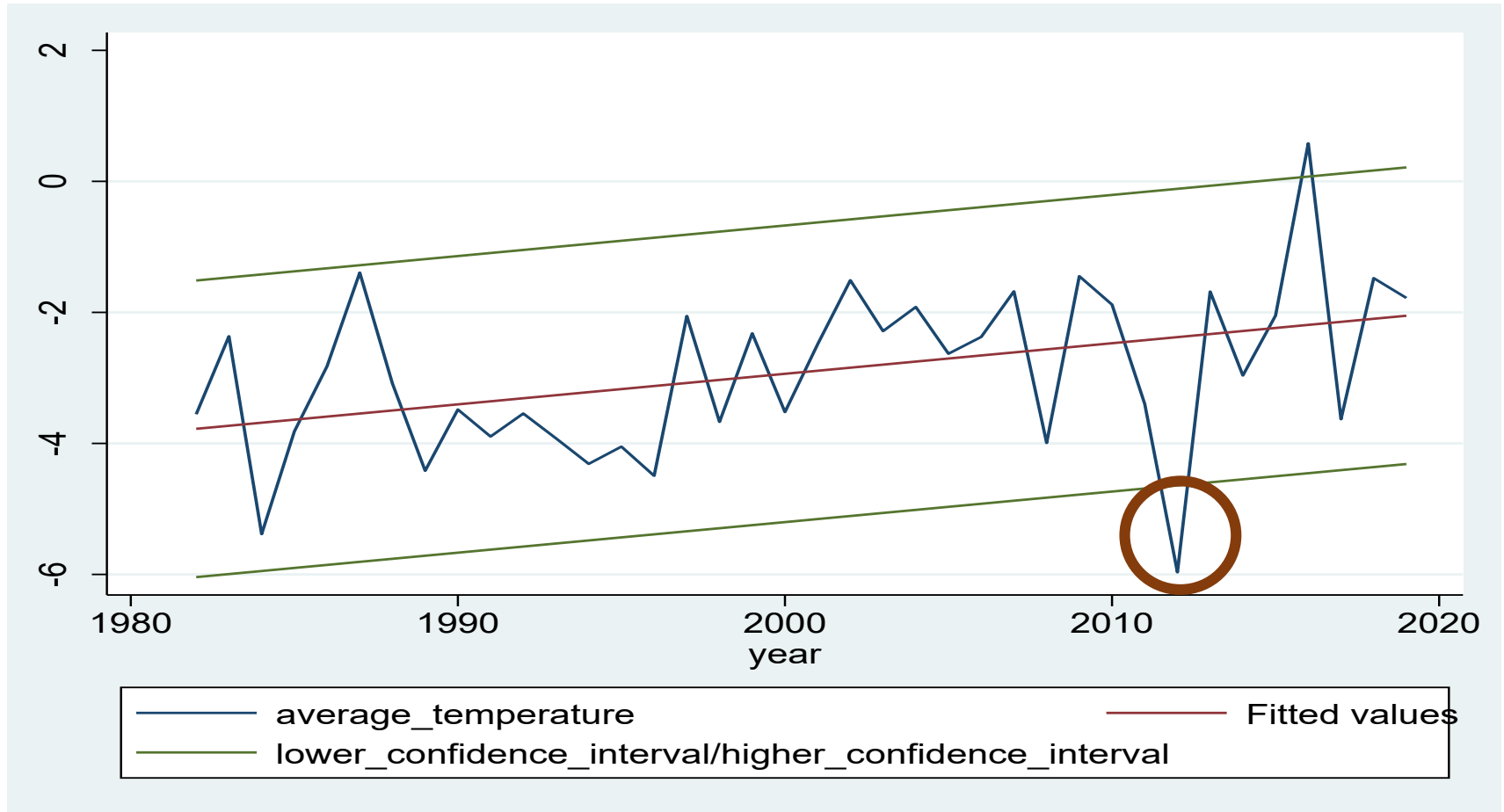
- I use thematic analysis, a well-established qualitative methodology (Braun & Clarke, 2012)

Study area

Population Points of LiK Respondents in the country



Winter temperature record



Source: Authors' work using daily temperature from MERRA-2 produced by NASA

Consumption smoothing vs Asset smoothing

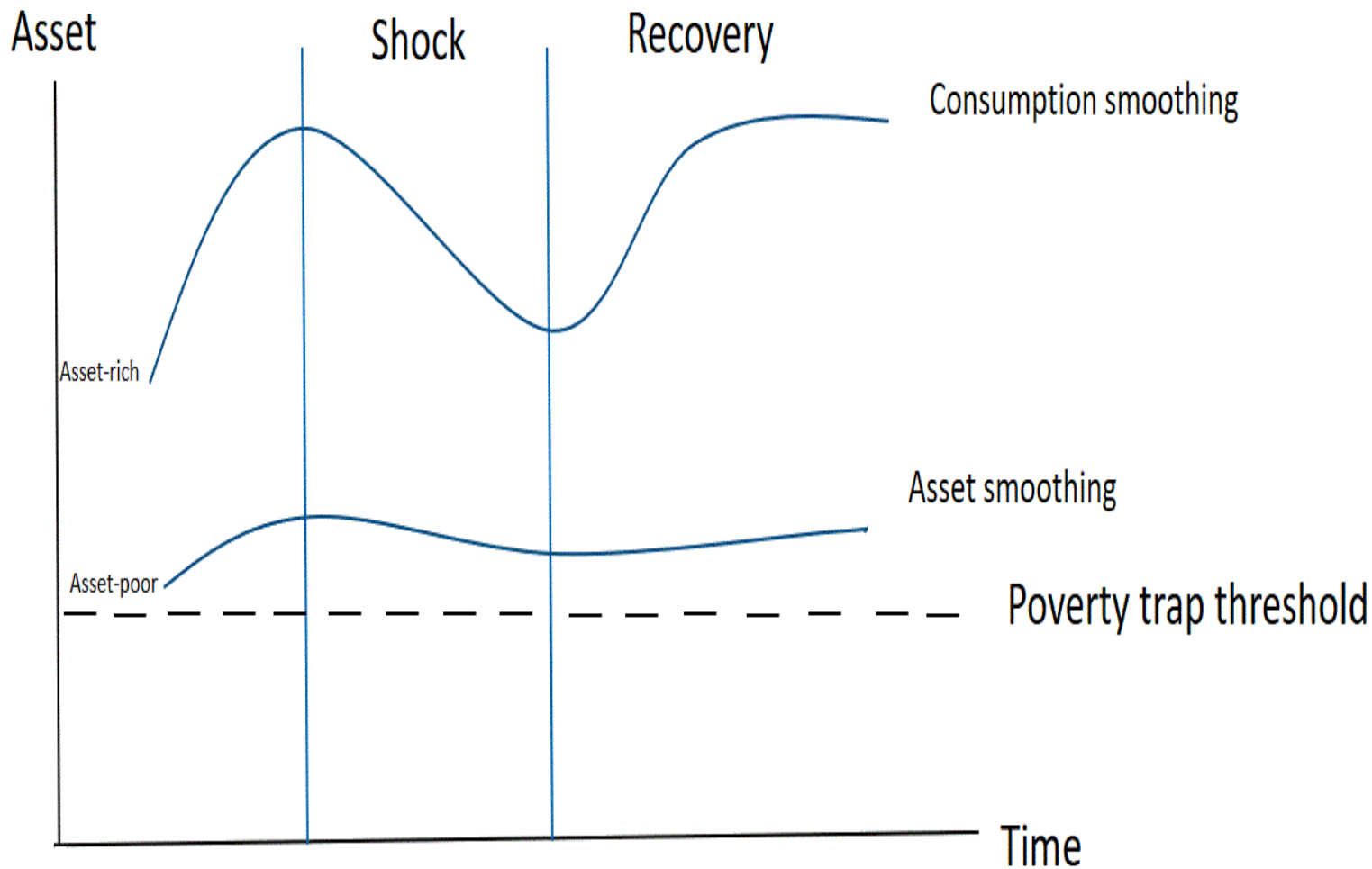


Figure 1: Asset smoothing vs consumption smoothing

Source: Adopted from Carter et al. (2007)

$$LSales_{ijt} = \begin{cases} \delta_t + a_i + \beta_1^h D^*_{it} + X_{ijt}' \beta_2^h + u_{it} & \text{if } A_{ijt} \geq \theta \\ \delta_t + a_i + \beta_1^l D^*_{it} + X_{ijt}' \beta_2^l + u_{it} & \text{if } A_{ijt} < \theta \end{cases}$$

LSales_{ijt}: annual livestock sales of household *i* in village *j* at year *t* in USD dollars. superscripts such as *h* and *l* denote a sample above or below the threshold θ . θ is the minimum level of assets (in our case, one cow)

D^*_{it} : number of harsh winter days in a village *i* and year *t* in which the average daily temperature fell below one standard deviation from long-run mean.

We take the difference between the annual mean for the village and the long-term average for the same village

X_{ijt} : vector of control variables representing livelihood capitals of household *i* in village *j* in year *t*.

P_{ijt} : vector of a price variable representing the prices of sheep, cows and horses.

δ_t time specific effect.

a_i time invariant unobserved heterogeneity

u_{it} stochastic error term. Standard errors are clustered at community level

Result (harsh winter increases livestock sales)

	All livestock owners (LU>0)		All livestock owners (LU>1)		All livestock owners (LU>1.6)	
	Coefficients	P> t	Coefficients	P> t	Coefficients	P> t
Harsh winter day	24.814**	0.02	30.760**	0.03	33.152**	0.03
Control variables are; social expenditure, migration network, wage (off-farm), plots, land area, distance to land, car, tractor, mobile phones, household size, age, education, children, price of sheep, cow and horses	yes		yes		yes	
Time fixed effect	yes	yes	yes	yes	yes	yes
N	5519		4161		3880	

a one-day increase in extreme cold das increases livestock sales by \$ 25 in the first column (for those with over 0 ELU) and \$ 31 in the second column

The sale of livestock serves as insurance during shocks, however, the impact depends on the level of livestock asset.

The higher the amount of LU, the stronger the impact. They demonstrate the ability to cope with a shock by selling animals depending on the level of their assets.

Result (asset-poor and asset-rich households)

	Asset rich HHs \geq 1 Cow		Asset poor HHs $<$ 1 Cow	
Harsh winter day	31.248*	(0.060)	5.938	(0.414)
Control variables are; social expenditure, migration network, wage (off-farm), plots, land area, distance to land, car, tractor, mobile phones, household size, age, education, children, price of sheep, cow and horses	yes		yes	
Time fixed effect	yes		yes	
N	3510		2009	

a one-day increase in extreme cold days increases livestock sales by \$31 in the first column (for asset-rich) and no impact in the second column for asset-poor. The results show that harsh winter days increase livestock sales of rich households, but do not affect livestock sales of poor livestock owners. Rich livestock owners liquidate their animals to smooth consumption, while poor livestock owners do not sell because they want to keep their livestock.

- 1 LU Threshold

additional threshold in the neighbourhood of the critical asset level

	Asset rich HHs LU \geq 1 LU		Asset poor HHs LU $<$ 1 LU	
Harsh winter days	30.084**	(0.033)	10.347	(0.118)
Other control variables	yes		yes	
Time effect	yes		yes	
Obs	5519		4161	

- 1.6 LU Threshold

	Asset rich HHs LU \geq 1,6 LU		Asset poor HHs LU $<$ 1,6 LU	
Harsh winter days	33.086**	(0.036)	6.760	(0.203)
Other control variables	yes		yes	
Time effect	yes		yes	
Obs	3880		1639	

	Themes	Codes and Excerpts
1	Different Survival Strategies	<p>Code 17: "Fodder for Livestock Survival"</p> <p>- P17 explained the strategy of saving livestock with stocked fodder during harsh winters, emphasizing the dire consequences of livestock suffering or dying in these conditions.</p> <p>Code 18: "Alternative Solution: Save now to send to pasture"</p> <p>- P18 discussed the alternative solution of sending cattle to pasture in harsh winter conditions, allowing them to gain weight and height from grazing.</p> <p>Code 19: "Balancing Short-Term Needs"</p> <p>- P19 described their approach of selling one or two animals to buy fodder and meet various urgent needs during severe winter while saving the remaining livestock.</p> <p>Code 20: "Easier Protection for Fewer Animals"</p> <p>- P20 shared that having fewer animals makes it easier to protect them, especially by using household food scraps, and highlighted the importance of owning a cow for sustainable animal product consumption.</p>

Two various strategies to ensure the survival of livestock during harsh winters

“During harsh winters, we suffer from lack of feed in the fields due to heavy snowfall. In this difficult situation, we keep them at home, trying to save them with stocked feed, but this is not enough to save our entire livestock. Due to the lack of feed for the livestock, we have only two options: either sell them or slaughter them, otherwise they will die. But in winter, most animals are thin and cannot be slaughtered. So we try to sell some because we need to buy hay or corn or wheat to store the leftovers. We are trying to bring the cattle out of the winter and put them out to pasture so we can sell them at a high price. In addition, we have other pressing needs related to this cold winter, for example, we need more coal to heat our homes (Interview with a wealthy livestock farmer, Jalal-Abad, Kochkor-Ata, September 2020)”

“I am the head of my family. I have a wife and 4 children. Sometimes I do seasonal work off the farm and I need to feed 1 cow and 5 chickens. During severe winter, I do not sell my livestock because I need to constantly consume animal products such as milk, butter, cheese, eggs, etc. Even though there is no feed in the field during severe winter, I try to save my the only cow with the food waste we eat (potatoes, carrots, etc.). Otherwise, if I sell my only cow due to lack of feed, my family will not be provided with food (Interview with a poor livestock farmer, Osh, September 2020)”

The story of a Kyrgyz woman told at the beginning of the presentation is an example of how the real world can be **different** from the fictional world where consumption smoothing through the sale of assets can have negative long-term consequences.

- Our five-year panel analysis identifies an asset smoothing strategy among households with low assets, suggesting that poor households protect their productive resources in order to obtain a stable income in the future.
- This asset-smoothing behaviour is consistent with **Aynura's fate** showing that shocks create hardship for the poor and bankrupt them if they sell their only livestock.
- It suggests the existence of a minimum asset base below which asset accumulation is not possible, causing poor farmers like Aynura to be stuck in a poverty trap for many years.
- We confirm the finding of a wealth-mediated response to shocks for our Central Asian setting.

- Moreover, our study provides novel insights into other determinants of livestock sales in which remittances and social obligations are major drivers of household liquidity.
- The standard policy recommendation to overcome poverty traps include improvements in credit and insurance access.
- Another strategy to overcome poverty traps is broad based asset redistribution implying a “big push” policy approach (Balboni et al., 2022).
- International donors can play a role in helping develop and fund transfer schemes that will keep villagers like Ainura safe from future deprivation.



Thank you for your attention!