

# Self-control and Vulnerability to Food Insecurity

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# Vulnerability & Self-control: Motivation

- Uninsured risk is an important cause of poverty.
- Vulnerability to poverty - “the likelihood that a shock will result in decline in well-being” (WDR2000) - is one way to capture its importance when measuring wellbeing. Similar concerns are included in the definition of food security that emphasizes “all people at all times have physical, social and economic access to sufficient, safe and nutritious food ... ” (World Food Summit, 1996).
- Vulnerability has been mostly explained by asset ownership (Moser, 1998) and access to different coping mechanisms (Maxwell et al, 1999).
- Our question: can self-control – the capacity to regulate one’s behavioral impulses to achieve long-term goals – also play a role?
- This may be particularly important for households in rural areas of developing countries: mostly self-employed (hence, no disciplining rules) and receiving one major source of income (at harvest time) that needs to be managed throughout the year, with weak access to commitment devices

# Vulnerability & Self-control: Overview

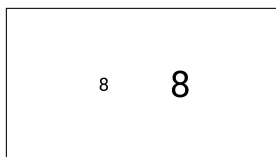
- Cross-sectional data from a sample of rural households in northern Laos (~ 800 households in 4 districts), part of a wider project on food security in the region
- Self-control  $\equiv$  inhibitory control, measured through the Stroop task
- Vulnerability  $\equiv$  subjective probability of not having enough food into the future
- Main conclusion: the negative correlation between self-control and vulnerability is robust to the inclusion of a wide set of control variables (including other executive functions, economic preferences, assets, demographics, etc)
- Causal relation? Estimates are plausibly robust to the effect of unobservable variables (Oster, 2019)
- Mechanisms: mostly via improved productivity (not via savings or consumption of temptation goods)

# Measuring self-control

- Numerical Stroop task: two numbers that differ on value or (font) size and respondents are asked to indicate the greater value (largest size) → value and size tasks
- For example, in the value task the participant has to select the highest value (and ignore font size) while being distracted by different stimuli, which either facilitates (congruent), interferes (incongruent) or is irrelevant (neutral) to the task at hand.
- Respondents performed 15 tests of each of the 3 three conditions, for each task. Implemented using the Psych Lab 101 app.
- Stroop effect: response delay associated with interference effect (incongruent conditions - neutral conditions), averaged over both tasks (hence, higher values reflect lower inhibitory control)



Incongruent



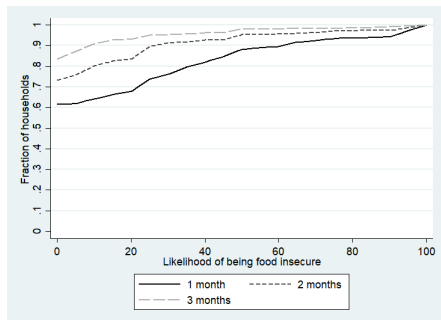
Neutral



Congruent

# Measuring Vulnerability

- What are the chances, in any given year, that you would not have enough food to eat at all times, in order to remain healthy, whether produced by your household or bought, for [1/2/3] month/s or more?
- Respondents had to distribute 20 tokens into two cells (“enough food” / “not enough food”).
- Approximately 40% of the respondents reported some chance of not having enough food for 1 month or more (and ~ 16% reported not having enough food for 3 months or more).
- Main advantage: probabilistic and future oriented (contrary to measures based on past extent of deprivation).
- Main shortcoming: is this just optimism/pessimism? No.



# Relating vulnerability with self-control

$$V_{iv} = \alpha + \beta SC_{iv} + X_{iv}\theta + Z_v\gamma + \epsilon_{iv} \quad (1)$$

- $V_{iv}$ : vulnerability: chances (/100) of not having enough food for 1 month or more ( $E(V_{iv}) = 16.3$ )
- $SC_{iv}$ : Self-control (average Stroop effect, standardized: delay, hence higher values  $\equiv$  lower self control)
- $X_{iv}$ : household/individual controls, including other executive functions (attention, working memory, planning, flexibility, intelligence), economic preferences (risk, time), demographic characteristics, wealth and social desirability bias (SDB)
- $Z_v$ : village controls, including access to roads and markets and importance of irrigation, district fixed effects
- Standard errors are clustered at village level

## Relating vulnerability with self-control

	(1)	(2)	(3)	(4)
Self-control	1.774** (0.830)	1.875** (0.822)	1.795** (0.856)	1.793** (0.851)
Demographics	yes	yes	yes	yes
Assets	yes	yes	yes	yes
Village	yes	yes	yes	yes
Other executive functions	no	yes	yes	yes
Time and risk preferences	no	no	yes	yes
SDB	no	no	no	yes
Observations	734	732	691	691
$R^2$	0.179	0.179	0.182	0.185

However, the importance of self-control is greatly diminished when we consider longer spells (3+ months) of food insecurity.

# Relating vulnerability with self-control

How sensitive are these estimates to some unobserved correlate of wellbeing that is also correlated with self-control? We follow Oster (2019) approach and estimate the sensitivity of our estimates to those potential confounders.

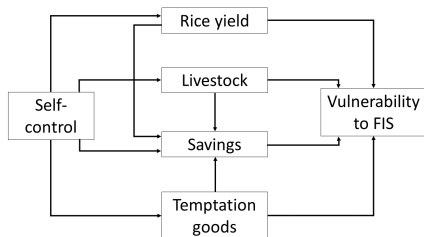
	Model 1		Model 2		Model 3		Model 4	
	Estimate	$R^2$	Estimate	$R^2$	Estimate	$R^2$	Estimate	$R^2$
$\beta$	1.77	0.17	1.87	0.17	1.79	0.18	1.79	0.18
$\beta^*$	1.63	0.23	1.69	0.23	1.63	0.23	1.63	0.24
$\beta^* = 0$	0.00	1.00	0.00	0.88	0.00	0.94	0.00	0.97

This analysis suggests that these results are reasonably robust.



# How does self-control operate?

We quantify the effect of four possible mediators: bank savings (S), livestock (L), consumption of temptation goods (T), rice productivity (P)



$$V_{iv} = \alpha + \gamma SC_{iv} + \delta^S S_{iv} + \lambda^L L_{iv} + \lambda^T T_{iv} + \lambda^P P_{iv} + X'_{iv} \theta + Z'_j \gamma + \epsilon_{iv} \quad (2a)$$

$$S_{iv} = \alpha + \gamma^S SC_{iv} + \lambda^{ST} T_{iv} + \lambda^{SP} P_{iv} + X'_{iv} \theta + Z'_j \gamma + \epsilon_{iv}^S \quad (2b)$$

$$L_{iv} = \alpha + \gamma^L SC_{iv} + X'_{iv} \theta + Z'_j \gamma + \epsilon_{iv}^L \quad (2c)$$

$$T_{iv} = \alpha + \gamma^T SC_{iv} + X'_{iv} \theta + Z'_j \gamma + \epsilon_{iv}^T \quad (2d)$$

$$P_{iv} = \alpha + \gamma^P SC_{iv} + X'_{iv} \theta + Z'_j \gamma + \epsilon_{iv}^P \quad (2e)$$

# How does self-control operate?

	Coefficients	Percentage
Direct effect	1.655	92.16%
Indirect effects		
Savings	-0.001	-0.03%
Large livestock	0.001	0.05%
Rice yield	0.100	5.58%
Temptation goods	0.040	2.24%
Total effect	1.795	100.00%

Main conclusion: productivity seems to be the main mediator in this context

# Conclusion

- Low self-control increases vulnerability to food insecurity.
- Estimates are economically and statistically significant, and plausibly robust to unobserved determinants of vulnerability.
- This conclusion does not mean that only self-control matters: its significance is greatly diminished when considering longer spells of deprivation.
- Ongoing work (not shown in paper) shows that reverse causality does not seem to be important.
- Self-control seems to operate mostly via lower productivity, which suggests few options for policy (what is the commitment device when producers are self-employed?).