Climate Change Beliefs and Adaptation Plans in Bangladesh

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- Changes in technology, location and occupation can substantially reduce the damages of climate change (Cruz Rossi Hansberg 2021).

- Are individuals informed about future shocks so that they can action these changes before disaster strikes?

Shocks
Damage(shocks)
Impacts
Returns

Heat
Yield(temp)
Yields
Ag profit

Experiment design

We elicit beliefs about future climate change among a sample of 5,700 individuals in rural Bangladesh.

We provide 0.5°x0.5° scientific forecasts on:

1. Future climate change
2. The damage function
3. Future climate change + the damage function

We study impacts on climate beliefs and expected adaptation investments (both in situ and through location and occupation change).

Roadmap

Design

Results

- Are people worried? Does this matter?
- What do people know about shocks and damages?
- What are the impacts of information provision?

Discussion

The sample

We interview a sample of 5,700 households living in rural Bangladesh.

- We select high and low impact villages from a representative survey collected by BRAC.
- We randomly sample households in these villages.
- We interview head of the household, and ask some questions to the partner, if present.

Four key decisions

1. What scenario to present? *SSP2/RCP4.5 (using CMIP5 and CIMP6 data from Byers et al. 2018; extreme heat data as in Carleton et al. 2022)*

2. What time frame to use? *2050*

3. Which information to provide/beliefs to elicit?
   - Extreme heat, floods, yields, mortality, sea level rise, total economic impacts ▸ Link

   → *Changes*
   → *Damages*
   → *Impacts*

4. Which outcomes to measure? *Climate beliefs, expected adaptation investments, incentivised policy demand*.

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Experiment design

We provide *local* forecasts on:

1. Future climate change
2. Damage function
3. Future climate change + damage function
4. (3) + information about Dhaka
5. (3) - information about worst-case scenario

▸ Balance

Roadmap

Design

Results

- Are people worried? Does this matter?
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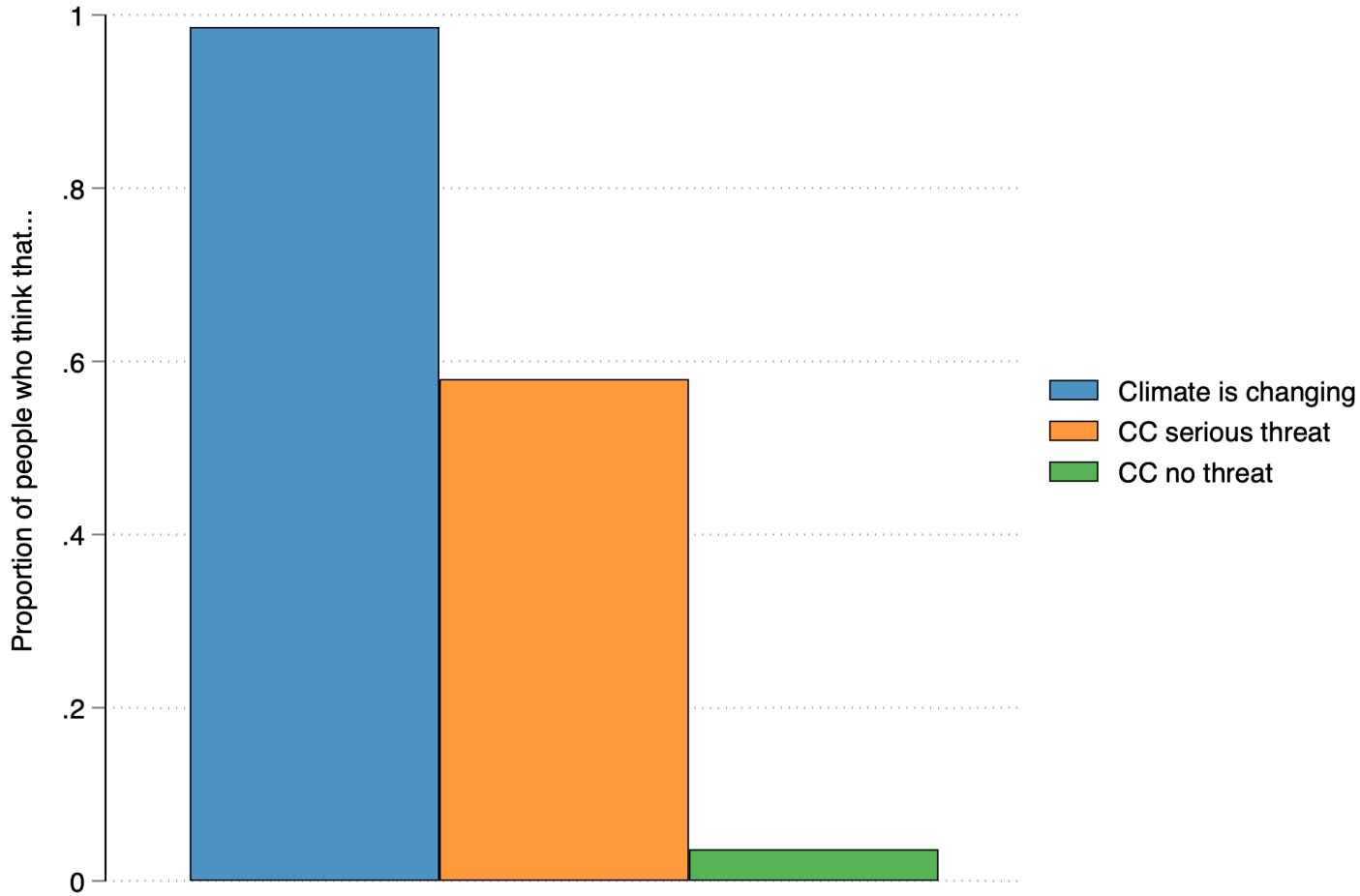
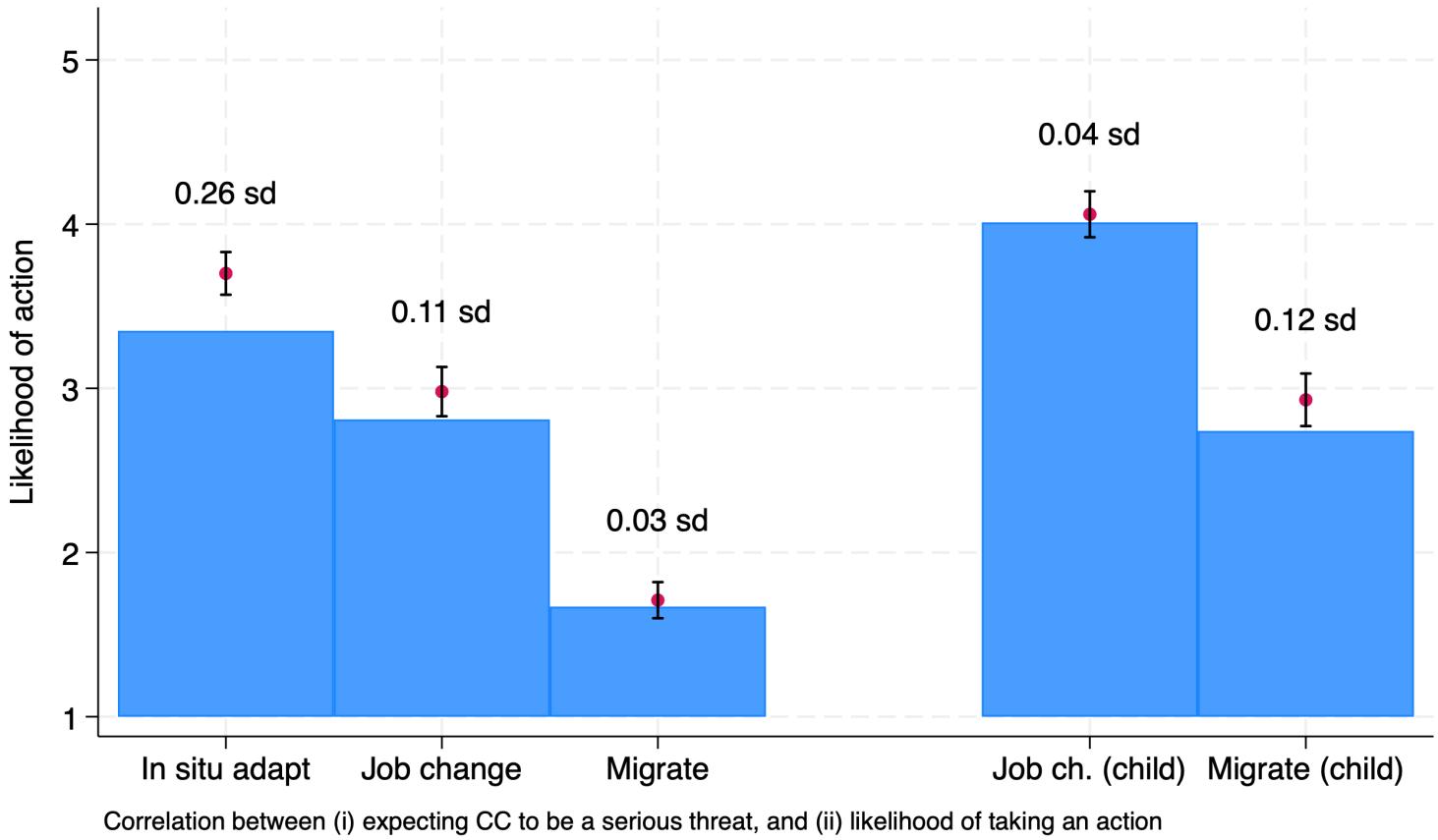
Discussion

Widespread concern with climate change



Concerns predict likely actions



Correlation between (i) expecting CC to be a serious threat, and (ii) likelihood of taking an action

Roadmap

Design

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Discussion

0. Quantitative beliefs data has reasonable quality

Quantitative beliefs correlate with:

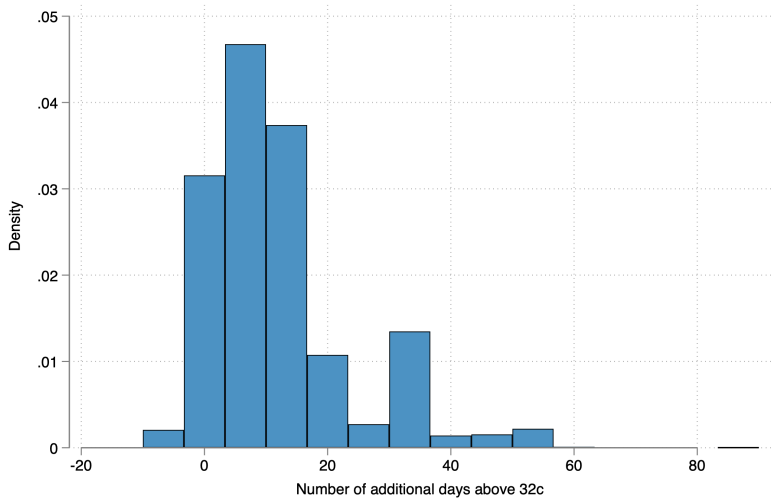
- qualitative beliefs ▸ Link
- climate change worries ▸ Link

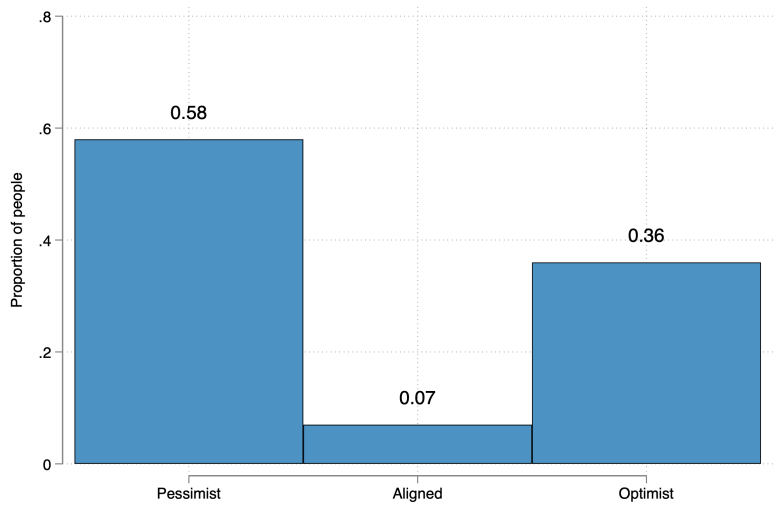
Quantitative beliefs are internally consistent:

- People who expect largest falls in yields also expect highest returns to adaptation ▸ Link
- People who expect highest returns to adaptation more likely to expect to invest in adaptation ▸ Link

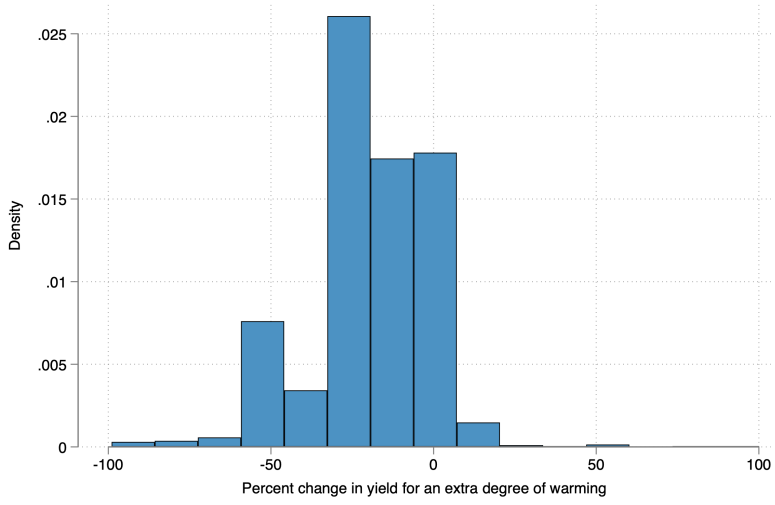
1. Wide dispersion of beliefs on future changes and damages

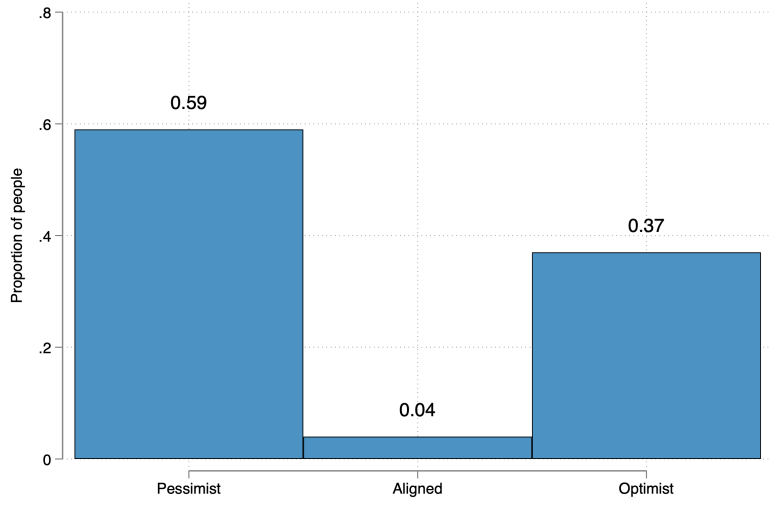
Belief dispersion: extremely hot days





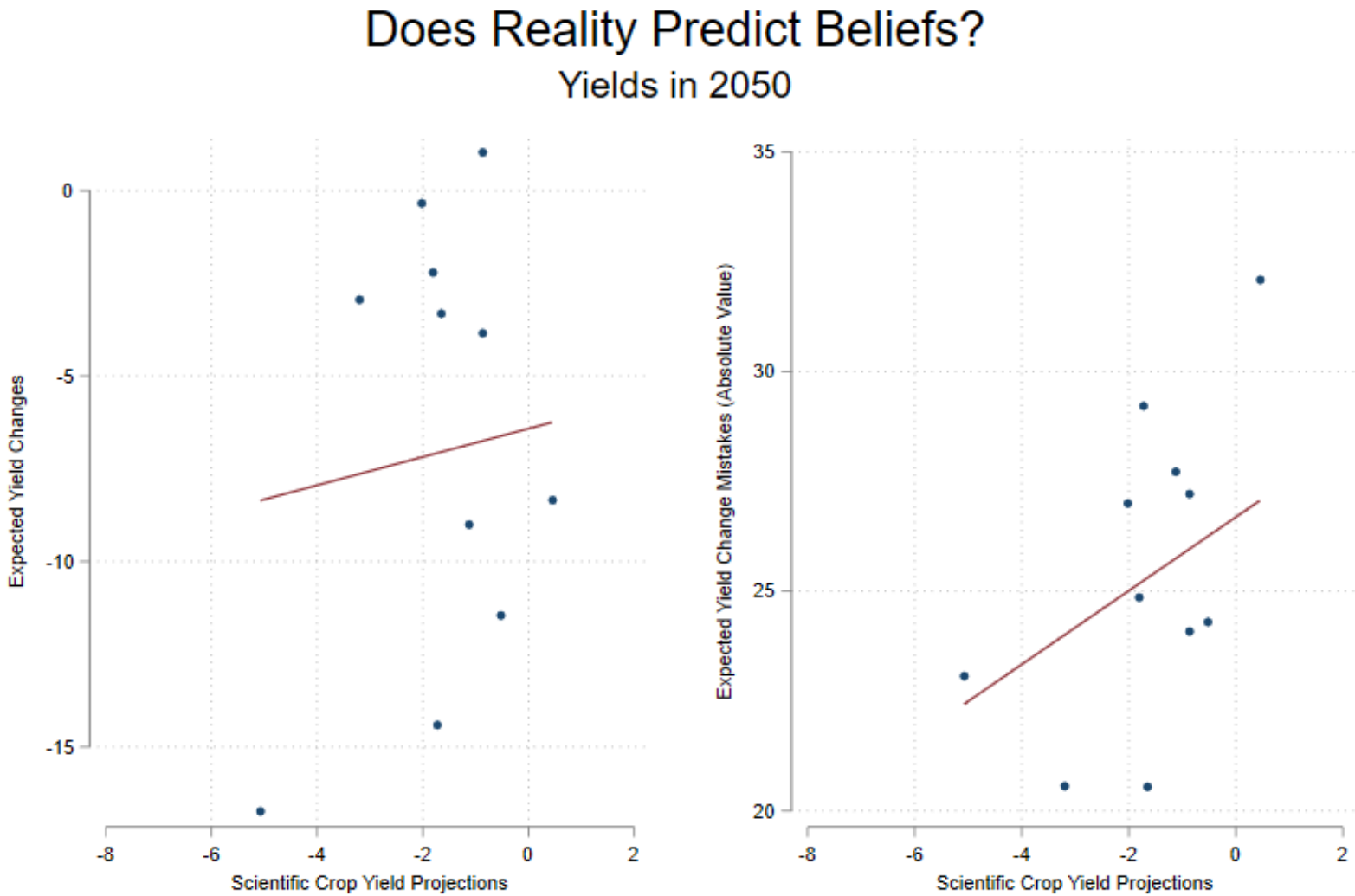
Belief dispersion: yield damage function



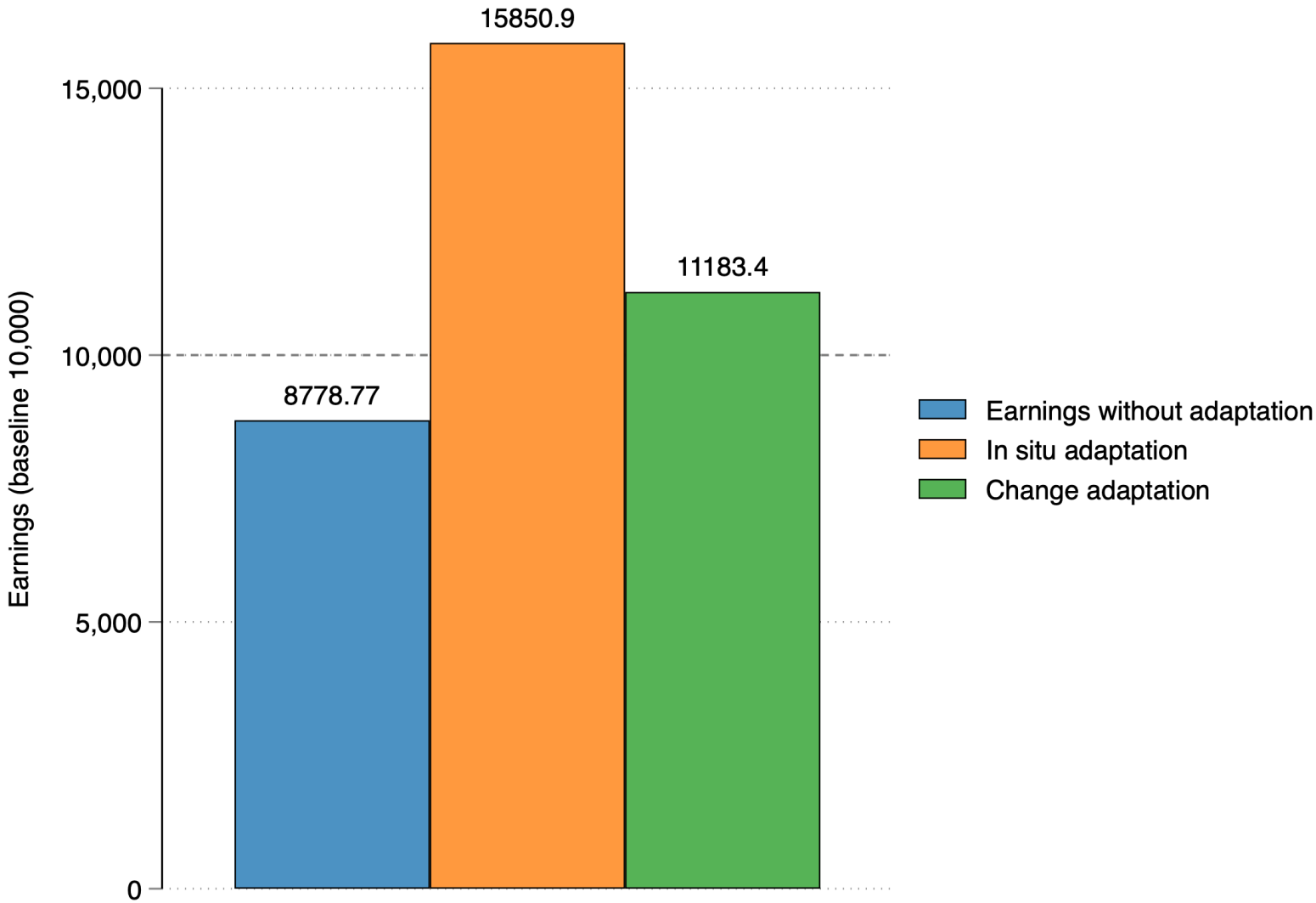


▸ Total yield change

Insignificant correlation with scientific forecasts



2. Respondents expect future income growth, given adaptation



▸ Returns in situ ▸ Returns change

Roadmap

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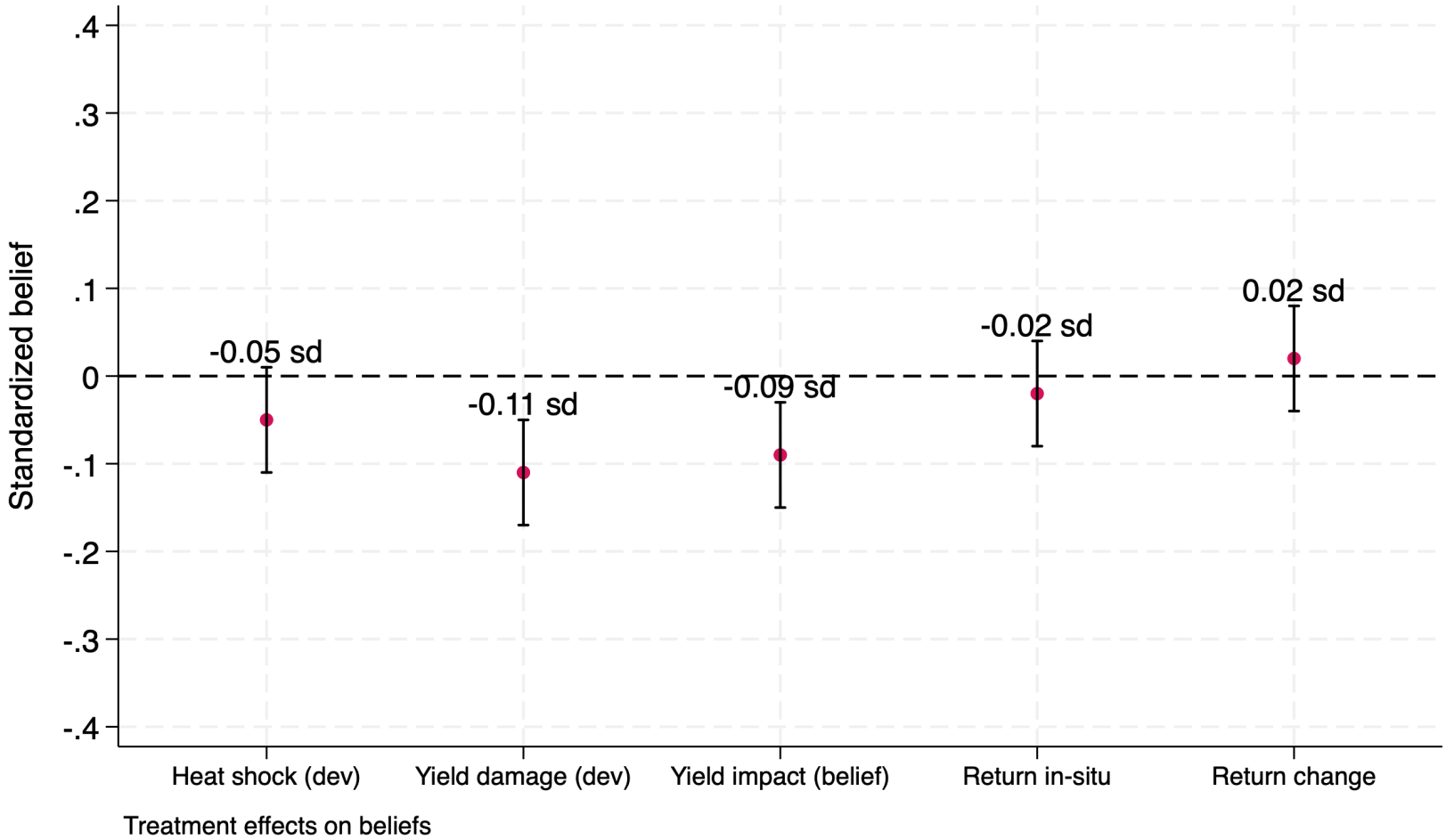
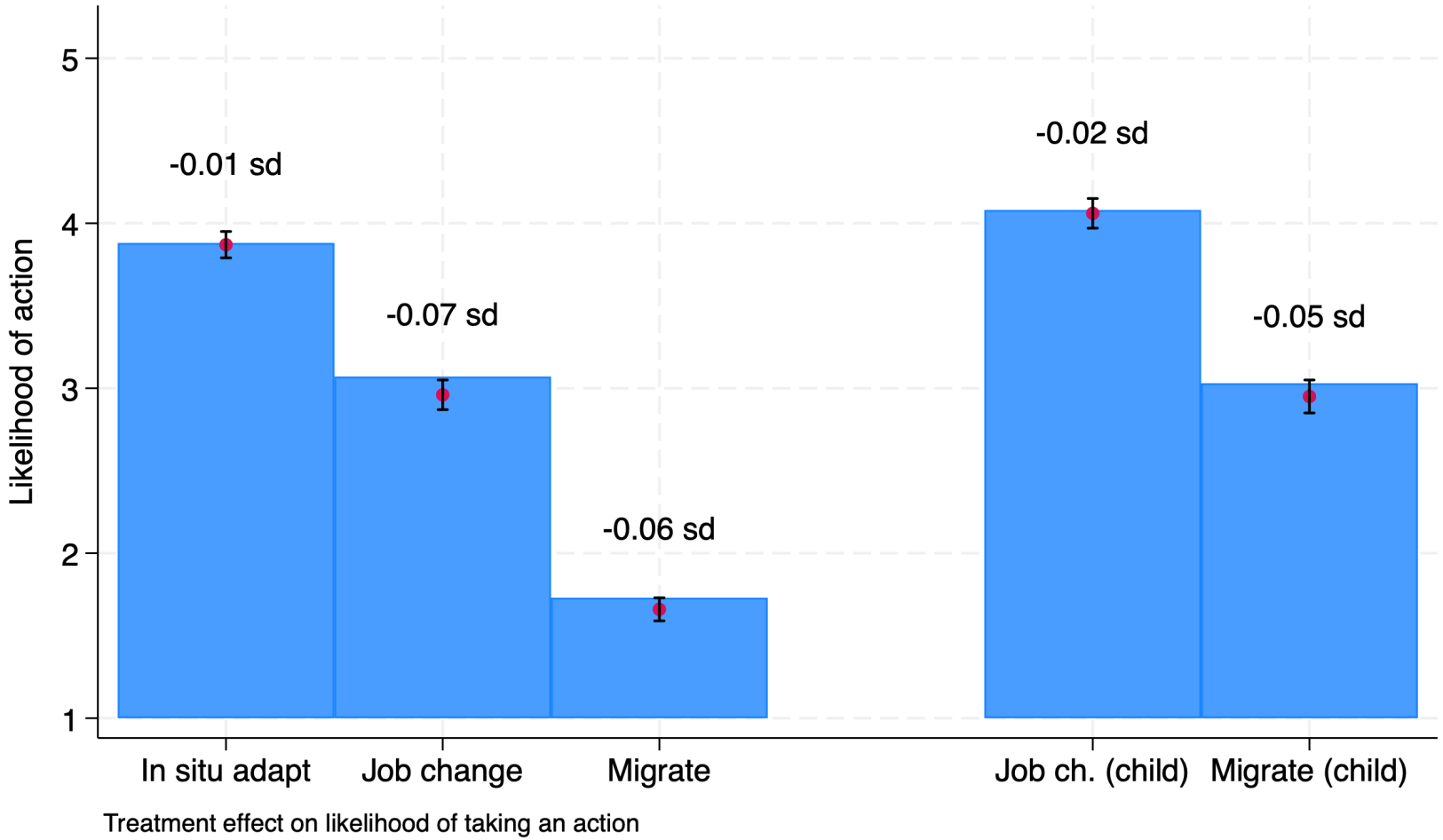
Discussion

1. Average treatment effects

Fewer mistakes, larger expected negative impacts, no changes in returns to actions

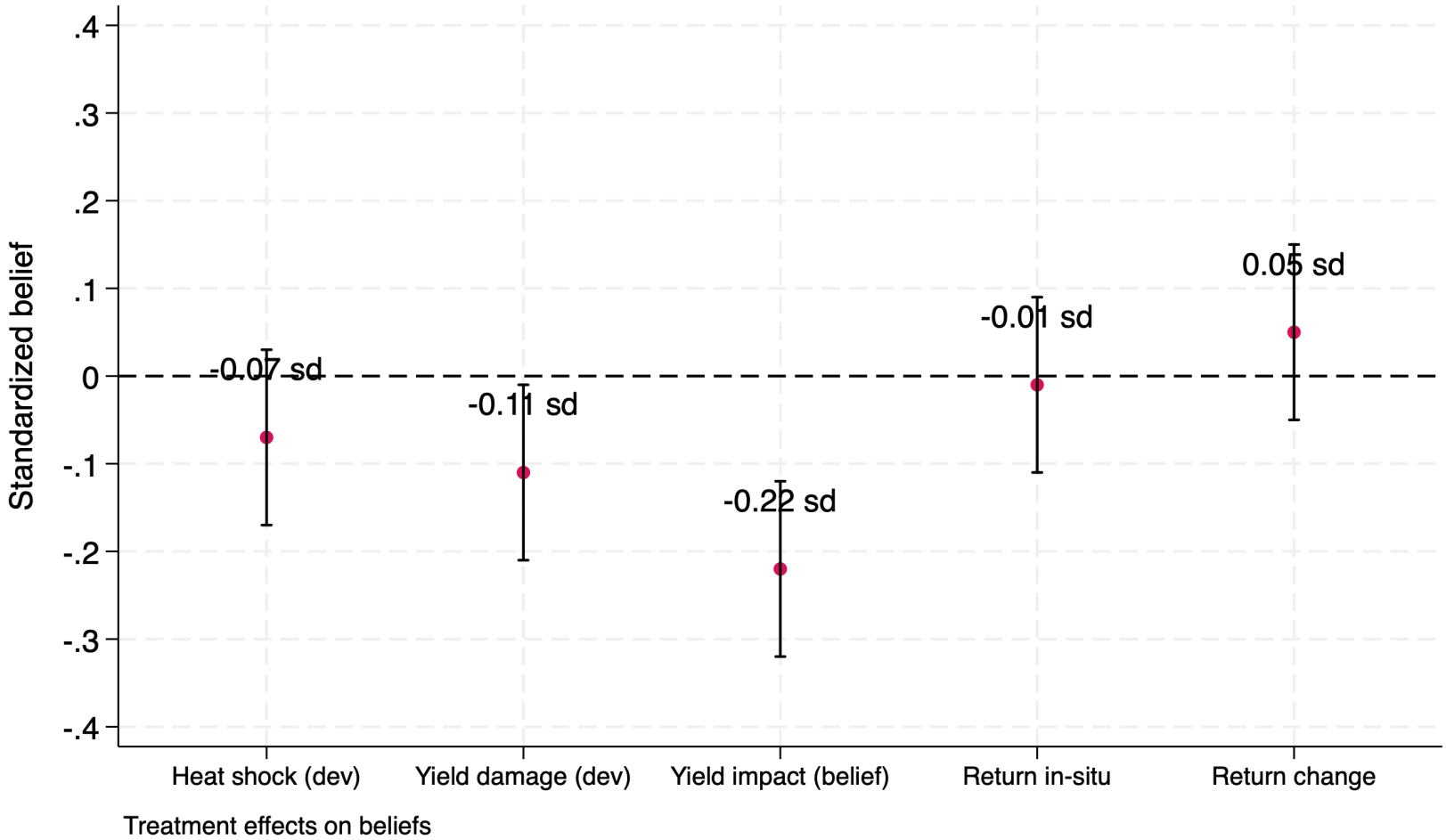


If anything, treatment lowers willingness to adapt

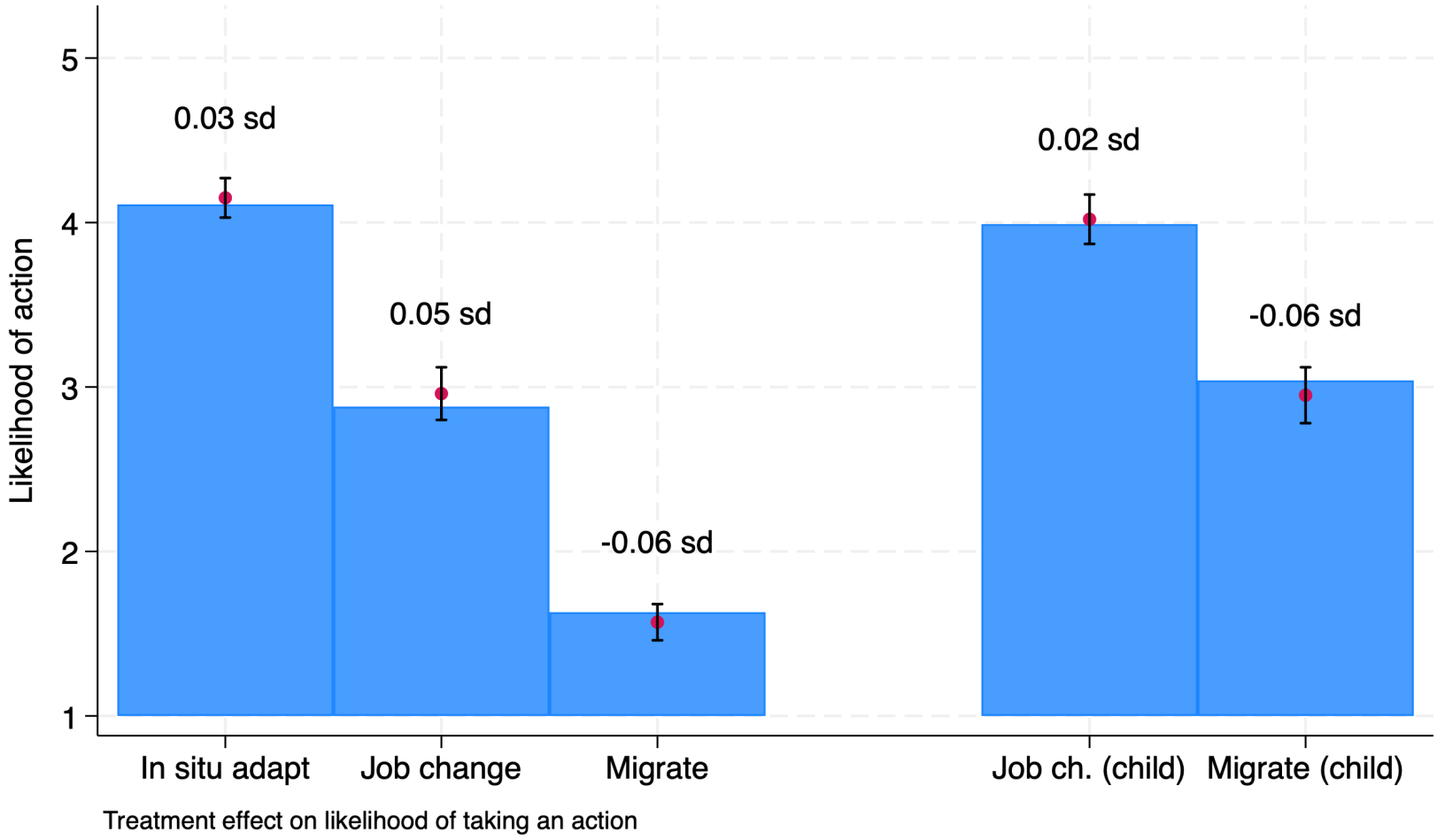


2. Treatment effects for people engaged in agriculture

Larger effects on impact beliefs



No changes in willingness to adapt



Treatment effect on likelihood of taking an action

▸ No agriculture

Roadmap

Design

Results

- Are people worried? Does this matter?
- What do people know about shocks and damages?
- What are the impacts of information provision?

Discussion

1. Mental model of climate change: impacts will be bad, but in-situ adaptation can secure further income growth.

2. Beliefs about specific climate shocks and damages differ widely across people, and deviate from scientific forecasts.

3. Providing information on shocks and damages does not meaningfully affect adaptation plans (in the short-run).

→ Should we provide information about returns to different adaptation strategies?

1. Mental model of climate change: impacts will be bad, but in-situ adaptation can secure further income growth.

2. Beliefs about specific climate shocks and damages differ widely across people, and deviate from scientific forecasts.

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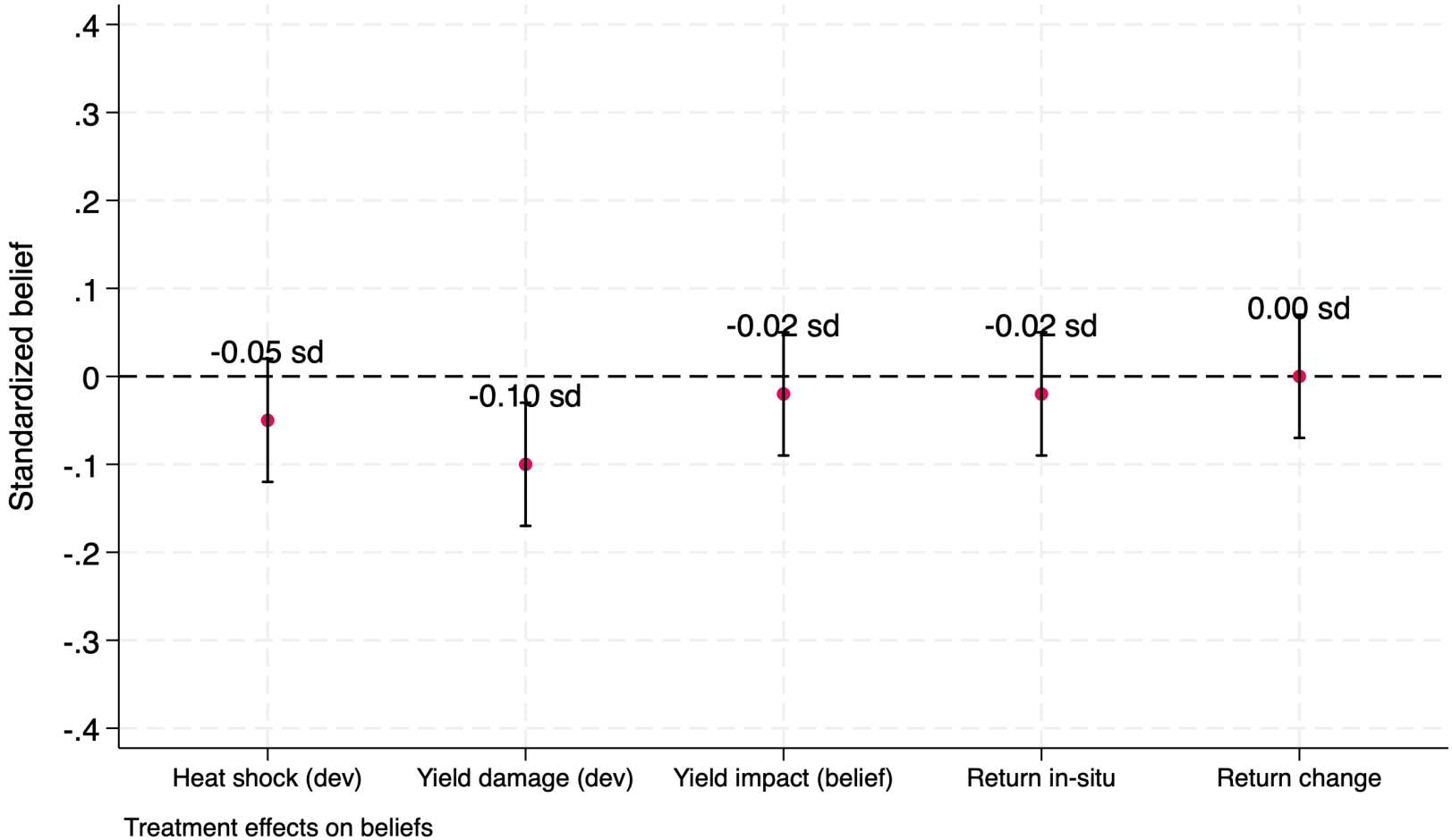
$\rightarrow$ Should we provide information about returns to different adaptation strategies?

Thank you!

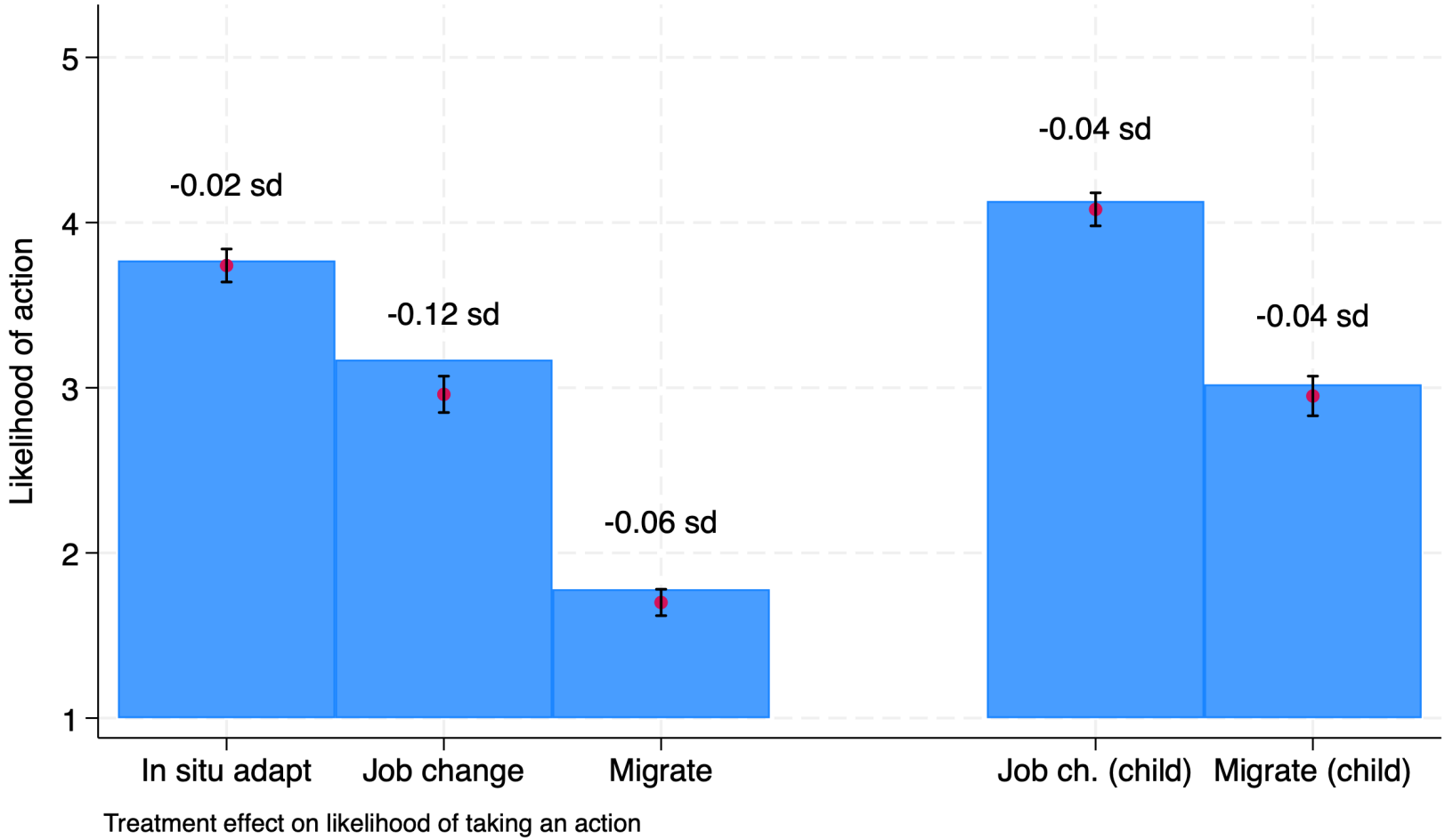
Balance Test

	Treatment Arm						
	Physical	Damage	Both	No Extremes	Dhaka	Control	Imbalance
Age	41.06	40.91	39.95	41.02	41.08	40.88	0.28
	(13.60)	(13.66)	(12.65)	(13.27)	(12.61)	(13.22)	
Share Male	0.55	0.54	0.52	0.54	0.55	0.57	0.24
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	
Trust in Science	1.64	1.69	1.62	1.63	1.68	1.64	0.58
	(0.91)	(0.97)	(0.92)	(0.90)	(0.95)	(0.90)	
Log Income	8.79	8.82	8.81	8.96	8.83	8.83	0.29
	(1.16)	(1.12)	(1.16)	(1.07)	(0.96)	(1.05)	
Family Members	4.63	4.66	4.65	4.72	4.63	4.69	0.89
	(1.61)	(1.76)	(1.70)	(1.70)	(1.82)	(1.74)	
Born in Village	0.62	0.62	0.62	0.61	0.61	0.65	0.64
	(0.48)	(0.49)	(0.49)	(0.49)	(0.49)	(0.48)	

3. Impacts for people not engaged in agriculture


.4
.3
.2
.1
0
-.1
-.2
-.3
-.4
Standardized belief
-0.05 sd
-0.10 sd
-0.02 sd
-0.02 sd
0.00 sd
Heat shock (dev)
Yield damage (dev)
Yield impact (belief)
Return in-situ
Return change
Treatment effects on beliefs

Back



Treatment effect on likelihood of taking an action

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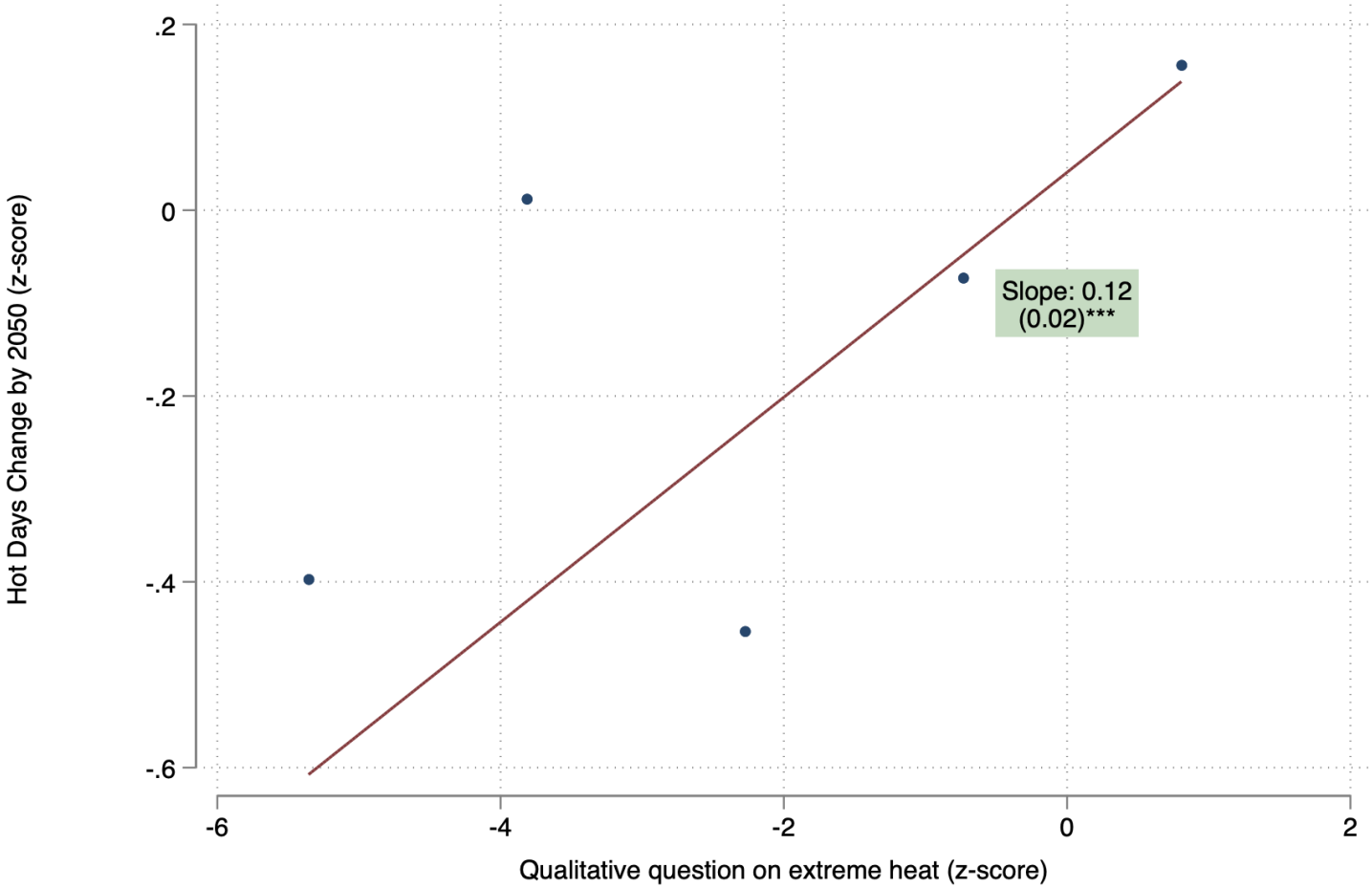
Quantitative beliefs correlate with qualitative beliefs and with with CC worry



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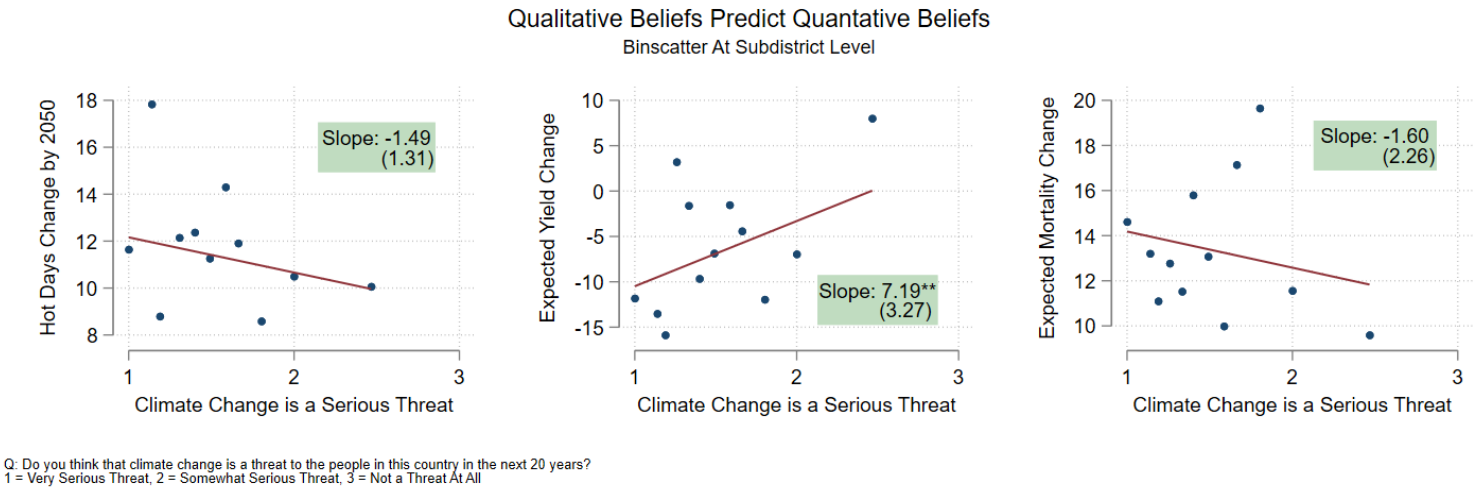
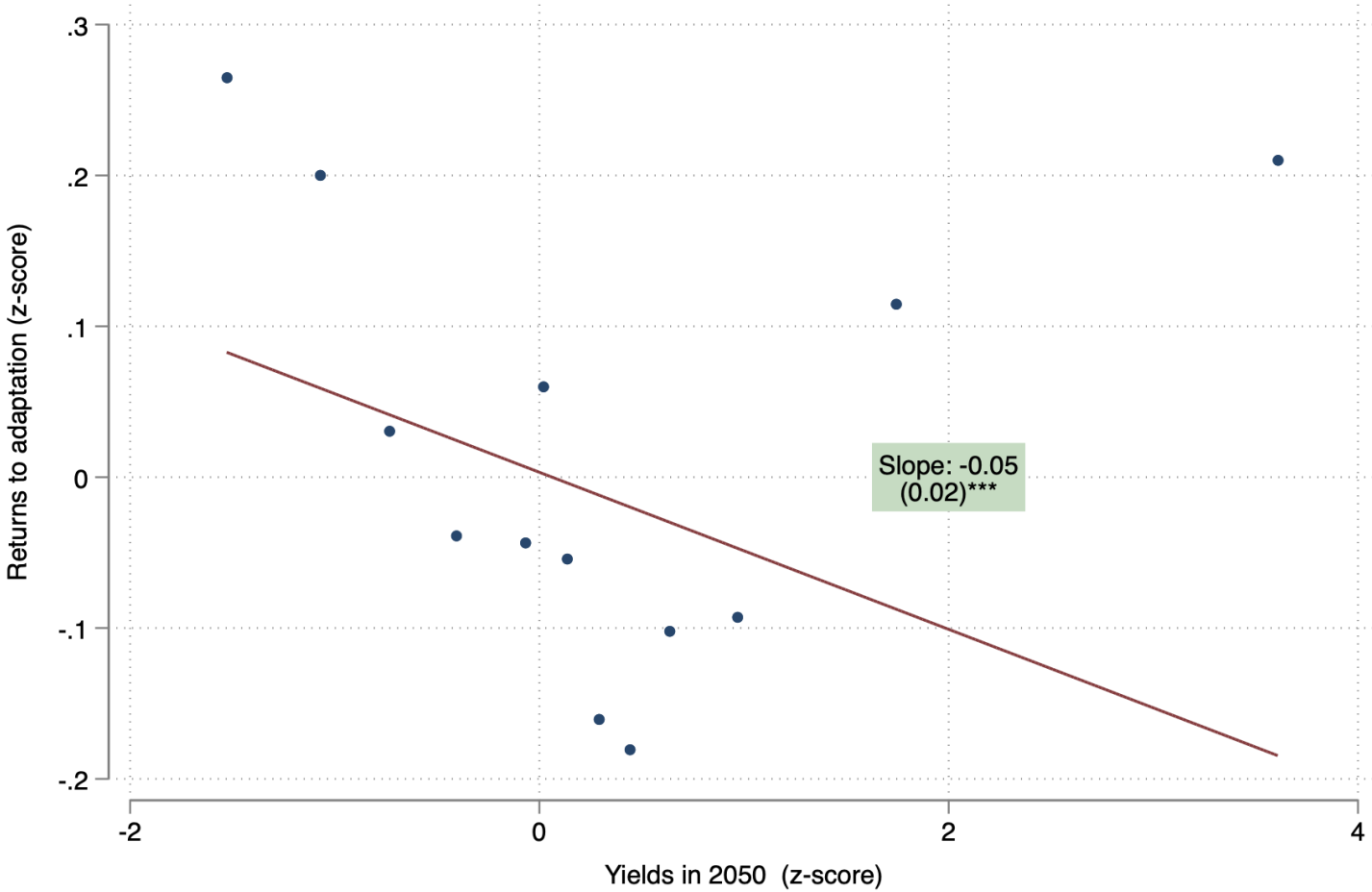
Quantitative beliefs correlate with worrying about climate change



Q: Do you think that climate change is a threat to the people in this country in the next 20 years?
1 = Very Serious Threat, 2 = Somewhat Serious Threat, 3 = Not a Threat At All

▸ Back

People who expect largest falls in yields also expect highest returns to adaptation



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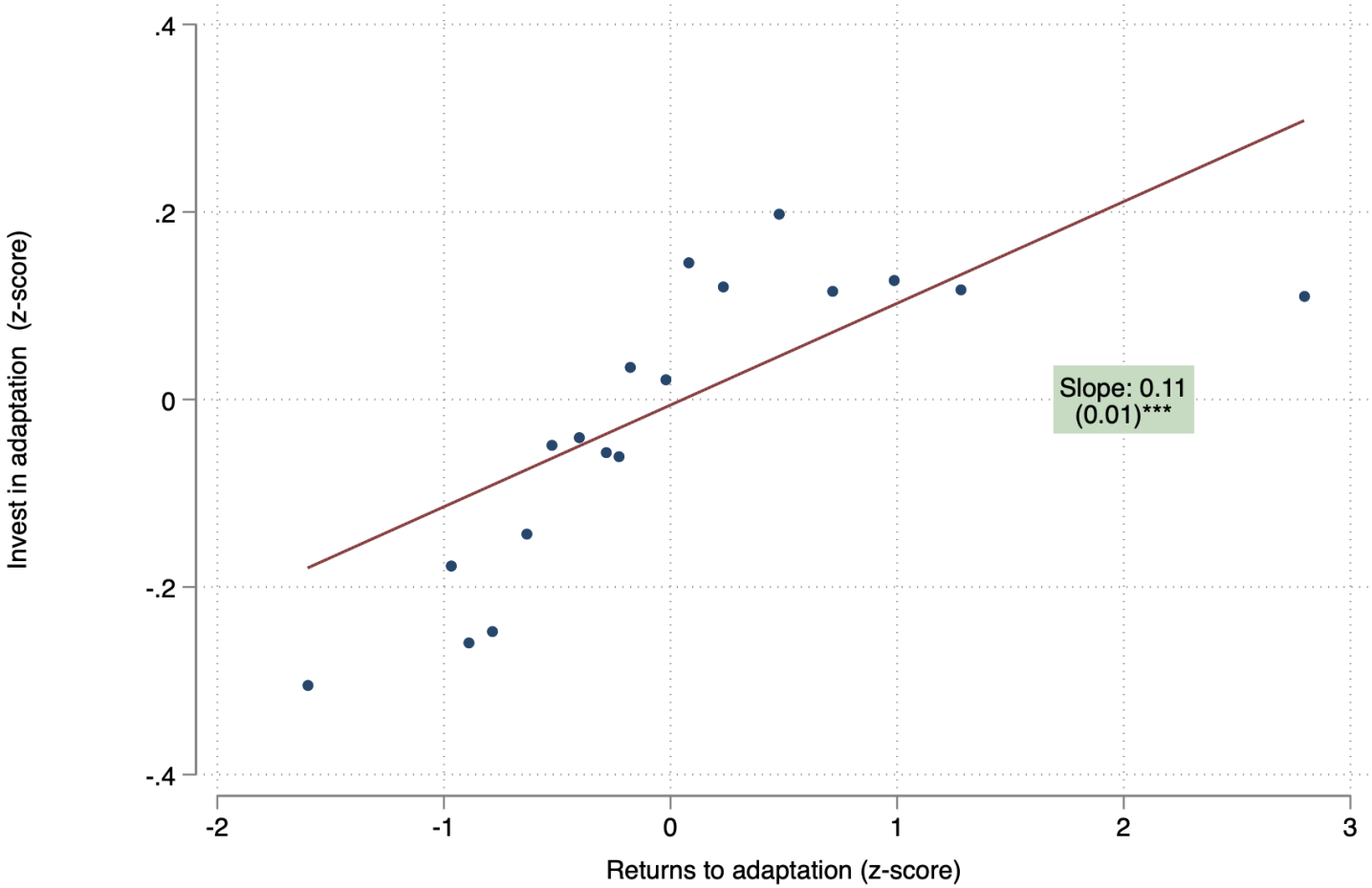
People who expect highest returns to adaptation intend to invest in adaptation



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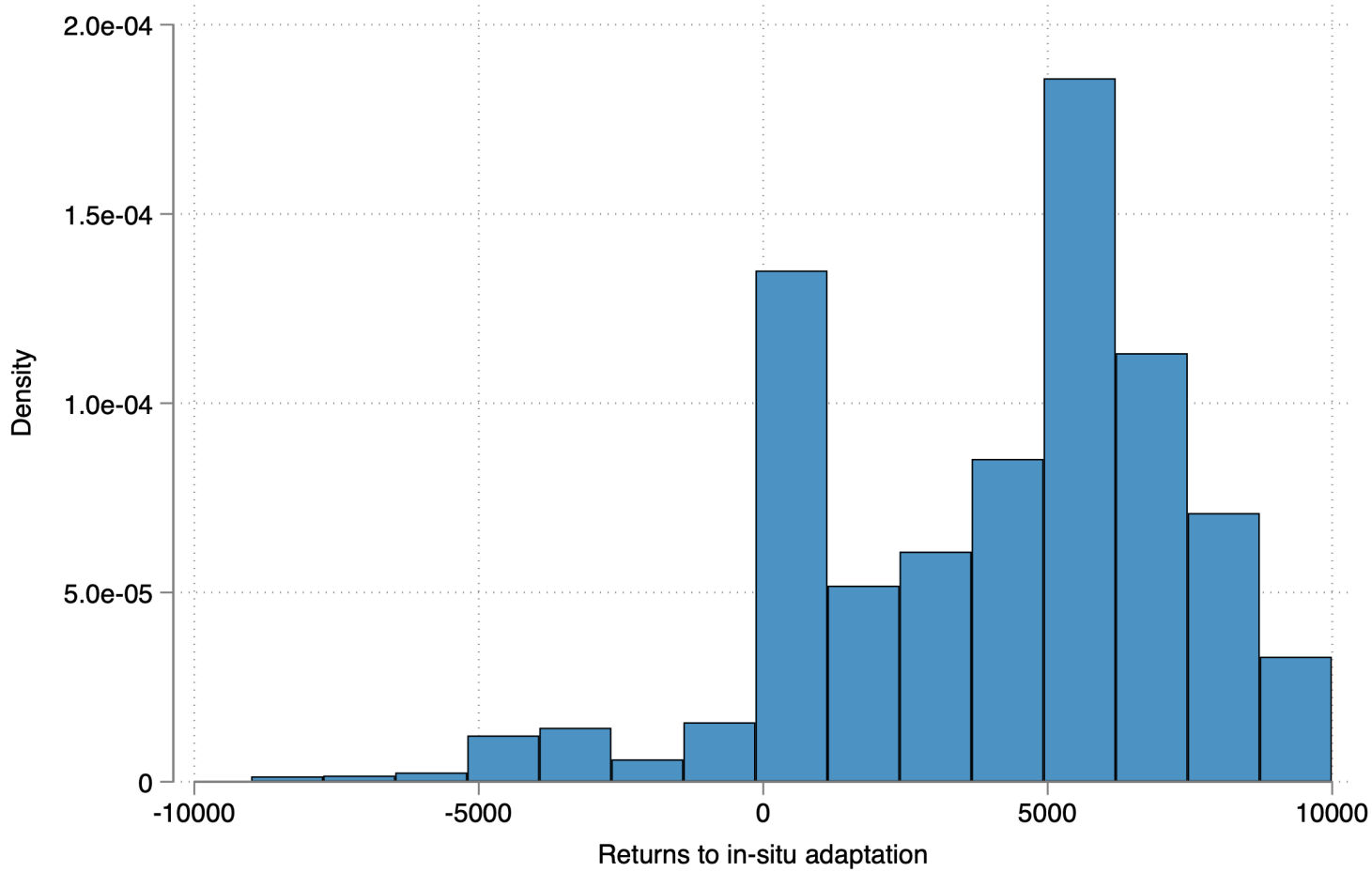
Returns to in-situ adaptation



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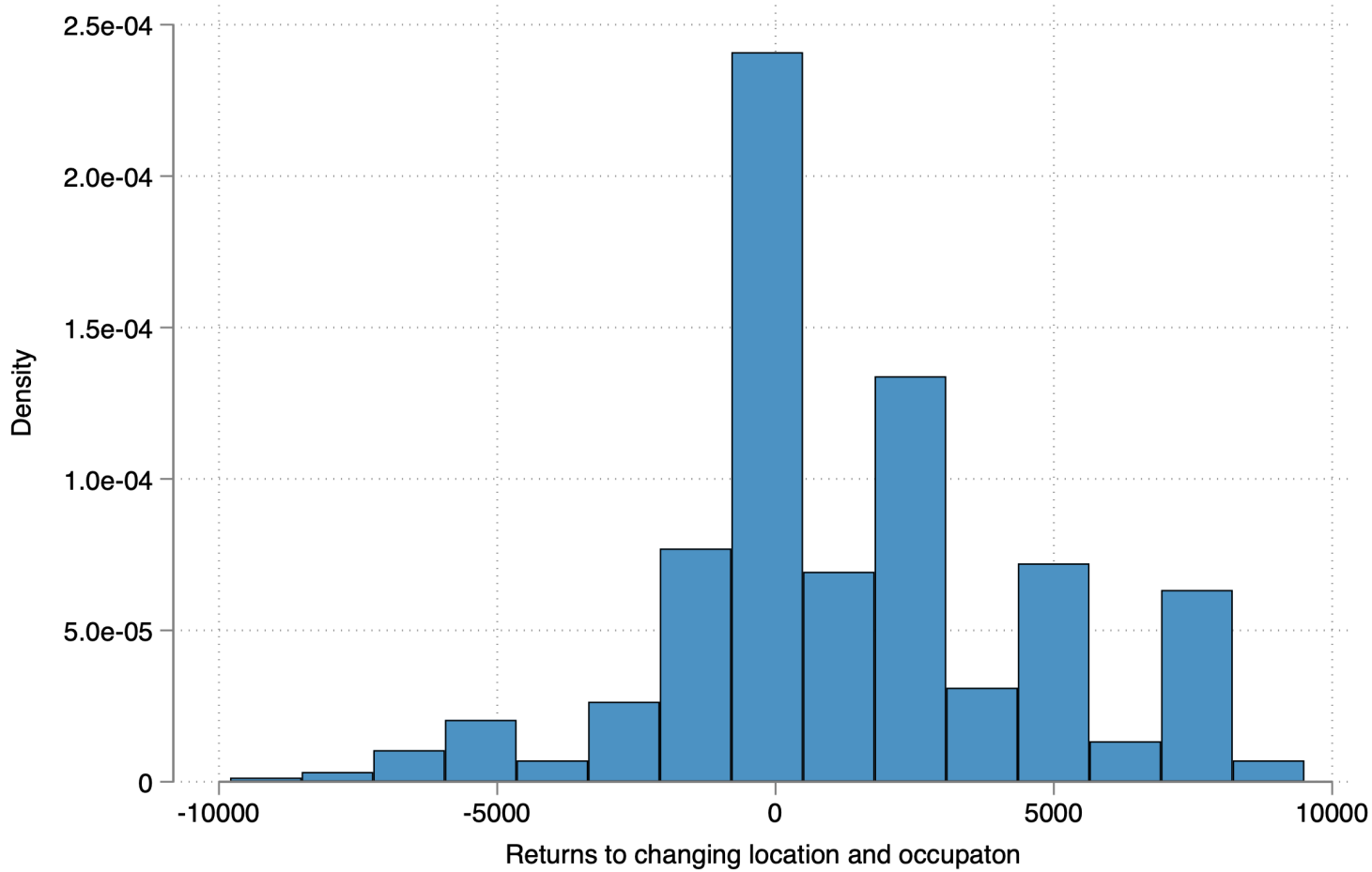
Returns to location and occupation change



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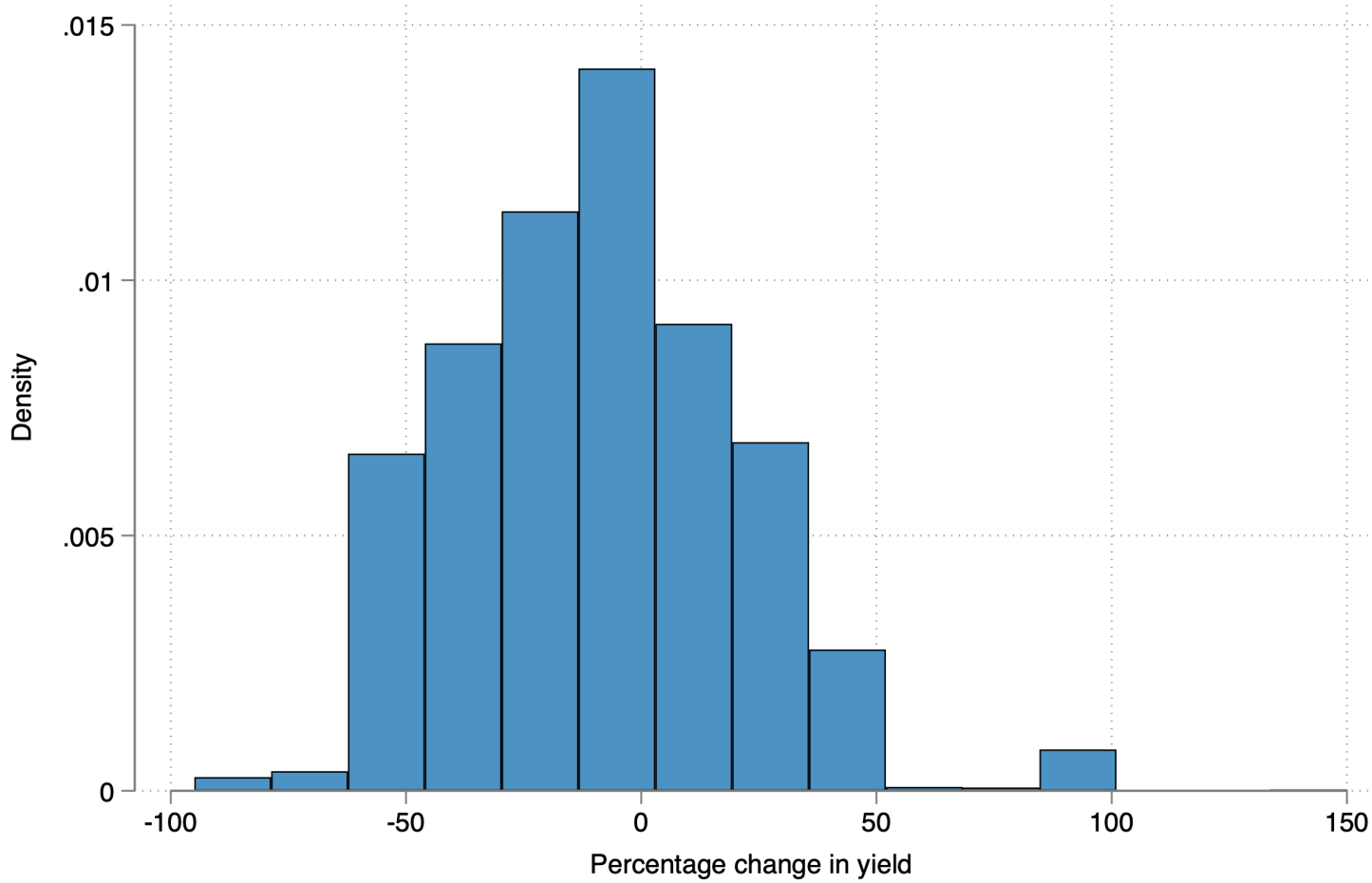
Total impacts on yields



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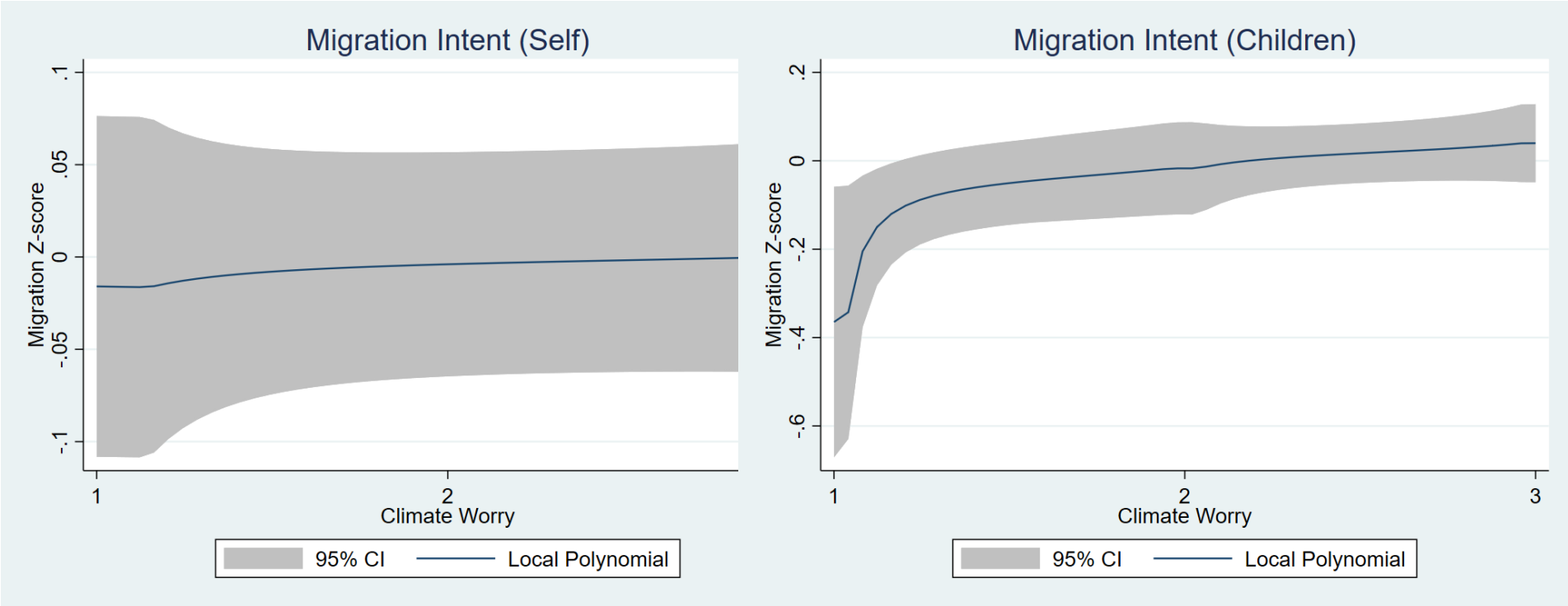
Migration intentions and climate change worry

Back



(a) Self

(b) Children

Physical + Damage

- Number of 32C days
- Likelihood of flooding
- Acres affected by sea level rise
- Groundwater salinity
- Total yield change

  degrees X damage
- Total mortality change

  days X damage
- Historical cost of 2007 flooding
- Examples of salinity damages

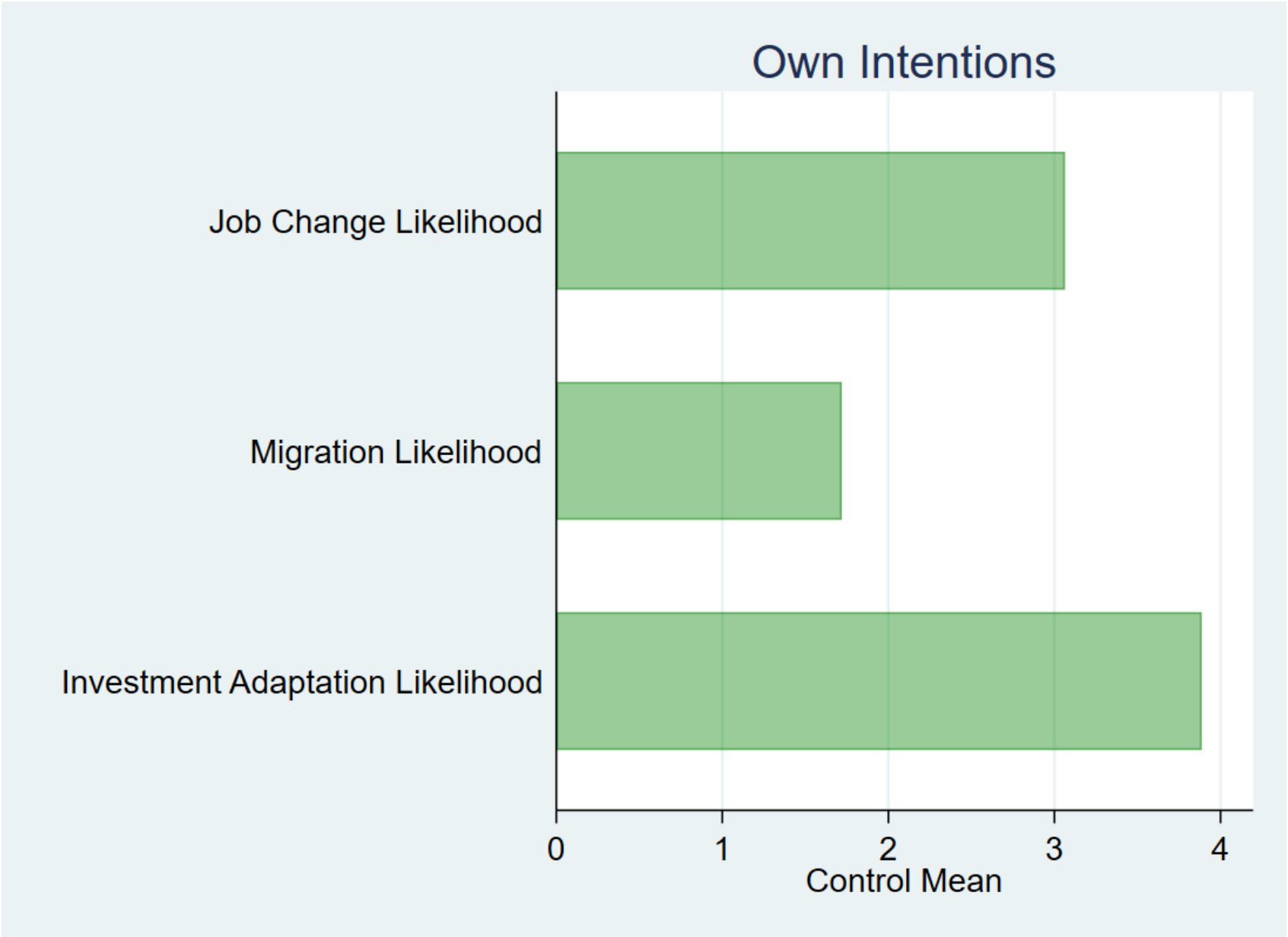
Physical Only

- Number of 32C days
- Likelihood of flooding
- Acres affected by sea level rise
- Groundwater salinity

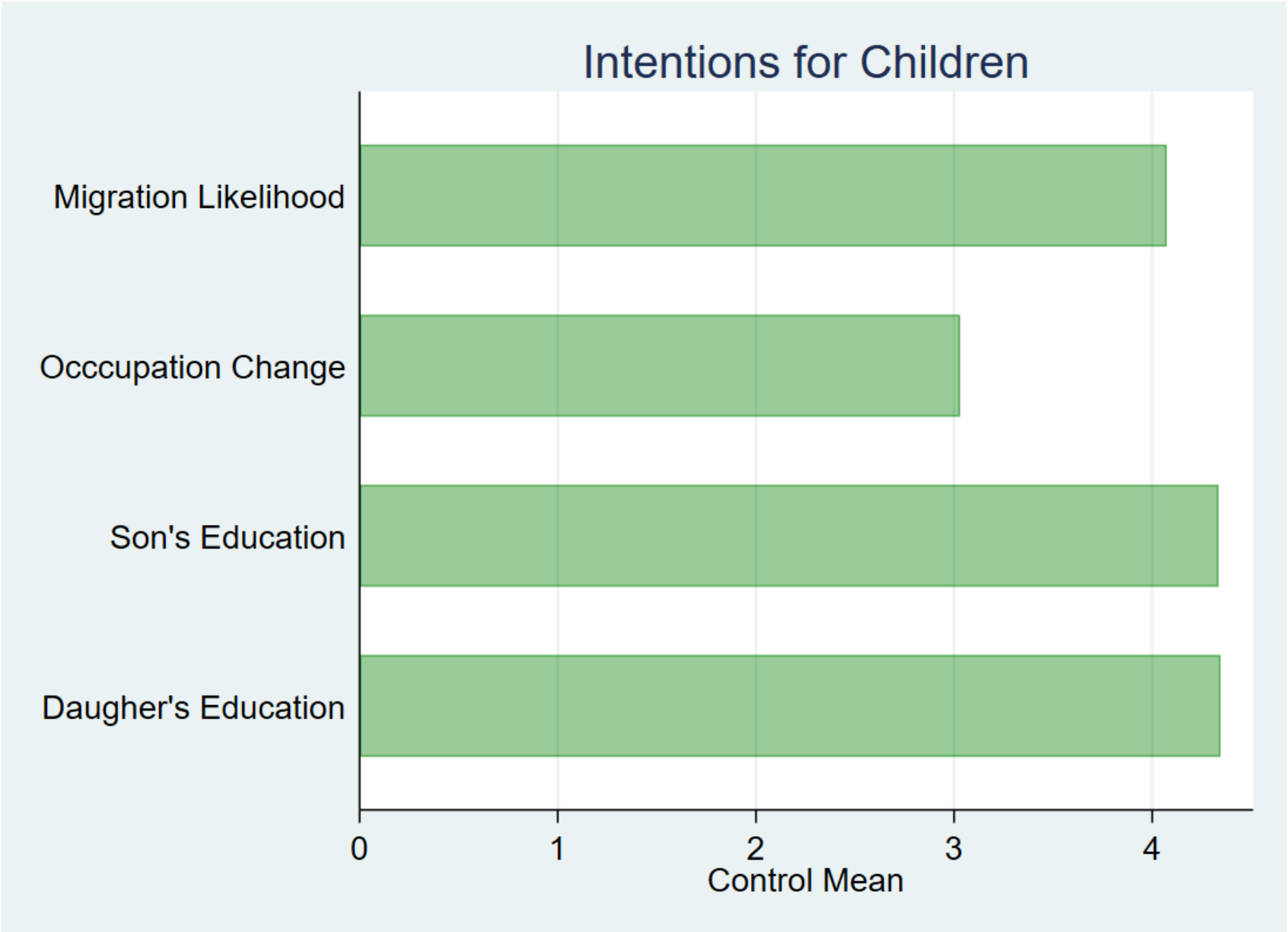
Damage Only

- Yield change per degree
- Mortality change per hot day
- Historical cost of 2007 flooding
- Examples of salinity damages

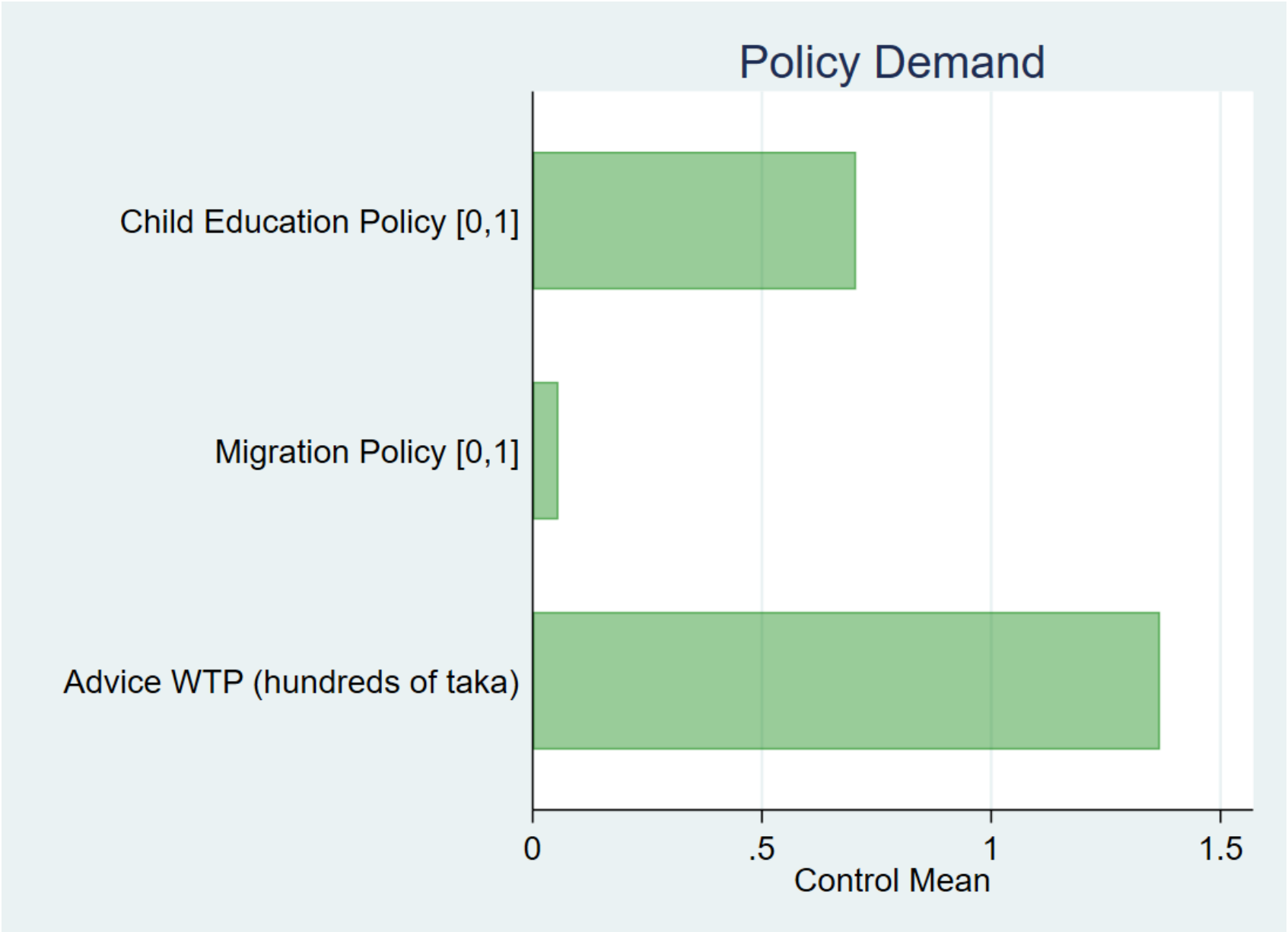
Back


Own Intentions
Job Change Likelihood
Migration Likelihood
Investment Adaptation Likelihood
0
1
2
3
4
Control Mean

Back


Intentions for Children
Migration Likelihood
Occcupation Change
Son's Education
Daugher's Education
0
1
2
3
4
Control Mean

Back


Policy Demand
Child Education Policy [0,1]
Migration Policy [0,1]
Advice WTP (hundreds of taka)
0
.5
1
1.5
Control Mean

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