Anticipatory cash transfers in climate disaster response

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Climate disasters have large long-run effects on welfare and development

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- Anticipatory action: Forecasts/triggers + pre-arranged finance + pre-agreed action plan

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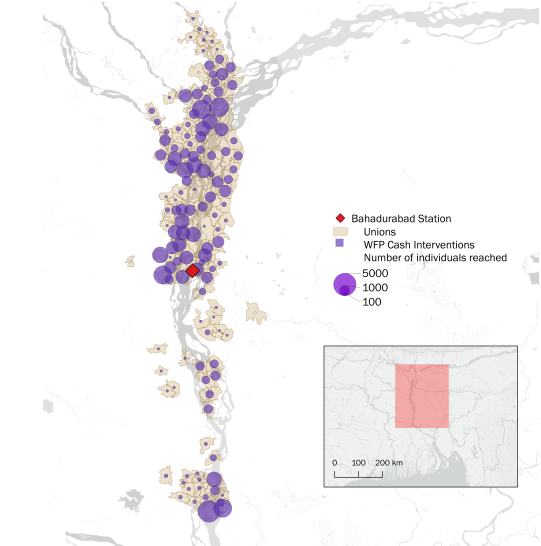
- This study: We quantify the impact of a one-off cash transfer delivered ahead of an extreme flood in Bangladesh.

In 2020, Bangladesh experienced the second highest and protracted flood in the past two decades, with 5.5 million people affected



WFP sent 4,500 Taka ($53) using mobile money to 23,000 households in 131 unions along the Jamuna River in Bangladesh prior to and during the flood.

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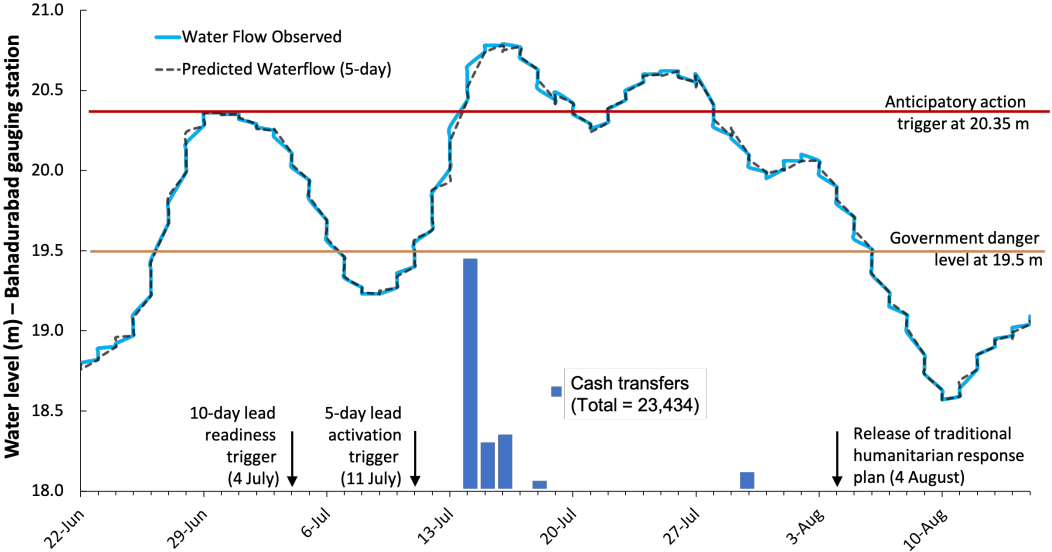
  1. An anticipatory cash transfer has an impact on welfare three months later.
  2. The cash transfer increases the set of pre-emptive actions taken by households.
  3. The speed of delivery matters: an earlier cash transfer is more effective.

2. Intervention and sample

Forecast-based triggers and five days of cash transfers



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→ Otherwise comparable households were excluded

→ Some variation in the day when households received cash within the same geographic unit

Treated and control households use technology in similar ways

	Control mean	Treatment mean	*p*-value
Individual characteristics			
Age	38.32	38.52	0.186
Female respondent	0.97	0.97	0.100
Household head	0.19	0.22	0.866
Completed primary school	0.30	0.31	0.044
Household characteristics			
Household size	4.64	4.75	0.338
Dependency ratio	0.73	0.76	0.929
Raw material house	0.26	0.27	0.011
Distance to large water body (m)	1242.05	1283.74	0.106
Protected mainland	0.45	0.33	0.548
Unprotected mainland	0.23	0.28	0.061
Char land	0.32	0.39	0.206
Technology			
Used digital wallet in last six months	0.47	0.48	0.251
Own mobile	0.83	0.80	0.617
Uses someone else's mobile	0.16	0.19	0.869
Uses mobile at least once a week	0.97	0.96	0.227
Anticipatory action			
Received WFP cash transfer	0.12	0.93	0.000
Received dignity kit from UNFPA	0.07	0.14	0.003
Received feed or storage from FAO	0.05	0.07	0.176
Observations	2235	6803	

p-value from test of equivalent means with Union fixed effects

Other data used in the analysis

Second round of phone surveys

- Conducted for a separate evaluation
- 1291 households consistent with selection of treated and control households
- Provides supplementary "cross-section" 20 weeks after the intervention

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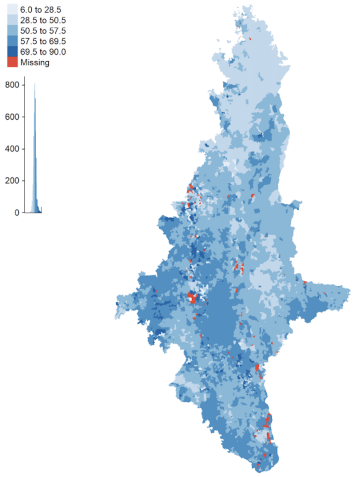
Satellite flood data

- With technical assistance from the UN Centre for Humanitarian Data and MapAction
- Validated against external data sources
- Identifies the date of local peak flooding to complement timing analysis

Variation in local flood peak date (days since 6 June, 2020)



2. Results

Empirical strategy

1. To what extent does an early cash transfer help households?

$$Y_i = \beta_0 + \beta \cdot T_i + \gamma \cdot X_i + \delta + \varepsilon_i \tag{1}$$

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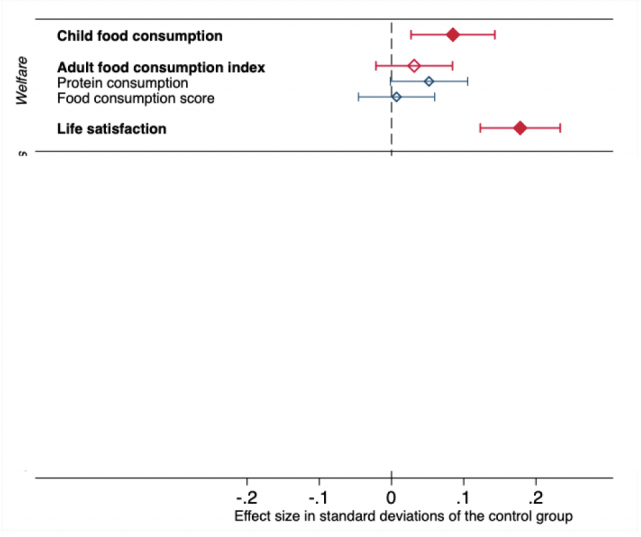
- **Union fixed effects**
- **Covariates:** Age, gender, education level, household size, dependency ratio, house structure, UNFPA/FAO recipient status, flood exposure (land type), mobile wallet use
- **Correction for multiple hypothesis testing:** Sharpened q-values (Benjamini et al. 2006)
- **Pre-analysis plan:** `https://www.socialscienceregistry.org/trials/6576`

2.1 Anticipatory cash improves welfare, even three months later



	Control mean	Treatment effect	q-value
Child food consumption	**0.80**	**+3.8%**	**0.006**
Adult food consumption index			**0.118**
Protein consumption	2.66	+4.1%	
Food consumption score	39.53	+0.3%	
Life satisfaction	**2.03**	**+18.7%**	**0.001**

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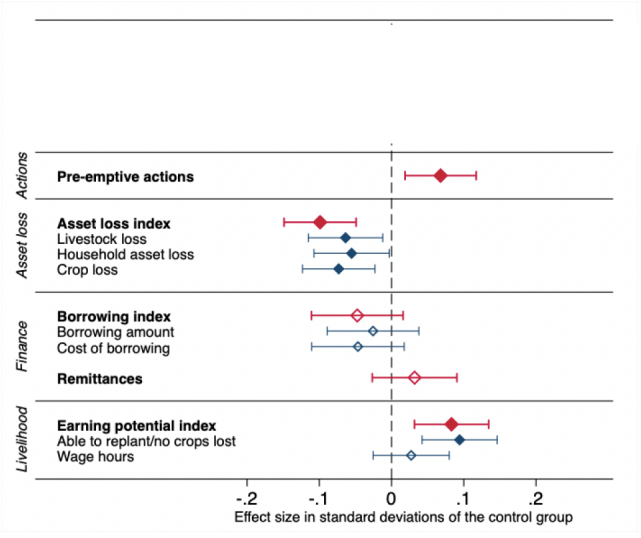

	Control mean	Treatment effect	q-value
Pre-emptive actions	**0.96**	**+8.3%**	**0.007**
Asset loss index			**0.001**
Livestock loss	0.62	-11.3%	
Household asset loss	1.31	-5.3%	
Crop loss	15.73	-12.6%	
Borrowing index			**0.077**
Borrowing amount	8596	-3.0%	
Cost of borrowing	4.63	-5.6%	
Remittances	**0.08**	**+12.5%**	**0.12**
Earning potential index			**0.004**
Able to replant/no crops lost	0.65	+7.8%	
Wage hours	9.25	+3.2%	

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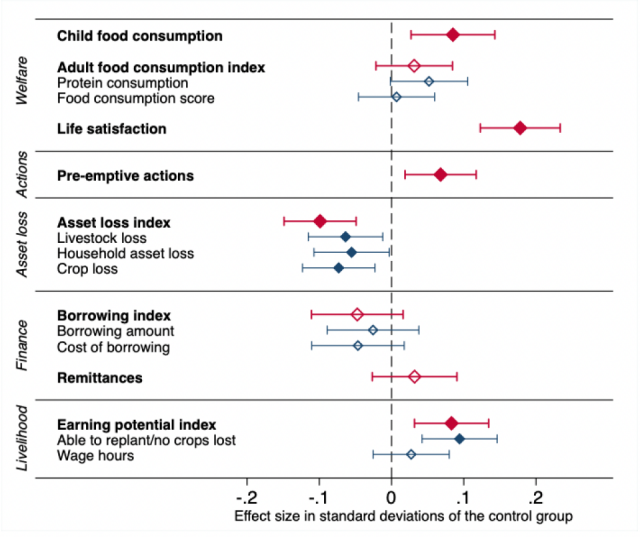

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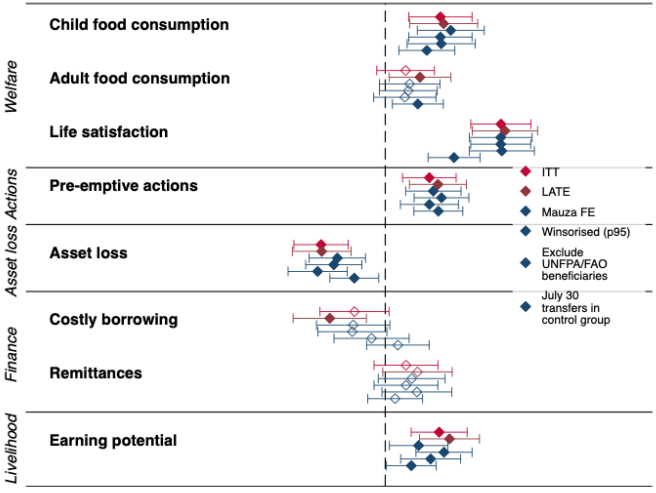
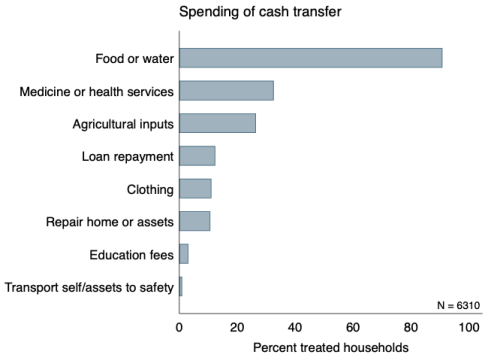
Results are robust to different model specifications

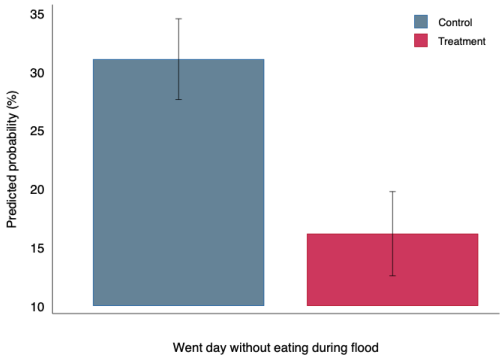


Cash was mostly spent on food and reduced food insecurity

Most households used the cash transfer to buy food or water



Treated households were less likely to go a day without eating during the flood



Cash was received at a critical juncture that increased the choice set available to households

	Pre-emptive actions				Asset loss		Borrowing	Earnings potential
	(1) Any action to prepare (0/1)	(2) Evacuated household (0/1)	(3) Evacuated livestock (0/1)	(4) Purchased food (0/1)	(5) Lost small livestock (0/1)	(6) Lost poultry (0/1)	(7) Borrowed money (0/1)	(8) Worked for wage (0/1)
ITT	0.053***	0.037***	0.041***	0.030**	-0.029**	-0.036***	0.035***	-0.028**
	(0.013)	(0.012)	(0.010)	(0.013)	(0.012)	(0.013)	(0.013)	(0.013)
Control mean	0.53	0.30	0.17	0.38	0.31	0.61	0.68	0.70
% Δ	9.9%	12.5%	24.3%	7.9%	-9.1%	-5.9%	5.1%	-4.1%
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Union FE	✓	✓	✓	✓	✓	✓	✓	✓
N	9030	9030	9030	9030	9035	9033	9033	9029
R^2	0.10	0.10	0.07	0.13	0.07	0.17	0.07	0.06

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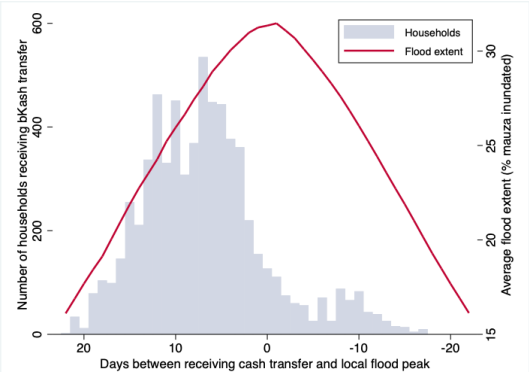
Does the speed of delivering anticipatory cash matter?

- We compare the date of cash transfers to the timing of the local flood peak using satellite data
- On average, households received cash 7 days before the local flood peak
- However, dangerous flood levels persisted for several weeks

Timing of transfer relative to local flood peak

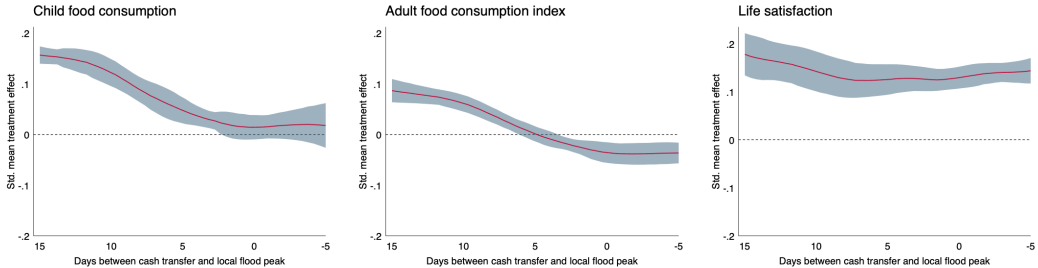


How do small changes in timing matter?

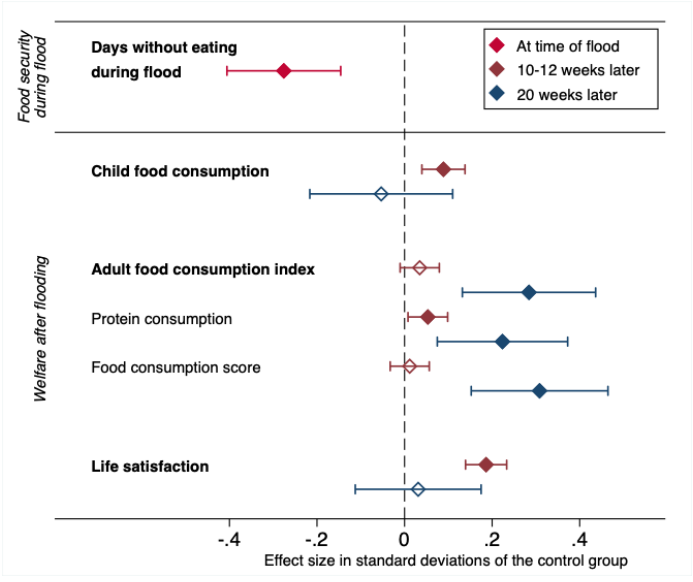
	(1) Child food consumption	(2) Adult food consumption index	(3) Life satis-faction	(4) Pre-emptive actions	(5) Asset loss index	(6) Borrowing index	(7) Remit-tances	(8) Earning potential index
ITT	0.084**	0.005	0.183***	0.081***	-0.117***	-0.086**	0.040	0.096***
	(0.033)	(0.030)	(0.032)	(0.028)	(0.028)	(0.036)	(0.034)	(0.029)
Transfer × days	0.002	0.005**	-0.001	0.002	0.003	0.006**	-0.001	-0.003
before flood peak (ITT)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)
p-value: Transfer × days	0.492	0.033	0.667	0.304	0.192	0.010	0.579	0.126
q-value: Transfer × days	0.623	0.130	0.623	0.508	0.405	0.091	0.623	0.338
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Union fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
N	7416	8797	8786	8793	8796	5941	8796	8790
R^2	0.04	0.09	0.10	0.10	0.13	0.09	0.04	0.11

✓Results are robust to controlling for transfer date

Timing matters, irrespective of functional form



Welfare effects five months later



Conclusion

- Using a natural experiment, we present evidence on the impact of a one-off humanitarian cash transfer in anticipation of an extreme flood.
- A small anticipatory cash transfer improves welfare, even three months later.
  - Children in treated households were 3 percentage points more likely to consume three meals or more a day
- An anticipatory cash transfer enabled households to take more action ahead of the flood.
- Speed of delivery matters.

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4. How large should the cash transfer be?

5. How can we target households more effectively in advance of extreme weather events?