

Heterogeneous effects of a conditional cash transfer programme on mental health

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A study from Malawi

*Julius Ohrnberger, Eleonora Fichera,
Matthew Sutton, Laura Anselmi*

Overview

Idea

Identify the **heterogeneous effects** of a conditional cash transfer-mental on mental health, heterogeneity by severity in mental health

Focus

Poor adult population (15 years and older) from rural Malawi

Estimation

Intention to Treat (ITT), Interactions, Quantile Treatment Effects (QTE)

Data

Malawi Incentive Project (MIP), Malawi Longitudinal Study of Family and Health (MLSFH); 2 waves (2006-2008)

Main Findings

The effect of the **ITT** on mental health is **1.1 (1/4 SD)**

QTE are strongest for the lowest quantile with size **4.3 (1 SD)**

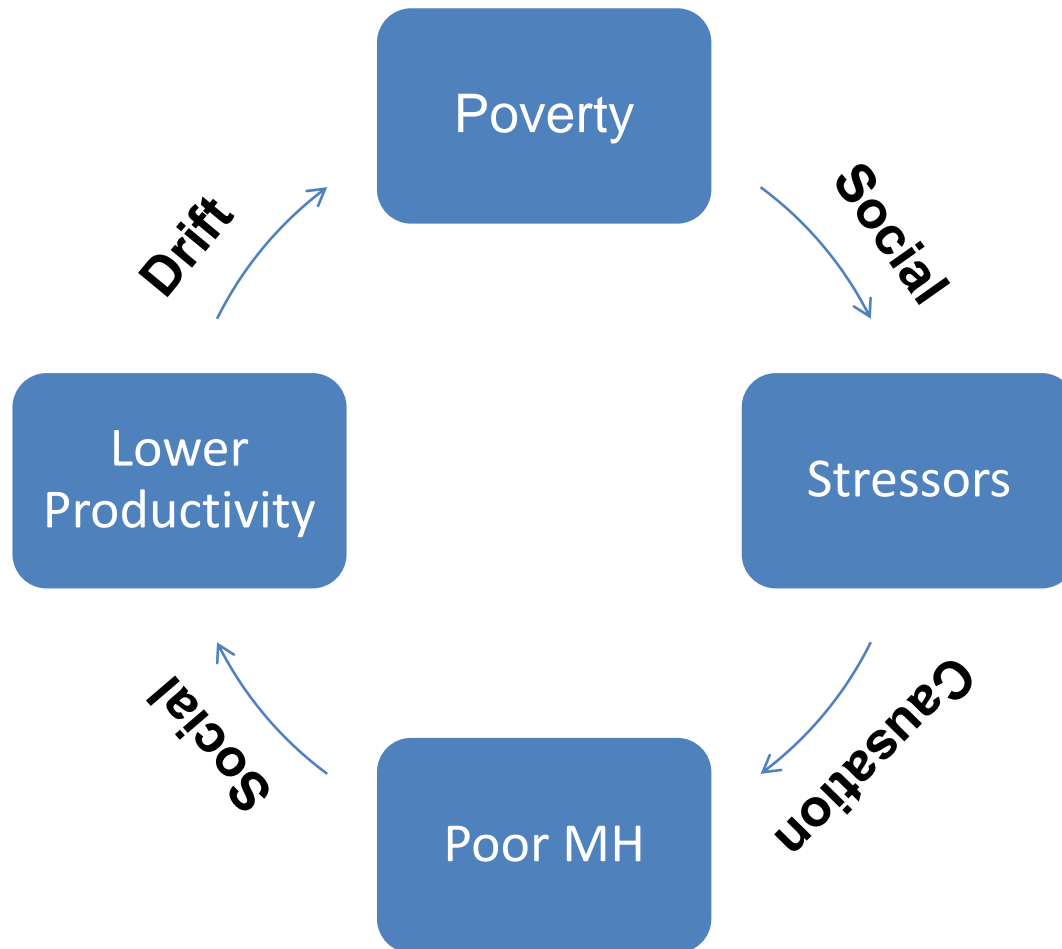
Outline

1. Background mental health and poverty
2. Data and cash transfer
3. Methods:
 - Heterogeneity by baseline
 - Heterogeneity post-intervention
4. Results and robustness
5. Conclusion

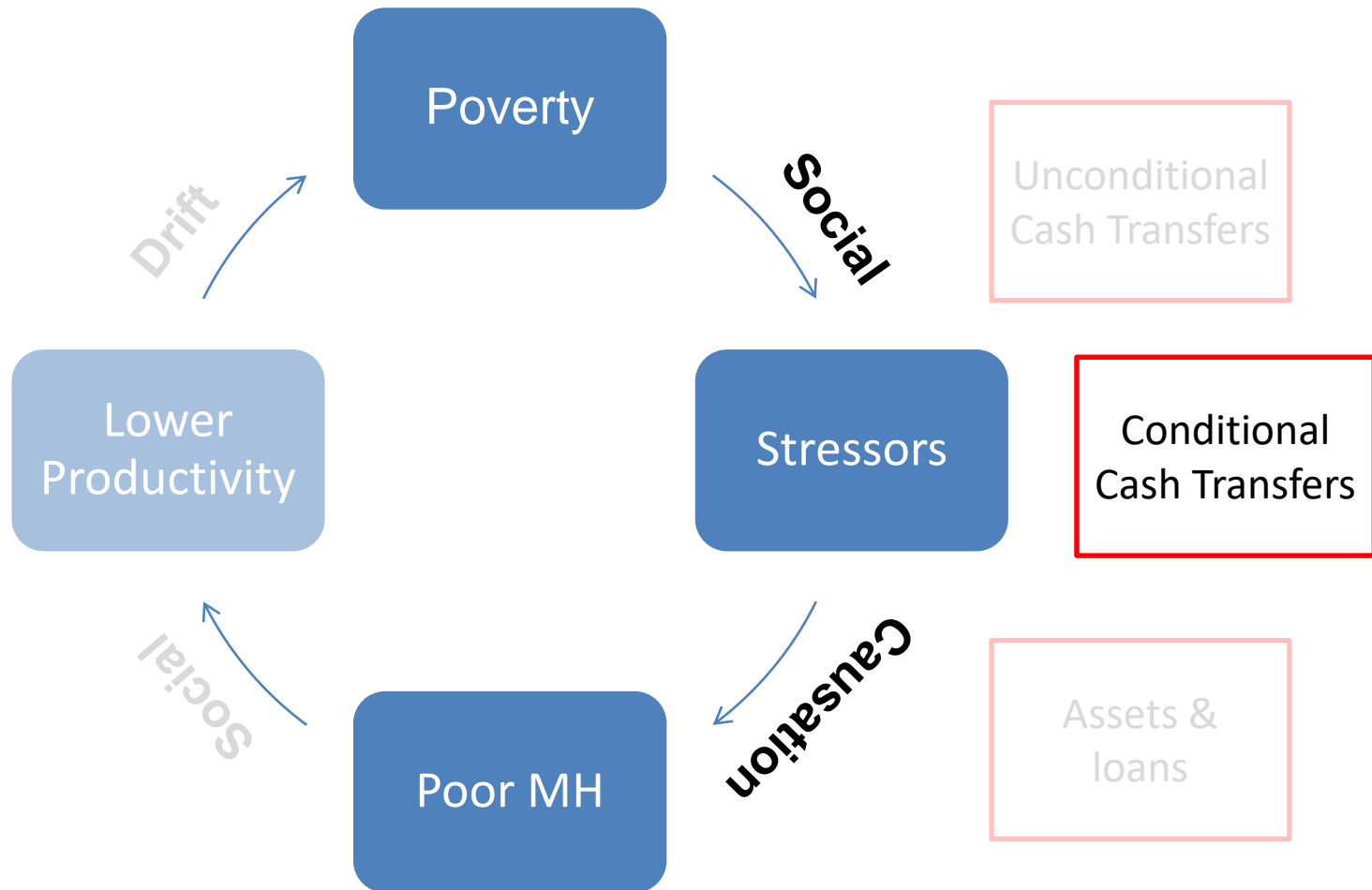
Mental Health matters

- **7.4% of global burden of disease** due to mental health problems (*Whiteford et al., 2013*)
- 80% of world population live in LMICs but **>90% mental health resources** located in high income countries (*WHO, 2005*)
- **85%** of people suffering from depression live in LMICs (*Funk et al., 2012*)
- **26.5million healthy years lost** (DALYs) due to unipolar depression in LMICs, **32.8million Malaria** (*WHO, 2008*)

Background: Poverty and MH



Background: Poverty and MH



CCTs and Mental Health

Fernald and Gunnar (2009)

- *Prospera*, matched control communities, **2-6 year old**; stress (salivary cortisol level) is reduced among 2-6 year old with depressed mothers

Ozer et al. (2009)

- *Prospera*, nearest neighbour matching, **5-6 year old**; treated with **reduced odds for anxiety and depression** (Behavioural Problem Index)

Ozer et al. (2011)

- *Prospera*, matched control communities, **maternal mental health**; treated with **26% reduced odds for depression** (CES-D 20)

Baird et al. (2013)

- *Zomba cash transfer*, RCT, **School girls in rural Malawi**, cash when \geq 80% at school; **17% improvement in mental health** (GHQ-12)

Contribution

- 1. Identify general population wide effects of a CCT on MH**
- 2. Identify heterogeneous effects by severity**
 - 1. At baseline**
 - 2. Post treatment**
- 3. Identify the usage of the cash transfer and related changes in MH**
- 4. Test the assumptions of our QTE estimator (rank preservation or similarity)**

Why Malawi?

High (mental) health risk environment:

- Landlocked country with high rural poverty rate of 85% (*Worldbank*)
- Exposure to catastrophic shocks: droughts, food shortages (*FAO, 2006*)
- One of the lowest life expectancy at birth, 59 years (*WHO, 2015*)
- High HIV prevalence of 10% among adults (*UNAIDS, 2014*)
- **43% of people with HIV** assumed to have mental disorders (*Freeman at al. 2007*)

Conditional cash transfer programme with RCT design



Malawi Incentive Project

Conditional Cash transfer programme 2007/2008

- **Condition: Keep HIV status for at least one year**
 - Joint as a couple or as an individual
 - HIV tests before and after the intervention
- **Half of the MLSFH 4 (2006) sample randomized in the CCT (1,403)**
 - As individuals (90%) or as couples (10%)
 - HIV positive included to avoid stigmatisation
- **1,308 enrolled and randomized into 3 groups:**
 - Untreated
 - Treated with lower transfer (MKW500, MKW1,000)
 - Treated higher transfer (MKW2,000, MKW4,000)
 - Attrition: 142 drop-outs (10%)

Data & Sample

Malawi Longitudinal Study of Family and Health (MLSFH)

- Panel survey data with seven waves (1998 - 2012)
- Balaka (South), Rumphu (North), Mchinji (Central)
- Cluster randomized within village level (150 villages)

Sample size:

- Individuals randomized in the MIP
- MLSFH 4 (2006) and MLSFH 5 (2008)
- Total sample size for the ITT and QTE: **790**
- **751** for the ATET



Mental Health measure

Outcome variable: *Short Form 12-item survey instrument for MH*

Baseline: Avg. D=1: 50.227 vs. D=0: 49.614; t: 0.806

- General mental health measure
- 6 PH, 5 PH and 1 question combining MH and PH

How much of the time during the past 4 weeks have you felt downhearted and depressed?

During the past 4 weeks, how much of the time have you been limited in the kind of work or other regular daily activities, as a result of your physical health?

- PFA to derive mental health weights, 2 vector solution
- Scale: 0-100, with **0 worst and 100 best mental health**, mean 50 and SD 10.

Estimation I

Average effect: Intention to Treat (ITT)

$$(1) \Delta y_i = \beta_0 + \beta_1 D_i + \beta_2 y_{i,t=0} + \mathbf{X}_{i,t=0} \beta_3 + \epsilon_i$$

- Δy_i : Change in SF12 MH (after – before)
- D_i : Treatment dummy variable
- $y_{i,t=0}$: Baseline SF 12 MH
- $\mathbf{X}_{t=0}$: Baseline covariates

Estimation II

Changes driven by individual conditions at baseline?

$$(2)\Delta y_i = \gamma_0 + Q_i(y_{i,t=0})\gamma_n + Q_i(y_{i,t=0}) * D_i\gamma_m + X_{i,t=0}\gamma_8 + \mu_i$$

- Δy_i : Change in SF12 MH (after – before)
- $Q_i(y_{i,t=0})$: 5 baseline quantiles (0.1, 0.25, 0.5, 0.75, 0.9) of SF12 MH
- $Q_i(y_{i,t=0}) * D_i$: 5 baseline SF12 MH interacted with treatment
- $X_{t=0}$: Baseline covariates

Estimation III

Continuous linear effects along baseline mental health?

$$(3)\Delta y_i = \delta_0 + \delta_1 D_i + \delta_2 y_{i,t=0} + \delta_3 (D_i * y_{i,t=0}) + X_{i,t=0} \delta_3 + \rho_i$$

- Δy_i : Change in SF12 MH (after – before)
- $y_{i,t=0}$: Baseline SF 12 MH
- $(D_i * y_{i,t=0})$: Interaction of SF MH baseline with treatment
- $X_{t=0}$: Baseline covariates

Estimation IV

Quantile Treatment Effect: Post-Intervention MH

$$(4)\Delta^\tau (y_{i,t=1}) = Q_{y^1}^\tau - Q_{y^0}^\tau | X_{i,t=0}, y_{i,t=0}$$

- $\Delta^\tau (y_{i,t=1})$: Quantile treatment effect at quantile $\tau \in (0.1, 0.25, 0.5, 0.75, 0.9)$
- $y_{i,t=0}$: Baseline SF12 MH
- $X_{t=0}$: Baseline covariates

- We use the sample of treated with QTE to identify cash usage.

Requires:

- **Rank invariance** or weaker **rank similarity** assumption

Estimation 1-3, ITT

	(1) Δ MH	(2) MH baseline interaction	(3) MH baseline q(.) interaction
Treated	1.124* (0.640)	-7.955* (4.339)	
MH baseline quantile q(0.25)			-15.886*** (2.999)
MH baseline quantile q(0.5)			-21.144*** (2.315)
MH baseline quantile q(0.75)			-23.993*** (2.541)
MH baseline quantile q(0.9)			-23.442*** (2.479)
Interacted treated with MH baseline q(0.1)			-4.821** (2.201)
Interacted treated with MH baseline q(0.25)			0.470 (1.842)
Interacted treated with MH baseline q(0.5)			2.380** (1.150)
Interacted treated with MH baseline q(0.75)			3.347** (1.574)
Interacted treated with MH baseline q(0.9)			1.136 (1.554)
Interacted treated with MH baseline		0.182** (0.083)	
MH baseline	-0.784*** (0.049)	-0.897*** (0.072)	
Covariates	Yes	Yes	Yes

Estimation IV, QTE

	(1) Q(0.1) MH	(2) Q(0.25) MH	(3) Q(0.50) MH	(4) Q(0.75) MH	(5) Q(0.9) MH	(6) ITT
Treated	4.599** (1.793)	1.900 (1.200)	0.458 (0.852)	0.116 (0.512)	0.021 (0.296)	1.124* (0.640)
MH baseline	0.334*** (0.117)	0.261*** (0.078)	0.276*** (0.060)	0.155*** (0.033)	0.040 (0.034)	0.216*** (0.049)
Constant	12.347 (9.980)	35.025*** (7.213)	43.526*** (4.402)	53.298*** (2.657)	59.915*** (2.289)	42.259*** (3.812)
Covariates	Yes	Yes	Yes	Yes	Yes	Yes

Usage of Money, QTE, D=1

	(1)	(2)	(3)	(4)	(5)	(6)
	Q(0.1)	Q(0.25)	Q(0.5)	Q(0.75)	Q(0.9)	ATET
	MH	MH	MH	MH	MH	Δ MH
Cash for productivity	8.012*** (2.808)	6.035** (2.446)	3.226* (1.643)	1.115 (1.068)	0.876 (1.141)	3.394** (1.318)
Cash for consumption	7.662*** (2.872)	6.771*** (2.577)	2.604 (1.936)	0.614 (1.193)	0.809 (1.138)	3.119** (1.256)
Cash for education	4.247 (4.273)	-1.735 (3.899)	-1.737 (3.191)	-1.049 (2.569)	0.270 (2.236)	-0.398 (1.609)
Cash for transport	5.553 (3.605)	2.180 (3.047)	0.518 (2.165)	-0.171 (1.400)	0.493 (1.083)	0.539 (1.528)
Cash for health	1.278 (5.457)	-4.838 (4.814)	-0.884 (5.074)	-2.498 (2.968)	-1.953 (1.810)	-3.359 (2.833)
Cash for other	-0.527 (3.280)	0.489 (2.196)	0.758 (1.433)	0.523 (1.028)	0.258 (0.739)	-0.075 (1.260)
MH baseline	0.492*** (0.113)	0.292*** (0.091)	0.340*** (0.078)	0.136*** (0.052)	0.076* (0.046)	-0.717*** (0.056)
Constant	6.736 (11.553)	27.226*** (8.824)	37.694*** (6.022)	50.420*** (4.196)	55.621*** (3.599)	34.184*** (4.870)
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robustness

Controlling for pathways: social interaction, productivity

- Treatment effects are robust and keep strong magnitude, **no significant pathway** effects on lower quantiles

Rank similarity assumption

- Following Frandsen and Lefgren (2017) we **test the rank similarity assumption**
- Statistical analysis identifies **no rank disadvantage** for treated and untreated → H_0 of rank similarity not rejected
- **Rank similarity holds**

Summary

1. Identify general population wide effects of a CCT on MH

→ We identify an **improvement of 1.1** units in SF12 MH

2. Identify heterogeneous effects by severity

→ QTE of the outcome distribution: **strongest for lowest quantile** 4.3 units in SF12 MH, fades out for $>q.25$

3. Identify the usage of the cash transfer and related changes in MH

→ Improvements in lowest quantiles of SF12 MH associated with **productivity** and **consumption**

Conclusion

- Cash transfers provide **capabilities** to **invest directly** or **indirectly** in better **mental health**
- Individuals with **strongest needs** (worst mental health), **benefit the most** from the transfer for higher marginal returns of health investments

Kiitos!
Thank you!