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The Role of Direct Capital Cash Transfers Towards Poverty and Extreme Poverty Alleviation - An Omega Risk Process

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Introduction

Figure 1: Impact of shocks on households' income and assets. Adapted from McCord (2005).

Introduction

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Cash Transfer (CT) programmes are one of the main social protection strategies to reduce poverty .

In their simplest form, these programmes transfer cash, whether in small, regular amounts, or as lump sums, to people living below the poverty line and are generally funded by governments, international organisations, donors or nongovernmental organisations (NGOs) (Garcia and Moore 2012).

Introduction

Adopting a ruin-theoretic approach, we study the impact of regular CTs on poverty dynamics and, particularly, their e ectiveness in reducing the likelihood of a household living in poverty and extreme poverty .

Despite the growing interest in studying the impact of CTs on poverty dynamics over the years, most studies have adopted an empirical approach.

We attempt to attach a mathematically based theoretical framework to the vast empirical literature.

Introduction

To do so, we extend the model proposed by Kovacevic and P ug (2011).

Here, a household quali es to be a bene ciary of the CT programme when its accumulated capital X_t up to time t is below some capital barrier level B.

Unlike the original capital process (K1hwoo344 0 Tsv(0 gro)-iyT

The Capital Model

An individual household's income I_t at time t comprises consumption C_t and savings S_t. Thus, income dynamics are given by,

$$I_t = C_t + S_t.$$

Consumption is modeled as an increasing function of income,

$$C_t = \begin{cases} I_t & \text{if } I_t \leq I^\star, \\ I^\star + a\,(I_t - I^\star) & \text{if } I_t > I^\star, \end{cases}$$

where $I^\star$ represents a critical income level and $0 < a < 1$.

The Capital Model

X_t will denote the accumulated capital up to time t. The capital grows as follows

$$\frac{dX_t}{dt} = c_S S_t ;$$

with $0 \le c_S \le 1$.

On the other hand, income is generated through capital

$$I_t = bX_t ;$$

where $0 \le b$ holds.

Figure 2: Consumption and savings level.

The Capital Model

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Bringing together the previous equations and de ning $x^{\ddagger} \quad I^{\ddagger} \sim b A 0$, as a critical capital level, leads us to the dynamical system for the capital

$$\frac{dX_t}{dt} \quad r \quad X_t \quad x^{\ddagger} \quad ;$$

where$r \quad \hat{}1 \quad a\bullet \quad b \quad c$

Figure 3: $\frac{dX_t}{dt} \quad r \quad X_t \quad x^{\ddagger} \quad .$

The Capital Model

We now assume that households are susceptible to su er heavy capital losses.

Occurrence of these events will follow a Poisson process with intensity .

The fraction of the capital not destroyed at the ith event is described by a random variable $0 B Z_i B 1$, which is independent of the Poisson process and i.i.d. with common distribution function G_Z.

Figure 4: Stochastic process subject to random losses.

An Alternative Capital Model

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An individual household quali es to be a bene ciary of the CT programme when its accumulated capital X_t

An Alternative Capital Model

(a) c_T $0{:}5$ (b) c_T 1 (c) c_T 2

(c)

When and How Households Become Poor?

The Trapping Time

m ˆx• E wˆX x x‡ ;SX x x‡ Se x1~ x@ •

Figure 6: The capital surplus immediately before the trapping time and the capital deficit at the trapping time.

Figure 7: Trapping probability ˆx• when Z_i Betaˆ1:25; 1•, a 0:1, b 3, c_S 0:4, B 2, 1 and $x^‡$ 1 for c_T 0:1; 1; 10; 100.

Figure 8: Trapping probability ˆx• when Z_i Betaˆ ; 1•, a 0:1, b 3, c_S 0:4, c_T 1, B 2, 1 and $x^‡$ 1 for 1:25; 1:45; 1:75; 2:25.

- We de ne the random variable !x for x >ˆ0; ª • as the time of extreme poverty i.e. the moment at which a household with initial capital x becomes extremely poor and ! ˆx• P ˆ !x @ª • as the probability of extreme poverty .
- The probability of extreme poverty is quanti ed by an extreme poverty rate function ! ˆx•, where x represents the value of capital below the critical capital x‡.
- The extreme poverty rate function is de ned in such a way in which the probability of extreme poverty increases when the capital de cit SXs x‡ S grows.
- Namely, for some capital Xs @ x‡ and no prior extreme poverty event, the probability of extreme poverty on the time interval s; s dt• is given by ! ˆXs• dt.

Examples of Extreme Poverty Rate Functions

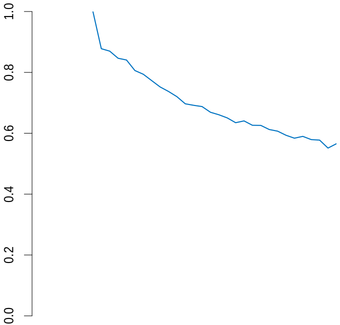

Figure 10: Probability of extreme poverty ! ^x• when Z_i Beta ^1:25; 1•, a 0:1, b 3, c_S 0:4, c_T 1, B 2, 1, $x^‡$ 1 for constant extreme poverty rate function ! c 0:1; 0:5; 1:5; 100.

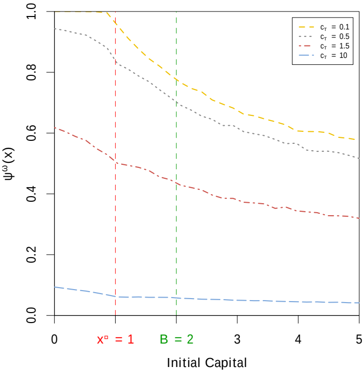

Figure 11: Probability of extreme poverty ! ^x• with constant extreme poverty rate function ! c 0:5 when Z_i Beta ^1:25; 1•, a 0:1, b 3, c_S 0:4, B 2, 1, $x^‡$ 1 for c_T 0:1; 0:5; 1:5; 10.

2. Exponential extreme poverty rate functions.

Let now ! $_2$ ˆx• $\frac{}{x}$ 1~ x@x‡., for some A0. In this case, the extreme poverty rates take fairly flat values for lower deficit levels and reach higher values when the capital level gets close to zero.

Figure 12: Exponential extreme poverty rate function ! $_2$ ˆx• $\frac{}{x}$ for 1; 5; 10; 15; 20.

Figure 13: Probability of extreme poverty ! ˆx• when Z_i Betaˆ1:25; 1•, a 0:1, b 3, c_S 0:4, c_T 1, B 2, 1, x‡ 1, ! $_2$ˆx• $\overline{x}$ for 0:1; 0:2; 0:5.

Figure 14: Probability of extreme poverty ! ˆx• when Z_i Betaˆ1:25; 1•, a 0:1, b 3, c_S 0:4, B 2, ! $_2$ˆx• $\frac{0:1}{x}$, 1, x‡ 1 for c_T 0:1; 0:5; 1:5; 10.

Conclusion and Future Research

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- This article extends the model first introduced in Kovacevic and Pflug (2011) by allowing households to have the possibility of escaping from the area of poverty due to CTs provided by donors or organisations.
- We generalise the trapping concept to the extreme poverty one by defining an extreme poverty rate as a function of the poverty gap, which designates a higher probability of becoming extremely poor to those households with greater deficit.
- Furthermore, for certain types of extreme poverty rate functions, we

References I

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References II

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