Economic Inequality and Informal Insurance among Rural Households: The Role of Household Transfer Networks

Mutita Ariyavutikul (Benz)[1] Minchung Hsu[2] Trang Le[3]

[1]Puey Ungphakorn Institute for Economic Research (PIER), Bank of Thailand, Bangkok
[2]National Graduate Institute for Policy Studies (GRIPS), Tokyo
[3]University of New South Wales (UNSW), Sydney

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Motivation

- Risk sharing in rural developing economies where
  - informal employment dominates (typically above 80%)
  - households face high income uncertainty
  - financial markets are thin
  - public safety nets are weak
- Households have very limited public insurance and have to rely on informal channels for risk sharing
- How much can households insure against income shocks in such environments?

Motivation (cont'd)

- Several studies (e.g., Townsend 1994, 1995, 2012; Rosenzweig 1988; De Magalhães and Santaeulàlia-Llopis, 2018) showed substantial consumption smoothing in rural villages through informal arrangements
- However, the precise role of family/community transfer networks among rural households, as an informal insurance mechanism, remains less well understood.

Research Questions

- Do the household transfer networks work as an insurance mechanism, and how?
  - Under which circumstances do households **receive** transfers from others?
  - Under which circumstances do households **give** (help) others?
  - An insurance against income shocks?
- How does this informal family transfer network provide insurance against income fluctuations over the life cycle?

Setting and Data: Rural Thailand

- Full project: rural Thailand, Indonesia, and Vietnam.
- Today: focus on **Thailand**
- Data: Thai Household Socio-Economic Survey (SES)
- Rural male-headed households, head age 21–75.
- Transfer network analysis:
  - 2013–2019 waves (when household net worth is observed),
  - detailed private transfer inflows/outflows and public transfers.

Descriptive Statistics: SES Rural Households

Age of head (distribution)	
21–30	6%
31–40	21%
41–50	30%
51–60	27%
61–75	16%
Education of head (distribution)	
Below high school	83%
High school graduates	7%
College and above	10%
Employment of head (distribution)	
Formal	18%
Informal	82%
Annual earnings[*1] **(THB/year)**	222,156
Number of family members	3.57
Number of Children (age 15 and below)	0.74
Households with 2 or more Elderly (60+)	0.38

Concept: Family Transfer Network as Informal Insurance

- To work as insurance: there should be a redistribution between the lucky and the unlucky
- For each household h, define it's net private transfer in a year:

$$\text{Net PT}_h = \text{Transfers received}_h - \text{Transfers given}_h.$$

- Classification:
  - **Receiver**: Net $\text{PT}_h > 0$,
  - **Helper**: Net $\text{PT}_h < 0$,
  - **Inactive**: Net $\text{PT}_h = 0$.
- The "network" consisting of "Receivers" and "Helpers" is summarized by:
  - conditional **probabilities** of being receiver/helper,
  - the **amounts** of transfers

  across age, earnings, and net-worth

Heatmap: Private Transfer Probabilities
Low Net Worth Households

Age \ Earnings	Receiver (%)					Helper (%)				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
21–30	15	8	6	4	3	14	33	51	61	68
31–40	12	6	5	3	2	12	21	33	39	51
41–50	29	17	12	9	6	9	16	22	31	42
51–60	48	36	25	19	16	4	8	14	20	28
61–75	62	43	31	31	21	2	3	12	9	10

Note: Probabilities of being receiver or helper, among Low NW (bottom 50%) households, SES 2013–2019.

Heatmap: Private Transfer Probabilities
High Net Worth Households

Age \ Earnings	Receiver (%)					Helper (%)				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
21–30	14	20	16	12	9	0	17	11	22	28
31–40	19	14	9	9	5	6	14	12	19	37
41–50	32	21	15	12	5	12	15	17	25	39
51–60	64	45	34	26	13	4	7	14	17	29
61–75	74	55	43	32	21	2	4	8	11	16

Note: Probabilities of being receiver or helper, among High NW (top 50%) households, SES 2013–2019.

Patterns of Receivers and Helpers

- **Receivers:**
  - Older and poorer people have higher receiver probabilities (both NW groups),
  - Given age, the probability of being receiver is higher when earnings are lower
- **Helpers:**
  - Younger / richer households tend to be helpers
  - Given age, the probability of being helper is higher when earnings are higher
  - Elderly rarely act as helpers.
- These patterns indicates a **life-cycle informal insurance network**:
  - a redistribution between high-income and low-income
  - a redistribution between young and old

Heatmap: Median Transfers (THB/year)
Low Net Worth Households

Age \ Earnings	Receiver Q1	Receiver Q2	Receiver Q3	Receiver Q4	Receiver Q5	Helper Q1	Helper Q2	Helper Q3	Helper Q4	Helper Q5
21–30	12,000	20,004	16,002	14,400	55,002	-12,000	-24,000	-30,000	-36,000	-48,000
31–40	16,500	20,004	21,996	24,000	28,626	-12,000	-20,004	-24,000	-36,000	-48,000
41–50	24,000	24,000	24,000	24,000	36,000	-14,592	-21,000	-32,604	-36,000	-48,000
51–60	30,000	24,000	25,500	30,000	28,500	-22,998	-18,000	-30,000	-48,000	-49,002
61–75	24,000	24,000	24,000	24,000	24,000	-12,000	-12,000	-36,000	-30,000	-36,000

Note: Conditional medians for non-zero net private transfers (positive receivers, negative helpers), SES 2013–2019.

Heatmap: Median Transfers (THB/year)
High Net Worth Households

Age \ Earnings	Receiver					Helper				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
21–30	30,498	28,002	18,498	72,000	36,000	—	-6,000	-18,000	-30,000	-42,000
31–40	36,000	19,002	24,000	24,000	24,000	-12,000	-5,502	-15,996	-22,002	-36,000
41–50	48,000	36,000	30,000	35,502	36,000	-37,998	-25,500	-36,000	-45,000	-60,000
51–60	48,000	36,000	35,004	36,000	36,000	-26,004	-31,002	-39,996	-48,000	-60,000
61–75	39,996	36,000	36,000	36,000	30,000	-15,996	-14,400	-30,000	-36,000	-36,000

Note: Conditional medians for non-zero net private transfers.

Patterns of Transfer Amount

- **Receivers:**
  - It's expected to see lower-income households (hit by a worse income shock) receive more if the networks serve as an insurance
  - This is observed among high net worth households
  - But not observed among low net worth households
- **Helpers:**
  - For an insurance mechanism, higher-income are expected to give more
  - This is observed in the above tables

Empirical Tests: Insurance Mechanism from the family networks

- Using a Probit model to test if changes in earnings (from the potential levels)
  - **reduce** the probability of being a receiver,
  - **increase** the probability of being a helper,
- Using an OLS model to test if changes in earnings (from the potential levels) are negatively corelated with the amount of net private transfers
- Both confirm that an insurance mechanism exists in the family network

Empirical Tests: Insurance Mechanism from the family networks

Table: Marginal Effects on the Probability of Being a Receiver/Helper – Probit Regressions

Variable	**Being a Receiver**	**Being a Helper**
Deviation of household current earnings from potential earnings	-0.045***	0.040***
Log of household net worth	0.000	-0.007***
Log of financial assets	-0.003***	0.008***
Log of household medical expenditure	0.004***	0.003***
Log of public transfers	0.009***	-0.001**
Family size	-0.054***	-0.023***
Number of children	0.121***	-0.039***
Elderly count (2 or more 60+)	0.023***	-0.016***
Age group (Base: 21–30)		
31–35	-0.055***	-0.028**
36–40	-0.071***	-0.029**
41–45	-0.018*	-0.022**
46–50	0.036***	-0.034***
51–55	0.143***	-0.101***
56–60	0.221***	-0.146***
61–65	0.210***	-0.171***
66–70	0.229***	-0.178***
71–75	0.282***	-0.188***
Observations	34,958	34,976

OLS Results: Amount of Net Private Transfers

Table: OLS: Net Private Transfer Amount

Variable	Net Private TR amount
Deviation of household current earnings from potential earnings	-0.044***
Household net worth	0.005***
Log of financial assets	-0.407***
Log of household medical expenditure	0.158***
Log of public transfers	0.377***
Family size	-1.201***
Number of children	8.603***
Elderly count (2 or more 60+)	1.980***
Age group (Base: 21–30)	
31–35	-6.951***
36–40	-6.590***
41–45	-5.859***
46–50	-1.395
51–55	6.207***
56–60	9.955***
61–65	13.281***
66–70	14.913***
71–75	16.955***
Observations	34,564

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Net private transfers, earnings deviation, and net worth are measured in thousand THB per year. The regression includes year and region fixed effects.

Public Transfers: A Parallel Layer

- SES also captures **public transfers** (including NPOs) received by households
- We conduct similar analysis on public transfers for comparison
  - Conditional probabilities of receiving
  - Median amounts of transfers

Public Transfers: Probability of Receiving Low Net Worth Households

Age \ Earnings	Q1	Q2	Q3	Q4	Q5
21–30	16	11	10	8	8
31–40	31	25	20	16	14
41–50	36	28	32	25	21
51–60	44	40	36	30	32
61–75	98	97	98	95	95

Public Transfers: Probability of Receiving High Net Worth Households

Age \ Earnings	Q1	Q2	Q3	Q4	Q5
21–30	43	22	33	23	24
31–40	41	43	31	31	26
41–50	48	44	38	31	26
51–60	54	49	44	30	33
61–75	99	99	98	95	95

Heatmap: Conditional Median Public Transfers (THB/year) Low Net Worth Households

Age \ Earnings	Median (THB/year)				
	Q1	Q2	Q3	Q4	Q5
21–30	7,200	4,698	6,000	4,800	8,010
31–40	7,200	5,004	3,600	6,000	7,200
41–50	7,200	7,200	7,200	7,200	7,200
51–60	7,200	7,200	7,200	7,200	8,400
61–75	14,400	14,400	10,800	14,400	14,400

Heatmap: Conditional Median Public Transfers (THB/year) High Net Worth Households

Age \ Earnings	Median (THB/year)				
	Q1	Q2	Q3	Q4	Q5
21–30	19,050*	3,000	7,200	9,300	8,400
31–40	8,148	9,798	7,200	7,200	7,200
41–50	9,996	9,000	9,600	9,600	8,400
51–60	9,996	9,600	9,600	9,000	9,600
61–75	15,600	14,400	14,400	14,400	14,400

*Small sample size.

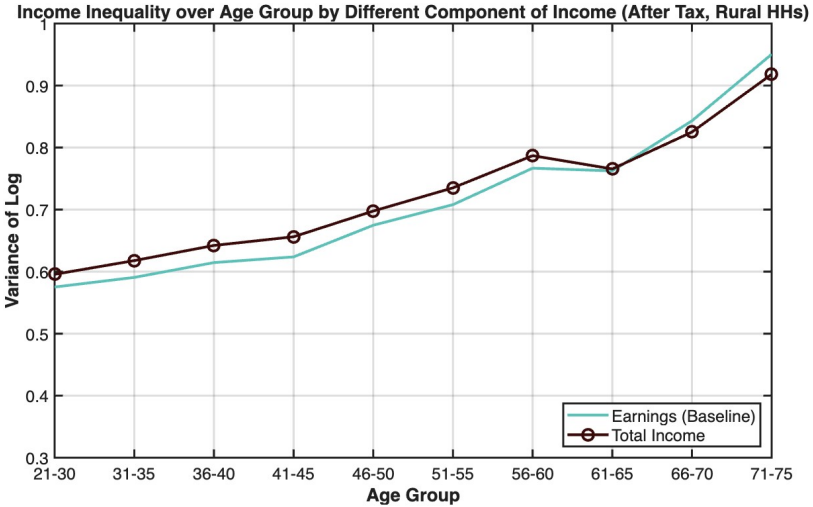
Summary: Public Transfers

- **Elderly (61–75):**
  - Receipt rates are close to 100% across income and net-worth groups.
  - Transfer amounts are similar across income levels.
- **Younger households:**
  - Some progressivity in receipt probabilities (lower-income households are more likely to receive).
  - limited income-based differentiation in benefit levels – largely program-driven benefits.
- Transfer amounts (benefit levels) are lower than private transfers.

Measuring Economic Inequality over Age

- We estimate income inequality over age
  - measured by variance of log household earnings (baseline)
  - removing cohort/year effects
  - follow the methodology in Deaton and Paxon (1994) and Storesletten, Telmer and Yaron (2004)

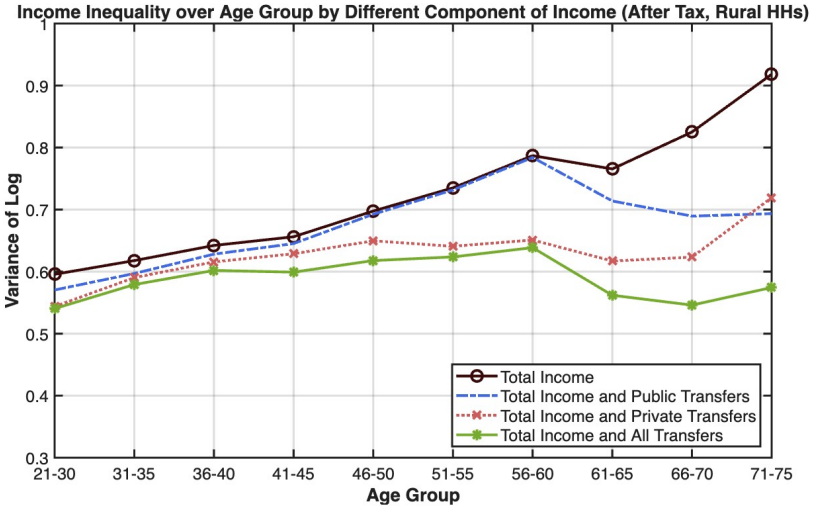
Life Cycle Earnings VS Total Income Inequality



Income Inequality with Transfers

- Alternative inequalities over the life cycle
  1. Earnings (baseline)
  2. Total income: earnings + capital income.
  3. Total income + **private transfers**.
  4. Total income + **public transfers**.
  5. Total income + **all transfers**.
- If family transfer networks and public programs insure shocks:
  - variance of log income should **decline** as we move from (2) to (5),
  - the age profile of inequality should become **smoother**.

Income Inequality with Transfers



Key Takeaways

- Detailed household transfer inflow/outflow data allow us to construct an empirical picture of the family transfer network in rural Thailand.
- Household transfer networks provide substantial insurance
  - Older and lower-earnings tend to be receivers
  - Younger and higher-earnings tend to be helpers
  - Redistribution between high/low income and between young/old
- Public transfers are more program-driven and targeting elderly
- Including private and public transfers in income largely **flattens** the life-cycle profile of inequality.
- Household transfer networks provide substantial **informal insurance** against income risk and are crucial for understanding inequality and designing rural social protection.