Flexible Debt Relief and Credit Behavior: Evidence from Loan-Level Data

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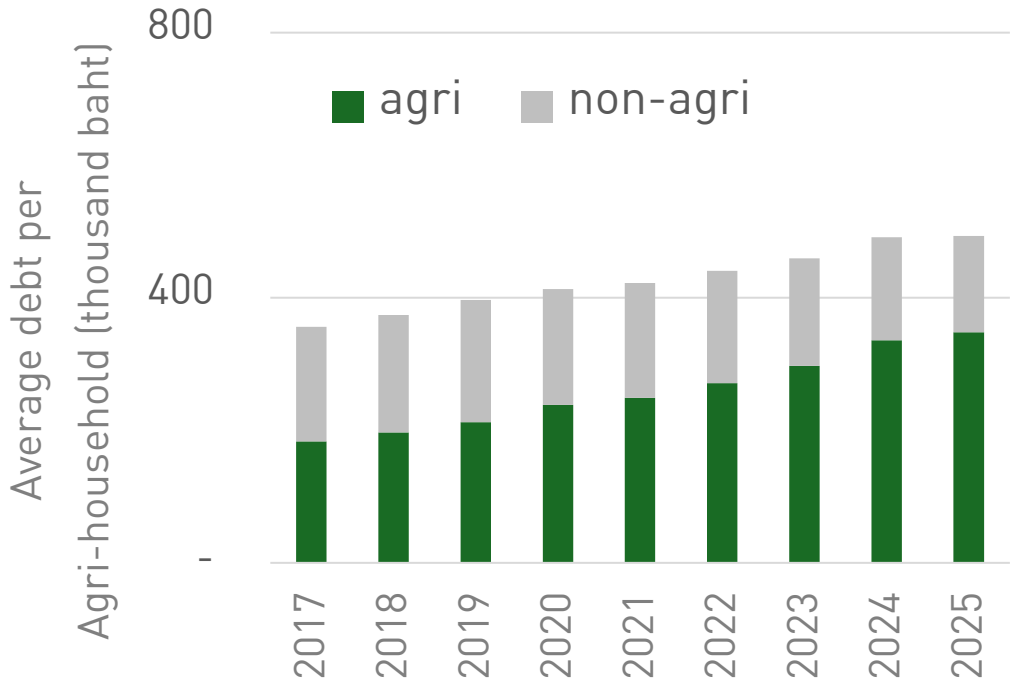
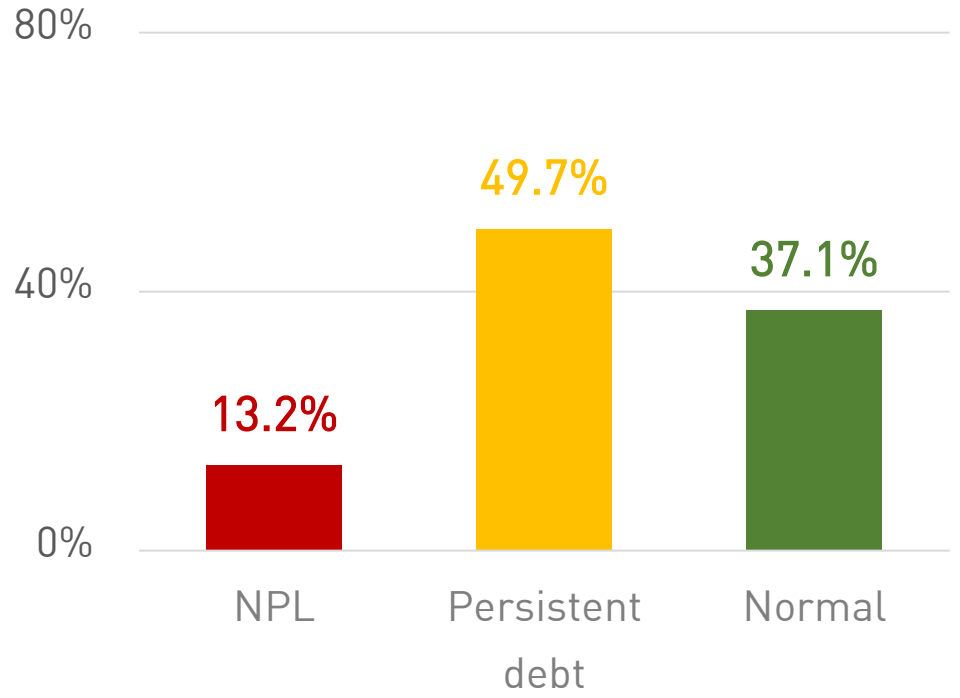
Rising debt burden and persistent debt among Thai farmers

Debt restructuring is key to get farmers out of trap!

40% Debt Growth Over 8 years



~50% potentially 'trapped' in persistent debt

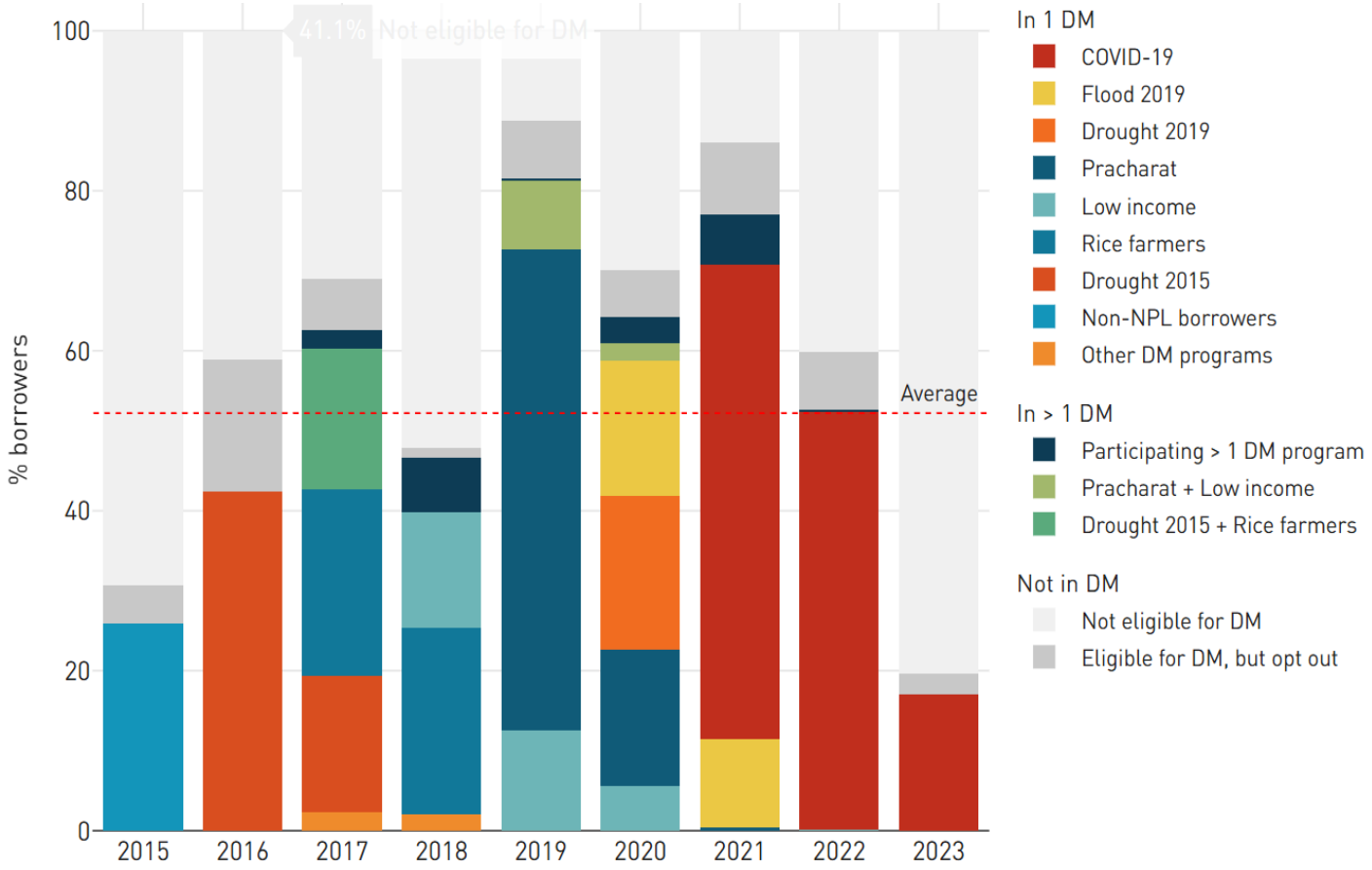


Source: Ratanavararak & Chantarat (2023)

Past measures concentrated on debt moratoria

… short-term address but further stimulate debt trap

- 13 debt moratoria (DM) in 9 years
  - **Blanket** relief → widespread **moral hazard**
  - 41% remained in DM > 4 years
  - **Increase debt accumulation** and **defaults, no effect on consumption and investment** (Ratanavararak & Chantarat, 2023; Tambunlertchai, 2004)
- Preventive debt restructuring were provided to less 0.01% of debtors



Source: Ratanavararak & Chantarat (2023)

Why might flexible debt relief work to help Thai farmers?

- Farmers' financial conditions: **low, irregular, and uncertain** (Chantarat et al., 2023; Morduch, 2023)

  → **Capacity to repay** is **hard to observe** and highly **uncertain**

- Why existing debt relief measures might not work?
  - **Blanket** relief → widespread **moral hazard**
  - **Targeted** relief → high risk of **mis-targeting**
  - **Tailored** relief → operationally **impractical**

- Why flexible debt relief might work?
  - **Flexibility = adaptability** to changing capacity to repay

This paper

- Research question: **How does a flexible debt relief program affect borrower credit behavior?**
  - Credit behavior (Repayment | Credit deterioration | New borrowing)
  - Safety net vs. repayment stimulation
  - Spillovers to other loans
  - Impact heterogeneity across groups
- Data: administrative data **from National Credit Bureau** (covering eligible and ineligible debts)
- Method: **fuzzy RD / DiD**
- Key findings → "Dual' roles of flexible debt relief
  - **Active incentive** for capable borrowers
  - **Safety net** for distress borrowers

This paper speaks to two strands of the literature

Debt relief measures

- **Debt forbearance**

  (Fiorin et al.,2023; Ratanavararak & Chantarat, 2023; Aydin, 2024; Dinerstein et al., 2024)

- **Debt restructuring**

  (Dobbie & Song, 2020; Aydin, 2024)

- **Debt forgiveness**
  (De & Tantri, 2017; Mishra et al., 2017; Mukherjee et al.,2018; Gyöngyösi & Verner, 2024)

- **Most effective when capacity is identified**

Flexible debt contracts

- **Shift from rigid structures to risk-contingent terms**

- **Benefits of explicit flexibility**
  (Field et al., 2012; Barboni & Agarwal, 2023; Battaglia et al., 2024)

- **Risks of excessive flexibility**

  (Brune et al., 2024; Czura et al., 2026)

- **Key challenge:** to ensure that borrowers behave based on their true capacity

Flexible debt relief program (Oct 23–Sep 26)

- **1.4 million** participants (~70% opt-in rate)
- Main eligibility criteria
  - **Outstanding debt ≤ 300,000 baht**
  - Normal and NPL
- Flexible features
  - **Debt forbearance**
  - **Principal first** if repaying during the program (full interest subsidy by the government)
- Extra features
  - Training
  - New borrowing cap of 100,000 baht at BAAC

Administrative data from National Credit Bureau

- Granularity:
  - **Monthly loan-level data /** from **2017** to **2025**
- Coverage:
  - **Majority of formal financial institutions**, including commercial banks, foreign branches, non-banks, and state-owned banks such as the BAAC
  - **All formal debt** across loan portfolios, including both eligible and ineligible loans of each borrower

Borrower characteristics	
Borrower's age	55.4 (11)
Female (0/1)	0.514 (0.500)
Multi-creditor borrowers (0/1)	0.312 (0.463)
Commercial bank borrowing (0/1)	0.099 (0.298)
Yearly repayment schedule (0/1)	0.972 (0.166)
Monthly repayment schedule (0/1)	0.310 (0.463)
Performing debtor (0/1)	0.753 (0.431)
Flood exposure (0/1)	0.135 (0.342)

Note: Mean (Std. Dev.), as of September 2023

Analysis by loan type:

- **Agricultural loan** → Eligible → **Direct effect** (Troubled Debt Restructuring (TDR) and non-TDR)
- **Non-agricultural loans at other FIs** → Ineligible → **Spillover effect**

Outcome	Agricultural	Non-agricultural loans			
		Auto	Machinery	Mortgage	Personal
Repayment (0/1)	0.324 (0.468)	0.923 (0.266)	0.733 (0.444)	0.908 (0.288)	0.760 (0.427)
Repayment amount (baht)	8,129 (24,214)	116,645 (115,293)	18,343 (30,676)	65,606 (123,020)	33,053 (71,897)
Credit deterioration (0/1)	0.035 (0.183)	0.084 (0.271)	0.102 0.303)	0.068 (0.252)	0.148 (0.355)
New borrowing (0/1)	0.118 (0.323)	0.019 (0.139)	0.051 (0.220)	0.001 (0.032)	0.118 (0.322)
New borrowing amount (baht)	15,476 (78,763)	11,573 (99,318)	2,080 (19,985)	797 (44,563)	10,412 (69,583)

Note: Mean (Std. Dev.), between April 2024 and July 2025

Fuzzy regression discontinuity (FRD) design

$$\frac{\lim_{\varepsilon \uparrow 0} E[Y|X=c+\varepsilon] - \lim_{\varepsilon \downarrow 0} E[Y|X=c+\varepsilon]}{\lim_{\varepsilon \uparrow 0} E[D|X=c+\varepsilon] - \lim_{\varepsilon \downarrow 0} E[D|X=c+\varepsilon]} = E[\beta_i \mid \text{unit is complier}, \mathrm{X} = c]$$

Y : outcome variable;
D : program participation status;
X : running variable (loan outstanding);
c : cutoff (loan outstanding at 300k baht);
ε : distance from the cutoff

Fuzzy regression discontinuity (FRD) design

Assumptions (Lee & Lemieux, 2010)

(1) **Imprecise control**

(2) **Discontinuity of first-stage** status at the threshold

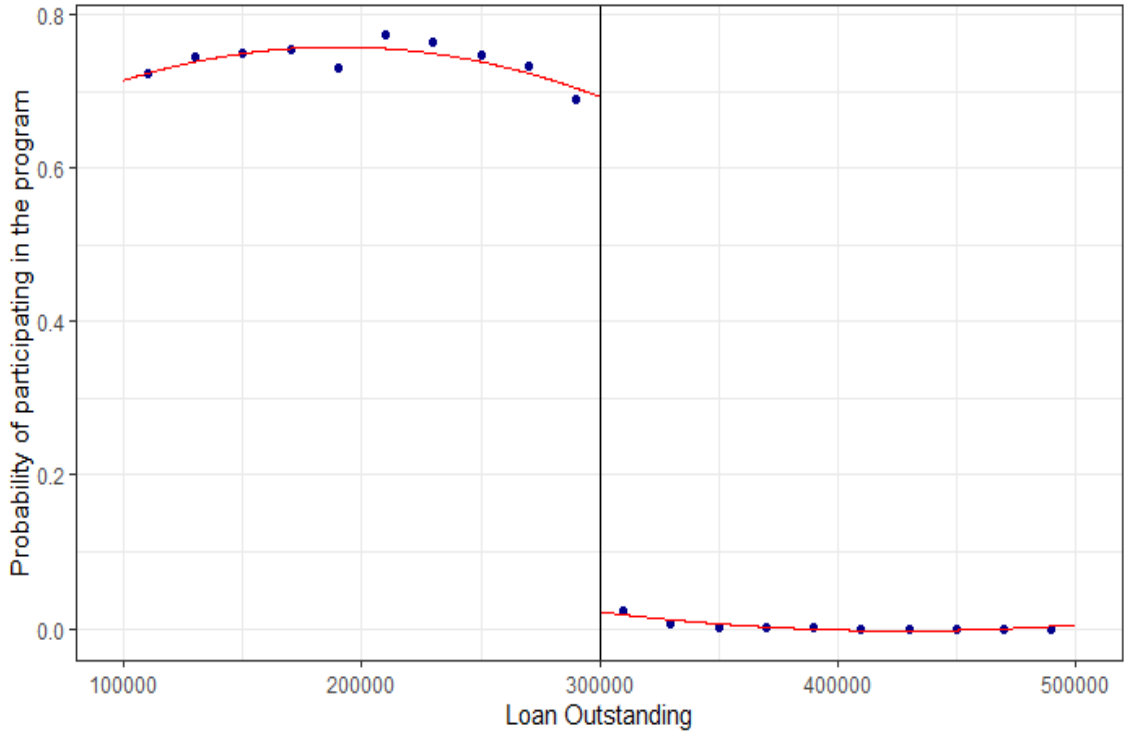
(3) **Excludability** (exclusion restriction)

(4) **Monotonicity**

Inference:

FRD estimate can be interpreted as the **LATE**, local average treatment effect at the cutoff for compliers

RD Plot: First stage result

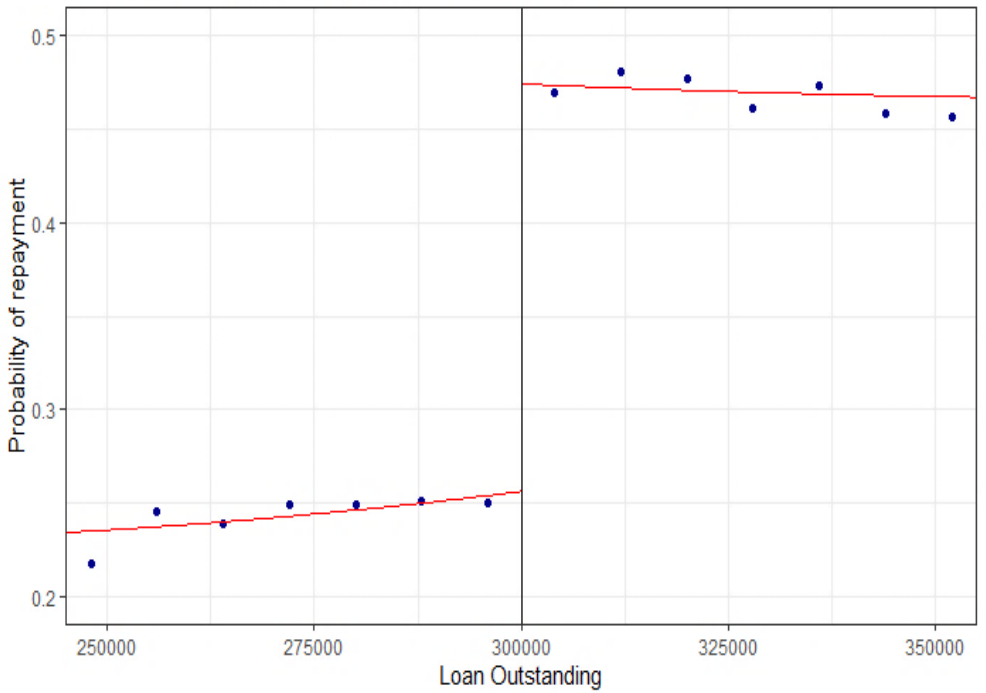


Note: Compliers refer to individuals who participate in the program when they are assigned to the treatment condition and remain untreated when they are assigned to the control condition

Result#1: Similar to a typical DM, the program reduces repayment probability by 26.8 p.p.

	Direct effect on agricultural loans		
	Repayment		
	(1) Overall	(2) Non-TDR	(3) TDR
RD Estimate	-0.268*** (0.009)	-0.239*** (0.010)	-0.289*** (0.018)
Observations	254,318	191,701	64,012
Bandwidth (L | R)	37,236 | 63,045	32,547 | 48,221	47,081 | 61,609
Sample	Full	Full	Full

RD plot: Agricultural loan repayment probability

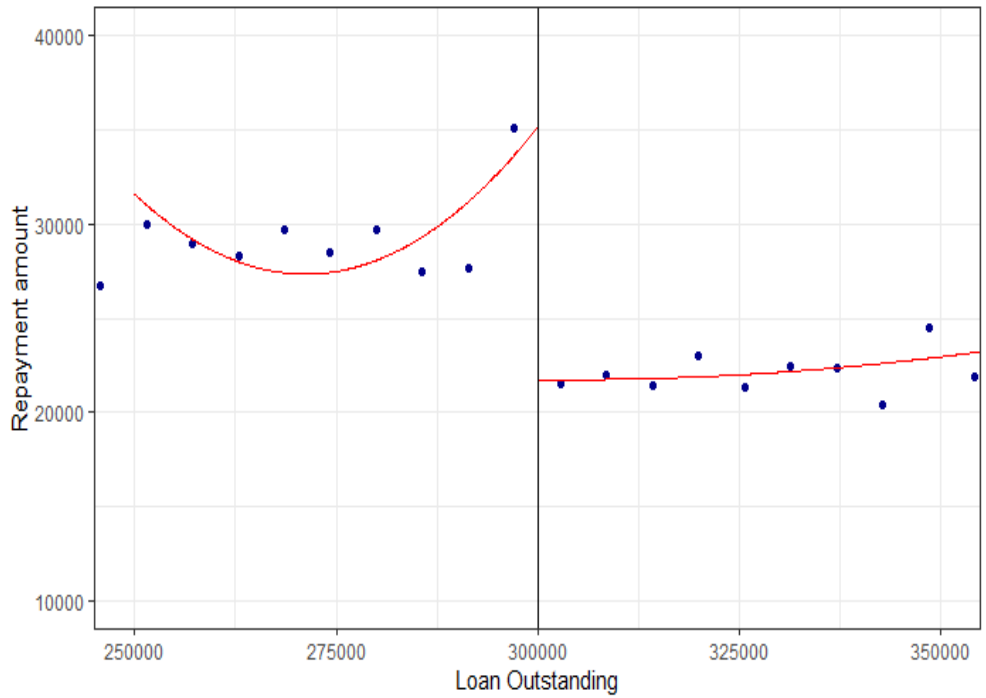


- Stronger effect for the vulnerable group (TDR)
- 49% maintain repayment

Result#2: Among active repayers, the program increases repayment amount, leading to higher principal reduction

	Direct effect on agricultural loans		
	Repayment amount		
	(1) Overall	(2) Non-TDR	(3) TDR
RD Estimate	26,886*** (1,203)	27,801*** (1,300)	8,696*** (1,843)
Observations	138,070	107,535	41,354
Bandwidth (L | R)	59,307 | 102,485	39,095 | 70,473	97,923 | 120,788
Sample	Active repayers	Active repayers	Active repayers

RD plot: Agricultural loan repayment amount



- Stronger effect for the less vulnerable group (Non-TDR)

Result#3: Among inactive repayers, the program generates positive cross-creditor spillovers to non-relief debt

- **Strategic liquidity reallocation:**
  - Divert liquidity to repay non-relief loans
  - Aligned with farmers' selective default behavior (Chantarat et al., 2023)
- **No substitution effects:**
  - Active repayers do not reduce repayment on non-relief loans
  - Adding a prize-linked incentive to the program reduces repayment on ineligible obligations (Chantarat et al., 2026)

	Spillover effects on non-agricultural loans					
	Repayment			Repayment amount		
	(1) Auto	(2) Machinery	(3) Personal	(4) Auto	(5) Machinery	(6) Personal
RD Estimate	0.043**	0.075**	0.059*	18,213***	2,748	5,376*
	(0.019)	(0.035)	(0.034)	(6,449)	(1,962)	(2,942)
Observations	32,325	22,949	17,448	32,959	16,668	21,892
Bandwidth (L | R)	91,065 | 106,864	104,962 | 122,020	49,289 | 67,161	97,167 | 111,783	71,548 | 81,227	65,896 | 71,689
Sample	Inactive repayers	Inactive repayers	Inactive repayers	Inactive repayers	Inactive repayers	Inactive repayers

Result#4: Without program forbearance, 5% of borrowers would have migrated to NPLs

- Reduced credit deterioration in agricultural loan

	Direct effect on agricultural loan credit deterioration		
	(1) Overall	(2) Non-TDR	(3) TDR
RD Estimate	-0.050*** (0.004)	-0.034*** (0.004)	-0.163*** (0.011)
Observations	344,471	237,073	113,233
Bandwidth (L | R)	55,099 | 69,216	46,870 | 63,484	85,385 | 119,959

- No effects on non-agricultural loan deterioration

Result#5: The program does not lead to higher debt accumulation

- **No effects on new borrowing:** no significant impact across all portfolios
  - **Available credit limits:** utilization of unused limits and new rehabilitation loan
  - **Alternative sources of funds:** informal financing (Chantarat et al., 2023) and other banks
  - Behavioral adjustments may take more time to manifest
- **Contrasts with prior evaluations** of Thai agricultural debt relief (Ratanavararak & Chantarat, 2023)

Robustness check 1:
Main results are robust across different RD specification

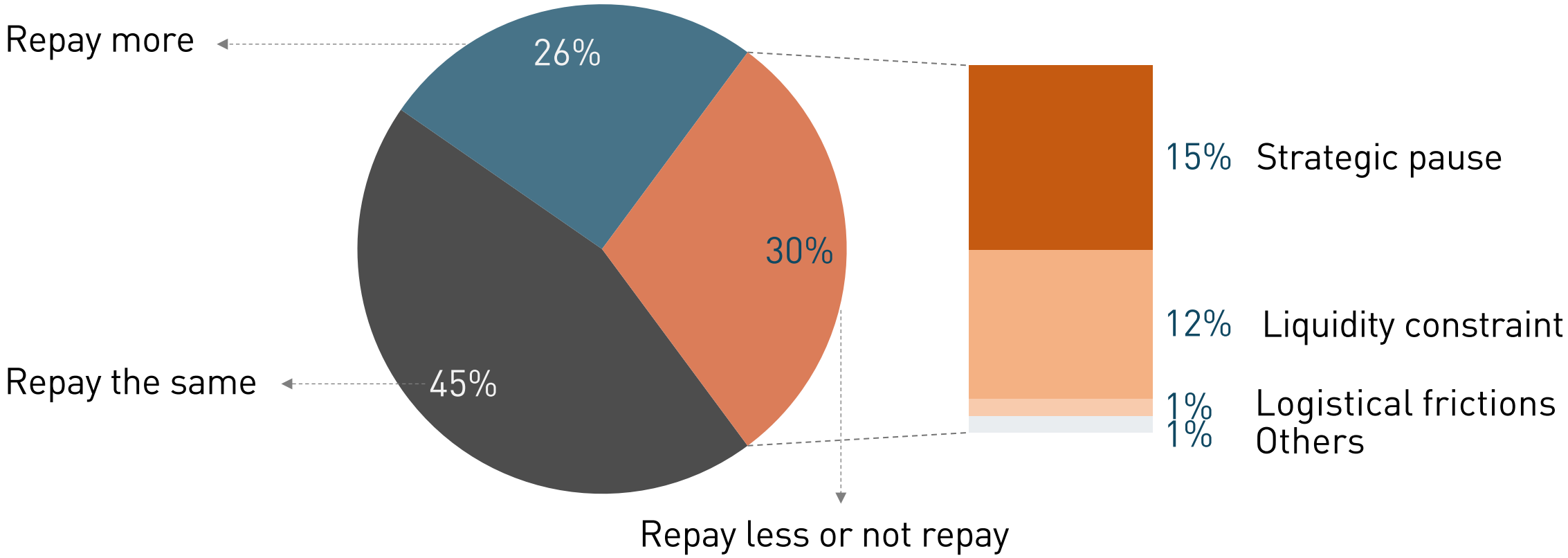
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Agricultural loan repayment							
RD Estimate	-0.276***	-0.268***	-0.257***	-0.271***	-0.270***	-0.254***	-0.241***
	(0.008)	(0.009)	(0.010)	(0.010)	(0.009)	(0.015)	(0.022)
Observations	163,345	254,318	313,047	193,790	248,073	150,357	84,356
Bandwidth (L | R)	21,523 | 45,855	37,236 | 63,045	44,935 | 64,067	29,035 | 49,945	36,657 | 61,624	20,000 | 20,000	10,000 | 10,000
Sample	Full	Full	Full	Full	Full	Full	Full
Agricultural loan repayment amount							
RD Estimate	25,469***	27,801***	28,771***	25,582***	21,388***	32,790***	33,876***
	(1,159)	(1,300)	(1,345)	(1,294)	(1,222)	(2,421)	(3,515)
Observations	66,493	107,535	161,818	101,287	129,948	42,886	23,265
Bandwidth (L | R)	27,456 | 72,129	39,095 | 70,473	56,177 | 78,239	50,161 | 95,126	74,980 | 114,823	20,000 | 20,000	10,000 | 10,000
Sample	Active repayers	Active repayers	Active repayers	Active repayers	Active repayers	Active repayers	Active repayers
Kernel	Triangular	Triangular	Triangular	Uniform	Epanechnikov	Triangular	Triangular
Local Poly (p)	1	2	3	2	2	2	2
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robustness check 2: Main results are robust with alternative identification strategy (DiD)

	Agricultural loan repayment	
	(1)	(2)
DiD Estimate	−0.256***	−0.225***
	(0.003)	(0.001)
Observations	612,430	5,292,550
R^2	0.044	0.044
Optimal bandwidth	Yes	No

	Agricultural loan repayment amount	
	(1)	(2)
DiD Estimate	12,622***	3,742***
	(347)	(338)
Observations	367,393	1,668,022
R^2	0.005	0.005
Optimal bandwidth	Yes	No

Supporting qualitative evidence from a nationwide survey (Chantarat et al., 2026)



Note: Data from a nationwide survey of 1,831 program participants across 19 provinces, conducted between January and March 2025

Key takeaways

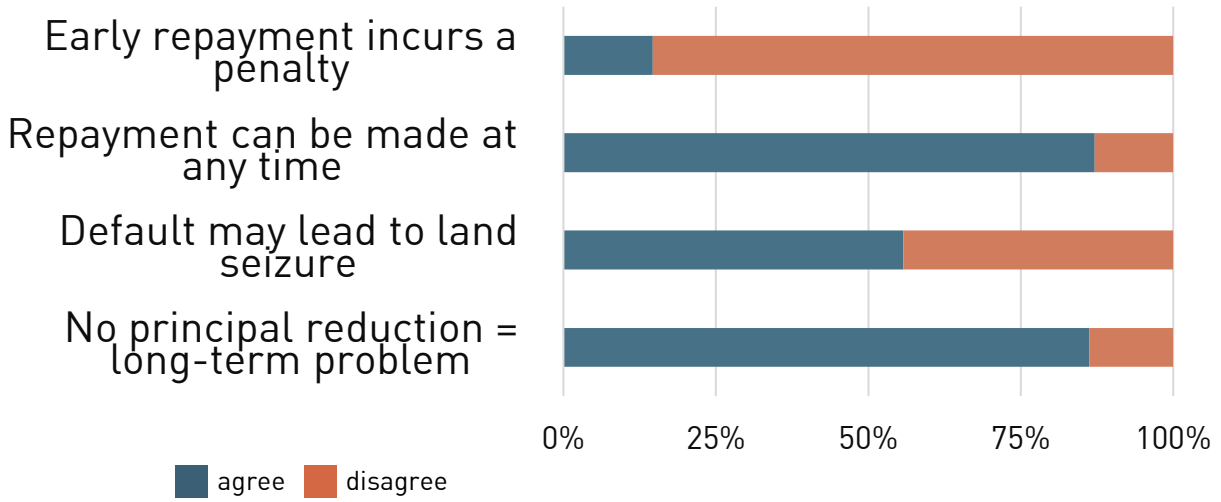
- **Flexible debt relief works!**
  - **Safety net** for distressed borrowers
  - **Repayment stimulation** for capable borrowers

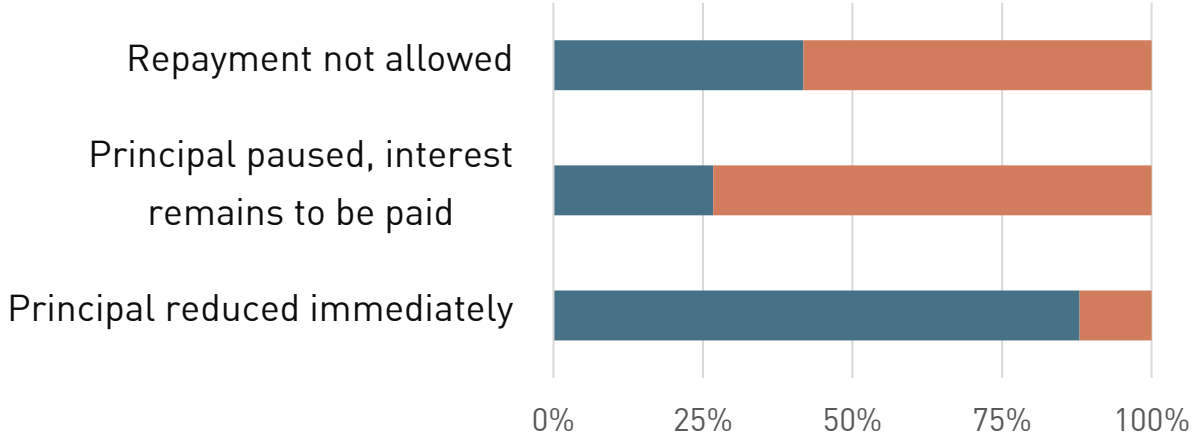
- **Shifting away from rigid blanket moratoria toward more flexible and incentive-based intervention** for vulnerable borrowers (hard to target, true capacity largely uncertain)

- Areas for program improvement
  - **Awareness?**
  - **Additional interventions to 'nudge' loan repayment?**
    (e.g., repayment lottery, mobile unit debt collection) (Chantarat et al., 2026)

- Next step: **extend the tracking of post-program behavior**

Better results with more awareness?





Note: Data from a nationwide survey of 1,831 program participants across 19 provinces, conducted between January and March 2025. The expected responses are (from top to bottom) "disagree", "agree", "agree", "agree", "disagree", "disagree", and "agree", respectively.

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Thank you
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