

Savings and consumption responses to student loan forbearance

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Introduction

Motivation

- Substantial policy interest in debt relief to alleviate household distress:
 - Stabilization: 2008 HAMP / TARP mortgage modification; 2020 CARES Act forbearance
 - Fiscal policy: Biden / Harris student debt relief plan
- Policy outcomes relative to alternatives depend on endogenous debt repayment behavior.

Research questions

- How do hhlds adjust savings and consumption in response to liquidity from debt relief?
- How does behavior compare with responses to theoretically-equivalent forms of liquidity?

Context and approach

- *Response to debt relief*: Universal federal student loan forbearance in 2020 CARES Act.
 - Monthly payments automatically paused.
 - Interest rates set to 0%.
- *Response to other liquidity*: Stimulus check payments
- *Measurement*: Administrative transaction panel

Overview

Results

- *Non-fungibility.*
 - 45% of forbearance liquidity used to prepay federal student loans...
 - ... vs. <1% of stimulus check liquidity.
- *Debt repayment mistakes.*
 - Borrowers with high-interest debt prepay federal loans at high rates...
 - ...but correctly prioritize repayment out of stimulus
- Failure to reallocate student loan payments suggests a liquidity flypaper effect:
 - Predicts lower marginal propensity to spend (MPX) out of forbearance than stimulus
 - Results consistent with this prediction.

Outline

- Policy background + theoretical predictions
- Non-fungibility, debt repayment mistakes, and total consumption response
- Modeling thoughts + wrap-up

Related literature (skip)

- Mistakes in debt management (Gathergood et al. 2019, Ponce, Seira, and Zamarripa 2017)
- Impact of debt relief on financial distress and consumption (*Student loans*: Di Maggio, Kalda, and Yao 2020, Mueller and Yannelis 2022; *Mortgages*: Ganong and Noel 2020, Di Maggio, Kermani, et al. 2017, Fuster and Willen 2017, Agarwal et al. 2017; *Revolving debt*: W. Dobbie and Song 2020)
- Macro effects of debt relief (Eberly and Krishnamurthy 2014, Eggertsson and Krugman 2012, Auclert, W. S. Dobbie, and Goldsmith-Pinkham 2019, Cherry et al. 2021)
- (Non-)fungibility of financial resources (Hastings and Shapiro 2013, Hastings and Shapiro 2018, Beatty et al. 2014, Milkman and Beshears 2009)

Policy context

Student debt

- \$1.75T outstanding as of 2022Q2; \$35K average amount per borrower.
- 80% federally-owned.

CARES Act forbearance + stimulus

- *March 13-20, 2020*: Interest set to 0%; opt-in 60-day forbearance.
- *March 27, 2020 (CARES Act)*: Opt-out payment pause; 0% interest until Sep 30, 2020:
 - No required payments, interest doesn't capitalize.
 - Applies to all federally-owned debt.
 - Accounts reported as paid on time to credit bureaus.
 - Costs ~\$98B / year (NY Fed).
- *April 15, 2020*: First round of stimulus checks deposited.
- Forbearance extended multiple times; set to expire December 31, 2022.

Theoretical framework: Setup

Benchmark: Lifecycle model with multiple assets

- *State variables:*
 - Liquid savings x_t with borrowing limit L_0 and gross interest rate R_0 ;
 - Amortizing debt B_{jt} with limit L_{jt} , prepayment option, and gross interest rate R_{jt} .
- *Consumer problem:* Choose consumption c and debt payments $\{p_j\}$ to solve:

$$\max_{\substack{c \in [0, x + L_0] \\ \{p_j \in [B_j - L_{j,+1}, B_j]\}}} \left\{ U(c) + \delta EV_{+1} \left(x + y_{+1} - c - \sum_j p_j, \{R_j(B_j - p_j)\} \right) \right\}$$

- Implies policy functions (θ collects $\{R_{jt}, L_{jt}\}$):
 - Consumption: $c^*(x, \{B_j\}; \theta)$
 - Payments: $p_j^*(x, \{B_j\}; \theta)$
- Forbearance: $\theta \rightarrow \theta'$ where $R'_{st} = 1, L'_{st} = L_{s, t_{start}-1}$ for $t \in [t_{start}, t_{end}]$.

(link to method)

Theoretical framework: Predictions

Model predictions:

1. (Student) loan s payments should weakly go to zero: $p_s^*(x, \{B_j\}; \theta') = 0$.
 - Strictly so if $\max_{j \neq s} R_j > 1$.
2. MPX out of windfalls \approx equal MPX out of forbearance:

$$-\frac{dc^{FB}}{dp_s^*} = \frac{\partial c^*(\cdot)}{\partial x} + \varepsilon(\cdot); \quad -\frac{dp_k^{FB}}{dp_s^*} = \frac{\partial p_k^*(\cdot)}{\partial x} + \eta_k(\cdot)$$

- Forbearance liquidity impact is Δ optimal pmt, not Δ minimum pmt.
- Net worth effects $\varepsilon, \eta_k \approx 0$ (Ganong Noel AER 2020; Raiella Pistaferri ReStat 2017)

Alternative: Flypaper effect \implies borrowers use forbearance liquidity to pay federal debt.

- Student loan payments will be positive after forbearance begins.
- People with interest-bearing debt will make student loan payments.
- Debt repayment patterns will be different out of stimulus.
- Consumption out of forbearance liquidity will be different than out of stimulus.

Data and sample selection

Consumer transaction dataset

- *Source*: Data aggregator for large US financial institutions.
- *Observations*: Transaction panel linking user bank, credit card, and debit card accts.
- *Scope*: ~ 60m users; observations from 2010-2021

Identifying student loan borrowers

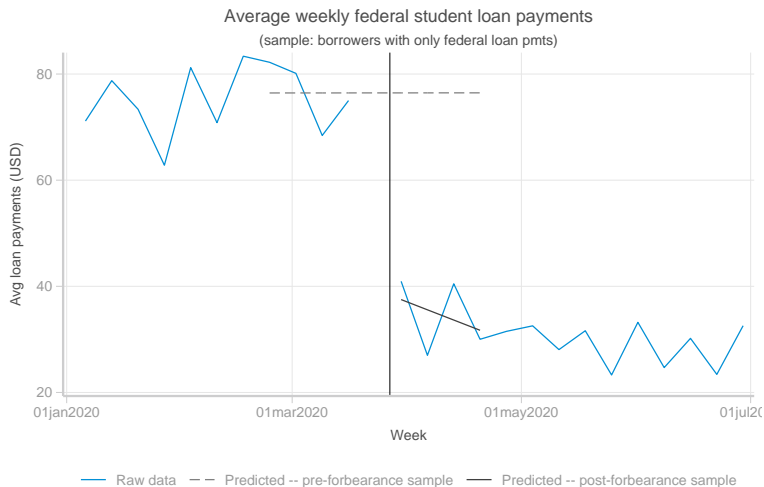
- Borrowers identified via payments to student loan servicers.
 - Government-owned loans serviced by limited set of contractors.
 - Loan receives automatic forbearance if loan servicer only handles federal loans.
 - Loan does not receive automatic forbearance if servicer only handles private loans.
- Distinguish between two categories:
 - Borrowers with *only* federally-owned student loans.
 - Borrowers with both federal and private loans.

Summary statistics

	Avg student loan pmt quartile				Total
	Q1	Q2	Q3	Q4	
Tot SL pmt	65.8	158	284	856	341
Fed SL pmt	65.1	155	274	818	328
Has private SL	.0255	.045	.0781	.204	.0882
Private SL pmt private pmt>0	25.9	58.5	110	402	266
Tot income	64,315	74,374	83,044	118,116	84,963
Has mtg	.299	.337	.349	.388	.343
Has savings pmts	.308	.316	.326	.367	.329
CC debt lower bound	1,486	5,803	1,797	2,143	2,883
N	78,349	78,350	78,348	78,349	313,396

- Note: Averages over 2019.

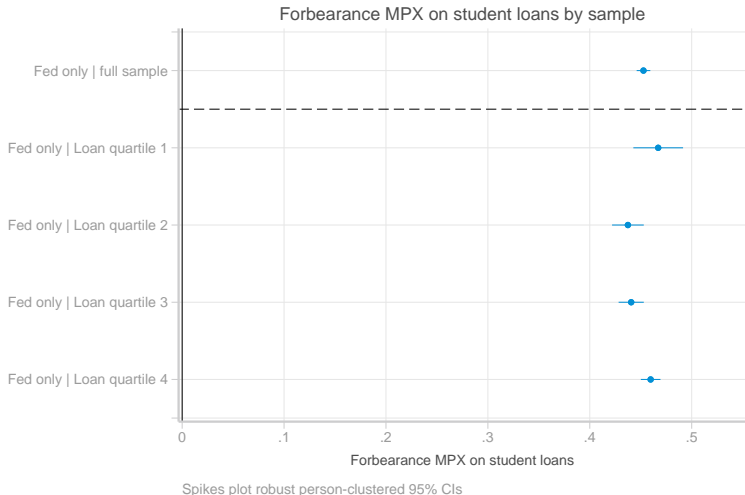
1. Borrowers used forbearance liquidity to prepay loans



- MPX on student loans out of forbearance liquidity: **0.45** (0.003)

1. Borrowers used forbearance liquidity to prepay loans

- Forbearance MPX on student loans does not vary with payment size



(by imputed DTI)

1. Do borrowers use stimulus liquidity to pay down loans?

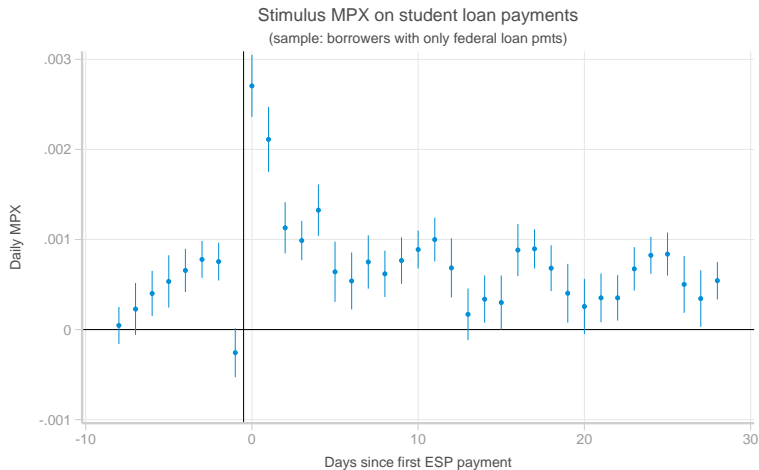
- Parameterize student loan payments for person i at time t as (Baker et al. 2020):

$$p_{s,it} = \alpha_i + \delta_{yt} + \sum_k \beta_k \mathbb{1}(t = k)_i \cdot EIP_i + \varepsilon_{it}$$

where:

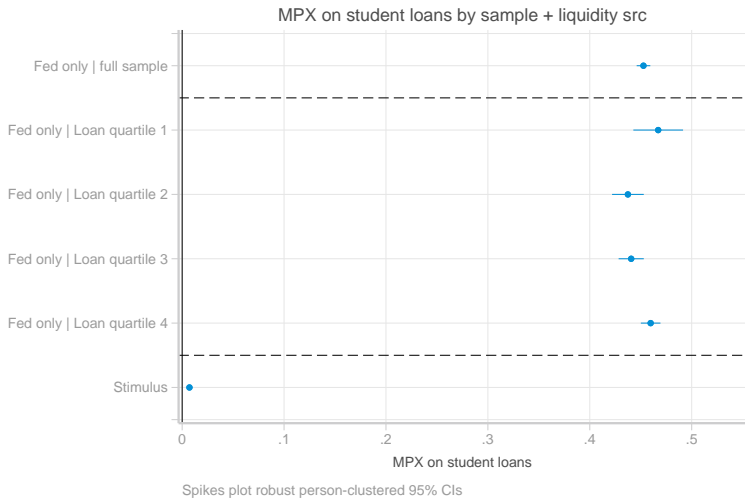
- EIP_i : Stimulus payment
- $\mathbb{1}(t = k)_i$: Indicator for k periods after stimulus receipt date
- β_k : Daily MPX k periods after stimulus receipt
- *Intuitively*:
 - Compare within-person spending before and after EIP receipt
 - Use variation in EIP receipt timing within income class to estimate time trends
- *Identifying assumption*: EIP timing unrelated to time trends, conditional on income

1. Do borrowers use stimulus liquidity to pay down loans?



Spikes plot robust unit clustered 95% CIs

1. Borrowers uniquely use forbearance liquidity to prepay



1. Prepayment looks like an active choice

1. Default effects and inattention bias towards non-payment.
 - Forbearance is automatic and opt-out.
 - Policy required servicers to automatically turned off auto-pay.
 - Prominent announcements on all payment portals.
2. Post-forbearance payment patterns are consistent with active pre-payment decisions. (details)
 - 6.4% of prepayers pay the same amount each month post-forbearance.
 - 59.0% of prepayers pay a different amount in April 2020 than in Jan or Feb 2020.
 - Payment variance increases in April 2020 + distribution bunches at round numbers.
3. Prepayers adjust spending due to stimulus.
 - Sample: borrowers with post-forbearance pmt *before* the first stimulus checks arrive

	MPX estimate	SE
Category		
General nondurables	0.136	0.013
Total spending	0.177	0.022

2. Debt repayment mistakes out of forbearance liquidity

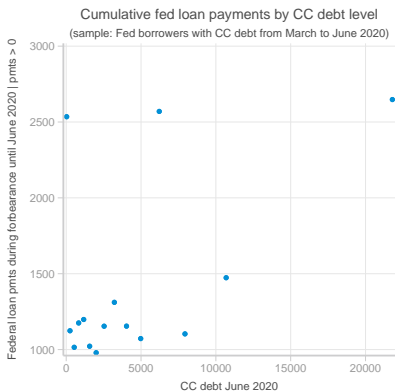
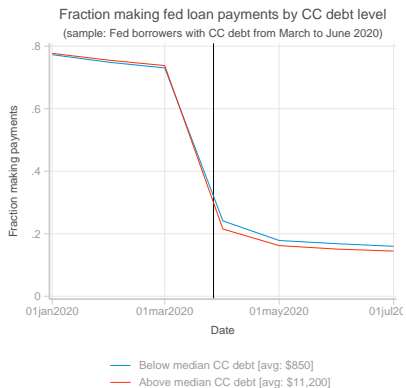
Does non-fungibility generate debt repayment mistakes?

1. Do borrowers with high-interest debt also exhibit high forbearance MPX on student loans?
2. Do borrowers correctly prioritize repayment out of stimulus liquidity?

Debt categories analyzed

- Non-revolving credit card debt.
 - APR 20-25%.
 - Lower bound measured through net transactions since 2019.
- (skip) Private student debt.
 - APR 5-10%.
 - Federal law prohibits prepayment penalties.

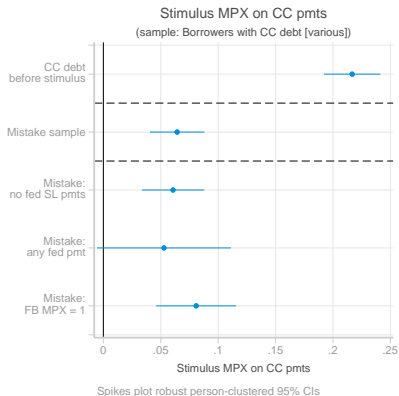
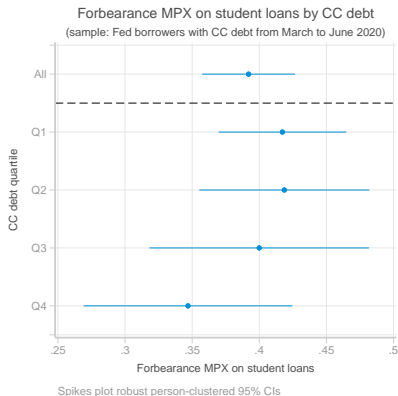
2. Borrowers with credit card debt prepay federal loans



- Avg prepayment April-May of $\sim \$1,400 \implies$ annualized cost of $\$1,400 \times 25\% \approx \350 .

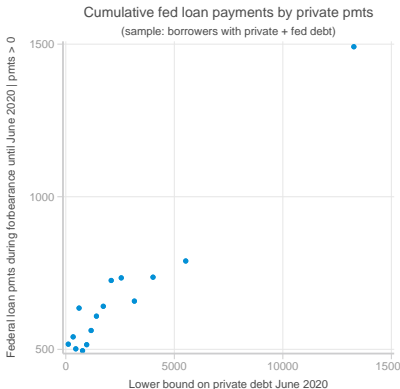
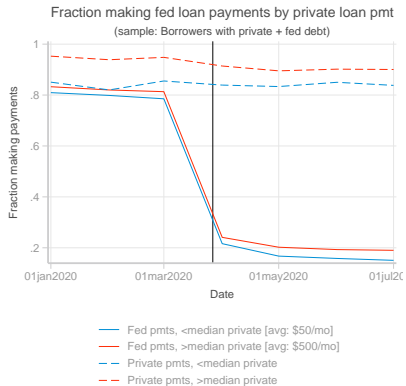
2. Prepayers use stimulus to pay down CC debt

- (left panel) Borrowers with cc debt use forbearance liquidity to prepay federal loans...



- (right panel) ...but indebted borrowers – including prepayers – use stimulus to pay cc debt.

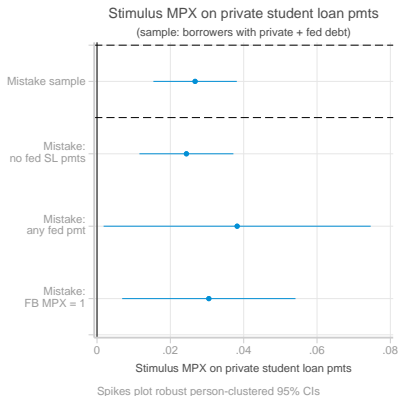
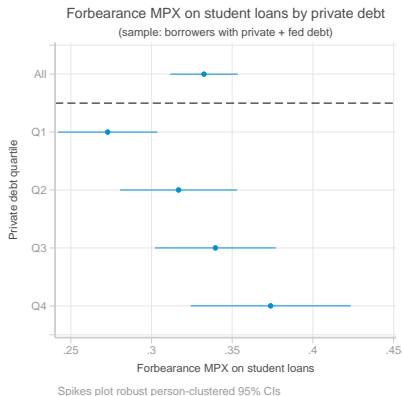
2. Borrowers with private student loans prepay fed loans



- Avg prepayment April-May of $\sim \$700 \implies$ annualized cost of $\$700 \times 10\% \approx \70 .

2. Prepayers use stimulus to pay down private loans

- (left panel) Borrowers with private debt use forbearance liquidity to prepay federal loans...



- (right panel) ...but use stimulus to repay private student loans.

3. Total spending response to forbearance: overview

Method 1. Semi-structural.

- *Idea*: Estimate liquidity from forbearance after federal loan payments; correlate with individual stimulus MPX
- Precise and applies to all subpopulations, but requires structural assumptions (next slide)

Method 2. Variation in repayment timing (Pmt end).

- *Idea*: Identify people who paid off debt just before forbearance; and use them as a control group for borrowers with similar debt levels.
- Better identification, but (i) selected population and (ii) measurement error issues

Method 3. Variation in federal relative to total student debt (Debt mix). (Mostly skip)

- *Idea*: Compare people with similar total debt levels but different mix of private and federal debt; use people with lower federal debt as control group.
- Identification slightly less credible but less measurement error.

Alternatives (not today)

- Heterogeneity in repayment date for federal borrowers.
- Difference-in-differences with private borrowers.

3. Total spending response: Semi-structural method

Framework:

- Goal: Write $E \left[-\frac{dc}{dp_s^*} \right]$ as a function of observables.
- Forbearance implies $\theta \rightarrow \theta'$ such that $-dp_s^* = p_s^*(\cdot; \theta)$.
- Note that (where derivatives wrt θ are path derivatives):

$$-\frac{dc}{dp_s} = -\frac{\frac{dc}{d\theta}}{\frac{dp_s^*}{d\theta}} \approx -\frac{\frac{\partial c}{\partial x} \frac{dp_s^o}{d\theta}}{\frac{dp_s^*}{d\theta}}$$

where:

- $\frac{dp_s^*}{d\theta}$: Approximated with pre-forbearance pmts
- $\frac{dc}{dx}$: Estimated using stimulus
- $\frac{dp_s^o}{d\theta}$: Observed as the difference b/w pre and post forbearance federal loan pmts

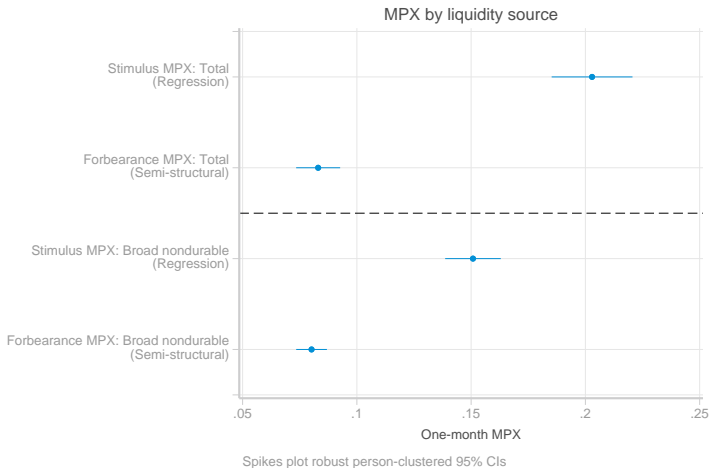
Estimator:

$$E \left[\widehat{-\frac{dc^*}{dp_s}} \right] \equiv \int \frac{dc_i}{dx} (1 - MPX_i^{ps})$$

where MPX_i^{ps} is the federal student loan MPX out of forbearance liquidity.

(link to framework)

3. Total spending response: Semi-structural estimates

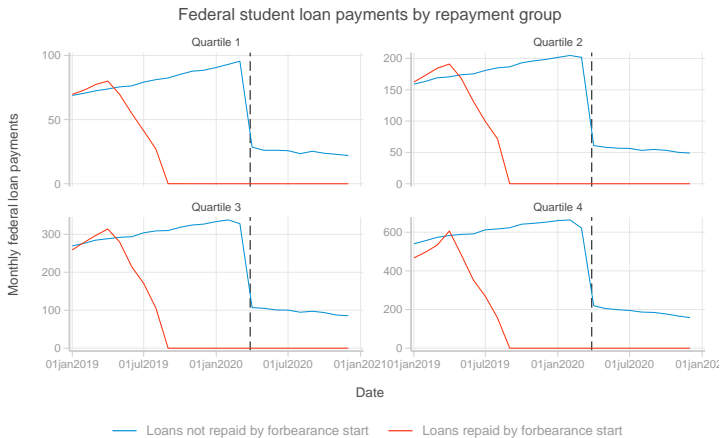


(beware: semi-structural SEs wrong.)

- Difference between stimulus and forbearance MPX lower for nondurable
- Driven by lower nondurable MPX for people who continue to make payments

3. Total spending response: Pmt end

- Control group: Federal borrowers who stopped repaying in 2019Q2
- Treatment variation:



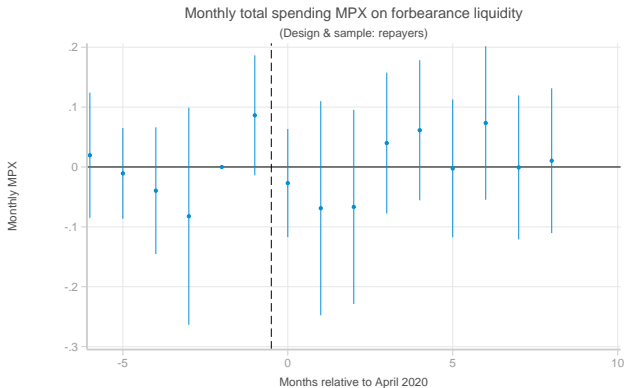
Graphs by loan payment quartile | Winsorized at 5 and 95%

(link to raw total spending)

3. Total spending response: Pmt end

$$c_{it} = \alpha_j + \delta_{yt} + \gamma_{pt} + \sum_k \beta_k \mathbb{1}\{t = k\} \times FB_Liquidity_j + \varepsilon_{it}$$

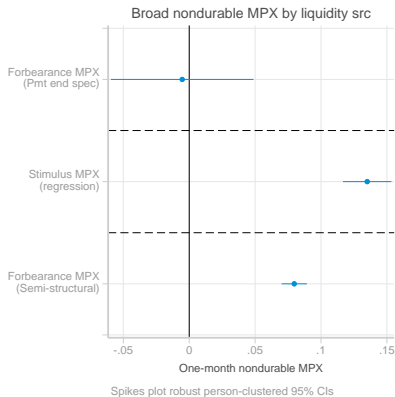
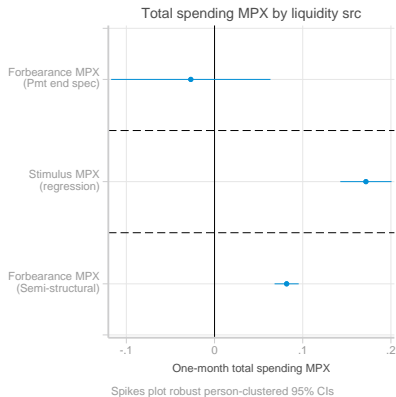
- γ_{pt} : Loan payment \times time FEs
- $FB_Liquidity_j$: Estimated liquidity from forbearance (=0 for ppl with debt paid off)



Spikes plot 95% robust unit-clustered CIs

3. Total spending response: Pmt end

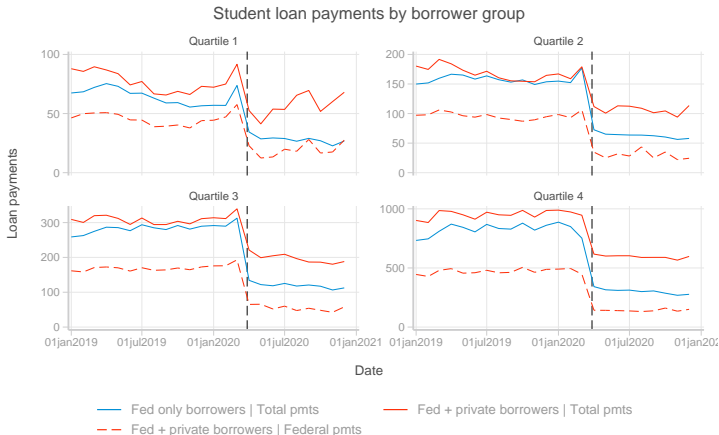
- How do estimates for this population compare:
 - To MPX out of stimulus?
 - To forbearance MPX estimates calculated semi-structurally?



(beware: semi-structural SEs wrong.)

3. Total spending response: Debt mix

- Control group: Borrowers with less federal debt, conditional on total debt
- Treatment variation:

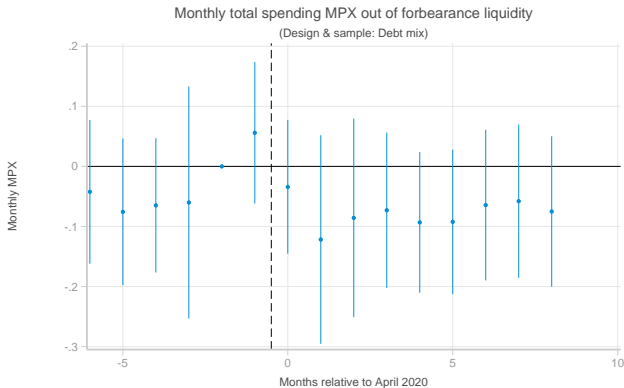


Graphs by total student loan quartile

3. Total spending response: Debt mix

$$c_{it} = \alpha_i + \delta_{yt} + \gamma_{pt} \times \text{Tot_Pmts}_i + \sum_k \beta_k \mathbb{1}\{t = k\} \times \text{Only_Fed}_i \times \text{FB_Liquidity}_i + \varepsilon_{it}$$

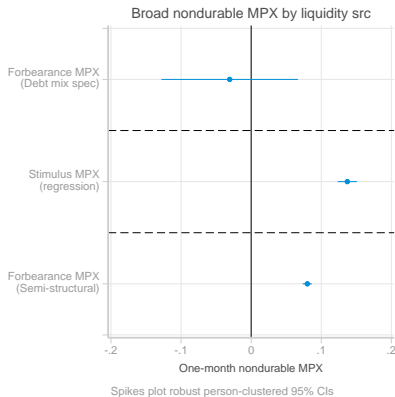
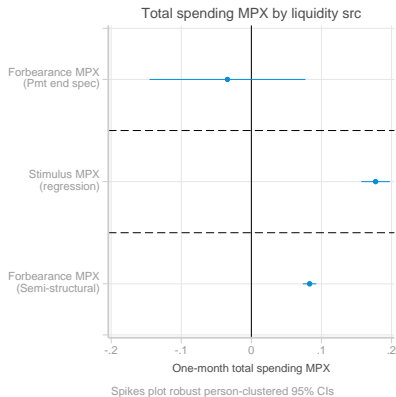
- Tot_Pmts_i : Avg pre-forbearance *total* student loan payments.
- Only_Fed_i : Indicator = 1 for only federal borrowers



Spikes plot 95% robust unit-clustered CIs

3. Total spending response: Debt mix

- How do estimates for this population compare:
 - To MPX out of stimulus?
 - To forbearance MPX estimates calculated semi-structurally?



(beware: semi-structural SEs wrong.)

Modeling thoughts + wrap up

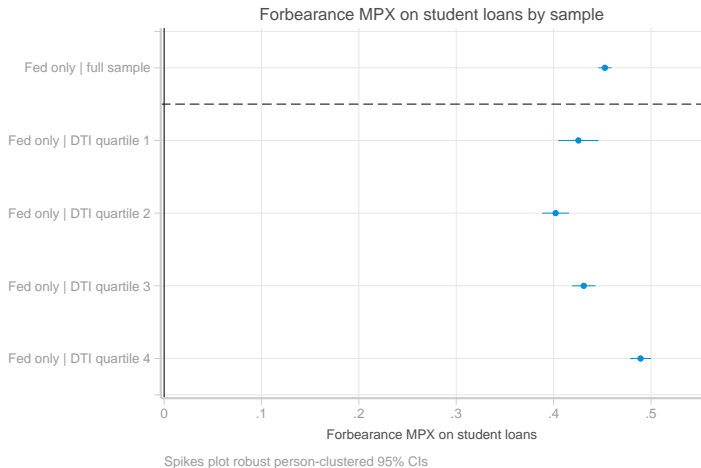
Takeaways

- Evidence for non-fungibility / flypaper effect in a visible and economically important context
- Debt relief policy has limited impacts outside of targeted domain
 - e.g. lower inflationary pressure from student loan forgiveness than stimulus checks

Modeling next steps

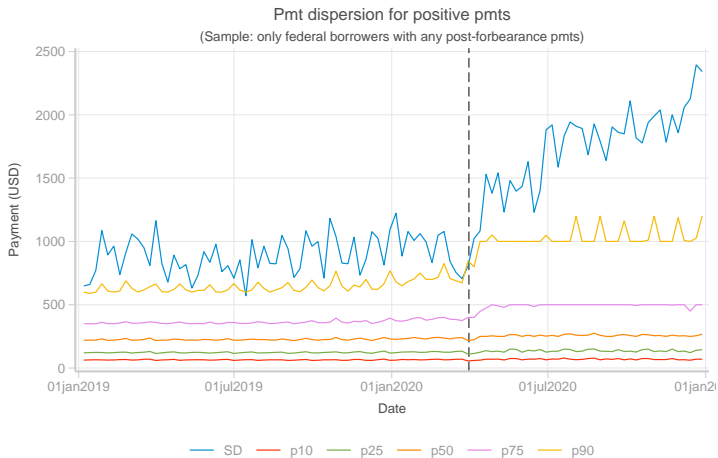
- Goal: match (i) repayment mistakes; and (ii) stimulus / forbearance repayment asymmetry.
- Idea 1. Convex budget set.
 - Replace $\sum_j p_j$ with $\gamma(\{p_j\}; \cdot)$.
 - Debt repayment mistakes: “costly” to set $p_s = 0$.
 - Asymmetric repayment: “target” level for p_s .
- Idea 2. Debt repayment from reinforcement process.
 - Student loan payments not considered for adjustment because not changed frequently.
 - Biases towards constant payments for student loans.
 - Explains difference with cc payments, which are frequently adjusted.
 - Predicts where mistakes may occur.

Forbearance MPX on student loans by DTI



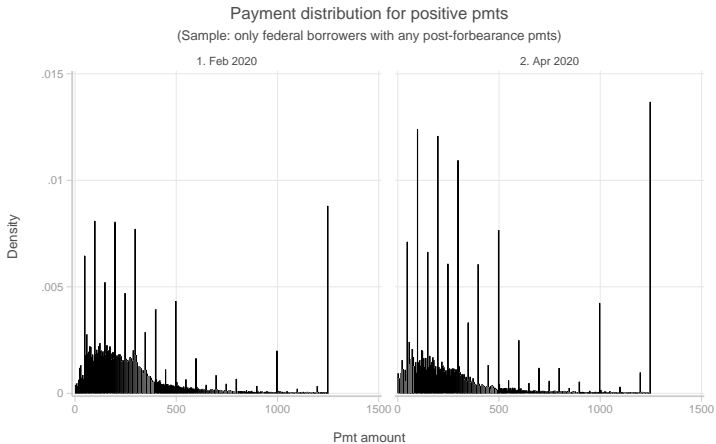
(back)

Payment variance increases in April 2020 for prepayers



(back)

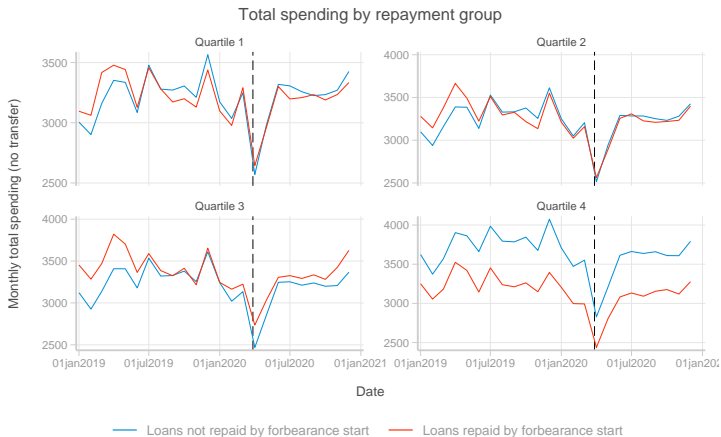
Prepayer payment distribution bunches at multiples of five in April 2020



Graphs by Month

(back)

Total spending response: Pmt end raw



Graphs by loan payment quartile | Winsorized at 5 and 95%

(back)