# Does Saving Cause Borrowing? Implications for the Co-Holding Puzzle

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— Workshop on Household Finance and Housing

# Motivation

- Significant number of US households hold both liquid savings and credit card debt (Gross and Souleles, 2002), which appears to be an unnecessary and costly financial behavior
- Three dominant theoretical explanations:
  - Transaction convenience: Telyukova (2013) and Zinman (2007)
  - Restricted credit access in times of need: Gorbachev and Luengo-Prado (2019), Fulford (2015), and Druedahl and Jørgensen (2018)
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  - Especially via so-called nudges (Benartzi et al., 2017)
  - When policymakers or researchers evaluate these, focus on the immediate savings outcome (Thaler, 1994; Beshears and Kosowsky, 2020)
- Investigate the impact of saving nudges on spending, saving, and credit card debt
  - Gain insights into the mechanisms behind the widespread co-holding of savings and credit card debt, important for researchers and policymakers alike

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# Contribution to the literature

- Literature on the mechanisms behind the co-holding puzzle: Gathergood and Weber (2014) evidence in favor of limited financial literacy and Gathergood and Olafsson (2020) evidence in favor of mental accounting
- Interventions such as automatic enrollment in 401(k) savings plans, SMS messages, and FinTech apps can increase savings (Choi et al., 2004; Karlan et al., 2016; Gargano and Rossi, 2020; Akbaş et al., 2016; Rodríguez and Saavedra, 2015)
  - Only two research papers have examined the effects of these nudges on other positions of household balance sheets, such as borrowing: Beshears et al. (2019) and Chetty et al. (2014)
  - We focus on rolled-over credit card debt (actual borrowing, not only credit card balances)

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# Conceptual framework: summary

- Investigate the joint responses of spending, savings, and credit card debt to saving nudges to distinguish among the leading explanations of the co-holding puzzle
- Key distinctive empirical predictions:
  - Optimal co-holding due to transaction-convenience or credit-limit chasing: agents would decrease their spending and repay their debt if they become more patient due to the nudge
  - Co-holding due to mental accounting or agency problems within the household: a nudge to patience or cash needs would decrease spending but leave credit card debt unchanged

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# Transaction-convenience model

- Intentionally simple to convey intuitions and broad applicability, two periods, log utility, agents may borrow, $b_1$ to consume $c_{1,2}$
- They must hold a certain amount of cash for transaction purposes: $x$

**Proposition (Transaction convenience I)**

*If agents co-hold and become more patient, then they decrease their consumption and repay their debt by the same amount, i.e.,* $\frac{\partial b_1}{\partial \delta} = \frac{\partial c_1^*}{\partial \delta} < 0$.

**Proposition (Transaction convenience II)**

*If agents co-hold and their cash needs, $x$, increase, then they will increase their debt by almost the same amount (a bit less due to the increased costs of interest they pay), i.e.,* $\frac{\partial b_1}{\partial x} = 1 - \frac{r}{(\delta+1)(1+r)}$.

- Very similar results for credit-limit-chasing model

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# Mental-accounting or agency problems model

- Two periods, log utility, agents may borrow to consume
- One patient and one impatient self/spouse, patient self/spouse can lock away cash, $x$, in a savings account, a fraction $a$ of it can be hidden from the impatient spouse (separation-of-accounts friction parameter)

**Proposition (Mental accounting I)**

*If agents co-hold and the patient self becomes more patient, then they increase their hidden assets, $x$, i.e., if $a \in (0,1]$ then $\frac{\partial x}{\partial \delta} > 0$.*

**Proposition (Mental accounting II)**

*If agents co-hold and the patient self increases the hidden assets, $x$, then the impatient agent consumes less, especially when more of the assets can be hidden, i.e., $\frac{\partial c_1^*}{\partial x} < 0 / \partial a < 0$. If the agent is very impatient and all assets are hidden, $\beta = 0$ and $a = 1$, they decrease their consumption by the same amount as the hidden assets and their borrowing is unchanged, i.e., $\frac{\partial c_1^*}{\partial x} = -1$ and $\frac{\partial b_1}{\partial x} = 0$.*

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# Empirical analysis

- Huge field experiment paired with panel data of individual credit cards and checking accounts transactions and balances by Banorte: 3,054,438 customers (374,893 control) received ATM and SMS messages inviting them to save in Fall 2019
- Randomize within 6,104 experimental strata based on pre-treatment covariates such as income quartiles, age, savings, and ATM, debit, versus credit card transactions
- Treatment: receive 1 of 7 messages that have been proven to be effective in previous experiments with different sets of customers
- The intervention lasted 7 weeks from September 13 to October 27, 2019

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# Treatment messages

## Messages about savings more generally

- "Congratulations. Your average balance over the last 12 months has been great! Continue to increase your balance and strengthen your savings."
- "Join customers your age who already save 10% or more of their income. Commit and increase the balance in your Banorte Account by $XXX this month."
- "Increase your balance this month by $XXX and reach your dreams. Commit to it. You can do it by saving only 10% of your income."
- $XXX is a personalized amount: 10% of monthly income

# Treatment messages

**Messages focused on short-term savings**

- "The holidays are coming. Commit to saving $XXX In your Banorte Account and see your wealth grow!"
- "Increase the balance in your Banorte Account and get ready today for year-end expenses!"
- "Be prepared for an emergency! Commit to leaving 10% more in your account. Don't withdraw all your money on payday."

**Message alluding to mental accounting and "locking away the money"**

- "In Banorte you have the safest money box! Increase your account balance by $XXX this payday and reach your goals."

# Data: summary statistics pre-intervention

| All Individuals (N= 3,054,503) | Mean | Std dev | P25 | P50 | P75 |
|---|---|---|---|---|---|
| Age (Years) | 44.31 | 15.98 | 31.00 | 43.00 | 56.00 |
| Monthly Income | 13,508.46 | 13,101.24 | 6,116.67 | 9,866.88 | 15,005.78 |
| Tenure (Months) | 80.52 | 72.68 | 22.00 | 59.33 | 125.37 |
| Monthly Spending | 16,122.10 | 40,352.17 | 3,100.00 | 9,034.20 | 13,278.36 |
| Checking Account Balance | 18,122.86 | 50,830.78 | 729.00 | 2,295.69 | 10,402.39 |
| Fraction with Credit Card | 0.12 | 0.32 | 0.00 | 0.00 | 0.00 |
| Monthly Credit Card Interest | 31.53 | 128.88 | 0.00 | 0.00 | 0.00 |
| Credit Card Balance | 2,132.81 | 6,018.13 | 0.00 | 0.00 | 0.00 |
| Ending Card Balance - Payments | 585.86 | 704.27 | 0.00 | 0.00 | 0.00 |
| Credit Card Limit | 9,930.49 | 20,050.48 | 0.00 | 0.00 | 0.00 |
| **Individuals with a Credit Card (N= 362,223)** | **Mean** | **Std dev** | **P25** | **P50** | **P75** |
| Age (Years) | 41.82 | 12.47 | 33.00 | 42.00 | 53.00 |
| Monthly Income | 19,632.27 | 17,983.48 | 9,071.32 | 13,912.75 | 22,718.28 |
| Tenure (Months) | 102.71 | 72.29 | 43.27 | 86.43 | 148.53 |
| Monthly Spending | 28,532.08 | 65,871025 | 6,181.81 | 18,063.10 | 21,145.28 |
| Checking Account Balance | 32,212.66 | 69,364.31 | 1,581.29 | 5,157.02 | 23,069.07 |
| Monthly Credit Card Interest | 266.07 | 389.71 | 0.00 | 0.00 | 170.01 |
| Credit Card Balance | 17,998.39 | 29,741.04 | 104.21 | 10,457.89 | 27,137.36 |
| Ending Card Balance - Payments | 5,073.91 | 6,736.91 | 0.00 | 0.00 | 2,980.34 |
| Credit Card Limit | 83,801.60 | 108,109.54 | 15,000.00 | 45,000.00 | 100,000.00 |

# Data: saving, borrowing, and co-holding

We define the co-holding puzzle group as having more than 50% of their monthly income in checking account balances as well as holding credit card debt

| | *All Individuals with a Credit Card* | | | | *Individuals with a Credit Card Who Paid Interest* | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Decile | N | Checking Account Balance over Income (Average) | Fraction of Clients with Non-Zero Credit Card Balance | Fraction of Clients Paying Credit Card Interest | Checking Account Balances (Average) | Monthly Income (Average) | Credit Card Balances (Average) | Monthly Credit Card Interest (Average) | Credit Card Interest over Income (Average) |
| 1 | 36,223 | 0.00 | 0.72 | 0.50 | 0.01 | 16,019.88 | 28,804.16 | 571.35 | 0.05 |
| 2 | 36,223 | 0.00 | 0.58 | 0.36 | 9.05 | 20,713.47 | 23,654.68 | 500.35 | 0.03 |
| 3 | 36,223 | 0.00 | 0.56 | 0.35 | 45.02 | 19,226.49 | 24,039.50 | 506.01 | 0.03 |
| 4 | 36,222 | 0.01 | 0.59 | 0.34 | 160.47 | 18,871.20 | 25,794.53 | 535.75 | 0.04 |
| 5 | 36,222 | 0.02 | 0.60 | 0.33 | 523.51 | 21,579.45 | 29,258.95 | 603.34 | 0.04 |
| 6 | 36,222 | 0.05 | 0.61 | 0.31 | 1,420.75 | 22,544.68 | 31,026.73 | 619.37 | 0.04 |
| 7 | 36,222 | 0.12 | 0.64 | 0.29 | 3,525.20 | 23,440.66 | 34,996.86 | 683.40 | 0.04 |
| 8 | 36,222 | 0.39 | 0.62 | 0.24 | 10,852.61 | 23,067.15 | 38,223.50 | 717.47 | 0.05 |
| 9 | 36,222 | 1.45 | 0.59 | 0.20 | 35,875.11 | 23,129.84 | 36,077.00 | 669.31 | 0.05 |
| 10 | 36,222 | 8.25 | 0.55 | 0.17 | 128,245.90 | 18,009.11 | 33,025.35 | 623.27 | 0.05 |

# Data: covariate balance

| | Control | Treatment | p-value of Difference |
|---|---|---|---|
| Age (Years) | 44.28 | 44.31 | 0.2157 |
| Monthly Income | 13,495.60 | 13,510.17 | 0.6892 |
| Tenure (Months) | 84.16 | 80.04 | 0.5219 |
| Monthly Spending | 16,232.41 | 16,107.47 | 0.5602 |
| Ln Monthly Spending +1 | 8.18 | 8.17 | 0.3290 |
| Checking Account Balance | 18,221.77 | 18,096.49 | 0.2951 |
| Ln Checking Account Balance +1 | 8.03 | 8.02 | 0.3210 |
| Monthly Credit Card Interest | 32.04 | 31.46 | 0.2489 |
| Ln Monthly Credit Card Interest +1 | 0.26 | 0.26 | 0.4283 |
| Credit Card Balance | 3,914.83 | 3,935.19 | 0.4124 |
| Ln Credit Card Balance +1 | 1.33 | 1.34 | 0.5973 |
| Ending Card Balance - Next Payment | 579.17 | 586.75 | 0.3151 |
| Ln Ending Card Balance - Next Payment +1 | 6.34 | 6.34 | 0.7027 |
| Credit Card Limit | 17,973.16 | 17,924.83 | 0.6176 |
| N | 357,567 | 2,696,936 | |

# Causal forests and heterogeneous treatment effects

- Because different individuals respond in different ways to saving nudges we use a causal forest algorithm (Athey and Imbens, 2015; Hitsch and Misra, 2018; Athey et al., 2019)
- If we would instead do repeated sample splits or interactions, we would run into the risk of overfitting
  - Test for treatment effect heterogeneities in the three outcomes of interest: spending, saving, and borrowing using 169 pre-treatment covariates
  - We find evidence for treatment effect heterogeneity in spending and saving, but not borrowing (using an omnibus test for the presence of heterogeneity as in Chernozhukov et al. (2018))

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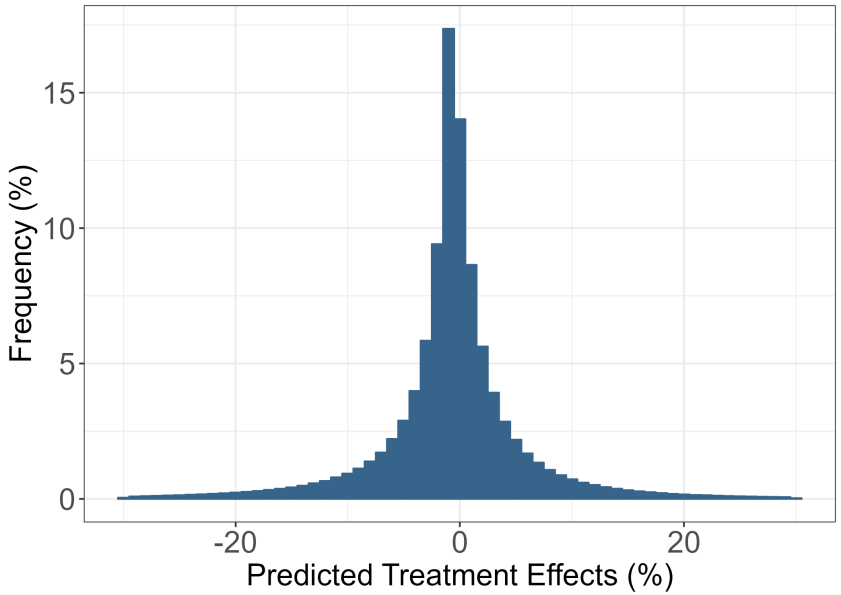
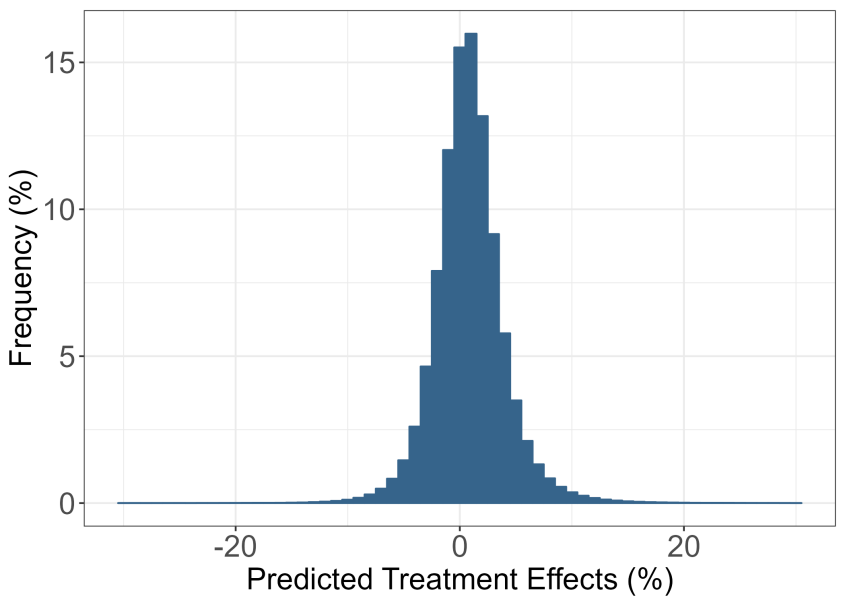
Causal forests with 2,000 trees: each divided into three subsamples

1. Splitting subsample: identify large treatment effect based on 161 pre-treatment covariates
2. Verify in estimation sample with AIPW estimator (balances characteristics between treatment and control)
3. Cross validate in test sample



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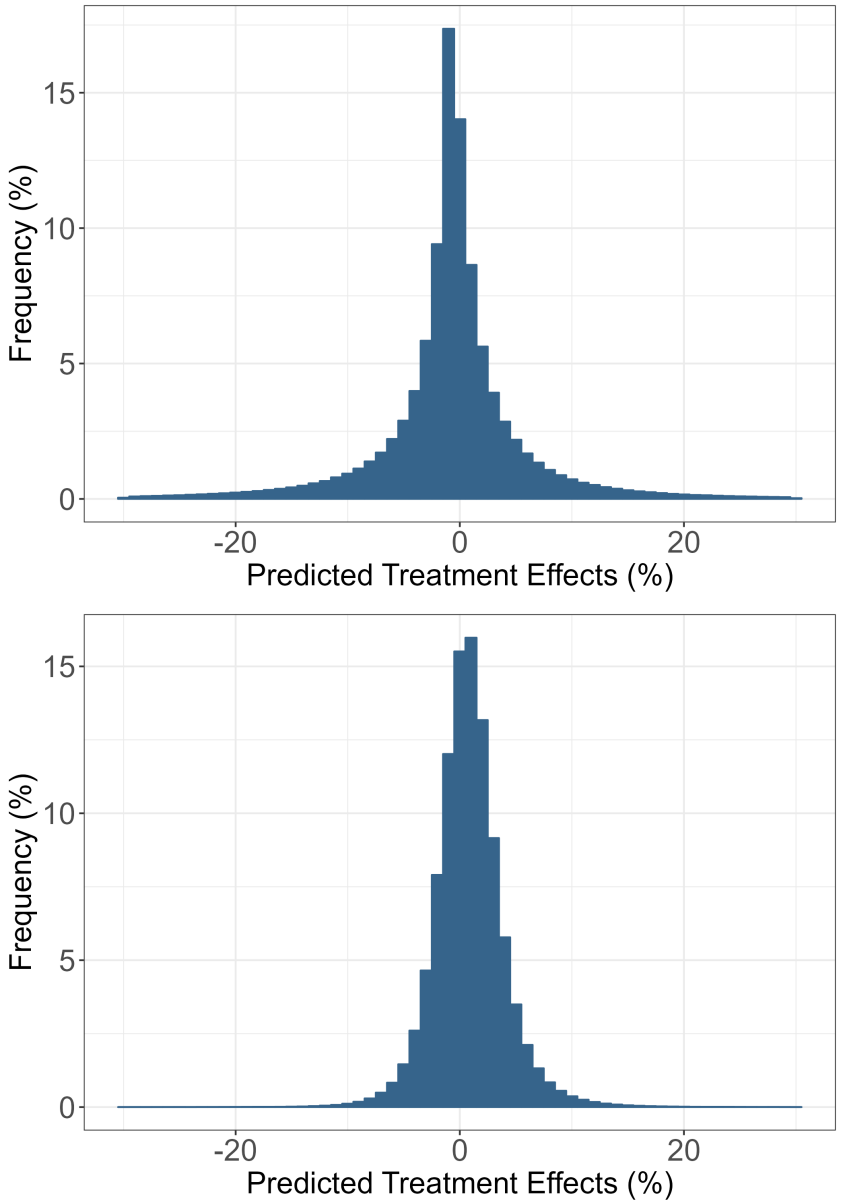

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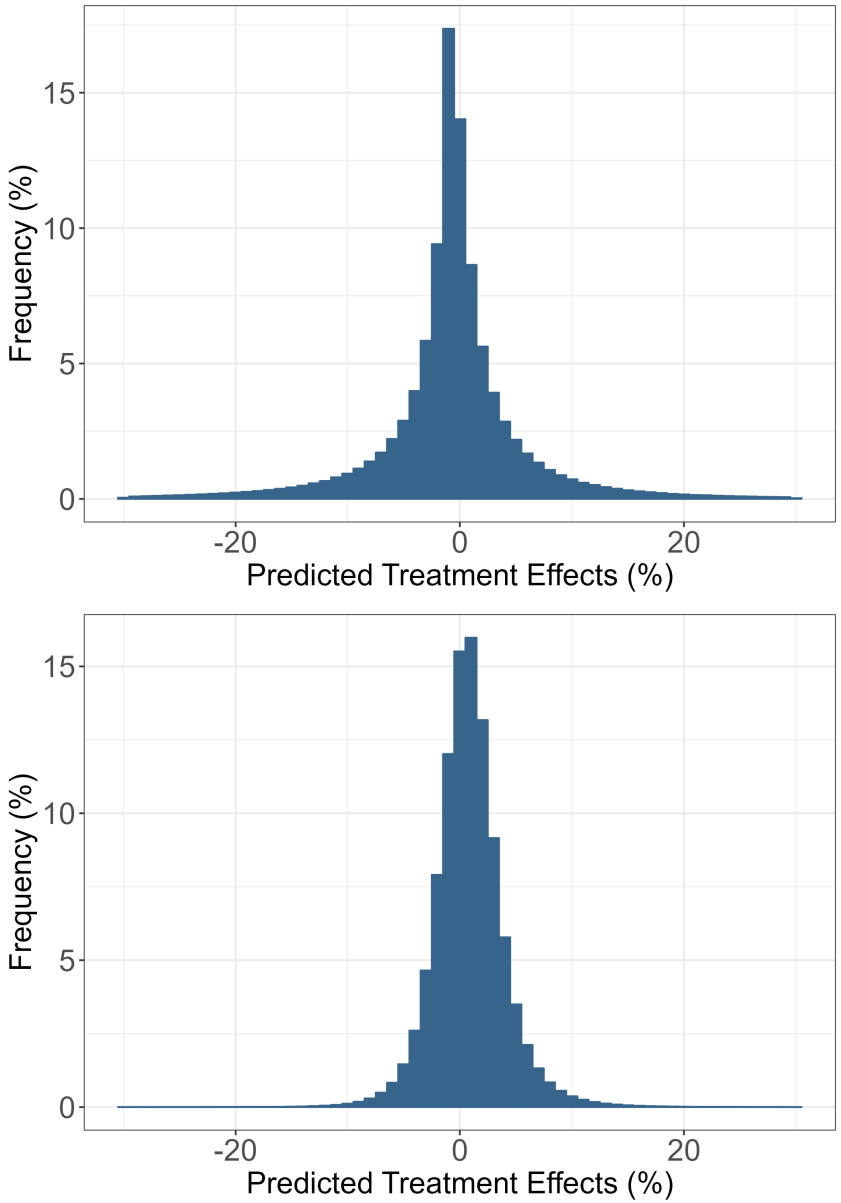

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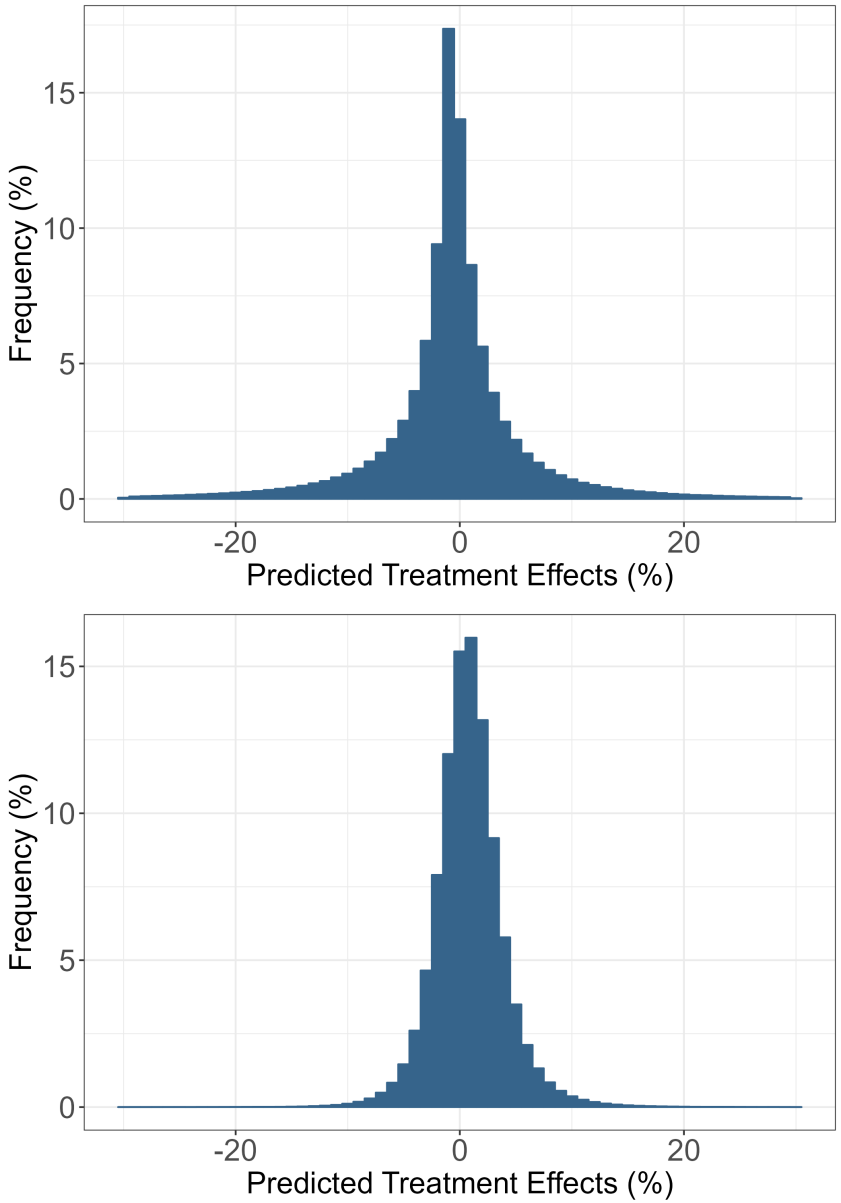
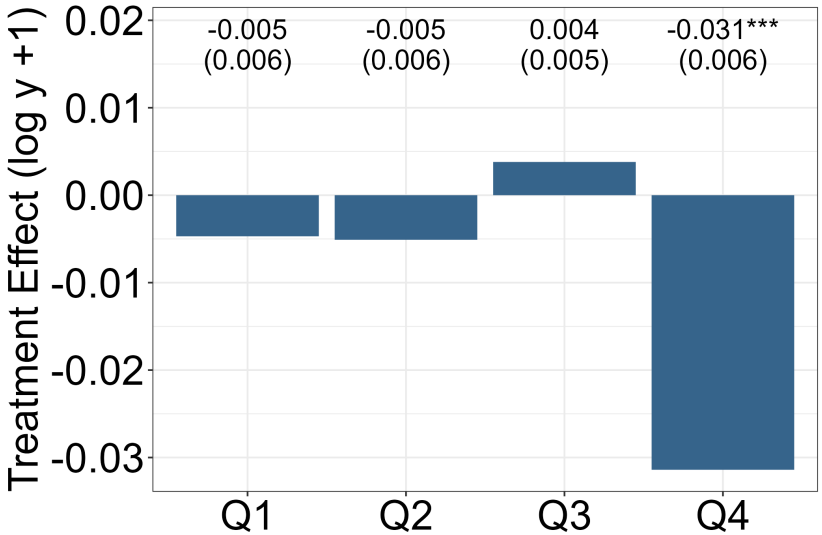
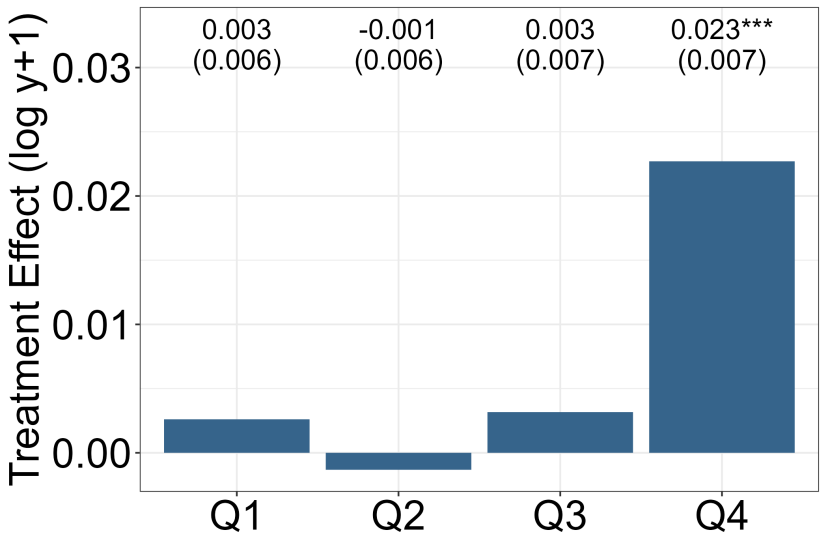


# Treatment effect heterogeneity in spending and savings

Causal forests successfully predict treatment effect heterogeneity in spending (decrease) and saving (increase)




Strong overlap between the group of individuals that are predicted to spend a lot and to save a lot in response to the treatment

(a) All Individuals

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 | 0.1106 | 0.0619 | 0.0596 | 0.0179 |
| 2 | 0.0616 | 0.1004 | 0.0450 | 0.0430 |
| 3 | 0.0418 | 0.0743 | 0.0855 | 0.0484 |
| 4 | 0.0360 | 0.0133 | 0.0599 | 0.1408 |

(b) Individuals with a Credit Card

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 | 0.1107 | 0.0406 | 0.0610 | 0.0377 |
| 2 | 0.0599 | 0.1173 | 0.0473 | 0.0253 |
| 3 | 0.0615 | 0.0649 | 0.0939 | 0.0301 |
| 4 | 0.0179 | 0.0272 | 0.0480 | 0.1570 |

(c) Individuals with a Credit Card Who Paid Interest at Baseline

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 | 0.1017 | 0.0576 | 0.0571 | 0.0332 |
| 2 | 0.0592 | 0.0901 | 0.0526 | 0.0478 |
| 3 | 0.0571 | 0.0669 | 0.1070 | 0.0195 |
| 4 | 0.0319 | 0.0355 | 0.0339 | 0.1492 |

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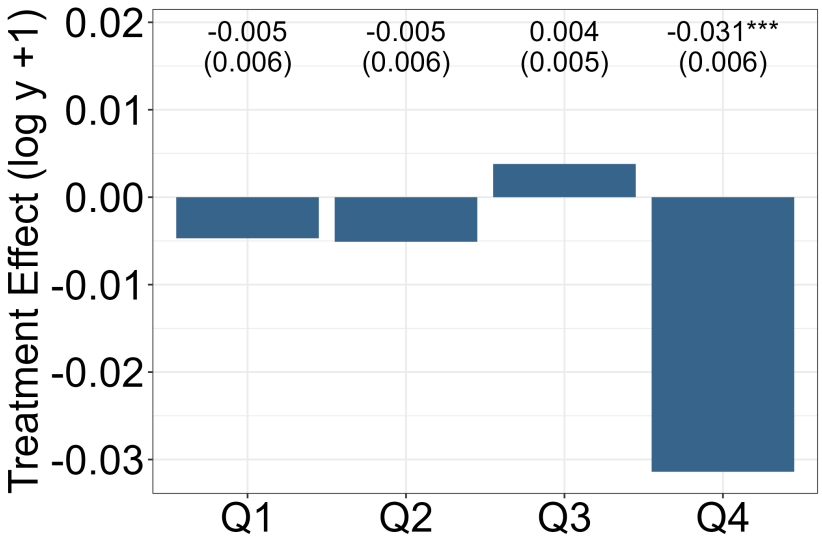


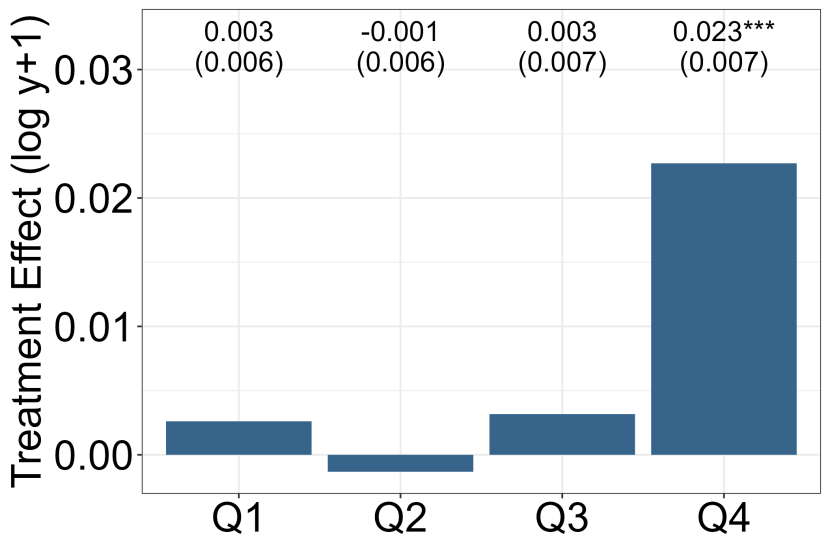


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# Results: spending, saving, and borrowing in the top quartile of predicted treatment effects

## Individuals in top quartile of predicted treatment effects in spending

| Dep.Var | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | Ln Spending +1 | Ln Checking Account Balance +1 | Ln Credit Card Interest +1 During Treat. (Banorte) | Ln Credit Card Interest +1 After Treat. (Banorte) | Paid Interest During Treat. {0,1} | Paid Interest After Treat. {0,1} | Ln Ending Statement Balance - Payments After Treat. +1 |
| Panel A: Individuals with a Credit Card | | | | | | | |
| TE | -0.0782*** | 0.0508*** | -0.0071 | -0.0077 | 0.0087 | -0.0061 | 0.0033 |
| | (0.0120) | (0.0145) | (0.0176) | (0.0178) | (0.0094) | (0.0095) | (0.0198) |
| Mean of Dep. Var in Control Group (MXN) | 33,485.48 | 41,463.01 | 207.37 | 210.91 | 0.47 | 0.46 | 5,088.41 |
| Change in Spending or Saving (MXN) | -2,618.56 | 2,106.32 | | | | | |
| Upper Confidence Interval (MXN) | | | 5.68 | 5.73 | 0.01 | 0.01 | 214.26 |
| Upper Confidence Interval Divided by Abs. Value of Change in Spending | | | 0.0022 | 0.0022 | 0.0000 | 0.0000 | 0.0818 |
| Lower Confidence Interval (MXN) | | | -8.63 | -8.98 | -0.00 | -0.01 | -180.68 |
| Lower Confidence Interval Divided by Abs. Value of Change in Spending | | | -0.0033 | -0.0034 | -0.0000 | -0.0000 | -0.0690 |
| N= 149561 | | | | | | | |
| Panel B: Individuals with a Credit Card Who Paid Interest at Baseline | | | | | | | |
| TE | -0.0739*** | 0.0537** | -0.0056 | -0.0053 | 0.0091 | -0.0084 | -0.0019 |
| | (0.0182) | (0.0255) | (0.0205) | (0.0201) | (0.0102) | (0.0104) | (0.0202) |
| Mean of Dep. Var in Control Group (MXN) | 35,190.08 | 36,471.10 | 400.85 | 415.03 | 0.87 | 0.89 | 11,186.20 |
| Change in Spending or Saving (MXN) | -2,600.55 | 1,958.50 | | | | | |
| Upper Confidence Interval (MXN) | | | 13.86 | 14.15 | 0.03 | 0.01 | 421.63 |
| Upper Confidence Interval Divided by Abs. Value of Change in Spending | | | 0.0053 | 0.0054 | 0.0000 | 0.0000 | 0.1621 |
| Lower Confidence Interval (MXN) | | | -18.35 | -18.55 | -0.01 | -0.03 | -464.14 |
| Lower Confidence Interval Divided by Abs. Value of Change in Spending | | | -0.0071 | -0.0071 | -0.0000 | -0.0000 | -0.1785 |
| N= 72365 | | | | | | | |

# Results: spending, saving, and borrowing in the top quartile of predicted treatment effects

## Individuals in top quartile of predicted treatment effects in saving

| Dep.Var | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | Ln Spending +1 | Ln Checking Account Balance +1 | Ln Credit Card Interest +1 During Treat. (Banorte) | Ln Credit Card Interest +1 After Treat. (Banorte) | Paid Interest During Treat. {0,1} | Paid Interest After Treat. {0,1} | Ln Ending Statement Balance - Payments After Treat. +1 |
| Panel A: All Clients with a Credit Card | | | | | | | |
| TE | -0.0551*** | 0.0611*** | -0.0082 | -0.0080 | -0.0045 | -0.0041 | 0.0038 |
| | (0.0182) | (0.0137) | (0.0175) | (0.0170) | (0.0067) | (0.0074) | (0.0181) |
| Mean of Dep. Var in Control Group (MXN) | 37,265.33 | 31,737.78 | 218.54 | 220.34 | 0.44 | 0.45 | 4,739.24 |
| Change in Spending or Saving (MXN) | -2,053.32 | 1,939.18 | | | | | |
| Upper Confidence Interval (MXN) | | | 5.70 | 5.58 | 0.00 | 0.00 | 186.14 |
| Upper Confidence Interval Divided by Abs. Value of Change in Saving | | | 0.0029 | 0.0029 | 0.0000 | 0.0000 | 0.0960 |
| Lower Confidence Interval (MXN) | | | -9.29 | -9.10 | -0.01 | -0.01 | -150.12 |
| Lower Confidence Interval Divided by Abs. Value of Change in Saving | | | -0.0048 | -0.0047 | -0.0000 | -0.0000 | -0.0774 |
| N= 147647 | | | | | | | |
| Panel B: Clients with a Credit Card Who Paid Interest at Baseline | | | | | | | |
| TE | -0.0639*** | 0.0559** | -0.0067 | -0.0063 | -0.0035 | -0.0033 | -0.0042 |
| | (0.0201) | (0.0218) | (0.0200) | (0.0199) | (0.0097) | (0.0091) | (0.0209) |
| Mean of Dep. Var in Control Group (MXN) | 31,034.19 | 27,809.32 | 403.93 | 405.33 | 0.74 | 0.76 | 10,414.98 |
| Change in spending or savings (MXN) | -1,983.08 | 1,554.54 | | | | | |
| Upper Confidence Interval (MXN) | | | 13.12 | 13.26 | 0.01 | 0.01 | 382.90 |
| Upper Confidence Interval Divided by Abs. Value of Change in Saving | | | 0.0084 | 0.0085 | 0.0000 | 0.0000 | 0.2463 |
| Lower Confidence Interval (MXN) | | | -18.54 | -18.36 | -0.02 | -0.02 | -470.38 |
| Lower Confidence Interval Divided by Abs. Value of Change in Saving | | | -0.0119 | -0.0118 | -0.0000 | -0.0000 | -0.3026 |
| N= 70912 | | | | | | | |

# Robustness

- Same results when we use the outcome variables measured in MXN
- Same results for spending, saving, and borrowing when Banorte is the main bank (no other credit lines in credit bureau records)
- Same results for spending, saving, and borrowing for individuals below the median credit utilization
- Same results when we use balances or repayments as outcome variables
- Same results when we restrict sample to individuals who have an entire billing cycle covered by the intervention

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# Lessons for the co-holding puzzle

Joint responses in spending, saving, and borrowing consistent with co-holding due to mental accounting or within-household agency problems

- Four additional supporting results:
  1. Unable to predict any treatment effect heterogeneity in borrowing behavior, suggests borrowing is not primarily driven by household needs but rather by the desire to constrain the spending capacity of the impatient self or spouse
  2. Strong overlap between puzzle group and individuals in top quartile of predicted treatment effects
  3. Individuals increase their saving primarily by cutting down their discretionary spending, i.e., ATM withdrawals
  4. Mental-accounting message carries largest treatment effect

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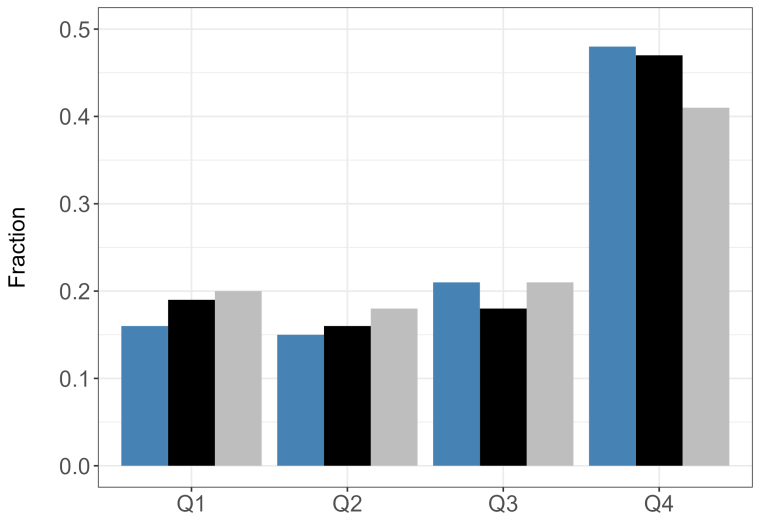
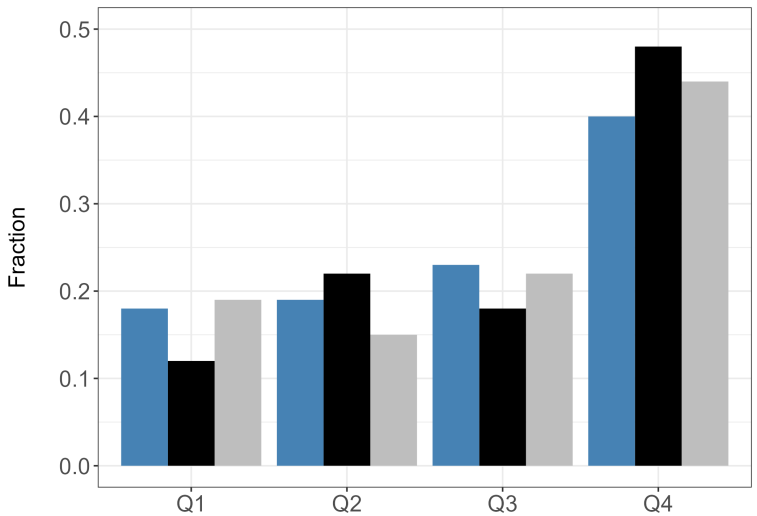
# Lessons for the co-holding puzzle

Strong overlap of puzzle group and individuals in top quartile of the treatment effect distribution



# Lessons for the co-holding puzzle

Increase in savings is primarily driven by reductions in ATM withdrawals and (but less so) card spending

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Dep.Var | Ln Deposits +1 | Ln ATM Withdrawals +1 | Ln Spending Debit or Credit Card +1 | Ln Transfers +1 |
| Panel A: All Clients with a Credit Card | | | | |
| TE | -0.0102 | -0.0878*** | -0.0699*** | 0.0022 |
| | (0.0103) | (0.0113) | (0.0117) | (0.0112) |
| Mean of Dep. Var in Control Group (MXN) | 29,362.42 | 14,154.34 | 17,199.21 | 1,663.67 |
| N= 149561 | | | | |
| Panel B: Clients with a Credit Card who Paid Interest at Baseline | | | | |
| TE | -0.0095 | -0.0991*** | -0.0530*** | 0.0016 |
| | (0.0124) | (0.0140) | (0.0128) | (0.0134) |
| Mean of Dep. Var in Control Group (MXN) | 24,470.24 | 12,743.78 | 20,034.51 | 1,483.56 |
| N= 72365 | | | | |

# Lessons for the co-holding puzzle

Treatment effects is strongest for the mental-accounting savings message

| Dep.Var | (1) | (2) | (3) |
|---|---|---|---|
| | Ln Monthly Spending +1 | Ln Checking Account Balance +1 | Ln Credit Card Interest +1 |
| Short-term messages | | | |
| Msg 2 | -0.087*** | 0.052** | 0.005 |
| Year-end Expenses | (0.022) | (0.023) | (0.036) |
| Msg 6 | -0.041* | 0.022 | -0.011 |
| Avoid Shortfalls | (0.021) | (0.023) | (0.036) |
| Msg 7 | -0.092*** | 0.055** | -0.011 |
| Emergency | (0.021) | (0.023) | (0.036) |
| All Short-term | -0.074*** | 0.043** | -0.006 |
| Msgs. Pooled | (0.017) | (0.018) | (0.028) |
| Long-term messages | | | |
| Msg 1 | -0.035 | 0.021 | -0.013 |
| Congratulations | (0.022) | (0.023) | (0.036) |
| Msg 3 | -0.122*** | 0.078*** | 0.006 |
| Others your Age | (0.021) | (0.023) | (0.036) |
| Msg 5 | -0.069*** | 0.037 | -0.015 |
| Reach Dreams | (0.022) | (0.023) | (0.036) |
| All Long-term | -0.075*** | 0.045** | -0.007 |
| Msgs. Pooled | (0.017) | (0.018) | (0.028) |

| Dep.Var | (1) | (2) | (3) |
|---|---|---|---|
| | Ln Monthly Spending +1 | Ln Checking Account Balance +1 | Ln Credit Card Interest +1 |
| Short-term messages | | | |
| Msg 4 | -0.124*** | 0.081*** | -0.009 |
| Money Box | (0.021) | (0.023) | (0.036) |
| Differences Across Types of Messages | | | |
| Short-term | 0.002 | -0.003 | 0.002 |
| - Long-term | (0.014) | (0.015) | (0.025) |
| Short-term | 0.050*** | -0.038* | 0.003 |
| - Mental Accounting | (0.019) | (0.020) | (0.032) |
| Long-term | 0.049** | -0.036* | 0.002 |
| - Mental Accounting | (0.019) | (0.021) | (0.031) |

# Lessons for the co-holding puzzle

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| Money Box | (0.021) | (0.023) | (0.036) |
| Differences Across Types of Messages | | | |
| Short-term | 0.002 | -0.003 | 0.002 |
| - Long-term | (0.014) | (0.015) | (0.025) |
| Short-term | 0.050*** | -0.038* | 0.003 |
| - Mental Accounting | (0.019) | (0.020) | (0.032) |
| Long-term | 0.049** | -0.036* | 0.002 |
| - Mental Accounting | (0.019) | (0.021) | (0.031) |

# Conclusion

* New evidence for economic mechanisms behind co-holding, using a large-scale experiment
    * Findings are consistent with mental-accounting or intra-household agency problems models of co-holding
* Policy relevant evaluation of nudges to save via SMS messages on borrowing outcomes
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* New evidence for economic mechanisms behind co-holding, using a large-scale experiment
  * Findings are consistent with mental-accounting or intra-household agency problems models of co-holding
* Policy relevant evaluation of nudges to save via SMS messages on borrowing outcomes
* Discussion of lessons for heterogeneity analysis in business and policy applications using causal forests

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