Sticking to Your Plan: The Role of Present Bias for Credit Card Paydown

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Motivation and Overview

• Substantial credit card borrowing at high cost by US households

• **Goal**: Understand the role of present bias in debt paydown

• **Data**: Sample of users of financial management website
  → Many fail to stick with self-set paydown plans

• Parsimonious model to show how to infer present-bias from high-frequency consumption data

• Relate to debt paydown
  • Sophisticated users pay down less the more impatient
  • Planned paydown more predictive of actual for sophisticated users
Present Bias - Definition

Present Bias

• More impatient in short-run ($\beta\delta$) than long-run ($\delta$)

\[ U_t = u(c_t) + \beta \sum_{\tau=t+1}^{\infty} \delta^\tau u(c_\tau) \]

→ Time *in*consistent
Present Bias - Definition

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- More impatient in short-run \((\beta \delta)\) than long-run \((\delta)\)

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- Two present-biased types
  - Fully Aware → \textbf{Sophisticated}
  - Unaware of changing preferences → \textbf{Naive}
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• Two present-biased types
  • Fully Aware → \textbf{Sophisticated}
  • Unaware of changing preferences → \textbf{Naive}

→ Two features of present bias:
  • Extent of short-run impatience \((\beta)\)
  • Sophistication
Analysis Preview

Relate features of present bias to spending patterns in model

• Level of short-run impatience → Sensitivity of consumption spending to paycheck receipt

• Awareness of future short-run impatience/sophistication → Effect of varying resources on spending patterns

Assess who sticks to plan of debt reduction

• Naive/Unaware of future present bias: Repeatedly delay to pay down debt as planned

• Sophisticated: Follow plan better, but pay down less the more impatient

→ Consistent with important role of present bias

→ Inconsistent with alternative explanations (e.g., credit constraints, unrealistic expectations)
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1. Relate features of present bias to spending patterns in model
   - Level of short-run impatience
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Overview

- Data
- Present bias and high frequency consumption patterns: Model intuition
- Present bias and high frequency consumption patterns: Estimation
- Debt paydown
Data

Users of a website to help manage and pay down credit card debt (www.readyforzero.com)
Data

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Information on:

- Balance, credit limit, available credit of accounts
- Transaction level data for checking and credit card
- Incoming payments, including paycheck
- Amount planned to pay down each month at signup
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Information on:
- Balance, credit limit, available credit of accounts
- Transaction level data for checking and credit card
- Incoming payments, including paycheck
- Amount planned to pay down each month at signup

Include users in sample if:
- Linked checking account
- Regular, bi-weekly paychecks
- Data on all linked accounts available from signup till 180 days
Overview

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- Present bias and high frequency consumption patterns: Model intuition
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Infer Present Bias from High Frequency Consumption

\[ U_t = u(c_t) + \beta \sum_{\tau=t+1}^{\infty} \delta^\tau u(c_{\tau}) \]

- Two features of present bias:
  - Extent of short-run impatience (\( \beta \))
  - Awareness/sophistication (belief about future \( \beta \))

→ Infer from high-frequency consumption

- Paper: Life-cycle model
  - Simulate model
  - Run equivalent of empirical regressions on simulated data

- Now: Focus on intuition
Intuition: Short-run Impatience and Sensitivity to Paycheck

Setup: Consumer receives regular paycheck every 2 weeks
Short-run Impatience and Consumption Over the Paycycle

Setup: Consumer receives regular paycheck every 2 weeks

Consumers with high short-run impatience
- Highly value current consumption
- Consume higher fraction immediately after receiving paycheck
Intuition: Short-run Impatience and Sensitivity to Paycheck

Setup: Consumer receives regular paycheck every 2 weeks

Consumers with high short-run impatience
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Intuition: Short-run Impatience and Sensitivity to Paycheck

Setup: Consumer receives regular paycheck every 2 weeks

Consumers with low or no short-run impatience
- Smooth consumption over paycycle
- Consumption spending does not depend on *when* paycheck arrives
Intuition: Short-run Impatience and Sensitivity to Paycheck

Setup: Consumer receives regular paycheck every 2 weeks

→ Higher short-run impatience reflected in sensitivity of consumption to paycheck
Sophistication: Euler Equation

- **Naive:** $\hat{\beta} = 1$
  
  $$u'(C_t) = \delta E_t[R\beta u'(\hat{C}_{t+1})]$$

- **Sophisticated:** $\hat{\beta} = \beta$
  
  $$u'(C_t) = \delta E_t[R(\beta \frac{\partial C_{t+1}}{\partial X_{t+1}} + (1 - \frac{\partial C_{t+1}}{\partial X_{t+1}}))u'(C_{t+1})].$$
**Sophistication: Euler Equation**

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  $\rightarrow$ Effective discount factor depends on $\frac{\partial C_{t+1}}{\partial X_{t+1}}$ only for sophisticates.
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  → Effective discount factor depends on \( \frac{\partial C_{t+1}}{\partial X_{t+1}} \) only for sophisticates

- Marginal propensity to consume \( \frac{\partial C_{t+1}}{\partial X_{t+1}} \) unobserved

- But: Lower marginal propensity to consume \( \frac{\partial C_{t+1}}{\partial X_{t+1}} \) when higher resources (diminishing marginal utility)
  
  → Variation in resources as proxy for variation in \( \frac{\partial C_{t+1}}{\partial X_{t+1}} \)
Sophistication and Effect of Resources

Setup: Consumer sometimes receives higher net paycheck, e.g. bonus

Sophisticated consumer is aware
• Future propensity to overconsume, relative to long-run preferences
• Resources being partially consumed rather than further passed on
Sophistication and Effect of Resources

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Sophisticated consumer *aware* of
- Future propensity to overconsume, relative to long-run preferences
- Resources being partially consumed rather than further passed on
**Sophistication and Effect of Resources**

Setup: Consumer sometimes receives higher net paycheck, e.g., bonus

Higher paycheck

→ Higher consumption, lower marginal propensity to (over)consume
→ More resources further passed on rather than consumed
→ More worthwhile to act patiently / pass on resources
Sophistication and Effect of Resources

Setup: Consumer sometimes receives higher net paycheck, e.g. bonus

→ Sophisticates less sensitive to paycheck when resources high
Sophistication and Effect of Resources

Setup: Consumer sometimes receives higher net paycheck, e.g. bonus

- Naive consumer *unaware* of future propensity to overconsume, relative to long-run preferences
Sophistication and Effect of Resources

Setup: Consumer sometimes receives higher net paycheck, e.g., bonus

- Naive consumer *unaware* of future propensity to overconsume, relative to long-run preferences
  → Intertemporal trade-off unaffected by level of resources
**Sophistication and Effect of Resources**

Setup: Consumer sometimes receives higher net paycheck, e.g. bonus

→ **Level of resources affects trade-off for sophisticates only**

→ **Sophistication reflected in effect of resources**
Overview

- Data
- Present bias and high frequency consumption patterns: Model intuition
- Present bias and high frequency consumption patterns: Estimation
- Debt paydown
Estimating Sensitivity to Paycheck

Estimate separately for each user

\[ \log(E_{it}) = \alpha_i + \text{payweek}_{it} \gamma_1 + X_{it} \psi_i + \varepsilon_{it} \]
Estimating Sensitivity to Paycheck

Estimate separately for each user

\[ \log(E_{it}) = \alpha_i + \text{payweek}_{it} \gamma_{1i} + X'_{it} \psi_i + \varepsilon_{it} \]

where \( X_{it} \) includes month FE and day of week FE
Estimating Sensitivity to Paycheck

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\[ \log(E_{it}) = \alpha_i + \text{payweek}_{it} \gamma_1 i + X'_{it} \psi_i + \epsilon_{it} \]

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<table>
<thead>
<tr>
<th></th>
<th>Sensitivity to Paycheck Receipt</th>
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<tbody>
<tr>
<td></td>
<td>Obs.</td>
<td>Mean</td>
<td>Std. Dev.</td>
<td>25th</td>
<td>50th</td>
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<tr>
<td><strong>Sensitivity ((\gamma_1)) - Pooled estimates</strong></td>
<td></td>
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<tr>
<td>Short-Run Consumables</td>
<td>516</td>
<td>0.061</td>
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<td>t-stat = 6.94</td>
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<td>Restaurants&amp;Entertainment</td>
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Estimating Sensitivity to Paycheck Receipt

Estimate separately for each user

\[ \log(E_{it}) = \alpha_i + \text{payweek}_{it} \gamma_1 + X'_{it} \psi_i + \varepsilon_{it} \]

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| **Sensitivity \((\gamma_1)\) - Individual estimates** |       |      |           |             |             |             |
| Short-Run Consumables| 516  | 0.061| 0.211    | -0.081      | 0.049       | 0.199       |
| Restaurants&Entertainment| 516  | 0.046| 0.201    | -0.086      | 0.052       | 0.172       |

| **Effect of Resources on Sensitivity \((\gamma_3)\)** |       |      |           |             |             |             |
| Short-Run Consumables| 516  | -0.473| 8.932    | -0.116      | 0.014       | 0.134       |
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→ Extent of sensitivity as proxy for level of short-run impatience
Effect of Resources and Sophistication

\[
\log(E_{it}) = \alpha_i + \text{payweek}_{it}\gamma_{1i} + \text{resources}_{it}\gamma_{2i} \\
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Sophisticated  ⇔  *Negative* effect of resources on sensitivity (\( \gamma_{3i} \))

Naive  ⇔  *Non-negative* effect of resources on sensitivity (\( \gamma_{3i} \))
Methodology: Estimating Effect of Resources?

\[ \log(E_{it}) = \alpha_i + \text{payweek}_{it} \gamma_{1i} + \text{resources}_{it} \gamma_{2i} \\
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- **Endogeneity?**
  - Spending \( E_{it} \) affects \( \text{resources}_{i,t+1} \) directly
  - Spending \( E_{it} \) potentially affects “taste for consumption” in \( t + 1 \), i.e. \( \varepsilon_{i,t+1} \)
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- Solution
  - Measure resources at beginning
  - Instrument for level of resources
    \( \rightarrow \) Simulated balances as simulated instrument
Methodology: Simulated Instrument

Idea: Isolate exogenous part of variation, filter out endogenous part
Methodology: Simulated Instrument

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Need: Source of exogenous variation
Methodology: Simulated Instrument

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• Policy change, e.g., tax change
• Discontinuity /kink in allocation formula
• Fixed timing of payments
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→ What would have happened if only exogenous variation, no endogenous response?
**Methodology: Simulated Instrument**

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**Need:** Source of exogenous variation

- Policy change, e.g., tax change
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- Fixed timing of payments

→ What would have happened if only exogenous variation, no endogenous response?

→ Use simulated /hypothetical variable as instrument for actual
Endogeneity of resource level and spending
Estimating Effect of Resources: Simulated Balances

Endogeneity of resource level and spending

→ Instrument for resources using

**Hypothetical balances based on regular, expected payments**
Estimating Effect of Resources: Simulated Balances

Endogeneity of resource level and spending

→ Instrument for resources using
  **Hypothetical balances based on regular, expected payments**

- **Regular payments**: same amount, regularly (7, 14 or 30 days)
- **Idea**: Affect available resources, but independent of past or future discretionary spending
Regular Payments and Simulated Balances
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- paycheck
- paycheck
- paycheck
- paycheck

- rent
- rent
Regular Payments and Simulated Balances

paycheck paycheck paycheck paycheck
- rent - rent

Actual Resources
Regular Payments and Simulated Balances

paycheck paycheck paycheck paycheck
- rent - rent

Simulated balance
Regular Payments and Simulated Balances

- rent

Simulated balance

Slope:
Average daily non-regular expenditure over sample period
Effect of Resources and Sophistication

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- Debt paydown
Regression Results - Debt Paydown

\[
Paydown_i = \mu_0 + Sensitivity_i \mu_{1n} + PlannedPaydown_i \mu_{2n} \\
+ Sensitivity_i \times Sophist_i \mu_{1s} \\
+ PlannedPaydown_i \times Sophist_i \mu_{2s} \\
+ X'_i \lambda + \nu_i
\]
Methodology: Estimated Regressors

\[ \text{Paydown}_i = \mu_0 + \text{Sensitivity}_i \mu_{1n} + \text{PlannedPaydown}_i \mu_{2n} \]
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+ X_i' \lambda + \nu_i
\]

- Usually: regressors are observables
- \( Sensitivity_i, Sophist_i \) are estimated
  - Estimated with noise
  - First stage regression informative of estimation error

→ Need to correct standard errors
→ Bootstrap standard errors
Methodology: Estimated Regressors

\[ Paydown_i = \mu_0 + Sensitivity_i \mu_{1n} + PlannedPaydown_i \mu_{2n} \]
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Methodology: Bootstrap Standard Errors

- Idea
  - Draw sample from data with replacement
  - Estimate regression specification for each sample draw
  - Compute standard errors based on sample draws

Good news: Bootstrap Package in Stata
Bad news: Exact specification depends on specifics of estimation at hand
Methodology: Bootstrap Standard Errors

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\[ \text{Paydown}_i = \mu_0 + \text{Sensitivity}_i \mu_{1n} + \text{PlannedPaydown}_i \mu_{2n} + \text{Sensitivity}_i \ast \text{Sophist}_i \mu_{1s} + \text{PlannedPaydown}_i \ast \text{Sophist}_i \mu_{2s} + X'_i \lambda + \nu_i \]
### Regression Results - Debt Paydown

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\text{Paydown}_i = \mu_0 + \text{Sensitivity}_i \mu_{1n} + \text{PlannedPaydown}_i \mu_{2n} \\
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\]

<table>
<thead>
<tr>
<th></th>
<th>Paydown 90 Days</th>
<th></th>
<th>Paydown 180 Days</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Short-run</td>
<td>Restaurant &amp;</td>
<td>Short-run</td>
<td>Restaurant &amp;</td>
</tr>
<tr>
<td></td>
<td>Consumables</td>
<td>Entertainment</td>
<td>Consumables</td>
<td>Entertainment</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>8.511</td>
<td>-3.293</td>
<td>6.461*</td>
<td>7.547*</td>
</tr>
<tr>
<td></td>
<td>(0.241)</td>
<td>(0.613)</td>
<td>(0.099)</td>
<td>(0.083)</td>
</tr>
<tr>
<td>Planned paydown</td>
<td>0.179*</td>
<td>0.280***</td>
<td>0.129</td>
<td>0.177**</td>
</tr>
<tr>
<td></td>
<td>(0.056)</td>
<td>(0.002)</td>
<td>(0.133)</td>
<td>(0.033)</td>
</tr>
<tr>
<td>Sensitivity \ast Sophisticated</td>
<td>-33.293***</td>
<td>-13.820</td>
<td>-10.179*</td>
<td>-17.774***</td>
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<tr>
<td></td>
<td>(0.004)</td>
<td>(0.188)</td>
<td>(0.082)</td>
<td>(0.006)</td>
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<tr>
<td>Planned paydown \ast Sophisticated</td>
<td>0.371*</td>
<td>0.086</td>
<td>0.391*</td>
<td>0.295</td>
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<tr>
<td></td>
<td>(0.098)</td>
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<td>(0.119)</td>
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<tr>
<td>Sophisticated</td>
<td>4.157</td>
<td>-8.474</td>
<td>-1.099</td>
<td>-7.299</td>
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<tr>
<td>Constant</td>
<td>-12.035***</td>
<td>-7.636*</td>
<td>-8.585***</td>
<td>-6.217**</td>
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P-values of bootstrapped standard errors in parentheses. Significance: * (p<0.10), ** (p<0.05), *** (p<0.01).
Regression Results - Debt Paydown

\[ \text{Paydown}_i = \mu_0 + \text{Sensitivity}_i \mu_{1n} + \text{PlannedPaydown}_i \mu_{2n} + \text{Sensitivity}_i \times \text{Sophist}_i \mu_{1s} + \text{PlannedPaydown}_i \times \text{Sophist}_i \mu_{2s} + X_i' \lambda + \nu_i \]

<table>
<thead>
<tr>
<th></th>
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<tr>
<td></td>
<td>Short-run</td>
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<td></td>
<td>Consumables</td>
<td>Entertainment</td>
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<td>Sensitivity</td>
<td>8.511</td>
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<td>(0.241)</td>
<td>(0.613)</td>
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<tr>
<td>Planned paydown</td>
<td>0.179*</td>
<td>0.280***</td>
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<td>(0.056)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>Sensitivity * Sophisticated</td>
<td>-33.293***</td>
<td>-13.820</td>
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<td>(0.004)</td>
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<td>Planned paydown * Sophisticated</td>
<td>0.371*</td>
<td>0.086</td>
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Debt Paydown and Present Bias

Patterns of debt paydown are

• *Consistent* with present bias/hyperbolic discounting
Debt Paydown and Present Bias

Patterns of debt paydown are

- *Consistent* with present bias/hyperbolic discounting
- *Inconsistent* with alternative explanations:
  - Direct relation between reduction in sensitivity and paydown
  - Impatient users drive difference btw sophisticated and naive
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  - Habits, non-separabilities
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- Present bias can explain joint patterns of consumption and success in debt paydown
- Distinction between sophisticated and naive important
Conclusion

- Present bias can explain joint patterns of consumption and success in debt paydown
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- Individual level impatience/sophistication inferred from observed consumption choices
  → Use as measure in other settings

Implications

- Regulation of credit cards and other consumer financial products
- Financial service providers understanding customer behavior
- Policies to help consumers get out of debt
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Backup Slides
Classification into Sophisticated / Naive

- Classify based on effect of resources on sensitivity (coefficient on \textit{payweek} \times \textit{resources})
- Higher reduction in sensitivity leads to lower paydown?
Classification into Sophisticated / Naive

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Classification into Sophisticated / Naive

\[ Paydown_i = \mu_0 + (\text{coefficient\_on\_payweek} \times \text{resources})\mu_1 + X'_i \lambda + \nu_i \]

<table>
<thead>
<tr>
<th></th>
<th>Paydown 90 Days</th>
<th>Paydown 180 Days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
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<tr>
<td><strong>Short-run Consumables</strong></td>
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<tr>
<td>Coefficient on</td>
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<td>0.114</td>
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<td>Resources*Payweek</td>
<td>(0.432)</td>
<td>(0.935)</td>
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<tr>
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<td>1%</td>
<td>5%</td>
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<tr>
<td>Controls</td>
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<td>Y</td>
</tr>
<tr>
<td><strong>N</strong></td>
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<td></td>
</tr>
<tr>
<td>75th - 25th percentile</td>
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<td></td>
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<tr>
<td><strong>Restaurant &amp; Entertainment</strong></td>
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<tr>
<td>Coefficient on</td>
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<tr>
<td>Resources*Payweek</td>
<td>(0.864)</td>
<td>(0.867)</td>
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<tr>
<td>Winsorized</td>
<td>1%</td>
<td>5%</td>
</tr>
<tr>
<td>Controls</td>
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<td>Y</td>
</tr>
<tr>
<td><strong>N</strong></td>
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P-values in parentheses. Significance: * (p<0.10), ** (p<0.05), *** (p<0.01).
Robustness - Credit Constraints

Sensitivity caused by credit constraints?

- Estimation restricted to when spending of payweek affordable in non-payweek
Robustness - Credit Constraints

Sensitivity caused by credit constraints?

- Estimation restricted to when spending of payweek affordable in non-payweek
  - Baseline: *Category spending* possible
  - Now: 1. *Total discretionary spending* possible
    2. Category spending possible with *buffer stock* (10th percentile of resources)
## Robustness - Credit Constraints

<table>
<thead>
<tr>
<th></th>
<th>Short-Run Consumables</th>
<th>Restaurant &amp; Entertainment</th>
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<tr>
<td></td>
<td>buffer</td>
<td>discretionary</td>
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<tr>
<td><strong>Dependent Variable: Paydown 90 Days</strong></td>
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<td>(0.369)</td>
<td>(0.158)</td>
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<td>0.180*</td>
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<td>(0.058)</td>
<td>(0.058)</td>
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<tr>
<td>* Sophisticated</td>
<td>(0.013)</td>
<td>(0.002)</td>
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<tr>
<td>Planned paydown</td>
<td>0.380*</td>
<td>0.372*</td>
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<tr>
<td>* Sophisticated</td>
<td>(0.096)</td>
<td>(0.100)</td>
</tr>
<tr>
<td></td>
<td>(0.587)</td>
<td>(0.529)</td>
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<tr>
<td><strong>Dependent Variable: Paydown 180 Days</strong></td>
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<tr>
<td>Sensitivity</td>
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<td>3.920</td>
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<td></td>
<td>(0.276)</td>
<td>(0.326)</td>
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<tr>
<td>Planned paydown</td>
<td>0.139</td>
<td>0.139</td>
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<tr>
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<td>0.138</td>
<td>0.136</td>
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<tr>
<td>* Sophisticated</td>
<td>(0.238)</td>
<td>(0.271)</td>
</tr>
<tr>
<td>Planned paydown</td>
<td>0.420*</td>
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<tr>
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<td>(0.071)</td>
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<tr>
<td>Sophisticated</td>
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<td>-1.550</td>
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<td>(0.736)</td>
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<tr>
<td>Median Paycheck</td>
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<td>Y</td>
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<tr>
<td>Original Debt</td>
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<td>Y</td>
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<tr>
<td>Nr of individuals</td>
<td>516</td>
<td>516</td>
</tr>
</tbody>
</table>
Robustness: Credit Constraints
Excluding Low Sensitivity

Classification into sophisticated/naive of low sensitivity users

- Not meaningful theoretically
- More likely to be potentially misclassified

→ Exclude users with low estimated sensitivity/short-run impatience
**Robustness: Impatient users drive results**

\[ \text{Paydown}_i = \mu_0 + \text{Sensitivity}_i \mu_1 + \text{PlannedPaydown}_i \mu_2 + \text{Sensitivity}_i \ast \text{Sophist}_i \mu_{1s} + \text{PlannedPaydown}_i \ast \text{Sophist}_i \mu_{2s} + X'_i \lambda + \nu_i \]

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<tr>
<td>Baseline</td>
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\[
\text{Paydown}_i = \mu_0 + \text{Sensitivity}_i \mu_{1n} + \text{PlannedPaydown}_i \mu_{2n} + \text{Sensitivity}_i \ast \text{Sophist}_i \mu_{1s} + \text{PlannedPaydown}_i \ast \text{Sophist}_i \mu_{2s} + X'_i \lambda + \nu_i
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<td><strong>15%</strong></td>
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<td></td>
<td>(0.613)</td>
<td>(0.652)</td>
</tr>
<tr>
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<td>0.258**</td>
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<td></td>
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<tr>
<td></td>
<td>(0.188)</td>
<td>(0.248)</td>
</tr>
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<td>Sophisticated * Planned paydown</td>
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<td>0.115</td>
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<td>(0.573)</td>
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Regular Payments and Simulated Balances
Regular Payments and Simulated Balances
Regular Payments and Simulated Balances

Actual Resources

paycheck
- rent

paycheck
- rent

paycheck
- rent
Regular Payments and Simulated Balances

Simulated balance

- rent

- rent
## Regular Payments and Simulated Balances

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<td>(0.188)</td>
<td>(0.248)</td>
<td>(0.315)</td>
<td>(0.194)</td>
</tr>
<tr>
<td>Sophisticated * Planned paydown</td>
<td>0.086</td>
<td>0.115</td>
<td>0.103</td>
<td>0.090</td>
</tr>
<tr>
<td></td>
<td>(0.666)</td>
<td>(0.573)</td>
<td>(0.624)</td>
<td>(0.682)</td>
</tr>
<tr>
<td></td>
<td>(0.127)</td>
<td>(0.213)</td>
<td>(0.192)</td>
<td>(0.337)</td>
</tr>
<tr>
<td>Median paycheck</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Original debt</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Constant</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Number of individuals</td>
<td>516</td>
<td>465</td>
<td>439</td>
<td>413</td>
</tr>
</tbody>
</table>
Regular Payments and Simulated Balances
## Summary Statistics by Sophistication

<table>
<thead>
<tr>
<th>Sophistication based on</th>
<th>Short-run consumables</th>
<th>Restaurant &amp; Entertainment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Naïve</td>
<td>Sophisticated</td>
</tr>
<tr>
<td><strong>Sensitivity to Paycheck</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average sensitivity</td>
<td>0.051</td>
<td>0.072</td>
</tr>
<tr>
<td>Median sensitivity</td>
<td>0.043</td>
<td>0.059</td>
</tr>
<tr>
<td><strong>Income and Debt</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income - Mean</td>
<td>3,808</td>
<td>3,802</td>
</tr>
<tr>
<td>Credit Card Debt - Mean</td>
<td>14,144</td>
<td>13,693</td>
</tr>
<tr>
<td>Credit Card Debt - Median</td>
<td>9,430</td>
<td>10,133</td>
</tr>
<tr>
<td>Credit Card Debt / Income - Mean</td>
<td>3.786</td>
<td>4.773</td>
</tr>
<tr>
<td><strong>Total Discretionary Spending</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>avg. $</td>
<td>1,844.0</td>
<td>1,755.8</td>
</tr>
<tr>
<td>avg. % of income</td>
<td>52.9</td>
<td>51.6</td>
</tr>
<tr>
<td>avg. % spend on credit cards</td>
<td>34.3</td>
<td>33.9</td>
</tr>
<tr>
<td><strong>Short-run Consumables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>avg. $ - mean</td>
<td>560.9</td>
<td>537.0</td>
</tr>
<tr>
<td>avg. % spend on credit cards</td>
<td>31.1</td>
<td>31.1</td>
</tr>
<tr>
<td><strong>Restaurant &amp; Entertainment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>avg. $ - mean</td>
<td>298.6</td>
<td>262.6</td>
</tr>
<tr>
<td>avg. % spend on credit cards</td>
<td>32.4</td>
<td>32.4</td>
</tr>
<tr>
<td><strong>Planned Paydown - 90 Days</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>2,540.1</td>
<td>2,409.7</td>
</tr>
<tr>
<td>Median</td>
<td>1,795.1</td>
<td>1,723.3</td>
</tr>
<tr>
<td><strong>Payments Made - 90 Days</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>3,375.0</td>
<td>2,895.0</td>
</tr>
<tr>
<td>Median</td>
<td>1,686.1</td>
<td>1,629.9</td>
</tr>
<tr>
<td><strong>Change in debt</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avg. change - 90 days</td>
<td>-693.0</td>
<td>-784.2</td>
</tr>
<tr>
<td>Median. change - 90 days</td>
<td>-209.1</td>
<td>-232.4</td>
</tr>
<tr>
<td>Avg. change - 180 days</td>
<td>-787.1</td>
<td>-1,210.8</td>
</tr>
<tr>
<td>Median change- 180 days</td>
<td>-395.3</td>
<td>-419.0</td>
</tr>
<tr>
<td>N</td>
<td>285</td>
<td>231</td>
</tr>
</tbody>
</table>
Summary Statistics by Sophistication
Debt Paydown by Sensitivity

Quintiles Based on Sensitivity to Paycheck Receipt

Sophisticated - Short-Run Consumables
Naive - Short-Run Consumables
Debt Paydown by Sensitivity

Quintiles Based on Sensitivity to Paycheck Receipt

Sophisticated - Restaurant & Entertainment
Naive - Restaurant & Entertainment
Paydown and Sensitivity to Paycheck