Consumption Smoothing or Consumption Binging?
The Effects of Government-led Consumer Credit Expansion in Brazil

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BCB

Atif Mian
Princeton

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Northwestern

Amir Sufi
Chicago Booth

Banco Central Do Brasil, May 2023
Motivation

- Large increase in household debt in developing economies in last decades

- Governments often play prominent role
  - Credit expansion policies (Malaysia, Pakistan), state-owned banks (Brazil, China)

- What explains large take up by households?
  - PIH hh that want to smooth consumption → relaxation of borrowing constraints
  - "Present-focus" hh that want to binge consumption → lack of financial sophistication
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Brazil Experiment

- Large credit expansion from government banks in Brazil from 2011
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• New data set matching individual-level information on:
  • Credit relationships: 12.8% random sample of borrowers
  • Consumption: credit card expenditure
  • Employer-employee data: wage, education, age, occupation
  • Financial knowledge/behavior: self-assessed via survey
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• Empirical strategy:
  • public sector employment as measure of exposure
  • Heterogeneous effects by borrowing constraint/financial sophistication (new proxies)
Institutional Setting

- Politically-motivated government intervention in credit markets
  - Large capital injections into government banks (Banco do Brasil, Caixa)
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• Which products? Payroll loans (18% hh liabilities)
  • Allow banks to deduct payments directly from borrowers’ paycheck
  • Scarce limited liability for borrowers, but still high real interest rate (20%)
Institutional Setting

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• Which products? Payroll loans (18% hh liabilities)
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• How did expansion happen in practice?
  • Flagship programs marketing new credit availability via advertising campaigns
  • Bank correspondents (pastinhas) paid by commission
Advertising Expenditure of 5 largest Brazilian Banks

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<thead>
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Empirical Strategy

- **Public sector employment** as exposure to credit push
  - high quality collateral, especially for payroll loans
  - explicitly targeted by ad campaigns
Empirical Strategy

- **Public sector employment** as exposure to credit push
  - high quality collateral, especially for payroll loans
  - explicitly targeted by ad campaigns
  - 20% workforce, 30% borrowers, 50% of payroll loans
  - Most diffused occupations:
    - secretaries, teachers, cleaning personnel, management and maintenance of public buildings.
Empirical Strategy, cont.

- Public employment **not** randomly assigned
Empirical Strategy, cont.

- Public employment **not** randomly assigned

1. Control for large set of baseline observables interacted with time FE
Empirical Strategy, cont.

- Public employment **not** randomly assigned

1. Control for large set of baseline observables interacted with time FE
2. Parallel trends before intervention
Empirical Strategy, cont.

- Public employment **not** randomly assigned

1. Control for large set of baseline observables interacted with time FE
2. Parallel trends before intervention
3. Exploit within-individual variation across banks
Dynamic effects of public employment on borrowing

\[
\left( \frac{\text{debt}_{it}}{\text{income}_{i,2010}} \right) = \alpha_i + \alpha_t + \sum_{k=2007}^{2016} \beta_k \mathbf{1}_{t=k} \text{Public}_i + \text{Controls}_i \times t + u_{it}
\]
Dynamic effects of public employment on borrowing

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Public employment and borrowing: 2010-2014

<table>
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<tr>
<th>outcome</th>
<th>$\Delta (\text{total debt})<em>{2010-2014} / \text{income}</em>{2010}$</th>
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<tr>
<td></td>
<td>total</td>
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<td>$I(\text{public sector employee})_{2010}$</td>
<td>0.151</td>
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<td></td>
<td>[0.007]**</td>
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<tr>
<td>R-squared</td>
<td>0.081</td>
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<td>N clusters</td>
<td>558</td>
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<tr>
<td>Observations</td>
<td>763,423</td>
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</tbody>
</table>

Notes: standard errors clustered at micro-region level. Controls: share of borrowing from gov banks and initial debt to income ratio.
By Type of Loans

- Total: 0.151
- Payroll Loans: 0.188
- Nonpayroll Personal Loans: 0.006
- Car: -0.012
- Mortgages: -0.013
- Credit Card Debt: 0.005
- Overdraft: -0.002
Taking stock

• So far:
  • Major household credit expansion program from government banks
  • Larger take up by public sector employees
Taking stock

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  • Major household credit expansion program from government banks
  • Larger take up by public sector employees

• What *types* of households borrowed more during expansion?
Credit constrained households

- Plausible mechanism?
  - No change in explicit borrowing limits
  - Real interest rates remain high
  - Most public sector workers unconstrained in the payroll loan segment
Credit constrained households

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• Household with typical exponential preferences (PIH households):
  • Want to borrow more if expect high income but constrained on current resources
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- Measurement:
  - Estimate expected income slope of each occupation/age group.
  - Higher income slope, all else equal, implies more constrained
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Income slopes

Figure: Log wage and workers’ age for a given occupation
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Figure: Log wage and workers' age for a given occupation
Figure: Labor income slope by workers’ age

- Private
- Public
Financial Sophistication

- Plausible mechanism?
  - Large advertising campaign of products often difficult to master
  - Use of “predatory” loan officers
  - Concerns raised by regulator in real time (COMEF)
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• “Present-focus” households with high short-run discount rates ($\beta \delta$)
  • high demand for consumption today even if lower consumption tomorrow
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  1. Years of education
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• Measurement
  1. Years of education
  2. Index of familiarity with financial concepts based on occupational descriptions
     • 2,500 occupations with description of associated tasks
     • Text analysis counting keywords associated with finance, statistics, math, accounting
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→ $\text{FinSophistication} = 1 \times 2$
Sanity Check on Financial Sophistication Measure

- Highly correlated with measures from national survey on financial behavior
Dynamic effects of public employment on borrowing

Heterogeneous effects by financial sophistication and income slope

Coefficient estimates and 99% CI

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<tr>
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<td>-0.05</td>
<td>0</td>
<td>0.05</td>
<td>0.1</td>
<td>0.05</td>
<td>0.05</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
</tbody>
</table>
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Coefficient estimates and 99% CI

-0.1 -0.05 0 0.05 0.1


public workers with low financial sophistication
public workers with high income slope
Real Effects during Recession period: 2014-2016
Low Financially Sophisticated Public Sector Workers

![Graph showing coefficient values for Delta (Share Balance in default) and Delta (log(credit card expenditure)) with a coefficient of -0.04.]
Real Effects during whole sample period: 2010-2016

Low Financially Sophisticated Public Sector Workers

![Graph showing coefficients for after debt service income, credit card expenditure: average, and credit card expenditure: variance.]
Final remarks

• After GFC, several governments in developing economies implemented policies designed to boost household borrowing

• Case of Brazil: Higher take up among less financially sophisticated borrowers
  
  2010-2014 (boom): ↑ debt-to-income
  2014-2016 (recession): ↓ after-debt-service income, no default, ↓ spending
  → 2010-2016: Higher volatility and lower average consumption

• More research needed in other settings, but this is a cautionary tale.
Appendix Figures
By Type of Loans: Gov Banks

- Total: 0.177
- Payroll loans: 0.141
- Nonpayroll personal loans: 0.009
- Car: 0.0000
- Mortgages: -0.007
- Credit card debt: 0.0000
- Overdraft: 0.0000
By Type of Loans: Private Banks
Figure: Within-individual Effects - Dynamic specification

(a) Debt to income ratio
(b) Average interest rate (percentage points)
Figure: Within-individual Effects - Dynamic specification

(a) Debt to income ratio

(b) Average interest rate (percentage points)
Appendix Tables
## Summary Statistics

### Panel A: Summary statistics of regression sample

<table>
<thead>
<tr>
<th>Baseline characteristics</th>
<th>Mean</th>
<th>St.dev</th>
<th>Obs</th>
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<tbody>
<tr>
<td>Gender (=1 if female)</td>
<td>0.42</td>
<td>0.49</td>
<td>763,423</td>
</tr>
<tr>
<td>Education (years)</td>
<td>13.24</td>
<td>3.03</td>
<td>763,423</td>
</tr>
<tr>
<td>Age</td>
<td>40.55</td>
<td>10.30</td>
<td>763,423</td>
</tr>
<tr>
<td>Monthly Wage (BRL)</td>
<td>3.970</td>
<td>4.596</td>
<td>763,423</td>
</tr>
<tr>
<td>log (yearly labor income)</td>
<td>10.33</td>
<td>0.93</td>
<td>763,423</td>
</tr>
<tr>
<td>Public employment</td>
<td>0.41</td>
<td>0.49</td>
<td>763,423</td>
</tr>
<tr>
<td>Share of borrowing from government banks</td>
<td>0.23</td>
<td>0.41</td>
<td>763,423</td>
</tr>
<tr>
<td>Total debt to labor income</td>
<td>0.64</td>
<td>0.65</td>
<td>763,423</td>
</tr>
<tr>
<td>$\Delta$ (total debt)$<em>{2010-2014}$ /income$</em>{2010}$ all</td>
<td>0.66</td>
<td>1.18</td>
<td>763,423</td>
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### Panel B: Comparing Private vs Public sector workers

<table>
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<tr>
<th>Baseline characteristics</th>
<th>Private</th>
<th>Public</th>
<th>Difference</th>
<th>St.err.</th>
<th>N</th>
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<tr>
<td>Gender (=1 if female)</td>
<td>0.33</td>
<td>0.55</td>
<td>0.22</td>
<td>$[0.014]^{***}$</td>
<td>763,423</td>
</tr>
<tr>
<td>Education (years)</td>
<td>12.93</td>
<td>13.69</td>
<td>0.76</td>
<td>$[0.112]^{***}$</td>
<td>763,423</td>
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<tr>
<td>Age</td>
<td>38.52</td>
<td>43.52</td>
<td>4.99</td>
<td>$[0.230]^{***}$</td>
<td>763,423</td>
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<tr>
<td>Monthly Wage</td>
<td>3758</td>
<td>4281</td>
<td>523</td>
<td>$[252.791]^{**}$</td>
<td>763,423</td>
</tr>
<tr>
<td>Total debt to labor income</td>
<td>0.65</td>
<td>0.64</td>
<td>-0.01</td>
<td>$[0.018]$</td>
<td>763,423</td>
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<tr>
<td>Share of borrowing from government banks</td>
<td>0.20</td>
<td>0.28</td>
<td>0.08</td>
<td>$[0.014]^{***}$</td>
<td>763,423</td>
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## Individual-level Effects: Borrowing During Boom Years 2010-2014

Heterogeneity by Initial Financial Sophistication and Income Slope

<table>
<thead>
<tr>
<th>outcome</th>
<th>Δ $(\text{total debt})<em>{2010-2014} / \text{income}</em>{2010}$</th>
<th>total</th>
<th>government banks</th>
<th>private banks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>$I(\text{public sector employee})<em>{2010} \times LowFinSophi</em>{2010}$</td>
<td>0.054 [0.011]**</td>
<td>0.035 [0.010]**</td>
<td>0.020 [0.011]*</td>
<td></td>
</tr>
<tr>
<td>$I(\text{public sector employee})<em>{2010} \times HighSlope</em>{2010}$</td>
<td>-0.084 [0.011]**</td>
<td>-0.044 [0.012]**</td>
<td>-0.028 [0.006]**</td>
<td></td>
</tr>
<tr>
<td>$I(\text{public sector employee})_{2010}$</td>
<td>0.147 [0.008]**</td>
<td>0.154 [0.015]**</td>
<td>-0.002 [0.013]</td>
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<tr>
<td>$LowFinSophi_{2010}$</td>
<td>0.017 [0.018]</td>
<td>-0.024 [0.012]**</td>
<td>0.037 [0.011]**</td>
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<tr>
<td>$HighSlope_{2010}$</td>
<td>0.173 [0.009]**</td>
<td>0.144 [0.011]**</td>
<td>0.009 [0.008]</td>
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</table>

| Individual controls | y | y | y |
| Fixed effects: | micro-region | y | y | y |
| | income quintiles | y | y | y |
| | age quintiles | y | y | y |
| | education | y | y | y |
| | gender | y | y | y |
| | occupation | y | y | y |

| Observations | 763,423 | 763,423 | 763,423 |
| R-squared | 0.077 | 0.055 | 0.126 |
| N clusters | 558 | 558 | 558 |
Individual-level Real Effects During Recession Years 2014-2016

<table>
<thead>
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<tr>
<td></td>
<td>Δ after-debt-service income</td>
<td>Δ (Share Balance in default)</td>
<td>Δ log (credit card expenditure)</td>
<td>Δ log (income)</td>
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<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
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<tr>
<td>I(public sector employee)<em>{2010} × LowSophi</em>{2010}</td>
<td>-0.013</td>
<td>0.000</td>
<td>-0.041</td>
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<td></td>
<td>[0.006]**</td>
<td>[0.000]</td>
<td>[0.010]**</td>
<td>[0.004]*</td>
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<td>0.026</td>
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<td>I(public sector employee)_{2010}</td>
<td>-0.035</td>
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<tr>
<td>LowFinSophi_{2010}</td>
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<td>0.017</td>
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<td>occupation</td>
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<tr>
<td>Observations</td>
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<td>685,052</td>
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<td>R-squared</td>
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<td>0.024</td>
<td>0.013</td>
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<td>N clusters</td>
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<td>-0.008</td>
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<td>[0.006]**</td>
<td>[0.000]</td>
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<tr>
<td>I(public sector employee)<em>{2010} \times HighSlope</em>{2010}</td>
<td>0.026</td>
<td>-0.000</td>
<td>-0.015</td>
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<td></td>
<td></td>
<td>[0.004]**</td>
<td>[0.000]</td>
</tr>
<tr>
<td>I(public sector employee)<em>{2010} \times LowFinSophi</em>{2010}</td>
<td>-0.035</td>
<td>-0.001</td>
<td>-0.008</td>
<td>-0.006</td>
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<td></td>
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<td>[0.004]**</td>
<td>[0.000]**</td>
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<tr>
<td>LowFinSophi_{2010}</td>
<td>-0.016</td>
<td>-0.001</td>
<td>0.007</td>
<td>0.004</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>[0.009]*</td>
<td>[0.000]**</td>
</tr>
<tr>
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<td>0.001</td>
<td>0.001</td>
<td>0.017</td>
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<td>age quintiles</td>
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<td>education</td>
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<td>gender</td>
<td>y</td>
<td>y</td>
<td>y</td>
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<td>occupation</td>
<td>y</td>
<td>y</td>
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<tr>
<td>Observations</td>
<td>684,884</td>
<td>763,423</td>
<td>763,423</td>
<td>685,052</td>
</tr>
<tr>
<td>R-squared</td>
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<td>0.024</td>
<td>0.013</td>
<td>0.040</td>
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<tr>
<td>N clusters</td>
<td>558</td>
<td>558</td>
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</table>
## Individual-level Effects: Robustness

### Heterogeneity by Initial Financial Sophistication and Actual Income Growth during Boom Period

<table>
<thead>
<tr>
<th>outcome</th>
<th>Boom period 2010-14</th>
<th>Recession period 2014-16</th>
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<tr>
<td></td>
<td>Δ (total debt)_{2010-2014}</td>
<td>Δ after-debt-service income_{2010}</td>
</tr>
<tr>
<td>I(public sector employee)<em>{2010} × LowFinSophi</em>{2010}</td>
<td>0.064</td>
<td>-0.014</td>
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<td></td>
<td>[0.009]***</td>
<td>[0.005]**</td>
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<tr>
<td>I(public sector employee)<em>{2010} × HighIncomeGrowth</em>{2010-14}</td>
<td>0.050</td>
<td>0.039</td>
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<td></td>
<td>[0.018]***</td>
<td>[0.005]**</td>
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<tr>
<td>I(public sector employee)<em>{2010} × HighIncomeGrowth</em>{2010-14}</td>
<td>0.126</td>
<td>-0.023</td>
</tr>
<tr>
<td></td>
<td>[0.006]***</td>
<td>[0.001]**</td>
</tr>
</tbody>
</table>

LowFinSophi_{2010} | 0.008 | -0.011 | -0.001 | 0.008 | 0.010 |
|         | [0.020] | [0.009] | [0.000]*** | [0.016]*** | [0.005]*** |

HighIncomeGrowth_{2010-14} | 0.375 | -0.122 | 0.000 | 0.000 | -0.159 |
|         | [0.014]*** | [0.003]** | [0.000]*** | [0.005]*** | [0.002]*** |

### Individual controls
- y y y y y

### Fixed effects:
- y y y y y

### Micro-region
- y y y y y

### Income quintiles
- y y y y y

### Age quintiles
- y y y y y

### Education
- y y y y y

### Gender
- y y y y y

### Occupation
- y y y y y

### Observations
- 763,423

### R-squared
- 0.095

### N clusters
- 558