Knowing What Not to Do: Financial Literacy And Consumer Credit Choices

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FDIC Consumer Research Symposium - October 18, 2013
Outline

Motivation

Data
- General Information on the Data
- Measuring Financial Literacy & Self-Control
- Data on Overdraft Credit

Empirical Results
- $H_0$: Financial Literacy Influences Credit Decisions
- How do Financial Literacy and Self-Control Interact?
What matters for consumers‘ credit decisions?

- The life-cycle theory and the permanent income hypothesis tell us that
  - individuals will rationally smooth their consumption
  - according to age and expected income
- However, observed behavior deviates systematically from the rational choice model. Is this...
  - because people are myopic and prefer immediate gratification over long-term benefits and/or
  - because people are financially illiterate and rationally unable to understand when a level of debt is unsustainable?
- Our analysis: Does financial literacy play a role in credit decisions when consumers lack self-control/are impulsive?
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Results at a glance

The results provide evidence that:

- People with low self-control are more likely to use overdraft frequently, especially if they are financially illiterate.
- Being financially literate decreases the probability of people with low self-control to rely heavily on overdraft credit by around 20 percent (up to 6 percentage points).
- It is mainly advanced financial literacy (i.e. knowledge on financial products and markets) – opposed to numeracy like financial literacy – which affects the probability to use overdraft credit less often.
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Consumers‘ credit decisions and self-control

- Consumers are found to behave according to a theory of planner vs. doer
  - Shefrin, Thaler (1988) explicitly consider self-control issues in their “Behavioral Life-Cycle Hypothesis”.
  - A long-horizon planner has to exert willpower over a short-sighted doer who wants to consume right away.

- Empirical evidence
  - Ottaviani, Vandone (2011): Impulsive people take out more consumer credit.
  - Meier, Sprenger (2010): Present-biased individuals accrue more credit card debt.
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Empirical research provides evidence that financially illiterate households...

- take out loans with unfavorable credit conditions (Lusardi, Tufano 2009).
- exhibit higher delinquency rates (Gathergood 2012).
- Take out subprime mortgages more frequently (Geradi, Goette, and Meier 2010).
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The SAVE 2009 Dataset

- Micro data on 2,222 German households provided by MEA (Munich Center for the Economics of Aging)
- Contains information on demographic characteristics (age, family structure, occupation) and economic items (income, net wealth)
- Our focus: Credit lines on current accounts
  - Available to 80% of German households
  - Accessible through debit or delayed debit cards, withdrawals or bank transfers
  - Easy contract conditions
  - Used in everyday life without professional consultation
How can we measure financial literacy?

- Financial literacy is measured by a 9 items subset of the questions by van Rooij, Lusardi, Alessie (2011).

- Financial literacy gauges “the ability to perform basic calculations as well as familiarity with financial products and concepts”.

- Examples:
  - Suppose you had €100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think would have in the account if you left the money to grow? (i) More than €102; (ii) Exactly €102; (iii) Less than €102; (iv) Do not know.
  - Buying a company stock mutually provides a safer return than a stock mutual fund. True or false? (i) True; (ii) False; (iii) Do not know.
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  - Buying a company stock usually provides a safer return than a stock mutual fund. True or false? (i) True; (ii) False; (iii) Do not know.
Results on the financial literacy test

**Graph**: Distribution of number of correct and incorrect answers
How can we assess self-control?

- Self-control is approximated in a 3 items test. (Frederick’s (2005) cognitive reflection test.)
- Test measures the “tendency to override an intuitive response which is incorrect and to engage in further reflection”.
- Example:
  A bat and a ball cost 110 cents in total. The bat costs 100 cents more than the ball. How much does the ball cost? – Price of the ball: _ _ _ cents (please fill in)
- Approach: Counting the intuitive but incorrect answers.
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Results on the cognitive reflection test

**Table:** Percentage of correct, intuitive & incorrect and other incorrect answers

<table>
<thead>
<tr>
<th></th>
<th>Correct</th>
<th>Intuitive</th>
<th>Incorrect</th>
<th>Refusal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Bat and ball</td>
<td>19.4</td>
<td>66.7</td>
<td>3.1</td>
<td>10.8</td>
</tr>
<tr>
<td>2) Production time</td>
<td>40.3</td>
<td>32.1</td>
<td>11.8</td>
<td>15.8</td>
</tr>
<tr>
<td>3) Lily pond</td>
<td>42.6</td>
<td>33.3</td>
<td>6.3</td>
<td>17.8</td>
</tr>
</tbody>
</table>
Correlation between the proxies

**Table:** Pearson correlations for self-control and financial literacy

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Data</th>
<th>Empirical Results</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring Financial Literacy &amp; Self-Control</td>
<td>Full FL</td>
<td>Basic FL</td>
<td>Adv. FL</td>
</tr>
<tr>
<td>TF score</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full FL score</td>
<td>-0.34</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Basic FL score</td>
<td>-0.31</td>
<td>0.91</td>
<td>1</td>
</tr>
<tr>
<td>Advanced FL score</td>
<td>-0.27</td>
<td>0.85</td>
<td>0.56</td>
</tr>
<tr>
<td>Economics education</td>
<td>-0.05</td>
<td>0.16</td>
<td>0.18</td>
</tr>
</tbody>
</table>
## Distribution of Overdraft Credit Usage Frequency (conditional on access)

**Table: “How often do you use the overdraft line on your current account?”**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>never</td>
<td>811</td>
</tr>
<tr>
<td>1-3 times p.a.</td>
<td>438</td>
</tr>
<tr>
<td>4-6 times p.a.</td>
<td>152</td>
</tr>
<tr>
<td>more often or constantly</td>
<td>295</td>
</tr>
</tbody>
</table>
Basic model

\[ Creditfreq_i^* = \beta \text{FinLit}_i + \gamma' \phi_i + \varepsilon_i \]

- We regress the categorial variable \( Creditfreq \) indicating overdraft usage frequency on the explanatory variables and controls.
- As explanatory variable we consider FinLit counting the correct answers to the financial literacy test.
- We include several sets of control variables in \( \phi \) concerning
  - Economic situation, household structure, occupational situation, education
- Econometric approach: Ordered probit model
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### Table: Ordered probit regression of overdraft usage frequency on financial literacy indicators

<table>
<thead>
<tr>
<th></th>
<th>(i)</th>
<th>(ii)</th>
<th>(iii)</th>
<th>(iv)</th>
<th>(v)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial literacy</td>
<td>-0.239***</td>
<td>-0.241***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.069)</td>
<td>(0.071)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>basic literacy</td>
<td></td>
<td></td>
<td>-0.092</td>
<td>-0.100</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.068)</td>
<td>(0.068)</td>
<td></td>
</tr>
<tr>
<td>advanced literacy</td>
<td>-0.458***</td>
<td>-0.454***</td>
<td>-0.452***</td>
<td>-0.450***</td>
<td>-0.447***</td>
</tr>
<tr>
<td></td>
<td>(0.098)</td>
<td>(0.098)</td>
<td>(0.098)</td>
<td>(0.098)</td>
<td>(0.098)</td>
</tr>
<tr>
<td>2nd wealth quartile</td>
<td>-0.348***</td>
<td>-0.325***</td>
<td>-0.319***</td>
<td>-0.319***</td>
<td>-0.312***</td>
</tr>
<tr>
<td></td>
<td>(0.094)</td>
<td>(0.094)</td>
<td>(0.095)</td>
<td>(0.095)</td>
<td>(0.095)</td>
</tr>
<tr>
<td>3rd wealth quartile</td>
<td>-0.724***</td>
<td>-0.683***</td>
<td>-0.682***</td>
<td>-0.680***</td>
<td>-0.678***</td>
</tr>
<tr>
<td></td>
<td>(0.101)</td>
<td>(0.101)</td>
<td>(0.102)</td>
<td>(0.102)</td>
<td>(0.102)</td>
</tr>
<tr>
<td>4th wealth quartile</td>
<td>-0.079</td>
<td>-0.035</td>
<td>-0.042</td>
<td>-0.034</td>
<td>-0.039</td>
</tr>
<tr>
<td></td>
<td>(0.072)</td>
<td>(0.072)</td>
<td>(0.073)</td>
<td>(0.072)</td>
<td>(0.072)</td>
</tr>
<tr>
<td>Log income</td>
<td>0.064***</td>
<td>0.061***</td>
<td>0.061***</td>
<td>0.061***</td>
<td>0.061***</td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td>(0.018)</td>
<td>(0.018)</td>
<td>(0.018)</td>
<td>(0.018)</td>
</tr>
<tr>
<td>Age</td>
<td>-0.081***</td>
<td>-0.079***</td>
<td>-0.079***</td>
<td>-0.080***</td>
<td>-0.079***</td>
</tr>
<tr>
<td></td>
<td>(0.017)</td>
<td>(0.017)</td>
<td>(0.017)</td>
<td>(0.017)</td>
<td>(0.017)</td>
</tr>
<tr>
<td>Mid-level education</td>
<td>0.088</td>
<td>0.107</td>
<td>0.117</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.081)</td>
<td>(0.081)</td>
<td>(0.081)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-level education</td>
<td>0.049</td>
<td>0.094</td>
<td>0.096</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.089)</td>
<td>(0.091)</td>
<td>(0.090)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economics education</td>
<td>-0.030</td>
<td>-0.024</td>
<td>-0.026</td>
<td></td>
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<td></td>
<td>(0.020)</td>
<td>(0.020)</td>
<td>(0.020)</td>
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<td></td>
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<tr>
<td>Household structure</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Occupational variables</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>1298</td>
<td>1298</td>
<td>1298</td>
<td>1298</td>
<td>1298</td>
</tr>
<tr>
<td>Pseudo - $R^2$</td>
<td>0.142</td>
<td>0.148</td>
<td>0.146</td>
<td>0.146</td>
<td>0.148</td>
</tr>
</tbody>
</table>

Standard errors in parentheses, significance levels *** 1%, ** 5%, * 10%

H$_0$: Financial Literacy Influences Credit Decisions
How do Financial Literacy and Self-Control Interact?

**Table**: Ordered probit regression of overdraft usage frequency on financial literacy and self-control

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<th>(iv)</th>
<th>(v)</th>
<th>(vi)</th>
<th>(vii)</th>
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<tr>
<td>Financial literacy</td>
<td>-0.251***</td>
<td>-0.279***</td>
<td>-0.223***</td>
<td></td>
<td>-0.111</td>
<td>-0.099</td>
<td>-0.089</td>
</tr>
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<td></td>
<td>(0.072)</td>
<td>(0.073)</td>
<td>(0.070)</td>
<td></td>
<td>(0.069)</td>
<td>(0.070)</td>
<td>(0.069)</td>
</tr>
<tr>
<td>basic literacy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.178**</td>
<td>-0.168**</td>
<td>-0.145**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.074)</td>
<td>(0.074)</td>
<td>(0.072)</td>
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<tr>
<td>advanced literacy</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Self-control</td>
<td>0.188**</td>
<td>0.162**</td>
<td>0.145*</td>
<td>0.159*</td>
<td>0.146*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.081)</td>
<td>(0.082)</td>
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<td></td>
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</tr>
<tr>
<td>Log income</td>
<td>-0.025</td>
<td>-0.057</td>
<td>-0.021</td>
<td>0.006</td>
<td>-0.023</td>
<td>-0.019</td>
<td>0.002</td>
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<td></td>
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<td>(0.074)</td>
<td>(0.074)</td>
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<td>2nd wealth quantile</td>
<td>-0.507***</td>
<td>-0.508***</td>
<td>-0.505***</td>
<td>-0.482***</td>
<td>-0.498***</td>
<td>-0.496***</td>
<td>-0.475***</td>
</tr>
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<td>(0.101)</td>
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<td>-0.383***</td>
<td>-0.396***</td>
<td>-0.371***</td>
<td>-0.338***</td>
<td>-0.371***</td>
<td>-0.360***</td>
<td>-0.331***</td>
</tr>
<tr>
<td></td>
<td>(0.097)</td>
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<tr>
<td>4th wealth quantile</td>
<td>-0.748***</td>
<td>-0.776***</td>
<td>-0.737***</td>
<td>-0.683***</td>
<td>-0.741***</td>
<td>-0.731***</td>
<td>-0.681***</td>
</tr>
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<td></td>
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<td>(0.104)</td>
<td>(0.105)</td>
<td>(0.103)</td>
<td>(0.104)</td>
<td>(0.105)</td>
<td>(0.103)</td>
</tr>
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<td>Age</td>
<td>0.061***</td>
<td>0.062***</td>
<td>0.060***</td>
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<td>(0.018)</td>
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<tr>
<td>Age^2</td>
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<td>-0.079***</td>
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<td>(0.016)</td>
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<tr>
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<td>0.161</td>
<td>0.147</td>
<td>0.156</td>
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Standard errors in parentheses, significance levels *** 1%, ** 5%, * 10%
How do Financial Literacy and Self-Control Interact?

Predicted probabilities for frequent overdraft usage

**Figure**: Predicted probabilities for people of different age to use overdraft often
How do Financial Literacy and Self-Control Interact?

Predicted probabilities for never using overdraft

**Figure:** Predicted probabilities for people of different age to never use overdraft
How do Financial Literacy and Self-Control Interact?

**Predicted probabilities for frequent overdraft usage**

**Figure**: Predicted probabilities for people of different age to use overdraft often
Implications

- Individuals with low self-control will rely on liquid forms of credit frequently.
- Financial literacy can dampen the effect of low self-control.
- Differences are strongest when the demand for credit is highest according to the life-cycle theory (around age 40).
- Strongest effect to reduce excessive credit usage could be obtained by a reduction of the liquidity of the products while fostering individuals‘ financial knowledge beyond mathematical skills.