

Insights from Behavioral Economics for Personal Finance

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Mainstream Economics

Standard (or “classical”) assumptions:

- People *know* what’s in their best interest
 - And they *act* on that knowledge
- Competition between firms takes care of the rest
- Minimal regulatory intervention

Behavioral Economics

More realistic assumptions:

- People sometimes get confused
 - E.g., don't understand mortgage terms
- And even when we do understand what's best, we often don't follow through
 - E.g., want to borrow less (save more) – tomorrow

- Psychology & Economics
- Suboptimal decisions
- Regulation might be needed

Behavioral Finance

Use psychology *and* economics to understand finance:

Asset Pricing

Price Anomalies
IPO underperformance
Value Anomaly
Sentiment
Equity premium
PEA drift
Momentum
Bubbles

Corporate Finance

IPO timing
Winner's curse
Cash-flow sensitivity
Overconfidence
Superstar CEO's

Personal Finance

Present Bias
Emotional choice
Loss aversion
Narrow Framing
Return chasing
Financial illiteracy
Home bias
Overconfidence
Wishful thinking

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Outline

- 1 Present-Bias and Credit Cards
- 2 Numerical Ability and Mortgages
- 3 Will consumers learn?

Present-Biased Preferences

Thought experiment (Read and van Leeuwen, 1998):

- Deciding **today**, would you choose fruit or chocolate for **next week**?
 - 74% choose fruit
- Deciding **today**, would you choose fruit or chocolate for **today**?
 - 70% choose chocolate
- The effect of present bias:
 - People may value the present too much given their long-run plan
→ dynamic inconsistency
 - **Instantaneous** benefits trigger affective decision-making system (McClure et al. 2007)
 - Difference in present-bias exist already in small kids (Mischel et al. 1989)
 - Overborrowing given long-run plan (discount factor)

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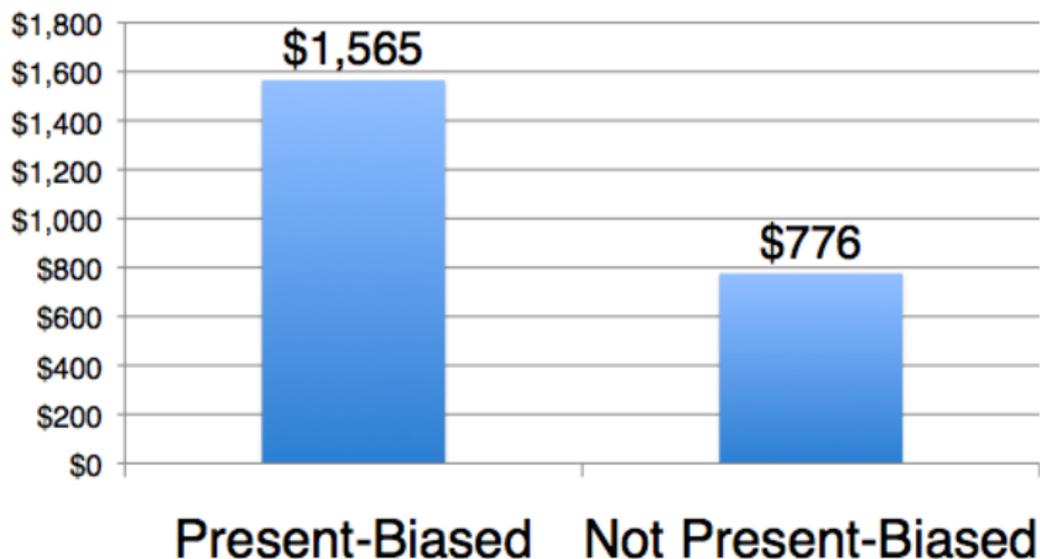
Present Bias and Credit Card Borrowing

(Meier and Sprenger, AEJ: Applied, 2010)

Is there a direct link between dynamic inconsistency and credit card borrowing?

- Study at a volunteer tax income assistance (VITA) site
 - Individuals get help filing their taxes
 - Selection of LMI individuals
- Two key parts of the study
 - 1 Experimental measurement of time preferences: individual-level measure of present bias
 - 2 Accurate measurement of debt through use of credit records

Outstanding Balance on Revolving Accounts



Note: $N = 541$. $p < 0.01$ in t - test.

The association between present bias and credit card balance is robust to (1) controlling for socio-demographic variables, (2) controlling for credit limits and fico scores, (3) using credit card balance one year after choice experiment as dependent variable, ...

Present-bias can explain various consumer mistakes

- Randomized study by major card issuer (Shui & Ausubel, 2004):
 - Teaser rates
 - Consumers don't switch to lower interest cards → +\$250 pa
 - Consumers prefer 4.9% for 6 months over 7.9% for 12 → + \$50
- Study by Gross & Souleles (2002):
 - 90% of revolvers have liquid assets → +\$200 pa
- Randomized study by U.S. bank (Agarwal et al., 2007):
 - 40% make wrong choice between 'no fee/lower r ' and 'fee/higher r '
- Study of dataset of large financial institution (Agarwal et al. 2009):
 - 28% make clear mistakes leading to substantial fees
 - ... even though they had enough money (Massoud et al., 2007)
 - Consumers make substantial mistakes in balance-transfer options

Other Evidence on Effects of Present Bias

- Laibson, Repetto & Tobacman (2007): savings
- Della Vigna & Malmendier (2004, 2006): gym membership
- Ashraf & Karlan (2004): commitment savings
- Della Vigna and Paserman (2005): job search
- Duflo (2009): immunization
- Duflo, Kremer, Robinson (2009): commitment fertilizer
- Karlan & Zinman (2009): commitment to stop smoking
- Milkman et al (2008): video rentals return sequencing
- Oster & Scott-Morton (2005): magazine marketing/sales
- Thornton (2005): HIV testing
- Trope & Fischbach (2000): commitment to medical adherence
- Wertebroch (1998): individual packaging

Is Financial Illiteracy Associated with Defaults?



Source: The Economist.

The Effect of Limited Numerical Abilities

- Limited numerical ability may cause . . .
 - Inappropriate reaction to income / consumption shocks
 - Gullible when confronted with complicated contracts
 - Impatience, because interest rate seems low in short run
 - Affects ability to compare offers

 - Indeed, recent research suggests that numerical abilities are associated with worse consumption / savings outcomes (Banks and Oldfield, 2007; Lusardi and Mitchell, 2009)
- Is numerical ability also associated with mortgage defaults?

Rationality and Credit Markets

- Are borrower well-equipped to make financial decisions?

- 1 Borrowers make informed decisions

“(...) I am more open to the idea that some borrowers were making rational decisions about risk and rewards.” (Ian Ayres in NYtimes.com, October 14, 2008)

- 2 Borrowers make uninformed decisions

“Many (...) buyers who took out high loan-to-value mortgages with adjustable rates did not have ready access to information about what they were doing (...) and so made serious mistakes” (Robert Shiller in *Wall Street Journal*, October 9th, 2008)

- No study so far, investigating mortgages and numerical abilities

Study on Numerical Ability and Mortgage Defaults

(Gerardi, Goette and Meier, 2010)

- We conducted a survey with borrowers and asked
 - info about mortgage
 - socio-demographics
 - preference parameters
 - cognitive ability
 - numerical ability
 - ...

... and then match it to data from the registry of deeds and loan performance data

Important details:

- Survey in 2008 for subprime mortgages issued in '06 and '07
- in MA, CT and RI

Measuring Numerical Ability

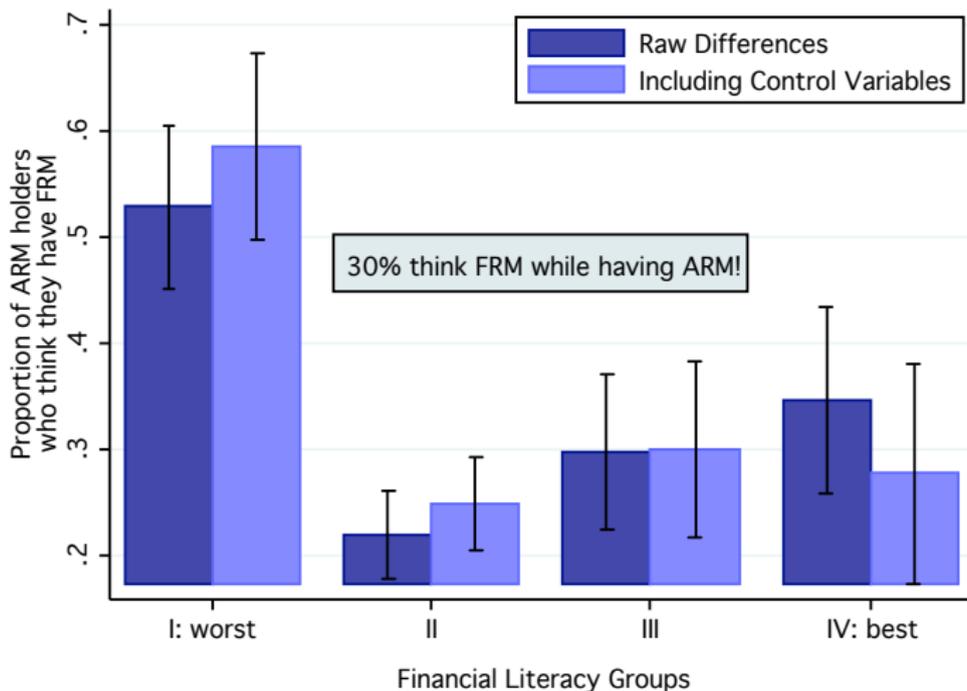
Numerical Ability Questions (Banks and Oldfield, 2007)

- 1 In a sale, a shop is selling all items at half price. Before the sale, a sofa costs \$300. How much will it cost in the sale?
- 2 If the chance of getting a disease is 10 per cent, how many people out of 1,000 would be expected to get the disease?
- 3 A second hand car dealer is selling a car for \$6,000. This is two-thirds of what it cost new. How much did the car cost new?
- 4 If 5 people all have the winning numbers in the lottery and the prize is \$2 million, how much will each of them get?
- 5 Let's say you have \$200 in a savings account. The account earns ten per cent interest per year. How much will you have in the account at the end of two years?

Banks and Oldfield (2007) suggest division into four groups:

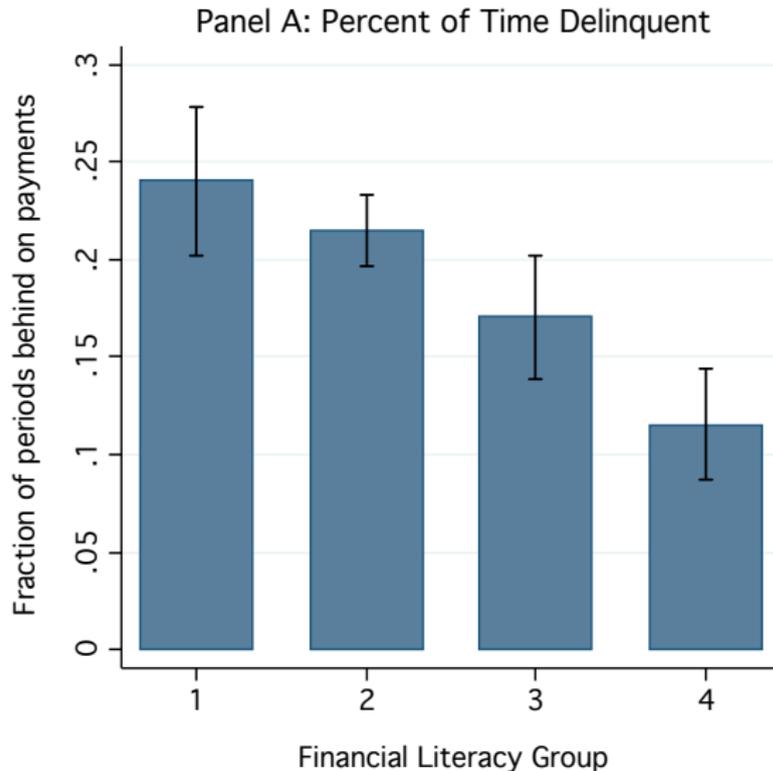
	Group			
	1	2	3	4
This study:	15.6%	53.9%	17.1%	13.3%
Banks and Oldfield (2007):	16.2%	46.6%	26.8%	11.1%

Knowledge About Mortgage Terms

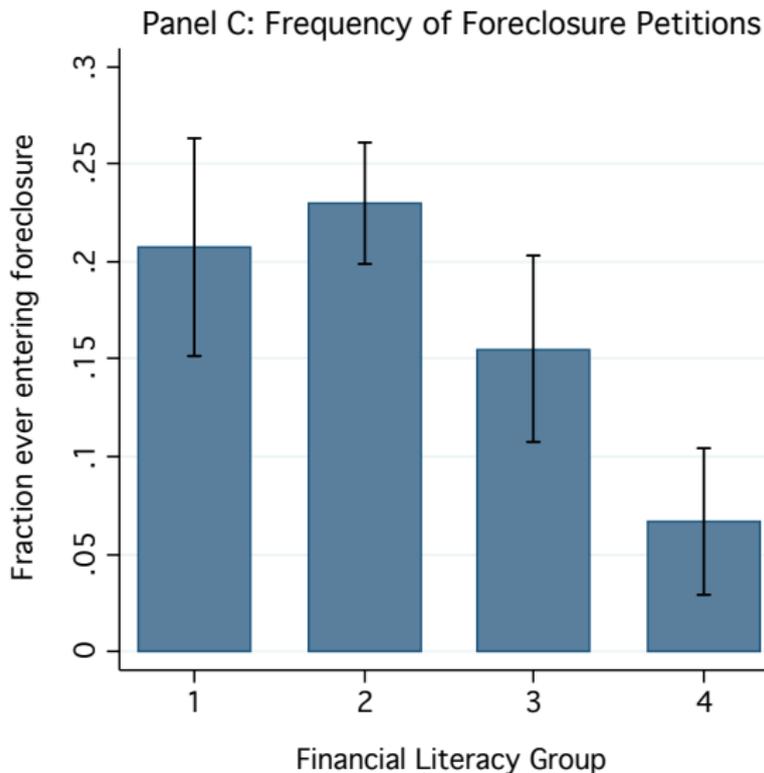


Note: N = 208. Control variables: Socio-demographics.

Raw Correlations: % of Time Delinquent (N=339)



Raw Correlations: Frequency of Foreclosure Petitions



Interpretation

- Strong and significant association between numerical ability and delinquency
 - Robust to including a wide range of control variables
 - Association with three different measures of delinquencies
- What is the channel of this association?

Narrowing Down the Channels

- 1 Which aspect of cognitive abilities is related to delinquencies?
General cognitive abilities, economic literacy, or numerical ability?
 - Control for general IQ and economic literacy
 - It is numerical ability!
- 2 Is the effect mediated by the choice of poorer mortgage terms?
 - Control for mortgage details (FRM, LTV, DTI, Low Doc)
 - Effect of numerical ability on delinquency is not mediated through poor choice of mortgage conditions!

Effects of Financial Illiteracy on Mortgages

- Results show that limited numerical ability/financial literacy is substantially associated with defaults
- In general, understanding mortgage contracts is challenging
- Various known consumer mistakes:
 - At least 40% who have subprime mortgages would have qualified for prime mortgage (NTIC, 2002)
 - Persistent consumer mistakes in home equity loans (Agarwal et al. 2008)
 - Substantial refinance mistakes (Campbell 2008) → +25% of loan value

Conclusion I

- ① Many don't fully understand details of financial products
- ② Psychological factors makes it hard to stick to long-run plans
- Fee structure, teaser rates, etc make it harder for some individuals
- A number of consumers make suboptimal decisions

- But don't they learn?

Do Consumers Learn to Avoid Mistakes?

- Not really! Many are uninformed. Why?
- People are not aware of mistakes
- People discount the future benefits (Meier & Sprenger, 2008)
- High cost of getting informed
- 'Recency effect' in learning (Agarwal et al. 2009)
- Many subprime borrowers don't seek advice or shop around (Gerardi et al., 2010)
- Education programs have limited effects

Conclusion II

- Assumptions in ‘traditional’ economics need revision:
 - Some consumers are confused
 - Some don't act in long-run best interest
- Consumers make (substantially) suboptimal decisions
- Credit markets are particularly prone for mistakes, due to . . .
 - Complexity of products
 - Intertemporal decision
 - Limited incentives of firms to ‘educate’ consumers
 - Difficulties to learn

- The question is how to helping those borrowers without hurting the ‘rational’ borrowers?

THANK YOU!

Measurement of Time Preferences

- Choices between a smaller reward ($\$X$) in period t and a larger reward ($\$Y > \X) in $t + d > t$
- Two time frames for choices:
 - Today vs. 1 month $\rightarrow d = 1$ month
 - 6 months vs. 7 months $\rightarrow d = 1$ month
- Choices allow to identify long-run discount factor δ and present-bias β
 - Individual discount factor: 0.83
 - 36% exhibit present-bias

Design of Choice Experiments

$t = 0, d = 1$: Option A (**TODAY**) or Option B (**IN A MONTH**)

Decision (1): \$ 75 guaranteed **today** - \$ 80 guaranteed **in a month**

Decision (2): \$ 70 guaranteed **today** - \$ 80 guaranteed **in a month**

Decision (3): \$ 65 guaranteed **today** - \$ 80 guaranteed **in a month**

Decision (4): \$ 60 guaranteed **today** - \$ 80 guaranteed **in a month**

Decision (5): \$ 50 guaranteed **today** - \$ 80 guaranteed **in a month**

Decision (6): \$ 40 guaranteed **today** - \$ 80 guaranteed **in a month**

$t = 6, d = 1$: Option A (**IN 6 MONTHS**) or Option B (**IN 7 MONTHS**)

Decision (1): \$ 75 guaranteed **in 6 months** - \$ 80 guaranteed **in 7 months**

Decision (2): \$ 70 guaranteed **in 6 months** - \$ 80 guaranteed **in 7 months**

Decision (3): \$ 65 guaranteed **in 6 months** - \$ 80 guaranteed **in 7 months**

Decision (4): \$ 60 guaranteed **in 6 months** - \$ 80 guaranteed **in 7 months**

Decision (5): \$ 50 guaranteed **in 6 months** - \$ 80 guaranteed **in 7 months**

Decision (6): \$ 40 guaranteed **in 6 months** - \$ 80 guaranteed **in 7 months**