

Non-Cognitive Abilities and Loan Delinquency

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Overview

- Cognitive abilities and cognitive biases are important in explaining financial decisions, but it seems likely that non-cognitive abilities matter too
 - Motivation, persistence, propensity to plan, self-discipline & self-efficacy seem important in forming and sticking to a financial plan
- **Do non-cognitive abilities influence financial decisions and outcomes?**

Loan repayment & self-efficacy

- Among financial decisions, we focus on household borrowing and loan default decisions
- Among non-cognitive abilities we focus on self-efficacy
 - Belief in the ability to change future outcomes through own actions
 - Economic story: low self-efficacy will reduce effort provision
- We test whether self-efficacy, measured in childhood, predicts loan delinquency later in life

Related literature

- Cognitive abilities/biases & financial decisions
 - Agarwal et al. 2009; Agarwal & Mazumder 2013; Choi, Laibson & Madrian 2010; Cole, Paulson & Shastry 2012; Gerardi, Goette & Meier 2013; Grinblatt, Keloharju & Linnainmaa 2011; Lusardi & Mitchell 2009; Stango & Zinman 2009
- Non-cognitive abilities, education and employment
 - Coleman & DeLeire 2003; Heckman, Stixrud & Urzua 2006; Heckman, Pinto & Savelyev 2013; Kalil & Khalid 2010; Lindqvist & Vestman 2011
- Non-cognitive ability & financial decisions: investment side
 - Puri & Robinson 2007; Cadena & Keys 2012, 2013; Lindqvist & Vestman 2013; Shapiro & Wu 2011

Empirical approach

- Longitudinal household survey data
- Examine correlation between self-efficacy in childhood (age 15-18) and loan delinquency during adulthood
 - Control for differences in cognitive ability, educational attainment and income, both past and contemporaneous
 - Test for differences in indebtedness
 - Explore differences within sibling groups, using sibling group fixed effects to absorb parental and environmental inputs common to siblings

Data

- National Longitudinal Survey of Youth 1979, Child and Young Adult sample
 - Offspring of original NLSY79
 - Biennial interviews through childhood and into adulthood
 - Measures of ability, both cognitive and non-cognitive, early in life
 - Measures of employment, income and financial outcomes in adulthood
- Rich information on debt balances, and delinquency (60+ days) questions added in 2010 survey
- Roughly 3,700 observations from 2010 cross-section
 - 2012 data recently made available, will soon be added to the analysis

Measuring self-efficacy

- Pearlin Mastery score (Pearlin et al. 1981)
- Respondent reports strength of agreement for each of 7 statements, e.g.:
 - “I have little control of things that happen to me.”
 - “I can do just about anything I really set my mind to.”
- Use standardized score, summing across all items and converting to percentiles

Correlates of self-efficacy

- Regress self-efficacy on covariates
 - Cognitive ability (+)
 - Educational attainment (+)
 - Income (+) and asset ownership (+), but no differences controlling for ability and education

Regression model

$$\text{Delinquency}_i = a + b\text{Self-efficacy}_i + qX_i + e_i$$

- Controls
 - Cognitive ability: PIAT math, reading recognition and reading comprehension
 - Education
 - Log income – 1) prior year; 2) average as adult
 - Asset ownership – 1) home; 2) vehicle
 - Race, gender, age, marital status, family size

Delinquency on credit card loan

	Credit Card Loan		
Self-efficacy (pctile)	-0.072** (0.030)	-0.063** (0.031)	-0.068** (0.030)
Observations	1,383	1,351	1,351
R-squared	0.004	0.022	0.064
Controls?	None	Ability & Education	All

- 1 sd increase in self-efficacy -> 2 percentage point reduction in likelihood of delinquency
nearly 20% decline from average of 11.7%

Delinquency on auto loan

	Auto Loan		
Self-efficacy (pctile)	-0.074** (0.029)	-0.055* (0.030)	-0.056* (0.030)
Observations	1,134	1,109	1,109
R-squared	0.006	0.025	0.054
Controls?	None	Ability & Education	All

- 1 sd increase in self-efficacy -> 1.6 percentage point reduction in likelihood of delinquency
nearly 20% decline from average of 8.3%

Delinquency on mortgage loan

	Mortgage Loan		
Self-efficacy (pctile)	-0.021 (0.038)	-0.013 (0.038)	-0.026 (0.038)
Observations	695	681	679
R-squared	0.000	0.020	0.074
Controls?	None	Ability & Education	All

- 1 sd increase in self-efficacy -> 74 basis point reduction in likelihood of delinquency, 8% decline from average of 8.9%

Differences in debt balances?

- Are those with low self-efficacy more indebted?
 - More susceptibility to income/consumption shocks
 - Moral hazard: stronger incentive to default
- Examine indebtedness as dependent variable and control for indebtedness in models of loan delinquency

Self-efficacy and indebtedness

Dependent variable: Log Debt-to-Income (DTI)

	Credit Card Debt	Vehicle Debt	Mortgage Debt
Self Efficacy (pctile)	-0.00001 (0.00003)	0.00004 (0.0001)	-0.0004*** (0.0001)
Observations	3,549	3,547	3,576
R-squared	0.066	0.162	0.652

- 1 sd increase in self-efficacy -> 1.1% reduction in total debt-to-income ratio

Controlling for indebtedness

	Dependent variable: Delinquency	
	Credit Card Loan	Vehicle Loan
Self-efficacy (pctile)	-0.063** (0.030)	-0.059* (0.030)
Log Credit Card DTI	66.8*** (11.3)	-5.0 (13.6)
Log Vehicle DTI	-10.1* (5.5)	10.7** (5.4)
Log Mortgage DTI	2.8 (3.8)	-1.4 (3.7)
Observations	1,312	1,099
R-squared	0.091	0.057

Variation among siblings

- Upbringing is likely a key determinant of both self-efficacy and attitudes toward delinquency
- Parental financial support during adulthood is also potential unobservable that correlates with self-efficacy
- Unique feature of NLSY data
 - IDs to link siblings, and 2/3 of sample are part of sibling group
- Use sibling-group fixed effects to control for unobserved inputs/support common among siblings

Sibling fixed effect results

	Credit Card Loan		Auto Loan	
Self-efficacy (pctile)	-0.151** (0.061)	-0.165*** (0.062)	-0.127* (0.065)	-0.117* (0.063)
Observations	1,383	1,351	1,134	1,109
R-squared	0.857	0.869	0.867	0.894
Sibling FEs?	Yes	Yes	Yes	Yes
Controls?	None	All	None	All

- Variation within sibling groups shows same pattern: higher self-efficacy, lower likelihood of delinquency. Estimates roughly 2x larger w/FEs

Conclusion

- Self-efficacy predicts substantial differences in loan delinquency, even controlling for differences in cognitive ability, education, income and unobserved parental inputs
- Interventions to improve non-cognitive skills may have lasting benefits in financial as well as educational and job market outcomes