Financial Education and the Debt behavior of the Young

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[1] The views expressed in this paper do not necessarily reflect those of the Federal Reserve System as a whole.

Motivation

US youth are heavily reliant on debt

- Bricker et al. (2012): 94% of 2010 SCF households under 35 have financial assets*, conditional median value $5500.
- 78 percent have consumer debt, conditional median value $39,600.
- 25 y.o.s in 2012 CCP - 79 percent consumer debt, conditional median $23,041.
- Default rates exceed 15% on student loans (for those in repayment).
- Suggests debt, rather than investment, is the primary financial concern of early adulthood.

Motivation

US youth are financially illiterate?

- Lusardi and Mitchell (2011), Lusardi (2011) - Financial literacy very low among US youth and general population.
- Financial literacy by age:

Age	Big 3 all correct	Big 5 all correct	Self-assessed overall financial knowledge, 1-7
18-24	22%	5%	4.6
25-34	32%	11%	6.1
35-44	38%	15%	5.9
45-54	43%	18%	5.9
55-64	48%	20%	5.9
65+	49%	19%	5.3

Source: Hastings, Madrian, & Skimmyhorn (2012), using 2009 National Financial Capability Survey

Motivation

US youth financially illiterate?

Policy push for financial education, under the assumption that it improves financial outcomes:

Treasury Secretary Lew, May 2013: "*In today's economy, it is also essential for Americans to develop basic financial knowledge....We need to make sure young people can make smart decisions about what financial products to use.*"

What do we know?

- Large literature on financial mistakes. Low financial literacy associated with high-cost borrowing, saving less, more default, and lower financial market participation.
- Causal studies emphasize saving/asset accumulation: Bernheim, Garrett, and Maki (2001), Choi, Laibson, & Madrian (2011).
- Experimental studies find limited effects of small-scale training (Hastings, Mardrian, and Skimmyhorn 2013).

This paper

- We use 1998-2011 state-mandated graduation requirements in
  - financial literacy
  - mathematics
  - economics
- to study *early adulthood* debt outcomes - FRBNY Consumer Credit Panel 2002-2012 (a new panel on credit reports of 5% of the US population).
- First paper to estimate the causal impact of financial education on debt outcomes for a representative sample of young US consumers.

Particularly relevant prior research

- Cole, Paulson, and Shastry (2012, 2013) - Financial education mandates 1957-82, math 1984-94, compulsory schooling –> saving and debt outcomes in middle age.
- Skimmyhorn (2013) - US Army 8 hour financial management course –> young soldiers' saving and debt outcomes.
- Mixed evidence on the effects of financial education.

Data

Educational reforms

- National Council for Economic Education (NCEE) biennial surveys - state-level financial education and economics graduation requirements from 1998-9 forward.
    - Financial education: from 1 to 17 states over 1999-2012.
    - Economics: from 10 to 20 states over 1999-2012.
- Council of Chief State School Officers (CCSSO) biennial surveys - state-level mathematics graduation requirements.
    - Almost all states had some math requirement by 1998.
    - 19 states increased years of math required for graduation from 1999-2012.

Data

FRBNY Consumer Credit Panel/Equifax (CCP)

5% random sample of all Equifax credit reports, + household

Sample on SS#: No panel attrition problems, automatic refreshing – Lee & van der Klaauw (2010)

- Balances, payments, limits, delinquency, & default on all standard consumer debts
- Foreclosure, bankruptcy, liens, collections, court actions
- Geographic location to the Census block
- Age, FICO-equivalent risk score
- Missing: gender, race/ethnicity, ...

Aggregates consistent with Flow of Funds, G.19, ACS, SCF.

Data

FRBNY Consumer Credit Panel/Equifax (CCP)

Our sample:

- 1999-2012 Q4 annual data
- 2% US in each year
- 1984 birth cohort forward - enter HS 1998 or later, observe from credit panel entry (18-19) for as long as we can, oldest 28 in 2012
- 3+ million panel observations on 613,178 distinct individuals, average 308,602 per year

Course content

Rough descriptions based on state curricula

- Financial literacy topics: decision-making, personal budgeting, borrowing, investing, credit management.
  - Increase debt savvy.
  - Increase credit report prevalence.
  - Improve credit outcomes: fewer adverse debt-related outcomes (delinquency, collections), *possibly* lower debt.

- Economics topics: markets, prices, interest rates.
  - Impact on credit report prevalence unclear.
  - Make students more comfortable with debt, increase debt balances.
  - Impact on adverse outcomes ambiguous - more debt means more exposure to delinquency and default risk, but economic concepts may help borrowers manage balance sheet more effectively.

Course content

Rough descriptions based on state curricula

- Math topics: improved knowledge and cognitive skills (Alexander and Pallas 1984, Agarwal and Mazumder 2013), higher labor income and asset accumulation (Goodman 2009,Cole et al. 2012).
    - Ambiguous effect on credit report prevalence.
    - Improved financial management, fewer adverse outcomes.
    - Ambiguous balance effect.

Identifying variation

Source: FRBNY Consumer Credit Panel/Equifax

Variable	N	Mean
Went to HS before state enacted Econ reform	3,311,743	0.127
Exposed to Econ Reform	3,311,743	0.492
Went to HS before state enacted Fin Lit reform	3,311,743	0.202
Exposed to Financial Literacy Reform	3,311,743	0.166
Went to HS before state enacted Math reform	3,311,743	0.210
Exposed to Math Reform	3,311,743	0.339

Empirical specification - credit report prevalence

$$R_{st} = \alpha_t + \gamma_t + \beta^X X_{st} + \sum_n (\beta^n_{st} I^n_{st}) + \varepsilon_{st}$$

$n \in \{\text{economics, financial literacy, mathematics}\}$

R_{st} = proportion of 20-28 year olds in state s at time t who have credit reports

$I^n_{st} = 1$ if s implements policy change in subject n prior to year t, 0 otherwise.

X_{st} = time-varying state-level controls: unemployment rate; gross state product; per capita state educational spending; subject requirements; yeas of compulsory schooling.

Errors clustered at state level in this panel of states.

Impact on credit report prevalence

	E1 Model	E2 Model
	(1)	(2)
Math Reform	-0.0008	-0.0007
	(0.0073)	(0.0273)
Economics Reform	-0.0039	-0.0014
	(0.0090)	(0.0139)
Financial Literacy Reform	0.0124**	0.0132**
	(0.0049)	(0.0108)
Number of Observations	402	402

- Fin lit education increases prevalence by 1.2 pp.
- Mean prevalence, among 20-29 year olds in 2012, is 85%.

Empirical specification - debt outcomes

$$Y_{i(sc)zt} = \gamma_{st} + \delta_{ct} + \beta^X X_{zt} + \sum_n \left(\beta^n_{post} D^n_{i(sc)}\right) + \beta^{math}_{post} M_{i(sc)} + \varepsilon_{i(sc)zt},$$

$Y_{i(sc)zt}$ = debt outcome of individual i in birth cohort c and state s, residing in zip code z in year t.

$D^n_{i(sc)} = 1$ if i's cohort c graduates from HS after her state enacts the reform.

γ_{st} = state-year fixed effect, δ_{ct} = cohort-year fixed effect

X_{zt} = time-varying regional controls: average zip code per capita gross income, county-level unemployment rate, gross state product, per capita state educational spending, state-level subject requirements, state-level compulsory schooling.

Empirical specification - debt outcomes

- **Identifying assumption:** Conditional on the controls, implementation of financial education reforms is uncorrelated with unobservable state and cohort factors, and other omitted determinants of financial outcomes.
  - we control for a rich set of state-level controls, and include state and cohort specific time trends

- Note we avoid the "common trends" assumption challenged by Stephens and Yang (2013). Errors clustered at state-year level.

Impact on debt outcomes - Math

	Risk Score	Number of Delinquent Accounts	Bankruptcy within past 24 months	Collections Flag	Any Debt	Auto Loans and Credit Card Balance	Home-secured Balance	Student Loan Balance
	(1)	(2)	(4)	(5)	(6)	(7)	(8)	(9)
Math years	1.848***	- 0.0403***	0.0101***	- 0.00629***	- 0.0505***	- 889.7***	- 1846.7***	- 2027.0***
Econ Reform	- 4.013***	0.0159***	- 0.00248***	0.0119**	0.0215***	554.1***	233.7	42.70
Fin Lit Reform	1.983***	- 0.00387	- 0.000619	- 0.0105**	- 0.0120	- 579.2***	- 2407.5***	451.7*
N	2.8E+06	3.0E+06	3.0E+06	3.0E+06	3.0E+06	3.0E+06	3.0E+06	3.0E+06
Mean	627.7	0.168	0.0274	0.378	0.760	4059.3	6914.0	5008.0

Math Education:

- decreases incidence of adverse outcomes.
- reduces likelihood of outstanding debts, and debt balances.
- increases risk score by 1.8 points (sample std dev is 91 points).

Impact on debt outcomes - Economics

	Risk Score	Number of Delinquent Accounts	Bankruptcy within past 24 months	Collections Flag	Any Debt	Auto Loans and Credit Card Balance	Home-secured Balance	Student Loan Balance
	(1)	(2)	(4)	(5)	(6)	(7)	(8)	(9)
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Economics education:

- Increases likelihood of adverse outcomes, and of carrying balances.
- Increases auto and credit card debt balances.
- Decreases creditworthiness of average borrower.

Impact on debt outcomes - Financial literacy

	Risk Score	Number of Delinquent Accounts	Bankruptcy within past 24 months	Collections Flag	Any Debt	Auto Loans and Credit Card Balance	Home-secured Balance	Student Loan Balance
	(1)	(2)	(4)	(5)	(6)	(7)	(8)	(9)
Math years	1.848***	- 0.0403***	0.0101***	- 0.00629***	- 0.0505***	- 889.7***	- 1846.7***	- 2027.0***
Econ Reform	- 4.013***	0.0159***	- 0.00248***	0.0119**	0.0215***	554.1***	233.7	42.70
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N	2.8E+06	3.0E+06	3.0E+06	3.0E+06	3.0E+06	3.0E+06	3.0E+06	3.0E+06
Mean	627.7	0.168	0.0274	0.378	0.760	4059.3	6914.0	5008.0

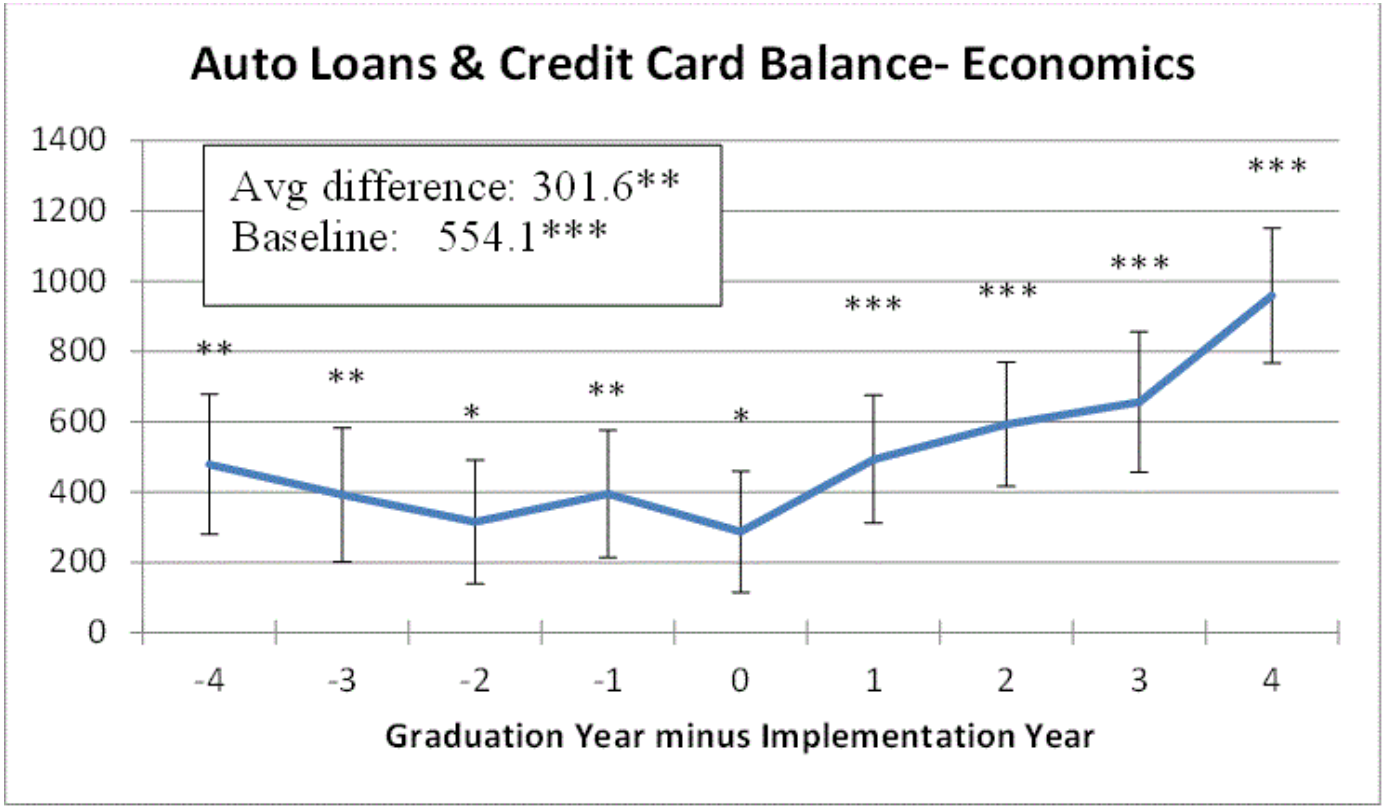
Financial Literacy education: has impacts similar to Math (but smaller in magnitude and less precise).

Impacts accumulate with age

	Risk Score	Number of Delinq. Accounts	Bankruptcy within past 24 months	Collection Flag	Any Debt	Auto and Credit Card Balance	Home-secured Balance	Student Loan Balance
Impact of Additional Math Year								
22-year-olds	0.970	-0.0297***	0.0195***	-0.00474	-0.0478***	-577.0***	-454.7**	-1596.2***
25-year-olds	2.735***	-0.0551***	0.00215	-0.0183***	-0.0664***	-1286.0***	-2572.7***	-3022.0***
28-year-olds	7.104***	-0.0642***	-0.00107	-0.0301***	-0.0565***	-1495.4***	-5632.6***	-3202.5***
Mean	642.0	0.219	0.0109	0.493	0.781	6654.4	25218.4	7520.8

Allow impacts to vary over time

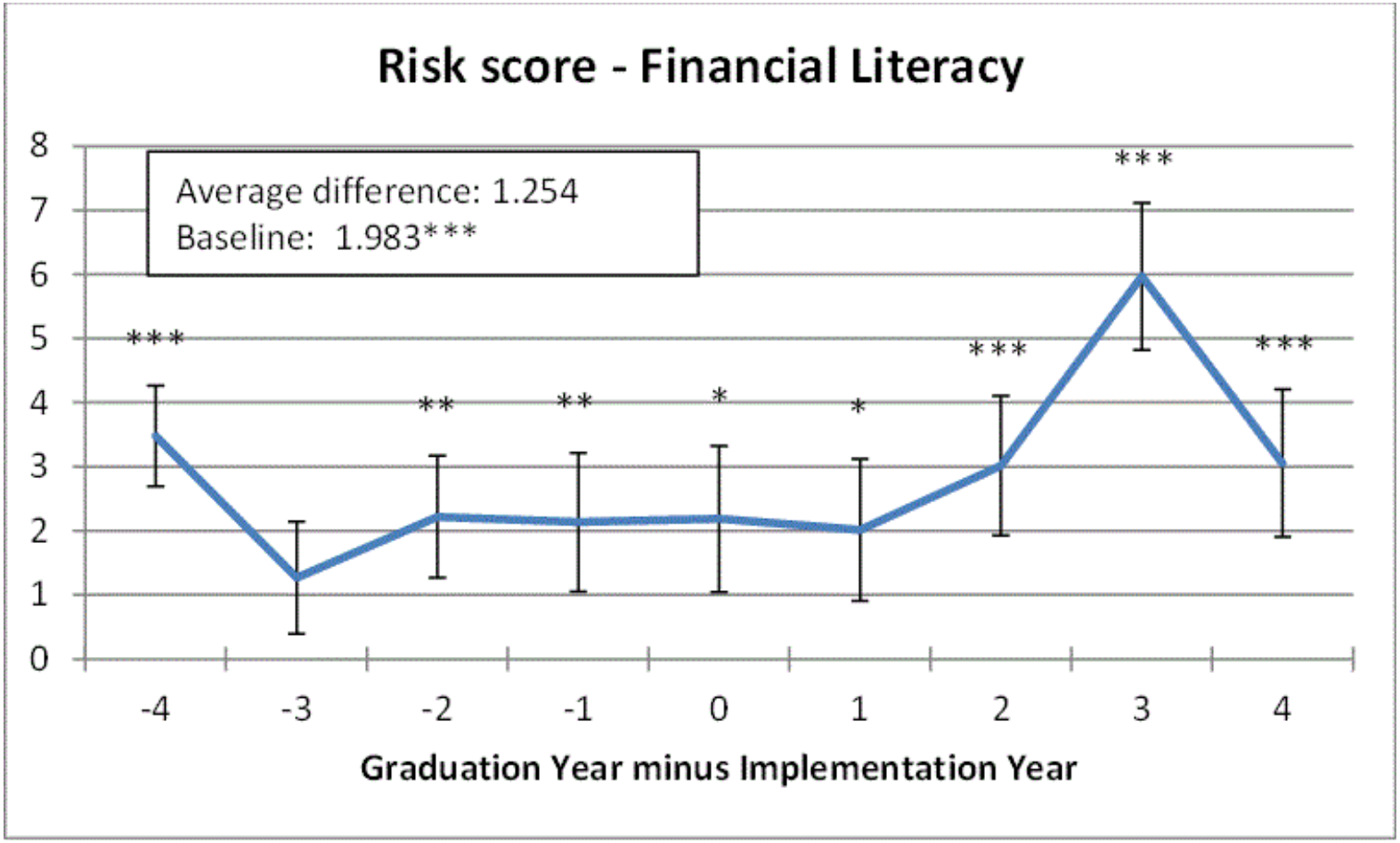
Pre-trends and gradual implementation



- Pre-period trends not zero.
- Average impacts similar to baseline. Effects larger for later cohorts.

Allow impacts to vary over time

Pre-trends and gradual implementation



Discussion

- Math education improves creditworthiness, reduces delinquencies and debt use.
  - Math training also leads to higher income and assets. Lower debt, higher income, higher assets suggest higher welfare.
  - Whether the debt declines are efficient is not clear.

- Financial education impacts are similar to math, also appears to increase debt savvy.
  - More credit reports, more exercise of bankruptcy option.

- Economics education warms young consumers to credit markets, and increases repayment problems.
  - Economics training associated with higher earnings (van der Klaauw et al. 2010, Altonji, Bloom, and Meghir 2012).
  - Overall welfare implications unclear.

Conclusions

- We find sizable impacts of HS quantitative education on the debt outcomes of the young.

- The goal of the paper is to identify causal impacts of education reforms on debt outcomes.
  - We can make no welfare or efficiency claims based on the observed patterns. Eg: bankruptcy - Fay, Hurst, & White (2002).

- Several open areas for future research are evident. Examples:
  - Mechanisms through which training affects debt outcomes.
  - Direct measurement of quantitative skills, the impact of training on skills and skills on outcomes.
  - Impact heterogeneity.
  - Distributional impacts of the reforms.