The Effects of State Policies Requiring High School Personal Finance Education on Credit Scores

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Financial Education in U.S. High Schools

- Goal of facilitating 'financial literacy'
- Some states mandated K-12 personal finance
- Research on the effectiveness not conclusive (Cole et. Al. 2013; Willis 2011).
    - Financial literacy's association with financial decisions unclear (Fernandes et al. 2013).

- **Do state policies impact the behavior of young people after graduation as they enter the credit market?**

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Key Outcome: Credit Behavior of 18-22 year olds

- Credit is often first experience in formal financial market–often same time as transaction accounts.
- Young people face challenges starting out:
  - As many as 1 in 5 are 90+days behind on an account.
- Learn by 'hard knocks'–due dates, grace periods, late fees, interest etc...
  - Costly way to gain knowledge.

Not Simple to Identify Policy Effects of Financial Education Policies

Prior studies show negative or null effects.

But state financial education policies are complicated to identify effects.

1. Implementation delays.
2. State 'requirements', but support or enforcement weak.
3. Financial education requirements vary; part of social studies vs. a full course, teacher training, and testing.

link to data

State Requirements in 2000s

State	Year	Course	Assessment
Georgia	2007	Economics	Yes
Idaho	2007	Economics	No
Texas	2007	Economics	Yes
Other States			
Arizona	2005	Economics	No
Arkansas	2005	Economics	No
Colorado	2009	Economics/Math	No
Illinois	1970s	Social Studies	Yes
Indiana	2008		No
Michigan	1998	Career course	No
New Hampshire	1993	Economics	No
New York	1996	Economics	No
North Carolina	2005	Economics	No
Rhode Island	1980		No
South Carolina	2009	Social Studies	No
Utah	2008		Yes
Washington	2000		No
Wyoming	2002	Social Studies	No

This Study: Georgia, Idaho, Texas

- Three states with intensive mandates implemented in 2007.
- Prescribed curricula, graduation requirements, testing, etc. statewide.

Note: Credit Card Accountability Responsibility and Disclosure Act

- Effective in February 2010, under age 21 had to have a source of income or an adult co-signer before obtaining a card.
- National in scope; all states were impacted.
- Class of 2007 not prevented from obtaining a credit card; Class of 2008 affected <1 year.
- Class of 2009 would have mostly been 19 or 20 when implemented.

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States: Georgia, Idaho, Texas

Education Policies

- Extensive 'model' curricula in each state.
- Required for graduation from high school statewide.
- No other economics, personal finance, or math course requirement changes.

Common Learning Objectives

- Understanding interest.
- Credit, debt, banking.
- The role of insurance.
- Understanding credit scores.

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How Mandates May Influence Behavior

- Directly benefit from the information provided in classes

- Learn from advice and the personal finance behavior modeled by other young adults in their age cohort

- View the state's course requirement as a signal that acquiring financial knowledge is valuable, leading to independent learning about the required topics.

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Behavioral Mechanisms

Present-biased preferences & Inattention

- Some people may have preference to borrow
  - However, some borrowers may behave counter to their own long-run preferences
- Consumption in the current period that results in missing loan payments
- Could fail to fully appreciate future costs of this in the present
- Problem may be even worse for relatively naive young adults
- Education may focus limited cognitive attention to financial issues

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Data and Method

Federal Reserve Consumer Credit Panel (CCP).

- 5% sample of all U.S. credit files from Equifax.

- 18-22 year olds using quarterly records (starts quarter appearing in CCP until quarter turning 22).

- Diff-in-Diff-in-Diff: What students in Georgia, Idaho, and Texas *would have* looked like if they never had the education.
  - Compare to students within the same state before and after 2007
  - Compare to students in nearby states
  - Counterfactual: Comparing in-state cohorts to out-of-state cohorts before and after 2007

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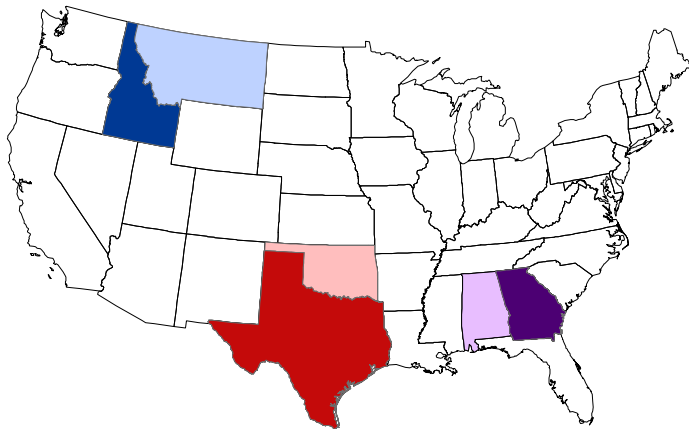
Quarterly Credit Panel Data

$$Y_{ist} = \alpha_0 + \beta_1(T_s \times \text{P1}_{it}) + \beta_2(T_s \times \text{P2}_{it}) + \beta_3(T_s \times \text{P3}_{it}) + \gamma_1 u_{it} + \kappa X_{it} + \eta_t + \epsilon_{ist} \tag{1}$$

- β_1 is first graduating class (2007); β_2 is 2008 class and β_3 is 2009 class.
- State-level and quarter-by-year fixed effects
- Current county-level unemployment rate
- Number of quarters the individual has appeared in the credit data (16 or 17 max)
- Total number of accounts
- Robust standard errors clustered at the individual level.

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Dependent Variables

Behaviors

- Young people are just establishing credit at ages 18 to 21

- Measuring relatively small relative differences among students exposed to financial education policies.

  - Equifax Risk Scores credit scores (higher)
  - Delinquency (30 day) rates and Default rates (60/90 day) (lower)
  - Balances (more or less?)
  - Using any credit; opening accounts (more or less?)

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Overall Means

	AL	GA	MT	ID	OK	TX
Credit Score	609.49	607.41	638.42	634.62	616.85	609.41
	(85.9)	(88.39)	(77.73)	(82.77)	(85.94)	(88.51)
N	256,141	827,654	65,414	174,346	27,180	1,501,366
30 Days Behind	0.05	0.05	0.03	0.04	0.05	0.04
	(0.21)	(0.21)	(0.18)	(0.19)	(0.21)	(0.20)
N	217,188	685,234	58,011	152,870	23,926	1,302,799
90+ Days Behind	0.19	0.19	0.13	0.13	0.13	0.18
	(0.39)	(0.39)	(0.34)	(0.33)	(0.34)	(0.38)
N	250,127	778,879	63,846	166,213	25,739	1,462,561
Total Balance	8423.87	8260.03	7868.91	7317.17	9137.26	8169.81
	(10918)	(11395)	(10103)	(9816)	(11731)	(11053)
N	283,896	899,568	68,709	179,950	29,012	1,633,457
Number of Accounts	2.23	2.13	2.49	2.36	2.60	2.37
	(2.39)	(2.3)	(2.41)	(2.27)	(2.49)	(2.49)
N	268,067	862,616	66,667	177,559	27,842	1,575,994
Number of Quarters	7.23	7.38	7.51	7.51	7.40	7.50
	(4.58)	(4.67)	(4.71)	(4.72)	(4.70)	(4.70)
N	301,006	956,261	72,502	190,902	29,655	1,735,756

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Combined States Results

	(1) Credit Score	(2) Account 30 Days Behind	(3) Account 90+ Days Behind
β_1	3.437***	-0.00205*	-0.00389*
	(1.200)	(0.00102)	(0.00196)
β_2	10.46***	-0.00345***	-0.0121***
	(1.643)	(0.00109)	(0.00206)
β_3	15.39***	-0.00438***	-0.0155***
	(1.735)	(0.00126)	(0.00327)

Notes: OLS; Robust standard errors clustered at the state level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Includes state-level and quarter-by-year fixed effects, current county-level unemployment rate, number of quarters the individual has appeared in the credit data, and their total number of accounts.
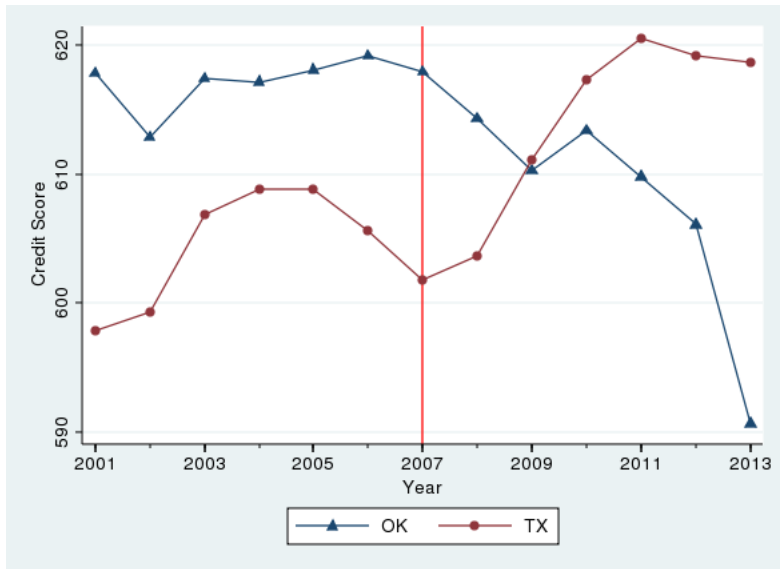
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Credit Score: GA vs. AL

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Credit Score: ID vs. MT
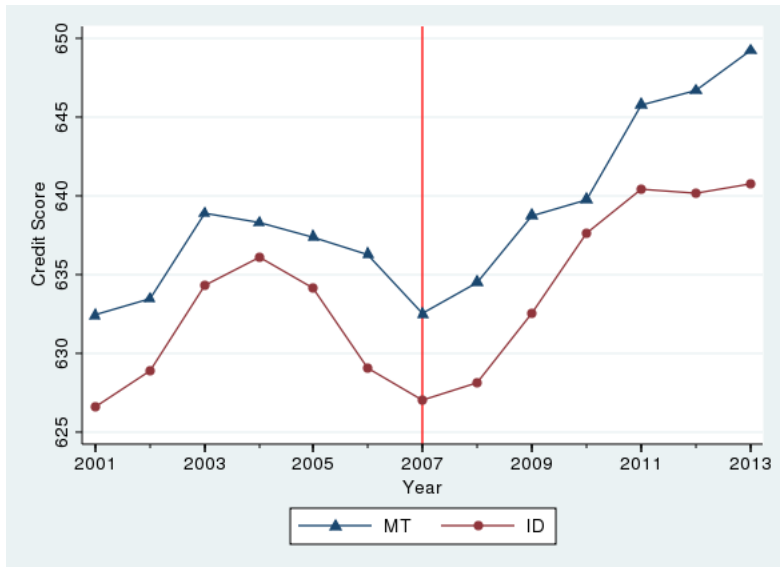
Credit Score: TX vs. OK

Border State Sample Results

Panel A: Georgia

	(1) Number Quarters	(2) Credit Score	(3) Account 30 Days Behind	(4) Account 90+ Days Behind
β_1	-0.280***	2.199**	-0.00290*	-0.000942
	(0.0736)	(1.062)	(0.00154)	(0.00241)
β_2	-0.557***	9.899***	-0.00262**	-0.00709***
	(0.0858)	(1.212)	(0.00122)	(0.00181)
β_3	-0.919***	15.11***	-0.00605***	-0.0136***
	(0.0967)	(1.286)	(0.00125)	(0.00320)
N	808,729	771,632	644,279	644,279
Mean	7.38	607.41	0.047	0.185

Notes: Robust standard errors clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. β_1 is first graduating class; β_2 and β_3 are two following classes. Includes state-level and quarter-by-year fixed effects, current county-level unemployment rate, number of quarters the individual has appeared in the credit data, and their total number of accounts.

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Border County Sample Results

Panel A: Georgia

	(1) Number Quarters	(2) Credit Score	(3) Account 30 Days Behind	(4) Account 90+ Days Behind
β_1	-0.439***	4.927***	-0.000777	-0.00229
	(0.0581)	(1.183)	(0.00171)	(0.00293)
β_2	-0.747***	14.37***	0.000278	-0.0131***
	(0.0647)	(1.326)	(0.00156)	(0.00253)
β_3	-1.144***	21.69***	-0.00328*	-0.0201***
	(0.0710)	(1.529)	(0.00181)	(0.00327)
N	392,399	374,695	310,280	310,280
Mean	7.46	609.64	0.045	0.181

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Border State Sample Results

Panel B: Idaho

	(1) Number Quarters	(2) Credit Score	(3) Account 30 Days Behind	(4) Account 90+ Days Behind
β_1	-0.269***	2.848***	-0.00100	0.00459
	(0.0703)	(0.904)	(0.00277)	(0.00277)
β_2	-0.548***	12.58***	-0.00674**	-0.0111***
	(0.0802)	(1.186)	(0.00269)	(0.00329)
β_3	-0.907***	16.38***	-0.00434*	-0.0120***
	(0.0871)	(1.506)	(0.00253)	(0.00312)
N	166,979	163,568	144,268	144,268
Mean	7.51	634.62	0.036	0.125

Notes: Robust standard errors clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. β_1 is first graduating class; β_2 and β_3 are two following classes. Includes state-level and quarter-by-year fixed effects, current county-level unemployment rate, number of quarters the individual has appeared in the credit data, and their total number of accounts.

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Border County Sample Results

Panel B: Idaho

	(1) Number Quarters	(2) Credit Score	(3) Account 30 Days Behind	(4) Account 90+ Days Behind
β_1	-0.222***	4.962***	-0.00766*	0.00130
	(0.0691)	(1.247)	(0.00423)	(0.00493)
β_2	-0.473***	5.765***	-0.00558	-0.00451
	(0.0785)	(1.295)	(0.00451)	(0.00461)
β_3	-0.814***	16.68***	-0.0147**	-0.0104***
	(0.0880)	(1.332)	(0.00590)	(0.00329)
N	60,053	58,860	52,182	52,182
Mean	7.54	637.95	0.035	0.120

Border State Sample Results

Panel C: Texas

	(1) Number Quarters	(2) Credit Score	(3) Account 30 Days Behind	(4) Account 90+ Days Behind
β_1	-0.518***	6.599***	-0.00324***	-0.00898***
	(0.0641)	(1.519)	(0.00110)	(0.00228)
β_2	-0.842***	13.71***	-0.00552***	-0.0181***
	(0.0644)	(1.775)	(0.00144)	(0.00221)
β_3	-1.241***	19.28***	-0.00644***	-0.0213***
	(0.0615)	(1.711)	(0.00163)	(0.00328)
N	1,479,654	1,401,100	1,224,241	1,224,241
Mean	7.50	609.41	0.044	0.177

Notes: Robust standard errors clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. β_1 is first graduating class; β_2 and β_3 are two following classes. Includes state-level and quarter-by-year fixed effects, current county-level unemployment rate, number of quarters the individual has appeared in the credit data, and their total number of accounts.
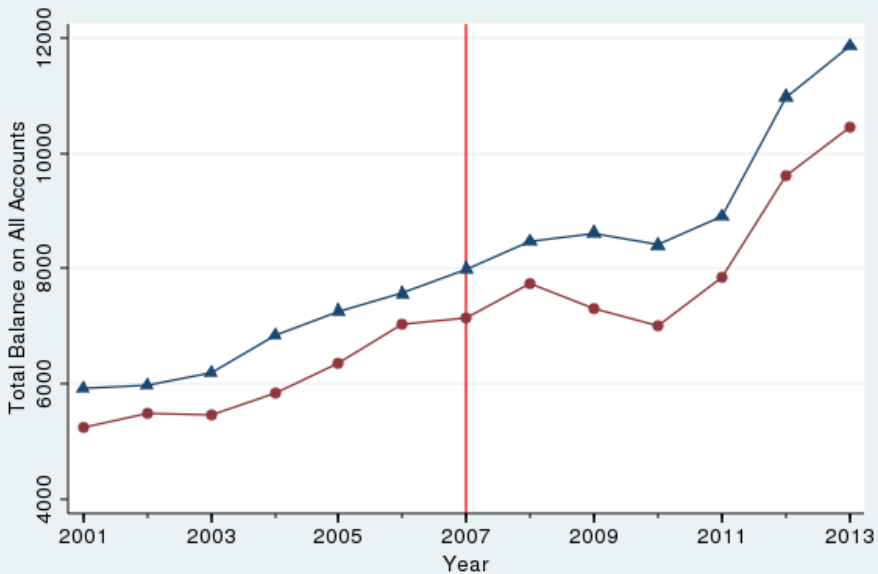
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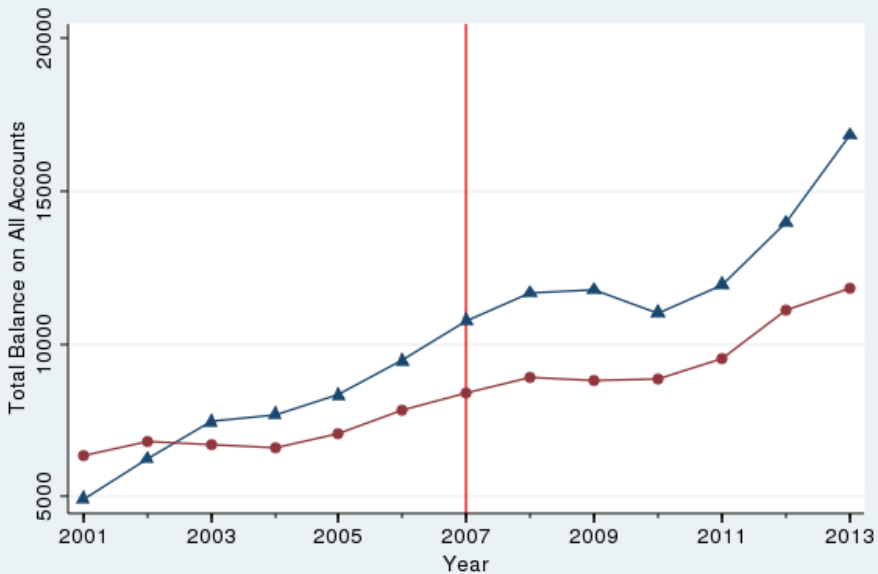UNIVERSITY OF WISCONSIN–MADISON

Border County Sample Results

Panel C: Texas

	(1) Number Quarters	(2) Credit Score	(3) Account 30 Days Behind	(4) Account 90+ Days Behind
β_1	-0.513***	6.917***	-0.00294**	-0.00613**
	(0.0651)	(1.417)	(0.00138)	(0.00285)
β_2	-0.833***	15.22***	-0.00441**	-0.0148***
	(0.0652)	(1.534)	(0.00173)	(0.00240)
β_3	-1.247***	22.38***	-0.00608***	-0.0183***
	(0.0620)	(1.409)	(0.00208)	(0.00440)
N	380,629	358,195	308,426	308,426
Mean	7.56	611.61	0.040	0.174

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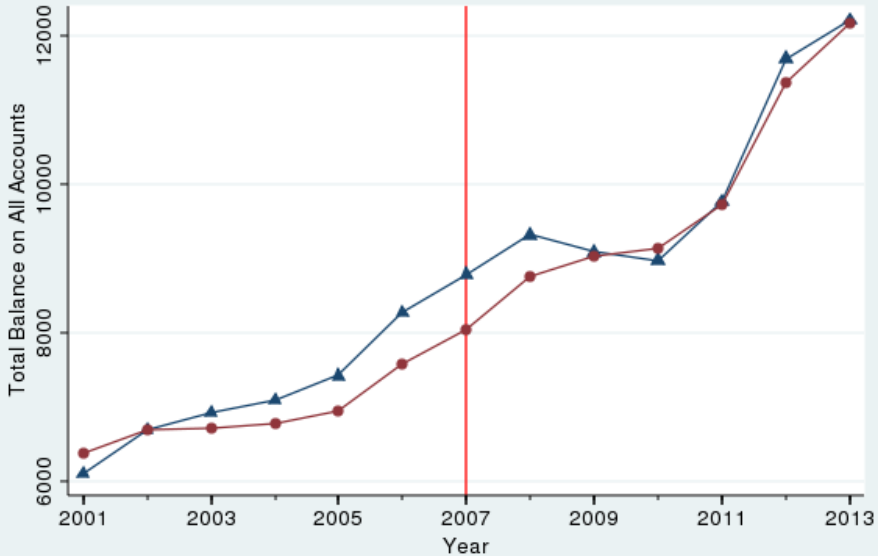
Account Balances: Georgia

Panel A: Georgia

	OLS	Quantile Regressions		
	ln(Total Balance)	25th Percentile	50th Percentile	75th Percentile
β_1	0.0265	-16.50**	91.93*	-83.05
	(0.0261)	(8.387)	(47.12)	(60.85)
β_2	0.142***	4.071	573.2***	-119.0*
	(0.0272)	(15.35)	(58.41)	(68.35)
β_3	0.298***	629.5***	808.9***	-453.3***
	(0.0252)	(63.13)	(62.18)	(66.46)
N	594,853	645,470	645,470	645,470
	Mean	25th	50th	75th
	$8,260	$700	$4,331	$11,766

Credit Score Estimates: Confidence Interval Variations

	Level of Clustering			
	(1)	(2)	(3) State (Bootstrap)	(4) Two-way State-year
	Individual	State *		
Georgia				
β_1	[0.117, 4.281]	[-26.14, 30.51]	[1.323, 3.046]	[-2.541, 6.909]
β_2	[7.523, 12.28]	[-29.67, 49.20]	[8.720, 10.80]	[3.207, 16.31]
β_3	[12.59, 17.63]	[-36.77, 66.87]	[13.81, 16.28]	[6.483, 23.61]
Idaho				
β_1	[1.076, 4.620]	[-0.565, 5.820]	[0.743, 4.512]	[1.576, 3.679]
β_2	[10.26, 14.91]	[10.37, 14.26]	[10.11, 14.52]	[11.08, 13.55]
β_3	[13.43, 19.33]	[12.93, 19.55]	[13.75, 18.74]	[14.68, 17.81]
Texas				
β_1	[3.622, 9.576]	[0.972, 12.24]	[5.969, 7.245]	[5.321, 7.892]
β_2	[10.23, 17.19]	[6.236, 21.20]	[12.96, 14.48]	[12.37, 15.07]
β_3	[15.93, 22.63]	[10.38, 28.04]	[18.32, 20.10]	[17.64, 20.78]

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What if We Use Date Enacted Not Implemented?

	(1) Number Quarters	(2) Credit Score	(3) Account 30 Days Behind	(4) Account 90+ Days Behind
Panel A: Georgia				
β_3	0.00168	5.926***	-0.00189	-0.00884***
	(0.120)	(1.146)	(0.00200)	(0.00325)
Panel B: Idaho				
β_3	0.0163	0.0768	0.00362**	-0.00420*
	(0.115)	(0.705)	(0.00156)	(0.00242)
Panel C: Texas				
β_3	-0.0236	-2.447*	0.000660	0.00366*
	(0.136)	(1.257)	(0.000803)	(0.00214)

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Summary (State Model)

- Georgia: 15.1 points higher credit score for the third cohort.
- Idaho: 16.4 points
- Texas: 19.3 points
    - Standard deviations: Georgia=88; Idaho=83; Texas=89
    - About one-quarter standard deviation (sigma unit) increase in average credit score.
    - Also used 'synthetic controls' approach - weighted by state characteristics. General results hold.
- School-based programs may accelerate learning process and prevent early problems

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Implications

Adding mandate for financial education makes financial management more salient.

- Reminder to avoid missing payments (a common behavior for young people)

- Attention to importance of on-time payments results in fewer delinquencies/defaults.

- Potentially be a benefit for lenders to avoid collections and loan write-off costs
- If defaults have negative externalities for families and communities, other costs may be avoided

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Implications

- Scale of Effects...rough estimate:
  - 265,000 students graduated from high school in Texas in 2009
  - Given 90 days+ default rate of 18 percent, 47,700 young people would experience a default by age 22.
  - Mandate had a 2 percentage point lower default rate (18-2=16)
  - Estimate 5,300 fewer young people would have experienced a serious credit default per cohort.

- Students are likely better off, at least in terms of lower interest rates and fees, as well as credit access.

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Implications

- Younger people have lower credit scores—learning by experience

- Payments have big effect on the credit score of someone with a brief credit history.

- Observed shift in credit scores driven by payments.

- However, many cautions...
  - Longer-run persistence into later adulthood unknown—may just jump start trial and error learning
  - Displacement of other curricula could have offsetting effects
  - Time period specific issues–2009-2012–during recession

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Still Reasons to Be Cautious

- Opportunity costs for students and schools associated with a personal finance graduation requirement

- More robust math, art, or other requirement might also result in positive benefits for young people.

- Remain circumspect regarding how long young people will sustain these positive credit repayment habits—could simply end up delaying problematic behavior.

- Perhaps making mistakes in managing credit helps people to manage credit better later in life

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Extensions

- Did GA, ID and Texas get their requirements 'right'? Still need more analysis (Policy data now complete).
    - Could weaker state requirements work as well? Testing? Shorter class? Earlier in schooling? More experiential?
    - Teachers training effects vs. financial education materials.

- Do effects influence parent's financial behaviors?

- Student loans, FAFSA, and other relevant behaviors for youth?

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