The Real Effects of Financial Innovation: Evidence from credit card markets

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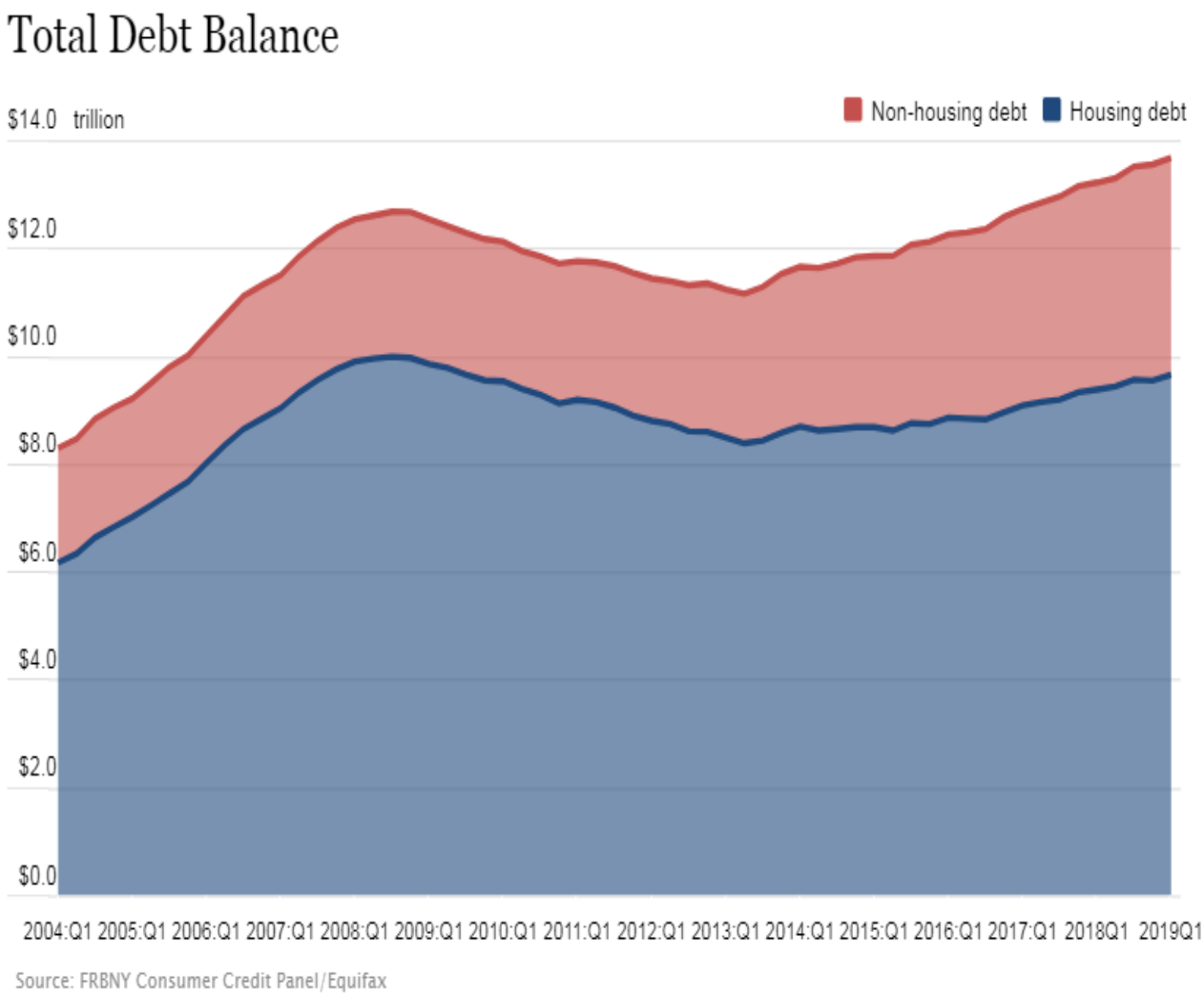
Real effects of financial innovation

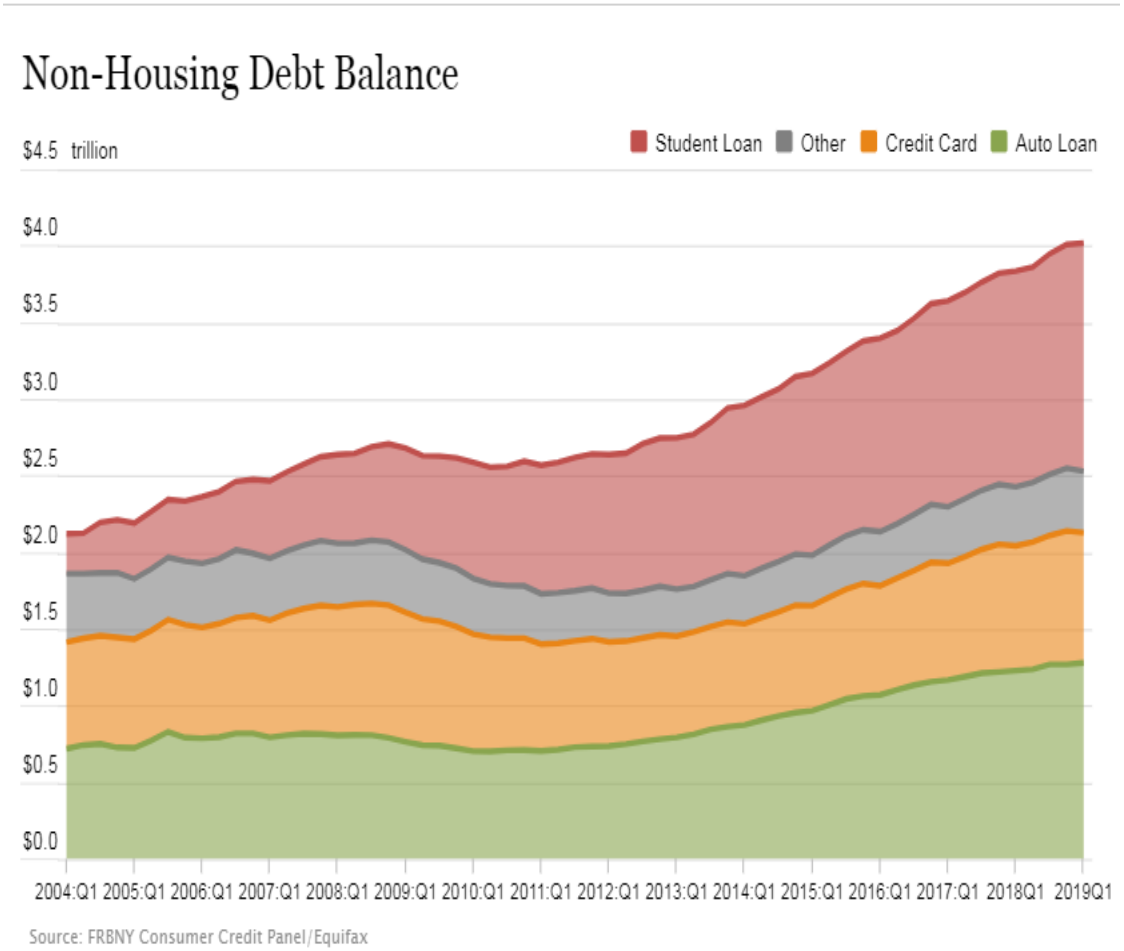
- Context and motivation
  - A particular type of financial innovation …
- Why credit cards? Macro
  - Small in the macro scheme of credit
  - Study card *offers* for the most *marginal borrowers*
- Micro: how do issuers use information?
  - More, but still asymmetric: card issuers may know more about borrowers than borrowers know about themselves
  - Do issuers exploit behavioral biases, respond to credit constraints, and/or manage risk?

Macro: in the US, most consumer debt is housing-based



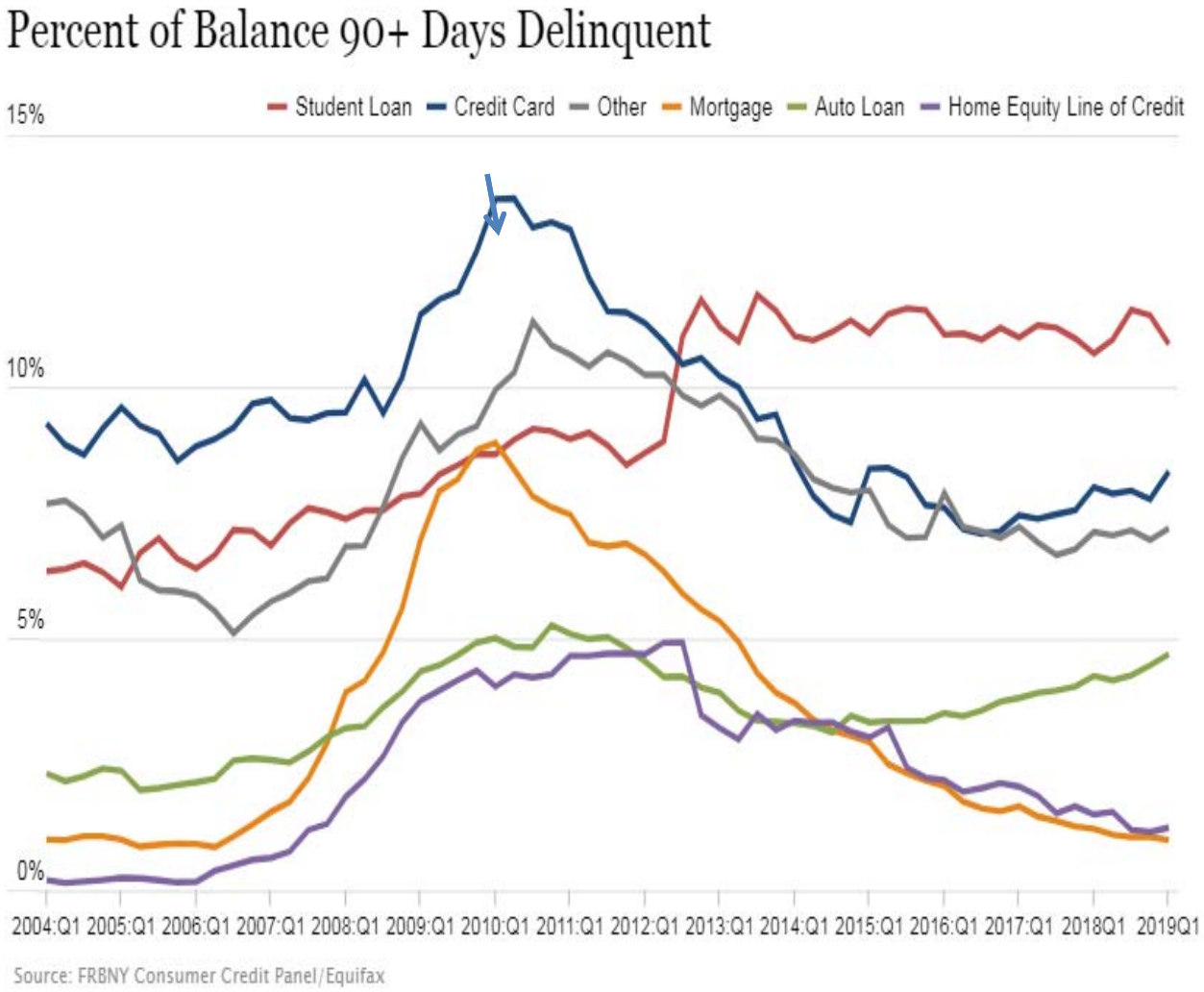
Macro: non-housing debt

- Largest categories are student loans and auto loans.
- Credit cards are < $1 trillion, or ~ 7% of household debt.
- But … short term (revolving), terms are adjustable, and widespread (about ¾ of households have at least 1 card).



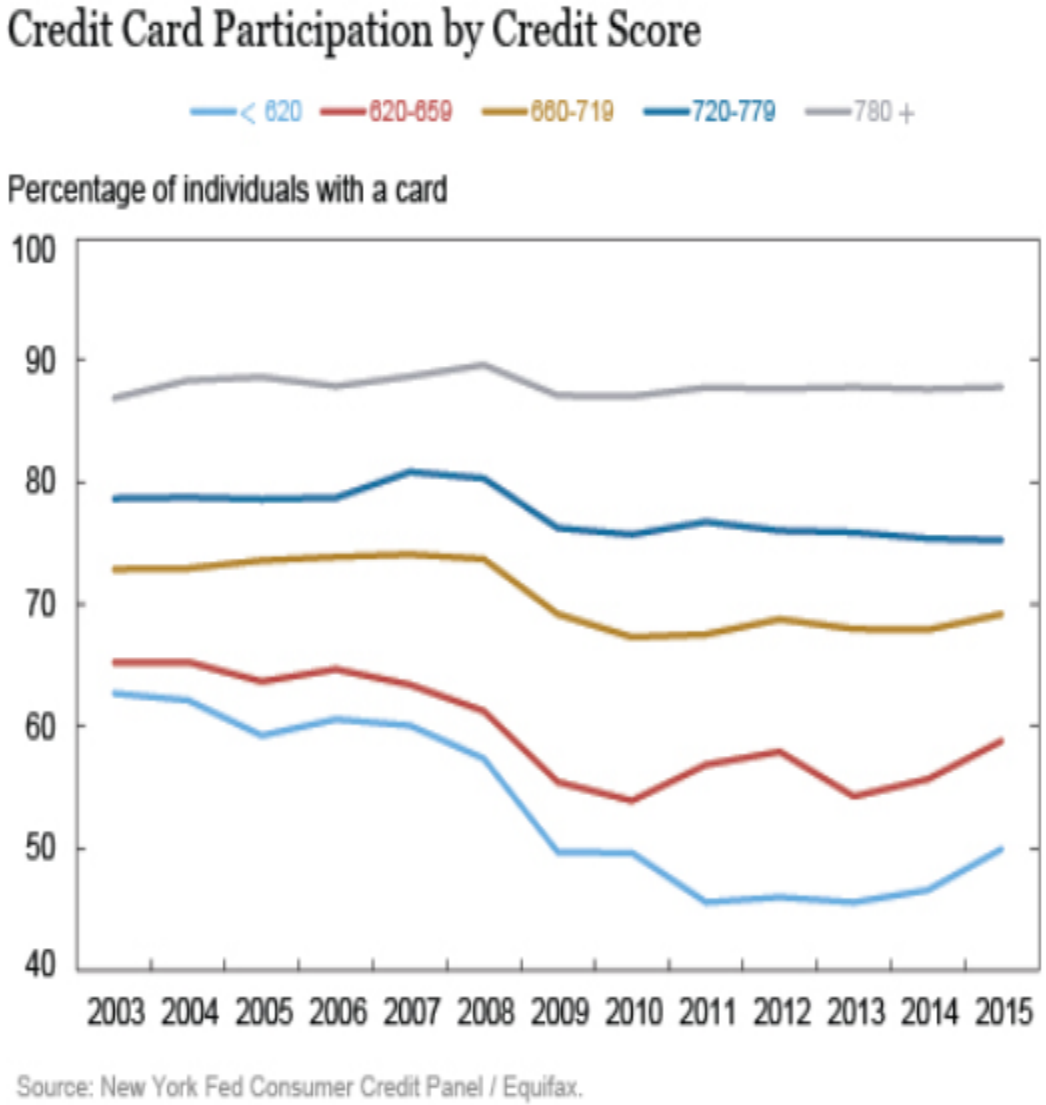
Cyclical properties

These properties translate to strong cyclical variation compared to other forms of credit –

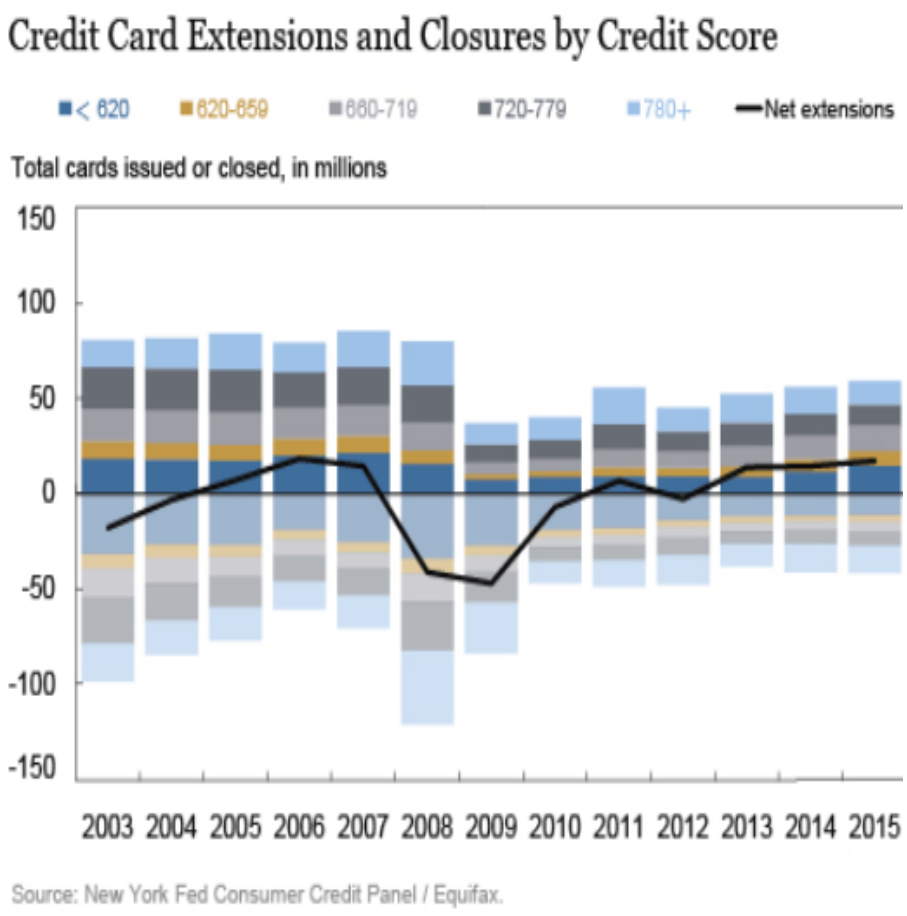


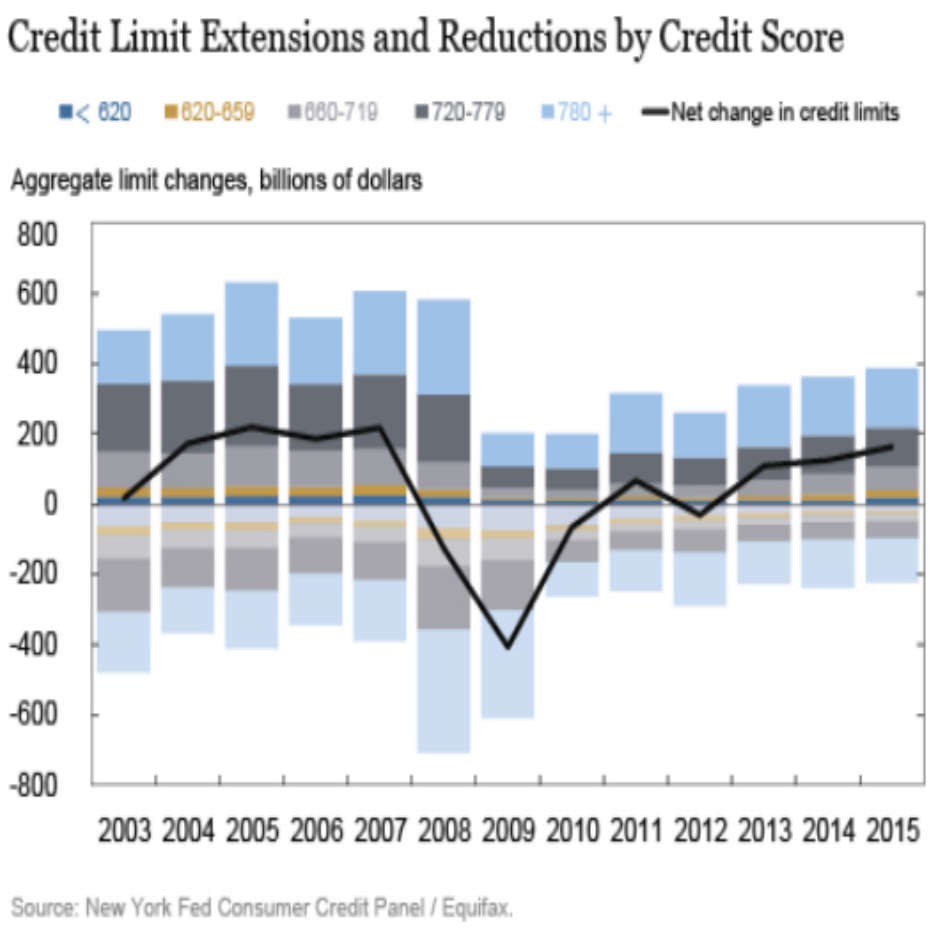
The importance of non-price credit rationing

- Like other credit markets, despite low rates, credit availability shrank post-crisis.
- Non-price rationing to less-credit-worthy borrowers
- The paper examines how issuers use non-price features differentially.



Credit expansion/shrinkage at the extensive margin





Card design

- Good attributes: ***EXCELLENT!***
- Normal attributes: OK
- Negative attributes:

You're going to be sorry

Card design

- Good attributes: ***EXCELLENT!***
- Normal attributes: OK
- Negative attributes:

More interesting: how does design vary with education?
NB: why not shroud for everyone?
Is there a penalty for shrouding and being found out?

You're going to be sorry

How do card issuers change credit over the cycle?

- Passively change spreads as costs change?
  - No, partial pass through and fee adjustment
  - Distribution of fees changes
- Up-front, annual fees select for high quality borrowers (MILES)
- Late, backloaded fees apply to lower quality borrowers
- Liquidity constraints? Unlikely – education matters, even controlling for income
- Exploiting myopia, over-optimism, other behavioral biases?
- Managing risk? – issue credit *with guardrails* to riskiest customers.

How do card issuers change credit over the cycle?

*Max{[(debt*spread)+ fees]*[1-Prdefault(debt,spread,fees)]}*

Max wrt fees => (1- Prdefault) = $[(debt * spread) + fees] \frac{\partial\, Prdefault}{\partial fees}$

- The classic problem of setting rates also applies to fees.
- If too high, may induce default and truncate payments.
- Hence, backward bending supply (Stiglitz and Weiss 1981).
- Issue credit offer with low rate and high late fees => attract borrowers and keep them on track for repayment.

Credit cards over the cycle: rising Fed Funds rate

TABLE 4 – RELATIONSHIP BETWEEN APRS/FEES AND EDUCATION

	1	2	3	4	5	6
Dependent Variable	APR	Annual Fee	Late Fee	Over-Limit Fee	Default APR Dummy	Intro_APR
FFR	0.755***	0.671***	0.007	-0.424***	-0.061***	-0.014***
	(0.005)	(0.033)	(0.011)	(0.011)	(0.001)	(0.001)
LowEdu	0.163***	1.148***	0.007	-0.042	0.030***	0.011***
	(0.032)	(0.158)	(0.043)	(0.047)	(0.004)	(0.003)
LowEdu*FFR	-0.050***	-0.440***	0.101***	0.173***	0.003**	0.003***
	(0.008)	(0.048)	(0.014)	(0.016)	(0.001)	(0.001)
Cell Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	785,950	800,546	798,936	749,306	808,430	808,430
R-squared	0.318	0.252	0.208	0.199	0.162	0.146

Partial pass through to rates, annual fees. But less so for less educated borrowers, and instead increase late, over-limit fees (backloaded). Year effects should control for business cycle, but nonlinearity for less educated (more cyclical) borrowers?

Credit cards over the cycle: Unemployment insurance

TABLE 6 – UNEMPLOYMENT INSURANCE AND CREDIT CARD FEATURE

Panel A	1 APR	2 Default APR Dummy	3 Late Fee	4 Annual Fee	5 IntroAPR All	6 Backward	7 Color	8 DefaultAPR MainPage	9 LateFee MainPage
FFR	0.421***	-0.048***				0.006			
	(0.043)	(0.003)				(0.005)			
UI	-0.276	0.044	0.909**	0.271	0.123**	0.061*	0.027**	-0.011***	-0.012**
	(0.353)	(0.028)	(0.389)	(0.454)	(0.056)	(0.035)	(0.012)	(0.003)	(0.005)
UI_Pre_3M	-0.005	0.022	0.655***	-0.036	0.140*	0.050	0.015	-0.005	-0.010
	(0.120)	(0.021)	(0.185)	(0.361)	(0.077)	(0.040)	(0.017)	(0.005)	(0.009)
UI_Pre_6M	0.156	-0.068***	-0.204	-0.159	0.066	0.058**	0.012	-0.004	-0.001
	(0.269)	(0.024)	(0.450)	(0.714)	(0.043)	(0.024)	(0.008)	(0.004)	(0.010)
UI_Small	-0.052	-0.015	0.125	-1.321	0.065	0.020	0.010	-0.006	0.012
	(0.158)	(0.015)	(0.402)	(0.925)	(0.042)	(0.034)	(0.012)	(0.004)	(0.010)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	93,224	93,491	92,876	93,215	93,940	90,700	81,968	46,161	46,161
R-squared	0.263	0.410	0.179	0.193	0.121	0.100	0.038	0.054	0.029

Little average effect on rates, annual fees; higher late fees and more intro rates.
Unemployment is of little risk to average borrower => risk is for marginal borrowers.

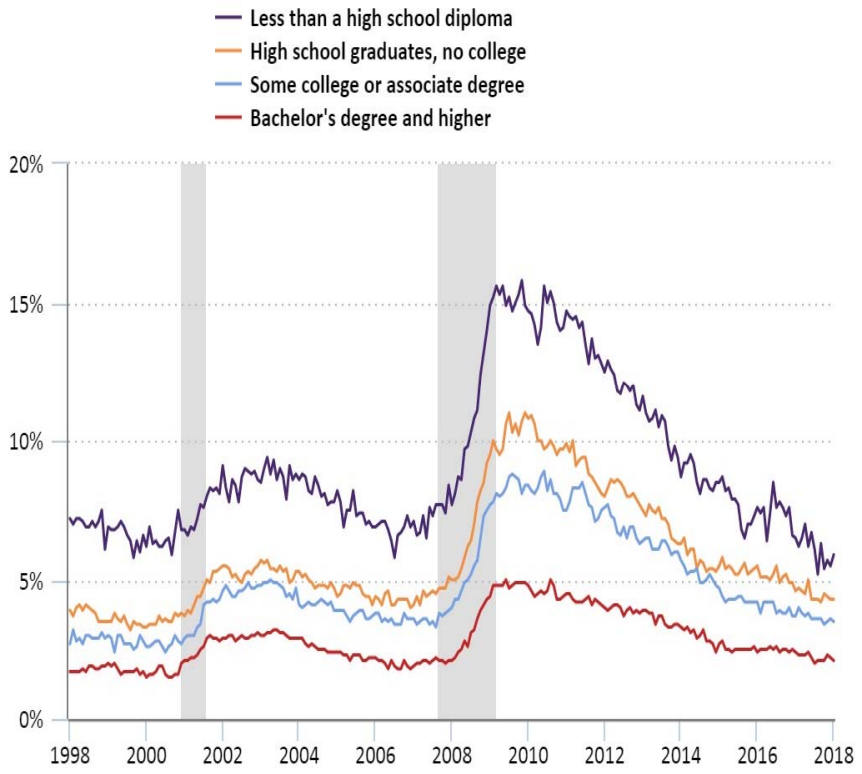
Credit cards over the cycle: Unemployment insurance

Low education is a risk factor for unemployment.

Unemployment insurance increases with the state-level unemployment rate.

Low ed * UI may be measuring risk.

Unemployment rates for people 25 years and older by educational attainment, April 1998 to April 2018, seasonally adjusted



Shaded areas represent recessions as determined by the National Bureau of Economic Research.
Click legend items to change data display. Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics.

Credit cards over the cycle: Unemployment insurance

- Panel B: for less educated borrowers, offered rates fall and late fees rise as benefits rise.
- May reflect both unemployment and the increase in benefits.
- Benefits rise => high risk borrowers are less likely to default; issuers offer lower rates, higher backloaded fees.
- Issuers offer credit, but with “guard rails”
- Importantly, does not appear to be additionally shrouded.

Panel B	1 APR	2 Default APR Dummy	3 Late Fee	4 Annual Fee	5 IntroAPR All
FFR	0.425***	-0.048***			
	(0.044)	(0.003)			
UI	-0.038	0.030	0.867**	0.695	0.135**
	(0.304)	(0.030)	(0.354)	(0.432)	(0.053)
UI*LowEdu	-0.324***	0.021***	0.215**	-0.597	-0.013
	(0.109)	(0.006)	(0.100)	(0.487)	(0.019)
UI*LowIncome	-0.048	-0.004	-0.295**	-0.062	-0.013
	(0.127)	(0.017)	(0.119)	(0.590)	(0.018)
UI_Pre_3M	0.004	0.021	0.648***	-0.028	0.140*
	(0.118)	(0.020)	(0.187)	(0.360)	(0.076)
UI_Pre_6M	0.174	-0.070***	-0.216	-0.129	0.067
	(0.281)	(0.024)	(0.454)	(0.725)	(0.042)
UI_Small	-0.041	-0.015	0.130	-1.306	0.066
	(0.159)	(0.015)	(0.400)	(0.923)	(0.042)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	93,224	93,491	92,876	93,215	93,940
R-squared	0.263	0.410	0.179	0.193	0.121

Conclusions

- Credit card lessons for macro – especially at the extensive margin.
- Non-price terms are allocative (broader warning)
- Non-price credit rationing
  - Undermines the impact of pricing (traditional monetary policy)
  - Are they determined by
    - Discriminatory fee extraction?
    - Risk management