

Consumer revolving credit and debt over the life-cycle and business cycle

Scott L. Fulford¹ and Scott Schuh²

¹Boston College
scott.fulford@bc.edu

²Federal Reserve Bank of Boston
Scott.Schuh@bos.frb.org

The views expressed in this paper are the author's and do not necessarily reflect the official position of the Federal Reserve Bank of Boston or the Federal Reserve System.

The relationship between consumer credit and debt

- On three different levels:
 - In aggregate over business cycle
 - On average over life-cycle
 - For individuals
- Focus on credit cards
 - Widely available and used
 - Limits observable
- Start with descriptive and reduced form, then add insights from consumption theory to make sense of results
- Key distinction between credit cards as payments mechanism, and credit as a way to accumulate debt

- For most households, credit is larger than liquid assets, and is the marginal source for smoothing (Fulford (2015b) *EER*)
- Credit limits are much more volatile than income (Fulford (2015a) *JME*)
- Household debts severely understudied (Zinman, forthcoming)

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 - Limitations: Generally short term, for single credit accounts, and does not distinguish uses of credit cards for payments
- Little empirical work on consumer credit over the life-cycle
- Some on mortgage debt over life-cycle, recent work on student loans

- Equifax/CCP

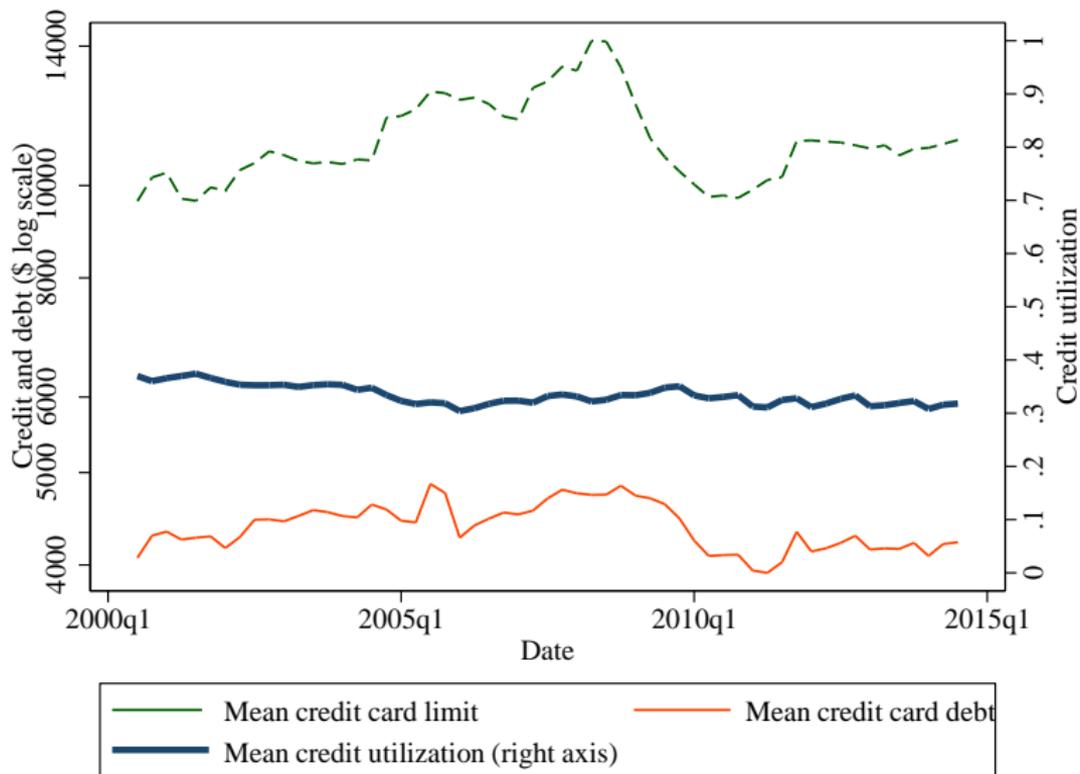
- 5% sample of all credit accounts, with full history for an account (for computational reasons, actually use a smaller sample)
- Quarterly 1999-2015
- Other than age, limited individual information beyond credit and debts
- Does not distinguish between those who revolve debt and those who pay full bill every month

- Survey of Consumer Payment Choice

- In field since 2008
- Asks questions on consumer preferences and adoption of payment options

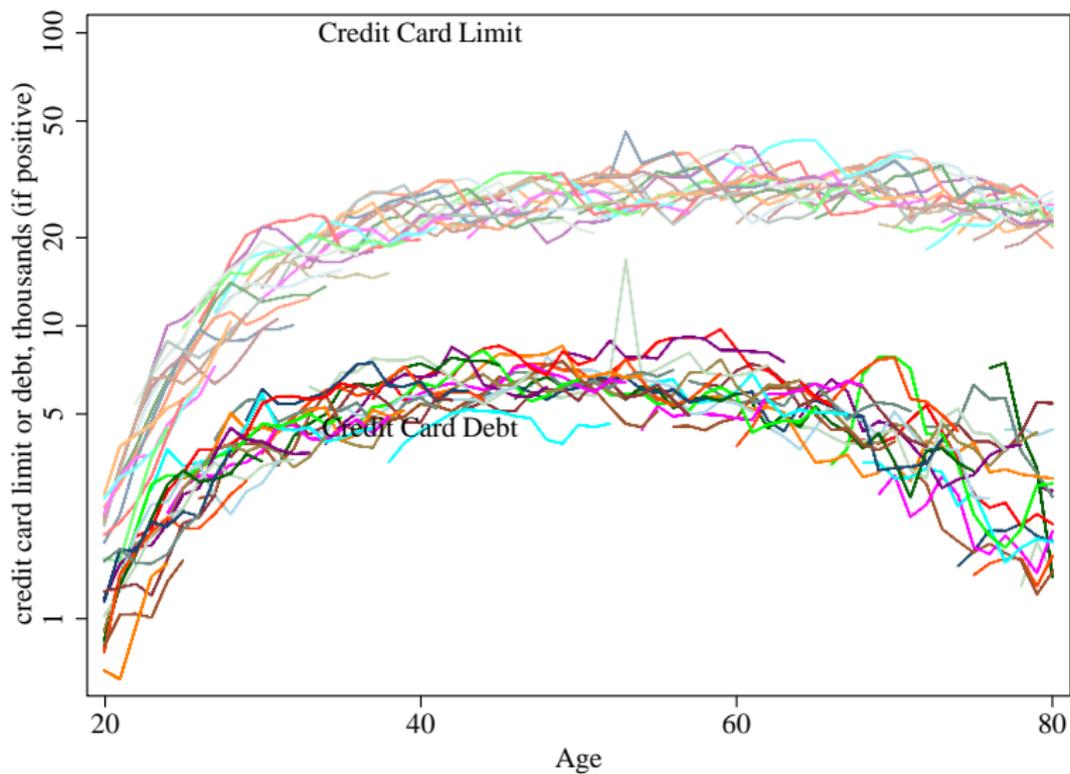
- Survey of Consumer Finances

Credit and debts vary, use does not

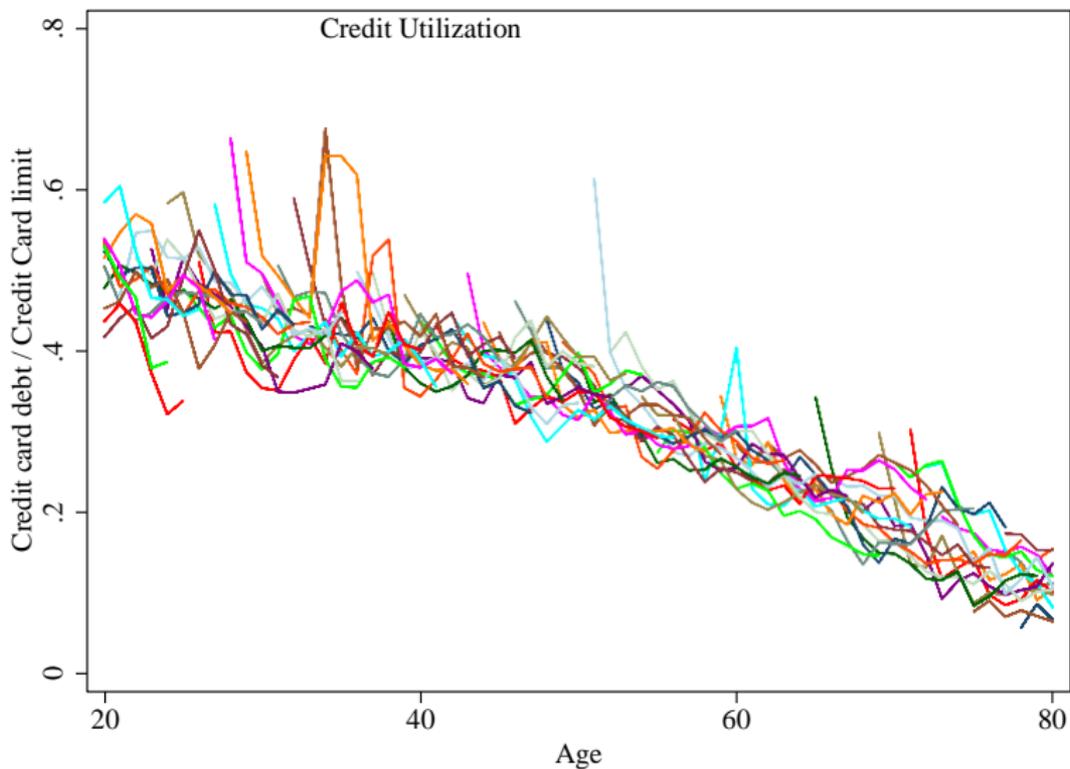


Source: Author's calculations from Equifax/CCP

Credit limits and debts increase with age

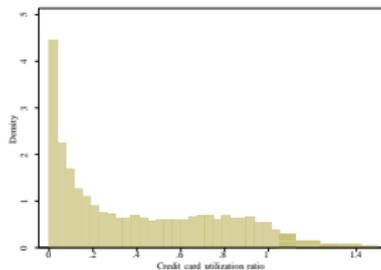


Credit utilization decreases slowly

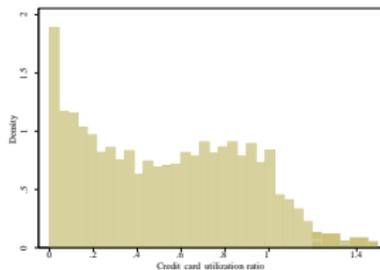


Distribution of credit utilization

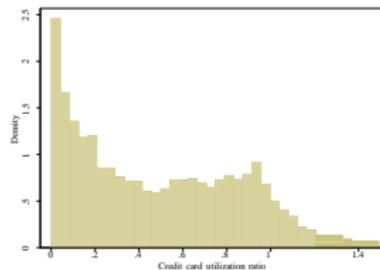
All ages



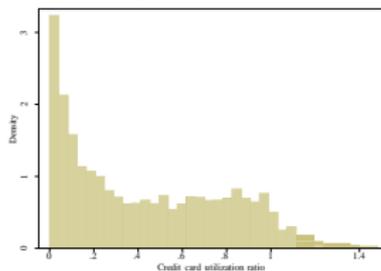
Age 20-30



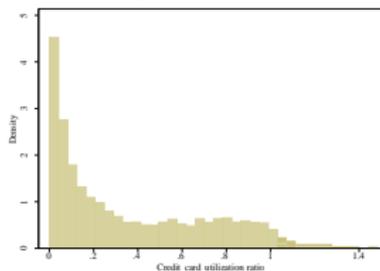
Age 30-40



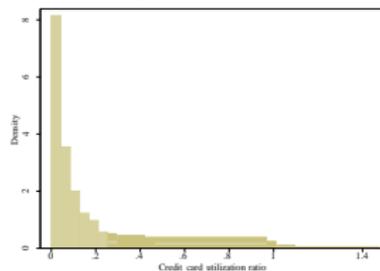
Age 40-50



Age 50-60



Age 60-80



$$\text{Credit utilization}_{it} = \vartheta_t + \vartheta_a + \alpha_i + \beta \text{Credit utilization}_{i,t-1} + e_{it}$$

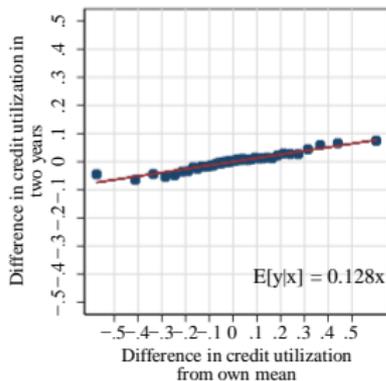
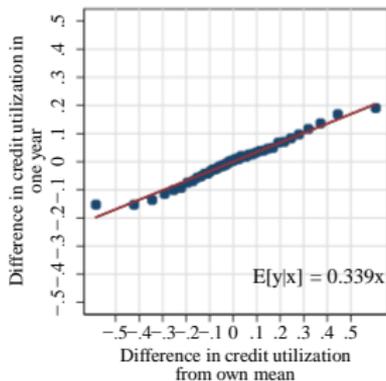
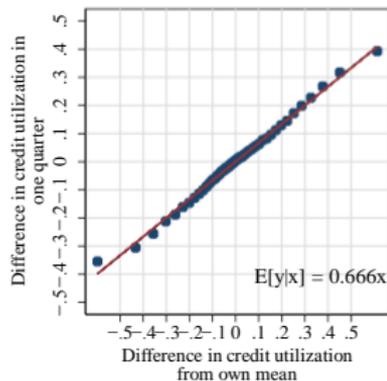
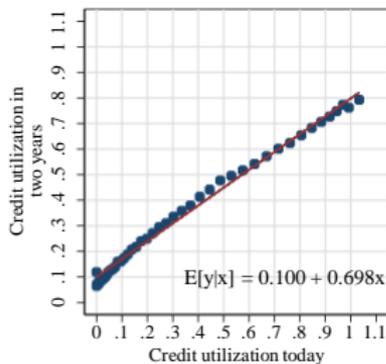
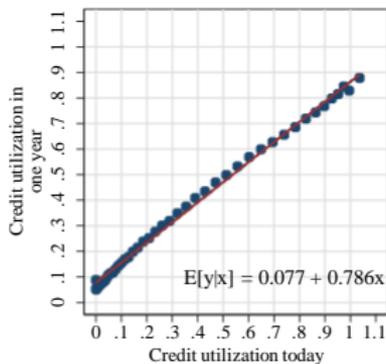
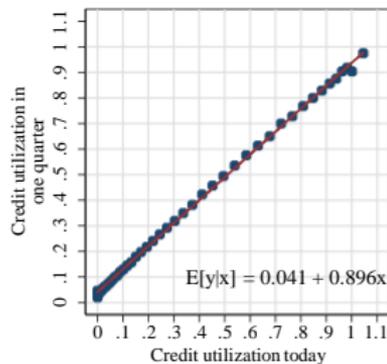
	Credit utilization _t		
Credit utilization _{t-1}	0.874*** (0.000876)	0.868*** (0.000892)	0.647*** (0.00131)
Constant	0.0479*** (0.000461)		
Observations	347,642	347,642	347,642
R-squared	0.741	0.743	0.429
Fixed effects	No	No	Yes
Age and year effects	No	Yes	Yes
Number of accounts	10,451		
Frac. Variance from FE	0.477		

$$\text{Credit utilization}_{it} = D_{it}/B_{it}$$

D_{it} : Credit card debt (including both revolving and non-revolving)

B_{it} : Credit limit (if positive)

Credit utilization: non-parametric



- **Convenience users:** Credit card debts are some fraction of consumption. Should behave like consumption:

$$D_{i,t} = \omega_{i,t} C_{i,t}$$

- **Revolvers:** Credit card debts accumulate (or are paid off). Should behave like negative assets:

$$D_{it+1} = (1 + r)(D_{it} + C_{it} - Y_{it})$$

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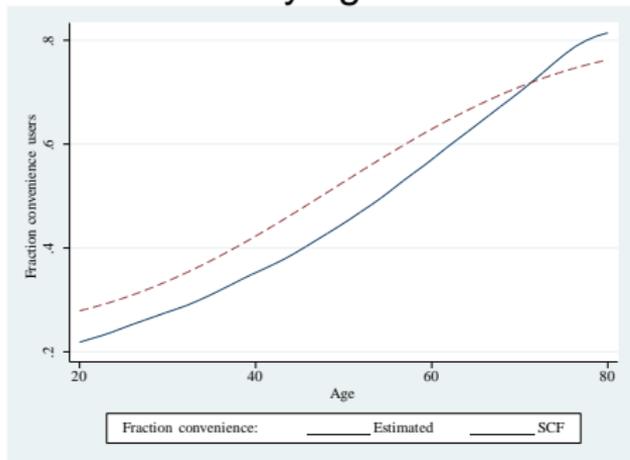
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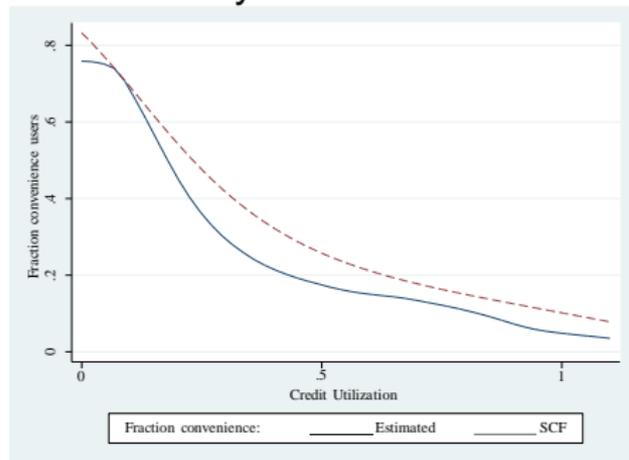
- Different relationships between past debts and current debts for revolvers and convenience users.
- Use to separate statistically between them (EM algorithm)

Fraction Convenience

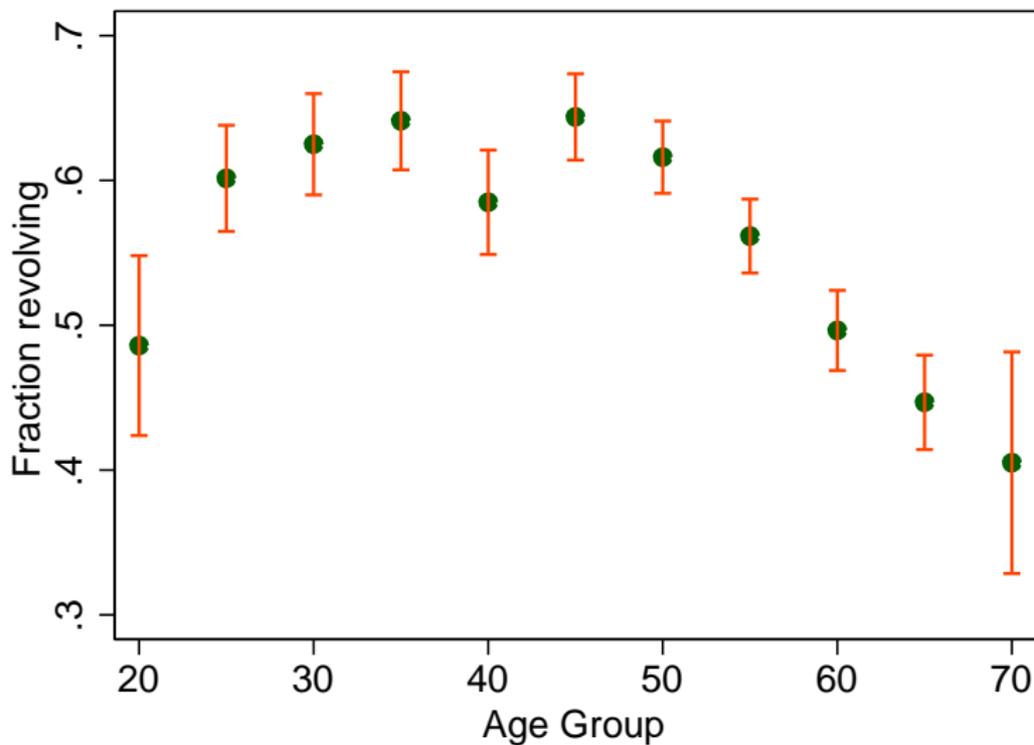
By age



By utilization

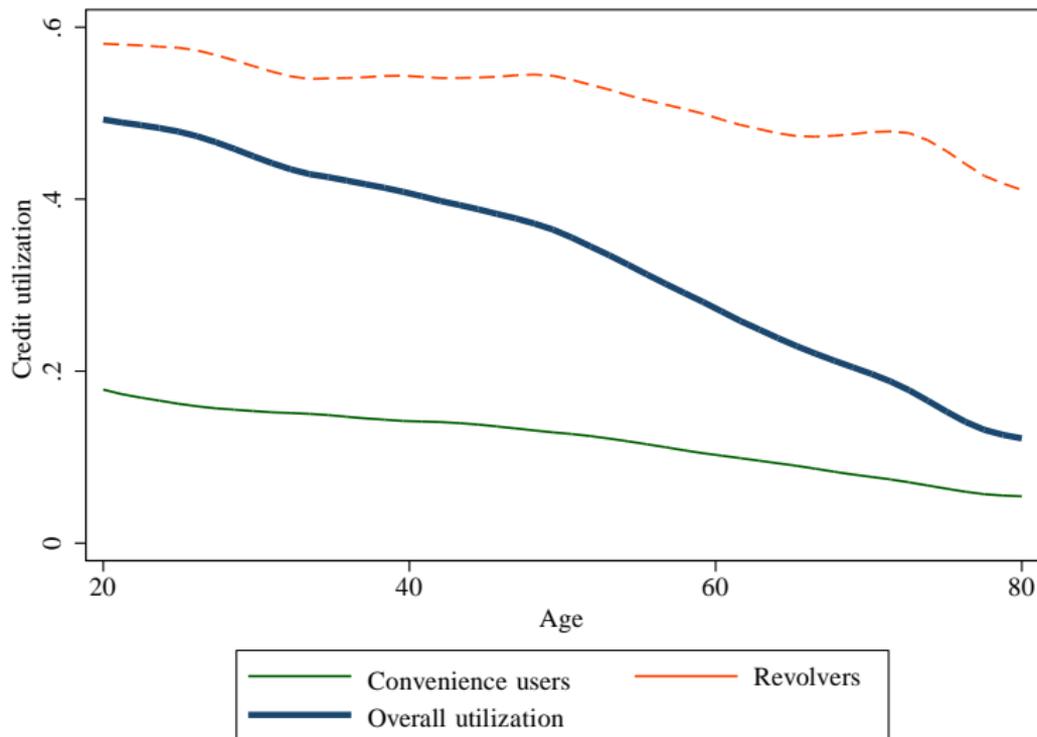


Fraction revolving SCPC, conditional on having card



Source: Author's calculations from SCPC

Age and utilization



$$\text{Credit utilization}_{it} = \vartheta_t + \vartheta_a + \alpha_i + \beta \text{Credit utilization}_{i,t-1} + e_{it}$$

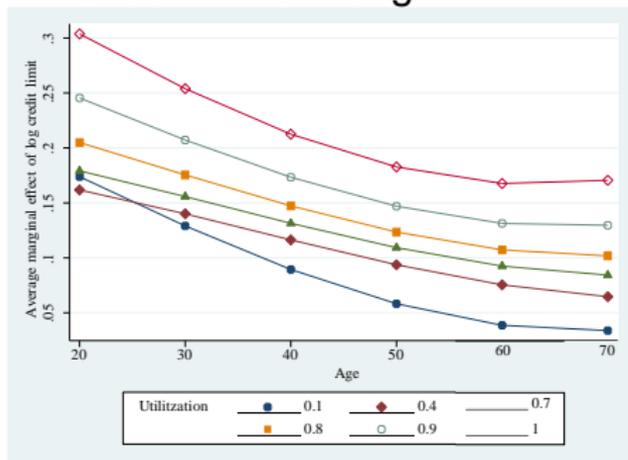
	Credit utilization _t			
	All	All	All	Revolvers
Credit utilization _{t-1}	0.874*** (0.000876)	0.868*** (0.000892)	0.647*** (0.00131)	0.766*** (0.00125)
Constant	0.0479*** (0.000461)			
Observations	347,642	347,642	347,642	
R-squared	0.741	0.743	0.429	
Fixed effects	No	No	Yes	Yes
Age and year effects	No	Yes	Yes	Yes
Number of accounts			10,451	
Frac. Variance from FE			0.477	

$$\text{Log Debt}_{it} = \vartheta_j + \vartheta_t + \vartheta_a + \alpha \text{Log Limit}_{i,t-1} + \beta \text{Log Debt}_{i,t-1} + e_{it}$$

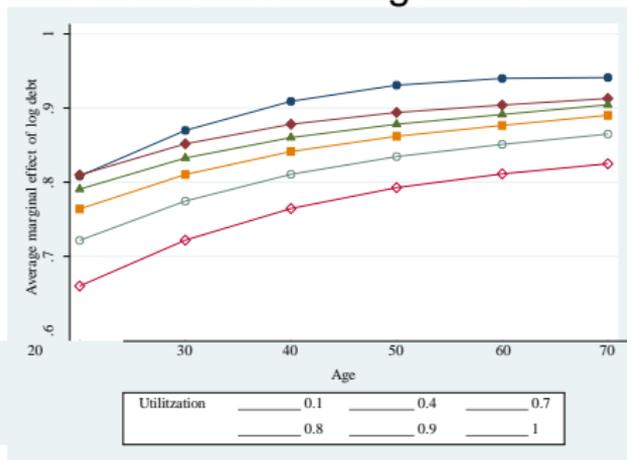
	Log Debt _t			
	All [1]	All [2]	All [3]	Revolvers [4]
Log Debt _{t-1}	0.505*** (0.00157)	0.758*** (0.00119)	0.604*** (0.00132)	0.859*** (0.000594)
Log Credit Limit _{t-1}	0.414*** (0.00262)	0.134*** (0.00148)	0.313*** (0.00243)	0.132*** (0.000784)
Observations	296,369	296,369	361,280	361,280
R-squared	0.432	0.667	0.610	0.927
Accounts	10,028		10,718	10,718
Fixed effects	Yes	No	Yes	Yes
Zero included	No	No	Yes	No
Age effects	Yes	Yes	Yes	Yes
Long term credit impact	0.862	0.875	0.879	0.990
Credit salience σ	0.443	0.665	0.530	0.754

Changing with utilization and age for Revolvers

Effect of 1% change in limit



Effect of 1% change in debt



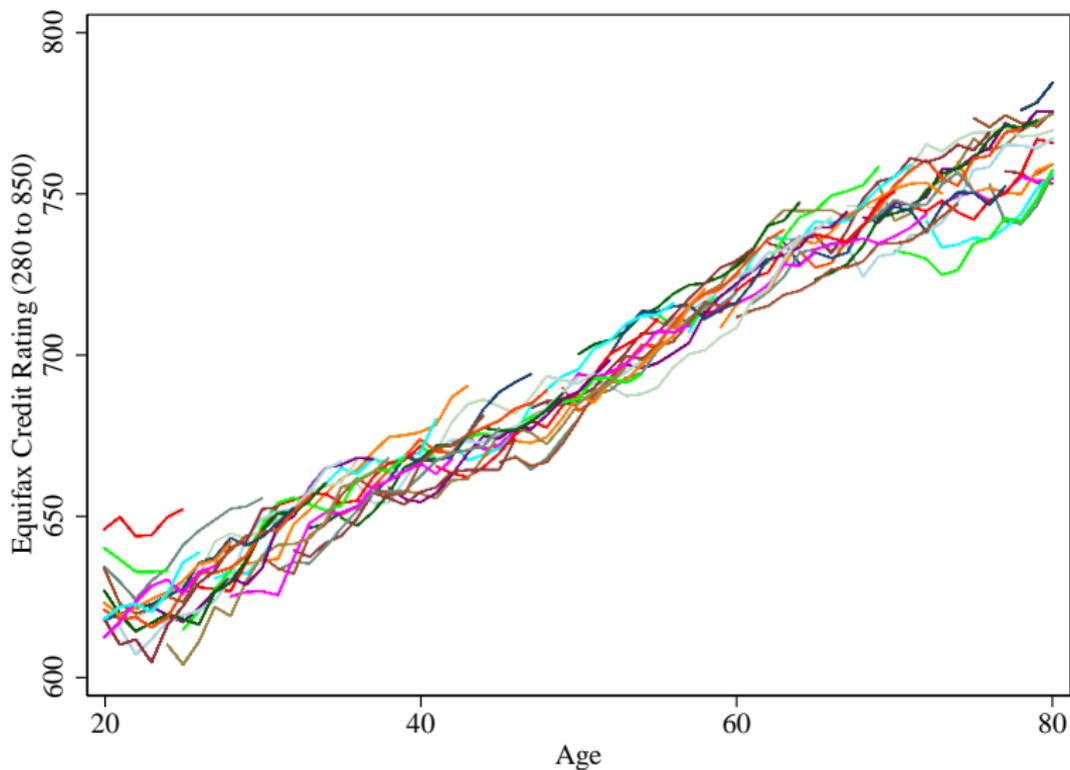
Source: Author's calculations from Equifax/CCP

- **Big fluctuations** in credit and debt over life-cycle and business cycle
- Yet credit utilization for credit cards very **stable**
- Stability comes from individuals returning quickly to mean utilization after shocks to debt and credit

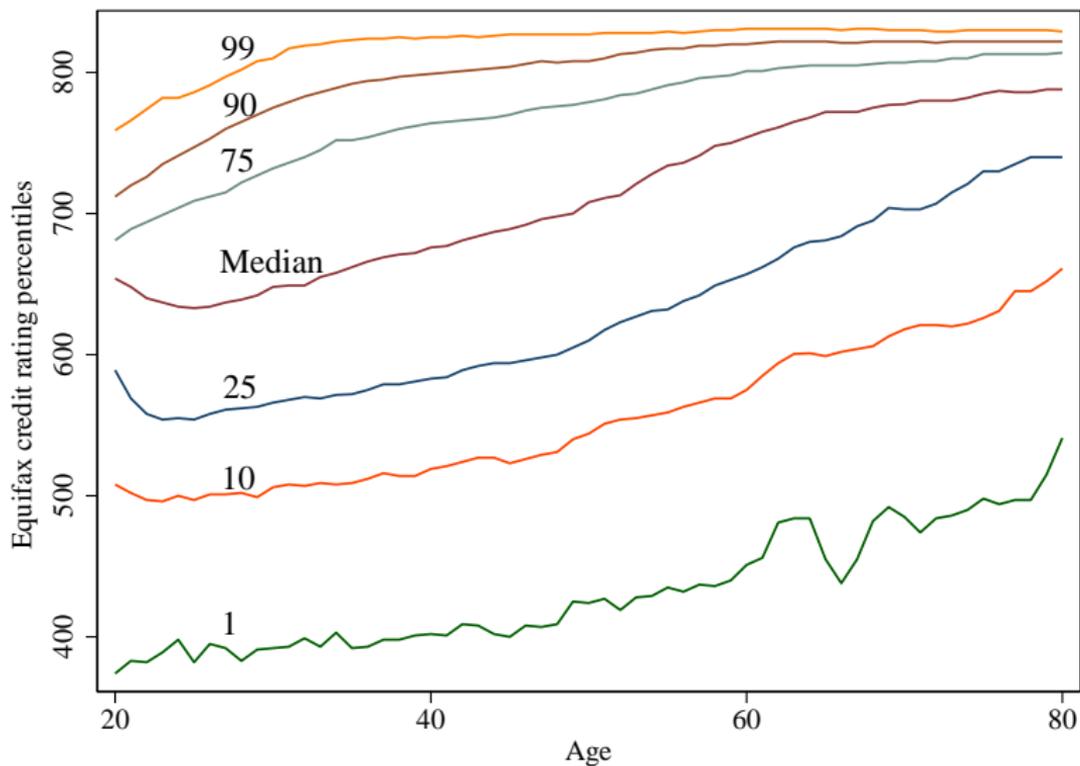
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- Individual stability from two sources:
 - 1 Convenience users: Use credit cards as payments, around 10% of available credit.
 - 2 Revolvers: Using 50-60% of available credit. Quickly return to their “target” utilization following increase in limit or debts.
- For Revolvers: All of increase in limit leads to additional debt eventually!
- Fraction Revolver falls slowly from around 70% in 20s to around 30% in 70s

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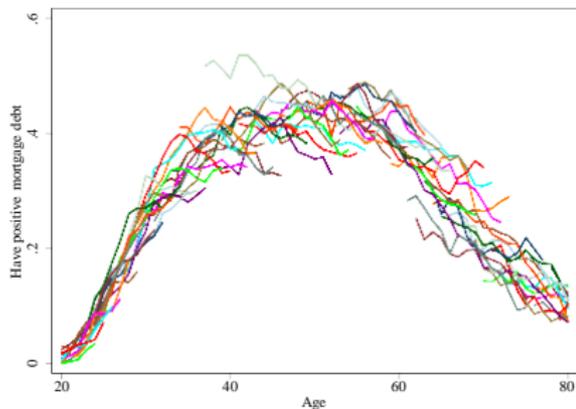
Credit ratings increase with age



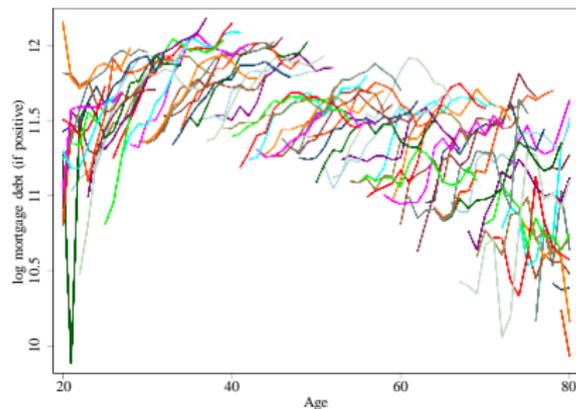
Credit rating inequality large



Have mortgage debt?



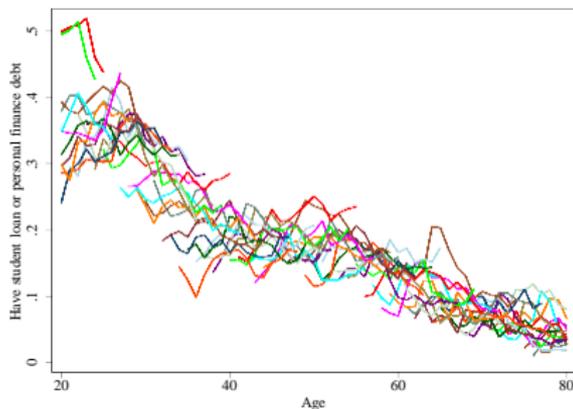
Log mortgage debt (if positive)



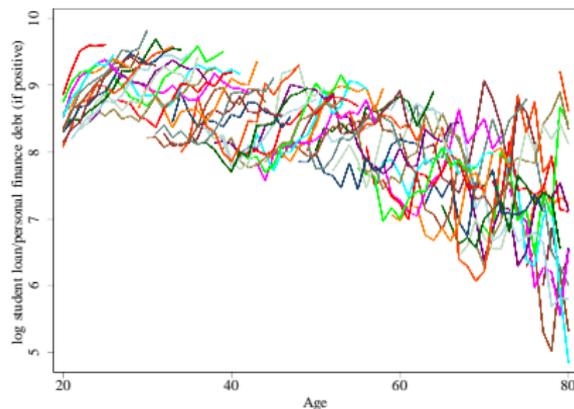
Source: Author's calculations from Equifax/CCP

Student loans

Have student loan debt?

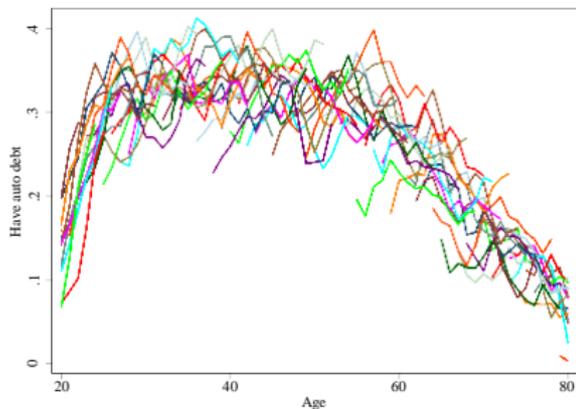


Log student loan debt (if positive)

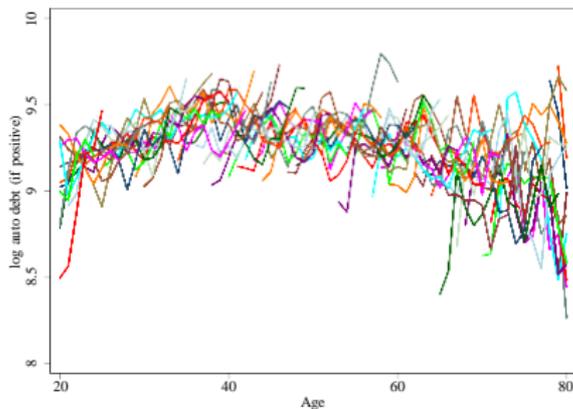


Source: Author's calculations from Equifax/CCP

Have auto loan?



Log auto loan debt (if positive)



Source: Author's calculations from Equifax/CCP