The Saving Behavior of Heterogeneous Households and Credit Constraints: A Decomposition

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2021 ASSA Annual Meeting
Florida International University

January 3-5, 2021

Motivation

- Numerous studies focus on the relationship between liquidity constraints and saving (Leland, 1968; Jappelli, 1990; Xu, 1995).
- Xu (1995) finds that liquidity constraints have a significant effect on household consumption and saving behavior.

Contribution

This paper:

- Examines the role that credit constraints play in the saving decisions of households by focusing on a well-defined set of reasons for saving.
- Classifies saving motives as (1) precautionary saving (liquidity), (2) saving to finance investments, and (3) saving for retirement.
- Utilizes probit regressions using cross-sectional data from the Survey of Consumer Finances (SCF) to examine the effect of credit constraints on constrained and discouraged households' saving behavior.
- Employs quantile regression to estimate how credit constraints affect household wealth at different levels.

Theoretical Elements

- Jappelli (1990) defines an agent as credit-constrained if:

$$C^* - Y - A(1+r) > D$$

Which is equivalent to $S^* < Y - C^* \iff C < C^* \iff S < S^*$

- An agent is credit-unconstrained if:
$S^* = Y - C^* \iff$ C= C* $\iff$ S= S*

Assumptions

1. The interest rates are very low.
2. Credit constraints exogenously affect households' saving decisions.

Hypotheses

1. Credit constraints move cyclically with precautionary saving (liquidity) motive and counter cyclically with saving to finance investment motive for constrained households.
2. Credit constraints negatively affect the wealth of constrained households.

Data

- We use cross-sectional data from the 2016 Survey of Consumer Finances (SCF).
- We classify discouraged and constrained households.
- By discouraged households, we refer to households that perceive a high probability of loan denials, while constrained households are those whose credit applications are denied by financial institutions.

Descriptive Statics

Table 1: Constrained, Discouraged & Unconstrained Households

Households	(1) Observations	(2) Mean	(3) Standard Deviation
Constrained	2,975	.095	.29
Discouraged	2,741	.088	.28
Unconstrained	25,524	.82	.39
Total	31,240		

Source: the data is downloaded from 2016 survey of Consumer Finances. Total number of respondents is 31,240

Descriptive Statics

Table 2: Reasons for Saving

Group of Households	(1) Constrained	(2) Discouraged	(3) Unconstrained
Can not Save	.5	.44	.71
Education	10.95	11.64	6.29
Family	7.29	11.27	6.38
Home	7.93	6.09	2.91
Purchase	13.45	13.6	9.53
Retirement	24.74	18.75	36.24
Liquidity/Future	32.3	35.24	35.08
Investment	2.7	2.96	1.82
No Particular Reason	.17	0	1.02
Total	2975	2741	25524

This table reports the motivation of households in 2016 survey of Consumer Finances data to save

Why Households are Constrained

Table 3: Reasons Why Households' Applications were Rejected or Discouraged to Apply for a Loan

Reasons	(1) Rejected Applicants	(2) Discouraged Applicants
Marital Status	0	.18
Age	.168	.18
Race	0	.18
Other Personal Characteristics	.37	.18
No Credit History	14.55	7.7
Credit Score	30.29	29.73
Credit Report	18.76	14.63
Not Enough assets	3.23	2.33
Amount of Debt	.6	9.16
Credit References	20.74	0
Other Credit characteristics	.71	.91
Bad Credit	7.13	10.07
Time in Job	.67	.55

Why Households are Constrained

Table 3: Reasons Why Households' Applications were Rejected or Discouraged to Apply for a Loan-Cont

Reasons	(1) Rejected Applicants	(2) Discouraged Applicants
Type of Job	.168	.36
Unemployed	.77	.55
Not Enough Income	12.07	8.43
Source of Income	.168	.73
Financial Characteristics	.50	0
Not A member of Credit Union	0	.36
Previous Experience	0	4.93
Strict Lending Requirements	.77	.36
The Loan is not eligible	0	.18
Discrimination	0	.18
Inconvenient	0	.40

2016 Survey of Consumer Finances.

Why Households are Constrained

Table 3: Reasons Why Households' Applications were Rejected or Discouraged to Apply for a Loan-Cont

Reasons	(1) Rejected Applicants	(2) Discouraged Applicants
Other	.87	1.28
Not approved for a Loan purpose	.57	0
Low Credit supply	.71	0
Interest rate	0	.36
Error in credit report	.94	.36
Characteristics of Collateral	.73	0
No Reasons	2.89	0
Observations	2975	2741

2016 Survey of Consumer Finances.

Why do Constrained & Discouraged Households Save?

- To classify saving motives for households, we apply the following probit model:

$$S_i = \alpha_0 + \alpha_1 Credit_i + \alpha_2 X_i + \alpha_3 FR_i + \epsilon_i$$

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- S_i is a dummy variable indicating household saving decisions.
- $Credit_i$ is a dummy variable that indicates that a household's loan request was rejected by a lender.
- X_i represents demographic variables such as gender, age, race, number of children and marital status.
- FR_i is a dummy variable indicating financially risk-averse households.
- ϵ_i is an error term.

Why do Constrained & Discouraged Households Save?

Table 4: Effect of Credit Constraints on Constrained & Discouraged Households Saving Decisions

	Constrained			Discouraged		
	Retirement	Liquidity	Investment	Retirement	Liquidity	Investment
Credit	-.08**	-.14**	.113	-.12	.115**	-.76**
	(.04)	(.04)	(.09)	(.06)	(.06)	(.33)
Black	-.24***	.09**	.22***	-.24***	.08**	.24***
	(.04)	(.04)	(.07)	(.037)	(.04)	(.07)
Age	.12***	-.04***	-.04***	.04***	.08*	-.04
	(.004)	(.004)	(.01)	(.004)	(.08)	(.008)
Age^2	-.001***	-.00***	0.00***	-.001***	.0003	0.0003***
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
College	.078***	- 0.03	0.004	0.08***	-.023	-.002
	(.02)	(.02)	(.02)	(.05)	(.02)	(.05)
# of children	-.103***	-.02**	-0.08***	-.10***	-.025**	-.074***
	(.01)	(.01)	(.03)	(.01)	(.01)	(.027)
Married	-.130***	-.01**	.39***	-.13***	.07**	.4***
	(.03)	(.03)	(.06)	(.03)	(.03)	(.06)
Female	-.001	-.4	-.43***	.001	-.037	-.43***
	(.03)	(.03)	(.08)	(.04)	(.04)	(.08)
Income	-.05***	-.004	.095***	-.047**	-.002	.093***
	(.007)	(.007)	(.014)	(.007)	(.007)	(.014)
Homeowner	.165***	0.03	.36***	.164***	.04	.24***
	(.03)	(.05)	(.07)	(.03)	(.03)	(.08)
Financial Averse	-.202***	.06**	.14**	-.2	.055**	.15***
	(.02)	(.03)	(.06)	(.03)	(.03)	(.057)
Constant	-2.68***	.48***	-2.8***	-2.7***	.44**	-2.77***
	(.15)	(.13)	(.29)	(.15)	(.14)	(.3)
Observations	19406					

Robust standard errors in parentheses.*** p<0.01, ** p<0.05, * p<0.1.

Effect of Credit Constraints on Constrained & Discouraged Households Wealth

We utilize quantile regression to examine the effect of credit constraints on the wealth of constrained and discouraged households.

$$W_i = \delta_0 + \delta_1 Credit_i + \delta_2 X_i + \epsilon_i$$

- W_i refers to wealth, which is the financial assets that are expressed in logarithm in this model.
- δ_0 is the constant term.
- $Credit_i$ is a dummy variable that indicates that a household's loan request was rejected by a lender.
- X_i represents demographic variables and ϵ_i is an error term.

Effect of Credit Constraints on Constrained & Discouraged Households Wealth

Following Amemiya (1982), to address potential endogeneity issue, we apply the Two-Stage Least Absolute Deviations (2SLAD) estimator. We utilize the credit score (CS) as an instrumental variable in this model as follows:

$$Credit_i = \pi_0 + \pi_1 CS_i + \pi_2 X_i + \upsilon_i$$

Then, we plug the estimated $Credit_i$ into the quantile model to estimate the effect of credit constrained on wealth of constrained and discouraged households as follow:

$$W_i = \delta_0 + \delta_1 \widehat{Credit_i} + \delta_2 X_i + \epsilon_i$$

Effect of Credit Constraints on Constrained & Discouraged Households Wealth

Table 5: Effect of Credit Constraints on Constrained and Discouraged Households Wealth-OLS & 2SLS Models

	(Constrained) OLS	(Constrained) 2SLS	(Discouraged) OLS	(Discouraged) 2SLS
Credit	-0.0575***	-0.666***	-0.356***	-0.176
	(0.00515)	(0.0931)	(0.0621)	(0.241)
Black	-0.652***	-0.619***	-0.627***	-0.638***
	(0.0419)	(0.0421)	(0.0418)	(0.0449)
Age	0.123***	0.122***	0.122***	0.122***
	(0.00542)	(0.00546)	(0.00541)	(0.00543)
Age^2	-0.000648***	-0.000628***	-0.000623***	-0.000619***
	(4.87e-05)	(4.91e-05)	(4.87e-05)	(4.89e-05)
# of children	-0.0179	-0.0127	-0.0173	-0.0183
	(0.0127)	(0.0128)	(0.0128)	(0.0129)
College	1.370***	1.346***	1.363***	1.365***
	(0.0246)	(0.0249)	(0.0247)	(0.0248)
Married	-0.475***	-0.448***	-0.451***	-0.454***
	(0.0395)	(0.0395)	(0.0396)	(0.0397)
Homeowner	0.653***	0.594***	0.618***	0.626***
	(0.0331)	(0.0333)	(0.0329)	(0.0346)
Female	-0.434***	-0.457***	-0.441***	-0.443***
	(0.0443)	(0.0444)	(0.0443)	(0.0444)
Financial Risk averse	-1.033***	-1.025***	-1.018***	-1.022***
	(0.0307)	(0.0303)	(0.0305)	(0.0305)
Constant	7.902***	7.803***	7.740***	7.740***
	(0.156)	(0.157)	(0.155)	(0.155)
Observations	19,623	19,623	19,623	19,623
R-squared	0.393	0.392	0.390	0.390

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Effect of Credit Constraints on Constrained & Discouraged Households Wealth

Table 6: Effect of Credit Constraints on Constrained & Discouraged Households Wealth-Quantile Model

	Constrained			Discouraged		
	Q.25	Q.50	Q.75	Q.25	Q.50	.75
Credit	-.446***	-.3975***	-.440***	-.271***	-.289**	-.095
	(.046)	(.041)	(.079)	(.060)	(.113)	(.084)
Black	-.505***	-.447***	-.615***	-.509***	-.460***	-.622***
	(.033)	(.053)	(.047)	(.053)	(.054)	(.057)
Age	.0978***	.1188***	.138***	.093***	.117***	.1446***
	(.005)	(.006)	(.008)	(.006)	(.005)	(.009)
Age^2	-.0005	-.0006***	-.0007***	-.0005***	-.0006***	-.0007***
	(.00004)	(.00005)	(.00007)	(.00005)	(.00005)	(.0008)
College	1.073***	.1.286***	1.489***	1.083***	1.299***	1.506***
	(.018)	(.024)	(.041)	(.018)	(.0269)	(.032)
# of Children	-.041***	.0007	.00028	-.047**	-.0102	-.003
	(.015)	(.009)	(.017)	(.019)	(.013)	(.025)
Married	-.311***	-.521***	-.561***	-.358***	-.487***	-.542***
	(.033)	(.044)	(.047)	(.045)	(.044)	(.045)
Homeowner	.433***	.475***	.678***	.463***	.504***	.715***
	(.026)	(.042)	(.075)	(.044)	(.042)	(.044)
Female	-.429***	-.4223***	-.501***	-.358***	-.461	-.519
	(.039)	(.049)	(.058)	(.0497)	(.049)	(.058)
Financial Averse	-.872***	-.9759***	-1.018***	-.855***	-.942***	-.994***
	(.030)	(.030)	(.051)	(.034)	(.027)	(.033)
Constant	7.657***	7.84***	8.085	7.81***	7.81***	7.788***
	(.163)	(.189)	(.252)	(.179)	(.155)	(.230)
Observations	19623					

Standard error in parenthesis *** p<0.01, ** p<0.05, * p<0.1

Effect of Credit Constraints on Constrained & Discouraged Households Wealth

Table 7: Effect of Credit Constraints on Constrained & Discouraged Households Wealth-2SLAD Model

	Constrained			Discouraged		
	Q.25	Q.50	Q.75	Q.25	Q.50	Q.75
Credit	-.382***	-.349***	-.775***	-.541*	.709***	-.277
	(.07)	(.073)	(.139)	(.297)	(.163)	(.246)
Black	-.49***	-.463***	-.564***	-.502***	-.546***	-.618***
	(.046)	(.053)	(.047)	(.05)	(.051)	(.032)
Age	0925***	.119***	.145***	.095***	.113***	.145***
	(.005)	(.005)	(.009)	(.005)	(.006)	(.009)
Age^2	-.0005***	-.0006***	-0.0008***	0.00049***	-.0005***	-0.0007***
	(.00005)	(.00004)	(.00001)	(.00005)	(.00006)	(.00008)
College	1.073***	1.28***	1.488***	1.08***	1.30***	.41***
	(.021)	(.040)	(.036)	(.022)	(.031)	(.03)
# of Children	-.048***	-.004	.0095	-.050***	-.013	-.0005
	(.011)	(.012)	(.027)	(.012)	(.008)	(.022)
Married	-.354***	-.495***	-.442***	-.348***	-.516***	-.546***
	(.052)	(.066)	(.045)	(.045)	(.042)	(.066)
Homeowner	.446***	.487***	.6377***	.451***	.523***	.693***
	(.042)	(.049)	(.058)	(.027)	(.038)	(.069)
Female	-.390***	-.438***	-.452***	-.373***	-.444***	-.511***
	(.055)	(.076)	(.068)	(.051)	(.052)	(.034)
Financial Averse	-.8545***	-.962***	-1.03***	-.848***	-.959***	-.999***
	(.030)	(.032)	(.051)	(.034)	(.024)	(.043)
Constant	7.85***	7.79***	7.91***	7.75***	7.87***	7.8***
	(.174)	(.159)	(.276)	(.152)	(.190)	(.267)
Observations	19623					

Standard error in parenthesis *** p<0.01, ** p<0.05, * p<0.1

Discussions

- Constrained households are less likely to save for retirement and for precautionary saving (liquidity) purposes.
- Discouraged households are more likely to save for precautionary saving (liquidity) purpose and less likely to save for investment purpose.
- The gap between the targeted and actual saving level negatively affects the ability of constrained households to accumulate wealth.
- The results of this study indicate that researchers should account for credit constraints when modeling household saving behavior.

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