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

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This paper sheds light on how saving decisions respond to credit constraints. In this paper, we examine the role credit constraints play in the savings decisions of households by focusing on a well-defined set of reasons for their savings. To do so, we classify the saving motives as precautionary saving, saving to finance investments, and saving for retirement. We find that credit-constrained households are less likely to save for retirement and liquidity, while they are more likely to save for investment purposes. Constrained Black households are more likely to save for investment purposes. Discouraged households are more likely to save for investment and less likely to save for retirement purposes. When households are credit-constrained, they use their savings to smooth their consumption rather than to accumulate wealth over time.

Keywords: credit constraints, saving, risk, wealth

INTRODUCTION

Saving is important for households as it reduces the effect of adverse income shocks, financial emergencies, and unexpected crises. Several factors affect the ability of the households to save. One notable factor is being credit constrained. Credit-constrained households cannot access the credit market and borrow. Borrowing enables households to finance spending and investment. In this paper, we examine the role that credit constraints play in the savings decisions of households by focusing on a well-defined set of reasons for saving. To do so, we classify saving motives as (1) precautionary saving, (2) saving to finance investments, and (3) saving for retirement. Investment here means wealth accumulation through financial assets. In this paper, we use cross-sectional data from the 2016 Survey of Consumer Finances (SCF), which consists of 6248 observations. SCF data provide rich information not only on wealth and income but also on measures of risk aversion and on credit constraints and saving motivations.

Specifically, this paper is an attempt to understand the extent to which credit-constrained households are able to accumulate wealth when the macro environment is characterized by the presence of a liquidity trap and borrowing constraints[1]. When the main saving motive for constrained households is precautionary savings or securing future liquidity to finance unexpected future expenses, they would not be able to build as much wealth in the presence of borrowing constraints.

Numerous studies focus on the relationship between liquidity constraints and savings. For example, Leland (1968) employs a two-period model to conclude that savings increase with uncertainty. Also, Kennickell and Lusardi (2004) find that the precautionary saving motive does not play a significant role in household wealth accumulation, representing a mere 8% of household wealth holdings.

In this paper, we utilize a probit model using cross-sectional data from SCF to examine the effect of credit constraints on the saving behavior of constrained and discouraged households. To do so, we classify the reasons for saving when saving is motivated primarily by uncertainty (precautionary saving), retirement, or investment needs as provided by SCF data. We define discouraged households as those who face a high probability of loan denials, while constrained households are those whose credit applications are denied by financial institutions[2].

This paper is organized as follows. Section 2 presents the previous studies. Section 3 defines credit-constrained, discouraged, and unconstrained households. Section 4 describes the data that are used in this paper. Section 5 represents the empirical approach. Sections 6, 7, and 8 present the implications of this paper, our conclusions, and the suggestions for future research, respectively.

PREVIOUS STUDIES

Several studies have focused on the relationship between liquidity constraints and household savings. For example, Xu (1995) distinguishes between the precautionary saving motives caused, on the one hand, by liquidity constraints and, on the other hand, by income uncertainty. He finds that liquidity constraints have a significant effect on household consumption and savings behavior. Furthermore, he finds that saving to counteract income uncertainty depends on the age and wealth level of the household. The question that we attempt to answer in this paper is: Why do households save? In the macroeconomics literature, several studies attributed the saving motive to uncertainty and vulnerability to negative shocks and risk [see, for example, Carrol and Kimball (2001 WP)]. Following Jappelli (1990), who utilizes Survey of Consumer Finances (SCF) data to study causes of liquidity constraints and to identify constrained and rationed consumers in the credit market, in what follows, we classify households as constrained and discouraged households.

Our empirical approach captures the effect of credit constraints on households savings and confirms the results of Caroll et al. (2012), who find that saving is decreasing in credit availability, and Slacalek and Sommer (2012), who document that saving is mainly affected by credit availability and the difference between actual and desired wealth. Constrained households are not able to access the credit market and meet their desired level of consumption. Campbell and Hercowitz (2019) show that the marginal propensity to consume (MPC) out of tax rebates among middle-income households is higher than predicted by the permanent income hypothesis (PIH). They attribute this higher increase of the MPC to the households' desire to finance large purchases. This prima facie evidence that credit constraints increase the marginal propensity to consume out of transitory income. Under the assumption that middle-income households are constrained, this finding supports our hypothesis here that credit-constrained households save to counteract liquidity constraints rather than to accumulate wealth.

Borrowing is an instrument that enables people to finance consumption. Deaton (1991) focuses on optimal intertemporal consumption behavior to explain how the demand for saving interacts with borrowing constraints. Zelades (1989) utilizes Panel Study of Income Dynamics (PSID) data to examine the effect of borrowing constraints on consumption. He finds that credit constraints substantially affect the consumption of a large portion of the population. This paper fills a gap in the literature by introducing household saving decisions in the presence of credit constraints.

That saving is an essential tool to mitigate the effects of the adverse shocks is evident in financial emergencies and unexpected crises. Kennickell and Lusardi (2004) find that the precautionary saving motive does not play a significant role in households' accumulation of wealth, accounting for only 8% of household assets holdings. However, they provide evidence that it is important for older and business-owning households. These findings support the argument of this paper that when the major reason for households to save is precautionary, they would not be able to accumulate wealth in the medium run, as they would be decumulated during financial difficulties.

Some studies classify the savings decisions and age cohorts of consumers to evaluate saving behavior. For instance, Gourinchas and Parker (2002) find that young individuals save to insure against negative shocks and uncertainty in their income and that individuals who are 40 years of age and older save for

retirement purposes. This finding supports the evidence presented in this paper that older constrained households are less likely to save for precautionary motives.

The studies mentioned above demonstrate that precautionary saving motives exist in almost all households, but they do not play a significant role in the accumulation of wealth. By the accumulation of wealth, we mean using savings to add to assets instead of using savings as a buffer during financial difficulties.

While the existing literature going back to Xu (1995) analytically distinguishes between the precautionary savings caused by liquidity constraints and the precautionary savings accumulated against income uncertainty, in this study, we classify saving decisions into precautionary savings, saving for retirement, and saving for investment in financial assets to accumulate capital stock.

Thus, this paper classifies saving decisions to understand the extent to which credit-constrained households are able to accumulate wealth when the macro environment is characterized by the presence of a liquidity trap and borrowing constraints.

BACKGROUND

Jappelli (1990)[3] defines an agent as credit constrained if $C^* - Y - A(1 + r) > D$, which is equivalent to $S^* < Y - C^*$, that is, an agent is credit constrained when the optimal level of saving is less than the actual level because she is unable to borrow enough to attain the desired, otherwise feasible consumption level,[4] where S^* and C^* refer to optimal saving and consumption in the absence of the current borrowing constraint. Further, Y, A, and D refer to income, stock of assets, and the amount that households are able to borrow. r is the exogenous real rate of interest.

When a household is a credit-constrained $C < C^*$, that is, credit constraints prevent households from borrowing to reach the optimal consumption level. On the other hand, we define discouraged households as those who perceive a high probability of loan denials. Consumption is a function of observable variables such as income, wealth and demographic characteristics, and idiosyncratic error $\Leftarrow\Rightarrow C^* = F(X_{i,}, \varepsilon_i)$ that determine the consumption behavior of households. Beaton (2009 WP) provides evidence that consumer spending is positively related to credit availability in the United States. In addition, Glick and Lansing (2011) find that changes in credit availability have played a significant role in explaining the variance in the saving rate in the US since the Great Recession. Hence, credit constraints play a significant role in determining the saving behavior of households.

In what follows, we say that an agent is unconstrained if $S^* = Y - C^* = S < Y - C \Leftarrow\Rightarrow C=C^*$

DATA AND SAMPLE DESCRIPTION

In this paper, we use cross-sectional data from the 2016 SCF, which consists of 6248 observations. SCF data provide rich information on not only wealth and income components but also questions measuring the risk aversion of households and direct questions on credit constraints by asking the following:

> "**In the past twelve months, has a particular lender or creditor turned down any request you (or your husband/wife/partner) made for credit, or not given you as much credit as you applied for? and You just indicated that you did not apply for any credit over the past twelve months. Was that because you had no need for additional credit, you thought interest rates were too high, you did not think you would get approved, or something else?**"

The SCF also measures the risk aversion of households by asking the following:

> "**On a scale from zero to ten, where zero is not at all willing to take risks and ten is very willing to take risks, what number would you and your husband/wife/partner) be on the scale?**"

Another example is a direct question related to credit constraints, which is:

> "**In the past twelve months, has a particular lender or creditor turned down any request you or your husband/wife/partner) made for credit, or not given you as much credit as you applied for? IF YES, PROBE: Were you turned down, or did you not get as much as you applied for?**"

A direct way to define constrained households is to ask respondents whether they applied for a loan and were denied [on this see also Attanasio and Weber (2010)]. Jappelli (1990) defines credit-constrained households as any household (agent) whose loan request is rejected by a lender[5]. Discouraged households, on the other hand, are households that have not applied for a loan due to the cost of applying or because there is a high probability of application rejection. Finally, unconstrained households are households that had applied for a loan and had their applications are approved.

EMPIRICAL APPROACH

We use cross-sectional data from the 2016 SCF from which we obtain information about credit-constrained households [6] to classify saving motives for households. Following Le Blanc et al. (2016) [7], we apply the following probit model:

$$S_i = \alpha_0 + \alpha_1 Credit_i + \alpha_2 INC_i + \alpha_3 HOME_i + \alpha_4 X_i + \alpha_5 FR_i + \varepsilon_i.$$

where S_i is a dummy variable indicating household saving decisions. $Credit_i$ refers to credit constraints and a dummy variable that indicates either a household's loan request was rejected by a lender, it refers to a credit-constrained household, or a household discouraged to apply for a loan (a discouraged household). FR_i is a dummy variable indicating financially risk-averse households, X_i represents demographic variables such as gender, age, race, number of children and marital status, INC_i represents household income, *HOME* is a dummy variable indicating household home-ownership, and ε_i is an error term.

We are interested in estimating the effect of credit constraints on household saving decisions for precautionary, investment, and retirement purposes to address the question of whether and to what extent credit constraints preclude households from accumulating wealth.

Since the data we utilize in this paper is the 2016 SCF, the data come from an environment in which the interest rate is low. For example, the interest rate on consumer installment loans at commercial banks was about 4.17% [8].

This implies that the opportunity cost of borrowing-saving is small. We also suppose that credit constraints exogenously affect households' saving decisions. Since the interest rate is low, households prefer borrowing to finance consumption rather than reducing consumption to increase savings. However, when credit constraints become tighter, the gap between the target and actual savings level negatively affects the ability of constrained households to accumulate wealth. Therefore, the hypotheses of this paper can be stated: credit constraints move cyclically with saving for liquidity and countercyclically with saving for investment for constrained households, and the credit constraint negatively affects the wealth of constrained households.

Table 1 reports the estimated effect of credit constraints on the predicted probability of saving decisions of constrained and discouraged households. Constrained households are less likely to save for retirement and liquidity, while they are more likely to save for investment. Constrained Black households are more likely to save for investment purposes. College graduates are more likely to save for retirement. Women are less likely to save for investment.

But actual saving is the outcome of both the desire to save on the part of the households and the true constraint they face. Therefore, this gap cannot just be something that prevents them because precluding that implies exogenous barriers, whereas this is a combination of choice and constraints. When households are credit-constrained, they use their savings to smooth their consumption rather than to accumulate wealth

over time. Financially, risk-averse households are more likely to save for retirement. Similar to Christelis et al. (2020), who find that precautionary saving is negatively associated with age, older constrained households are less likely to save for precautionary saving motives. Discouraged households are more likely to save for investment and less likely to save for retirement purposes. Similarly, discouraged households headed by college graduates are more likely to save for retirement, and women are less likely to save for investment.

TABLE 1
EFFECT OF CREDIT CONSTRAINTS ON CONSTRAINED & DISCOURAGED HOUSEHOLDS SAVING DECISIONS

	Constrained			**Discouraged**		
	Retirement	Liquidity	Investment	Retirement	Liquidity	Investment
Credit	-0.109**	-0.0788*	0.183**	-0.218***	-0.0144	0.449***
	(0.0551)	(0.0455)	(0.0757)	(0.0537)	(0.0432)	(0.0831)
Black	-0.200***	0.0595	0.186**	-0.186***	0.0572	0.156*
	(0.0416)	(0.0419)	(0.0948)	(0.0417)	(0.0421)	(0.0949)
Age	0.105***	-0.0208***	-0.00413	0.106***	-0.0207***	-0.00937
	(0.00682)	(0.00467)	(0.0112)	(0.00690)	(0.00465)	(0.0113)
Age^2	-0.000929***	0.000203***	5.16e-06	-0.000941***	0.000203***	5.86e-05
	(6.29e-05)	(4.44e-05)	(0.000111)	(6.36e-05)	(4.44e-05)	(0.000111)
College	0.162***	-0.0195	0.0549	0.155***	-0.0173	0.0901
	(0.0317)	(0.0281)	(0.0638)	(0.0322)	(0.0279)	(0.0664)
# of children	-0.120***	-0.0243**	-0.0863**	-0.116***	-0.0252**	-0.106**
	(0.0146)	(0.0117)	(0.0427)	(0.0150)	(0.0119)	(0.0437)
Married	-0.179***	0.0777**	0.152**	-0.175***	0.0776**	0.140**
	(0.0402)	(0.0325)	(0.0632)	(0.0405)	(0.0329)	(0.0662)
Female	-0.00170	-0.0123	-0.171**	0.00367	-0.0109	-0.203**
	(0.0408)	(0.0299)	(0.0854)	(0.0411)	(0.0296)	(0.0871)
Income	4.80e-08*	-1.64e-07***	5.41e-09	4.64e-08*	-1.62e-07***	7.38e-09
	(2.66e-08)	(3.93e-08)	(4.32e-08)	(2.62e-08)	(3.91e-08)	(3.86e-08)
Homeowner	0.235***	0.0983***	-0.0624	0.210***	0.0993***	0.0102
	(0.0348)	(0.0305)	(0.0626)	(0.0369)	(0.0310)	(0.0677)
Financial Averse	-0.264***	-0.000135	-0.0510	-0.258***	0.000281	-0.0615
	(0.0357)	(0.0317)	(0.0729)	(0.0355)	(0.0316)	(0.0737)
Constant	-2.941***	-0.0150	-2.048***	-2.949***	-0.0272	-2.013***
	(0.176)	(0.127)	(0.297)	(0.176)	(0.125)	(0.306)
R^2	0.1	0.01	0.02	0.1	0.01	0.04
Observations	6248	6248	6248	6248	6248	6248

2016 Survey of Consumer Finances. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

IMPLICATIONS OF FINDINGS

The policy implications of our findings may be crucial. For example, a targeted tax cut may significantly increase aggregate consumption. Targeting a particular population classified as credit-

constrained and credit-discouraged households would be effective. Those households will benefit from the tax cut not only by financing their consumption but also by increasing their wealth.

Further, as Roeger and Veld (2009) point out, a discretionary fiscal policy will result in short-term financial stability for credit-constrained households.

This is also consistent with the findings of Campbell and Hercowitz (2019), who show that the marginal propensity to consume (MPC) out of tax rebates among middle-income households is higher than predicted by the permanent income hypothesis (PIH). Therefore, credit constraint increases the marginal propensity to consume out of transitory income; and thus, fiscal policy could be an instrument that boosts the financial stability of those households.

The outcomes of this study suggest that improving access to the credit market for constrained and discouraged households could play a substantial role in building household wealth.

CONCLUSION

Saving is a behavior to reduce the effect of adverse income shocks, which is evident in a financial emergency and unexpected crises. Several factors affect the ability of households to save.

One notable factor is being credit constrained. By credit-constrained, we mean households cannot access the credit market and borrow. In this paper, we examine the role that credit constraints play in the savings decisions of households by focusing on a well-defined set of reasons for their saving. The paper is an attempt to understand to what extent credit-constrained households are able to accumulate wealth when the macro environment is characterized by the presence of a liquidity trap.

Here, we utilize a probit model using cross-sectional data from the SCF to examine the effect of credit constraints on constrained and discouraged households' savings behavior. Credit-constrained households are less likely to save for retirement and liquidity, while they are more likely to save for investment purposes. Constrained Black households are more likely to save for investment purposes. Discouraged households are more likely to save for investment and less likely to save for retirement purposes. When households are credit-constrained, they use their savings to smooth their consumption rather than to accumulate wealth over time.

LIMITATIONS OF THE STUDY AND FUTURE RESEARCH

It may be of interest to track the growth of household savings over time to obtain better insights into whether constrained households are able to accumulate wealth or if they remain stuck in a liquidity trap due to credit constraints. Regarding consumption smoothing, standard models predict an agent borrows if s/he expects an increase in income. However, information on consumption growth is not available in SCF. Unfortunately, SCF data are cross-sectional and do not track the same households across the years of the survey. In addition, it would be more informative if we could exploit household data on unemployment and financial distress to control for additional factors that may contribute to household credit constraints. Therefore, we recommend that future research shed light on the growth in saving for investment and income uncertainty reasons to provide full insight into this topic when such data become available.

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ENDNOTES

1. See Korinek and Simsek (2016).
2. See Jappelli (1990). Discouraged and constrained households are observed in the SCF data.
3. See Jappelli (1990).
4. See Jappelli (1990).
5. See also Jappelli et al. (1998) in defining liquidity-constrained households.
6. Pfeffera, Schoenia, Kennickell and Andreskic (2016) state that the SCF is a survey focused on an oversample of households that are at a high level of wealth to reflect the small numbers of households that hold a large share of total wealth in the US.
7. Le Blanc et al. (2016) employ a probit model to evaluate saving motives and household saving behavior in euro-area countries.
8. See https://fred.stlouisfed.org/series/TERMCBAUTO48NS

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