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Self-control and Financial Wealth Accumulation

[1]Danes Quirira Octavio, [2]Shadrina Hazmi, [3]Rina Dwiarti & [4]Foza Hadyu Hasanatina

[1,4]Universitas Diponegoro, Semarang

[2,3]Universitas Mercu Buana Yogyakarta, Yogyakarta

Email: danesquirira@lecturer.undip.ac.id

Abstract

This study aims to determine whether self-control positively affects financial wealth accumulation. We also aim to examine whether the effect of self-control differs when financial assets are categorized by liquidity. In addition, we test whether an inverted U-shaped relationship exists between age and wealth accumulation. We collected primary data from 396 Indonesian adults and working individuals through a web-based survey. We use OLS with robust standard errors as our estimation method, as we attempt to reduce omitted-variable bias by including socio-demographic variables in the model. Our study shows that self-control is not significantly related to financial wealth accumulation. However, when we categorize financial assets by liquidity, we find that self-control is relevant only for liquid rather than illiquid assets. Moreover, we also find an inverted U-shaped relationship between age and financial illiquid assets.

Keywords lifecycle hypothesis, behavioural life cycle hypothesis, age, wealth, self-control.

1. Introduction

Why does each person have different wealth though they have similar characteristic? Why we save too little for our retirement? Why some people buy impulsively? One of the answers may be depends on the self-control.

In economics literature, self-control is mentioned in Behavioural Life Cycle Hypothesis (BLCH) (Shefrin & Thaler, 1988). This theory extended previous theory, Life Cycle Hypothesis. BLCH pointed out that having rational thought is not enough. Self-control is needed for individuals to accumulate their wealth as a response for financing their retirement. By having strong self-control, individuals could avoid impulsive activities, resist temptation and break bad habits (Fujita et al., 2006). Having strong self-control may support an individual to adopt good financial behaviour as a habitual activity. It because people that have good self-control tend to set target, keep track on their money regularly and have strong commitment to achieve the target (Baumeister, 2002). Then, it may help individuals to have adequate wealth in their retirement (Shefrin & Thaler, 1988) and strengthen the individuals' capacity to face emergency problem (Despard, Friedline, & Martin-West, 2020).

Previous studies are successfully reveal the role of self-control on several financial behaviour and financial condition, such as reduce impulsive buying (Roberts & Manolis, 2012), decrease the probability of being compulsive spender (Mulyono & Rusdarti, 2020), increase saving behaviour (Kim & Hanna, 2017; Rha et al., 2006), promote financial well-being (Strömbäck et

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al., 2017), and increase wealth accumulation (Ameriks et al., 2003, 2007; Biljanovska & Palligkinis, 2016). These findings, indeed, confirm the important of self-control in creating good financial decision and financial behaviour.

Studies that closely related to ours are mostly conducted in developed countries (Ameriks et al., 2003, 2007; Biljanovska & Palligkinis, 2016). They both analyze the relationship of self-control on wealth accumulation. Their respondents are U.S. people, which lived in developed country. To the best of our knowledge, there is no study that analyse the relationship between self-control and wealth accumulation in emerging countries.

Our paper offers two keys of contribution. First, this study may enrich behavioural economics literatures as this study is present the evidence of the relationship of self-control and financial wealth accumulation in the context of developing country. Second, to specifically understand the relationship between self-control and financial wealth accumulation. We categorize financial wealth into two categories illiquid asset and liquid asset which reflected by time deposit and saving account. Our studies shows that self-control have relevant role on liquid asset accumulation, while self-control has no significant role on illiquid asset accumulation.

The rest of this paper proceeds as follows. Section two provides a brief review of the literatures. Section three describes the data and methodology. Section four shows empirical result and discussion. Last section concludes and presents implications.

2. Literature Review

Life Cycle Hypothesis. Life Cycle Hypothesis (LCH) stated that individuals accumulate their wealth to maintain their consumption expenditure for their retirement period by conduct saving activity in their productive stage. In other words, individuals could maintain their consumption though their revenue in retirement was not as high as their revenue in productive stage. Normally, people accumulate wealth when they are young and working, then decumulate it when they are old and retired. The process of wealth accumulation is particularly relevant during the age range of 45 to 50, when people are in their prime earning years (Cagetti, 2003). Furthermore, as individuals reach the age of 65 and beyond, there is a noticeable decline in their wealth, and it may even turn negative. This phenomenon aligns with what Lydall (1955) referred to as the hump pattern of wealth in the context of life cycle saving. Furthermore, during retirement ages, people facing the problem about life-span uncertainty and health hazard, thus makes wealth de-cumulate (Jappelli, 1999). In short, this theory showed that there is an inverted U-shaped relationship between age and wealth. This theory had been confirmed well in some empirical studies (Ameriks et al., 2003, 2007).

H1: There is inverted U-shaped relationship between age and financial wealth accumulation

Behavioural Life Cycle Hypothesis. In 1988, LCH is extended by Shefrin & Thaler (1988). This extension was famously called as Behavioural Life Cycle Hypothesis (BLCH). This paradigm suggested that behavioural variable, self-control, should be considered in explaining how individuals could accumulate their wealth well by saving behaviour. Ameriks et al., (2003) described self-control as the propensity to plan in future. Moreover, as highlighted by Thaler &

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Sunstein (2008), the decision-making process in individuals involves a duality of cognitive system, known as System 1 and System 2. System 1 represents the impulsive, rapid, and often myopic aspect of decision-making, while System 2 embodies the rational component, aimed at maximizing utility. The integration of these contrasting elements necessitates the exercise of self-control to govern one's actions effectively. By having self-control, individuals were able to have target, monitor their balance and stick to the plan (Baumeister, 2002). Thereby, they might be easier to adopt good financial behaviour, such as saving regularly, as a habitual activity (Kim & Hanna, 2017; Rha et al., 2006; Strömbäck et al., 2017) and reduced impulsive buying (Roberts & Manolis, 2012). Thus, they might have more wealth than people that have less self-control (Ameriks et al., 2003; Biljanovska & Palligkinis, 2016).

H2: Self-control has positive effect on financial wealth accumulation

Liquid and illiquid asset. Besides, we also categorized financial asset into two category, liquid and illiquid asset. The motivation of this action was the role of self-control might different between liquid and illiquid asset (Ameriks et al., 2007) By definition, liquid asset was the type of asset that easily converted to cash, while illiquid asset is vice versa. Putting the cash to illiquid asset could be a solution for individuals that had self-control problem (Thaler & Sunstein, 2008). It because the function of self -control could be replaced by illiquid asset. Asset which in the form of illiquid made individual difficult to consume it immediately. Thus, it could provide several times to contemplate, reducing irrational and impulsive behaviour in consuming this kind of asset.

H3: Self-control has insignificant effect on financial illiquid wealth accumulation

H4: Self-control has positive significant effect on financial liquid wealth accumulation

3. Research Method

Estimation strategy. Following previous studies (Ameriks et al., 2003, 2007; Biljanovska & Palligkinis, 2016) we applied ordinary least square (OLS) robust standard error as our estimation method as it could reduce heterogeneity. In this study, we included socio-demographic variables as our control variables. Moreover, in behavioural economic literatures, socio-demographic played important role in explaining individual behaviours. Thus, this strategy might reduce omitted variable bias. Furthermore, we also showed regression result hierarchically to reveal the consistency of our main variables. Below were regression models that we would be conducted:

$$ln_fin_asset = \alpha + \beta_1 self_control + \beta_2 Age + \beta_3 Age^2 + \gamma C + \varepsilon \quad (1)$$

$$ln_time_dep = \alpha + \beta_1 self_control + \beta_2 Age + \beta_3 Age^2 + \gamma C + \varepsilon \quad (2)$$

$$ln_sav = \alpha + \beta_1 self_control + \beta_2 Age + \beta_3 Age^2 + \gamma C + \varepsilon \quad (3)$$

Natural logarithm financial wealth was reflected by ln_fin_asset. ln_time_dep refered to natural logarithm of time deposit (illiquid asset). ln_saving reflected natural logarithm of saving account (liquid asset). These variables were the dependent variables. $Self_control$,

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Age, and $Age2$ refers to self-control, age, and age^2. Those three variables became our independent variable in this study. C refered to vector of control variables.

Data collection. A web-based survey was conducted to collect data. Our respondent is 396 Indonesian adults (more than 18 years old) and working people. These criteria were applied because adults and working people were assumed to have responsibility for managing their own life, unlike students who were mostly relying on their parents. It was also more relevant for adults and working people to create planning and having a farsighted point of view in conducting their activity instead of students.

Variable measurement. There were three dependent variables in our study. Wealth accumulation (ln_fin_asset) was measured by the total amount of saving account and time deposit which has been owned by respondent. Illiquid asset was measured by time deposit (ln_time_dep) and liquid asset was measured saving account (ln_sav). Time deposit was chosen as our proxy for illiquid asset since customer could not withdraw their cash anytime. They should wait until its maturity. They would be charged penalty fee if they withdraw their cash before its maturity. In contrast, saving account could be withdraw anytime without penalty. Thus, time deposit was less liquid than saving account. To reduce heterogeneity, all dependent variable should be transformed into natural logarithm. Self-control measurement was adopted from brief version of Tangney et al., (2004). Each item was measured using 5 Likert scale. There were thirteen item questionnaires in this measurement. However, not all items could be included on our analysis. There were seven items need to be excluded since the value of Confirmatory Factor Analysis (CFA) were less than 50% (0.5). Those items are "I am good at resisting temptation", "I say inappropriate things", "I do certain things that are bad for me, if they are fun", "I refuse things that are bad for me", "I wish I had more self-discipline", "People would say I have iron self-discipline", "I am able to work effectively toward long-term goals", and "I often act without thinking through all the alternatives". Items that become our measurement of self-control are reversed item, implied that it values 1 if respondent choose Strongly Agree and 5 if respondent choose Strongly Disagree. The value of Kaiser-Meyer-Olkin (KMO) which measured sampling adequacy is more than 0.6. Thus, it indicated that the result of factor analysis was relevant. After we found items that fit to construct self-control variable, we computed the average of items based on its cross-section to obtain self-control variable data.

Table 1. Factor Analysis of Self-Control Variable

Items	Factor Loading
Self-Control	
I have a hard time breaking bad habit*	0.729
I am lazy*	0.560
Pleasure and fun sometimes keep me from getting work done*	0.599
I have trouble concentrating*	0.755
I often act without thinking through all the alternatives*	0.746
Sometimes I can't stop myself from doing something, even if I know it is	0.579

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wrong* *reversed item	
Cronbach Alpha: 0.743; KMO: 0.808	

(Source: primary data, processed)

Other independent variables were age and age^2. These variables were measured by asking the respondent of how old he or she now. This variable also became our main concern as it based from LCH. To examine whether inverted U-shaped relationship exist, we should square the age. LCH would be supported if the coefficient of squared-age variable (age^2) was negative and significant. For control variables, we included socio-demographic variables. Socio-demographic variables included in this study were natural logarithm of monthly income, sex, married status, and higher education. Income was measured as natural logarithm of monthly income. This transformation was necessary to reduce heterogeneity. Sex was measured using a dummy variable. It valued as 1 if the respondent was male and 0 if respondent was female. Married was variable that reflected whether the respondent currently married when they were being surveyed. The value of this variable was 1 for having married when being surveyed, and 0 was vice versa. Higher education was variable that represented respondent level of education degree. This variable was measured using binary scales. It valued 1 if respondent has higher education and 0 if vice versa.

4. Finding and Discussion

Descriptive statistics and multicollinearity test. Before we conducted regression analysis, we showed descriptive statistic in Table 2 and correlation matrix result in Table 3. Descriptive statistic presented mean, standard deviation, minimum value, and maximum value. This information could ease reader to identify the characteristic of data that we inputted in regression estimation. To examine whether any multicolinearity, we showed correlation matrix. We excluded age^2 in this analysis as age and age^2 actually were same variable. Thus, it has high correlation. However, age^2 should be included to the regression model as the purpose is to examine whether any inverted U-shaped relationship existed. The correlation matrix showed that there was no multicollinearity since there was no value that higher 0.8 or below than -0.8.

Table 2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Dependent Variables					
ln_fin_asset	396	14.798	5.813	0	28.353
ln_time_dep	396	4.327	7.484	0	28.324
ln_sav	396	14.303	5.693	0	24.817
Independent Variables					
Self-control	396	3.623	0.598	1.667	5
age	396	32.585	10.802	19	65
age^2	396	1178.247	843.010	361	4225

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Control Variables					
ln_income	396	15.256	0.999	11.512	22.332
Sex	396	0.457	0.498	0	1
Married	396	0.537	0.499	0	1
Higher education	396	0.277	0.448	0	1
Number of Respondents (n = 396)					

(Source: primary data, processed)

Table 3. Correlation Matrix

	Self-control	age	ln_income	sex	married	higher education
Self-control	1					
age	0.1275	1				
ln_income	0.0781	0.3605	1			
sex	0.0425	0.1287	0.2073	1		
married	0.1982	0.5034	0.3704	0.1591	1	
higher education	0.1408	0.2663	0.2171	-0.071	0.1677	1

(Source: primary data, processed)

Self-control and financial wealth accumulation. In Table 4, we conducted Ordinary Least Square (OLS) robust standard error regression to explain which variables were relevant in explaining financial wealth accumulation. To show the stability of the relationship between independent and dependent variables, we inputted variables hierarchically. The value of F-test was significant in all model. It implied that the ability regression model in explaining dependent variable was good. In other words, we had included right variables to explain dependent variable. Regression estimations showed that the self-control coefficient was positive and significant in all model, though the significance reduced when other variables were included. Inverted U-shaped relationship between age and wealth, reflected by the negative value and significant of age^2 coefficient, only existed in model 2 (p-value<1%). This relationship was not consistent as it became insignificant when control variables were included. For control variables, only ln_income which had significant coefficient. It had positive effect on financial wealth accumulation.

Table 4. Financial Wealth Accumulation Regression Results

	(1)	(2)	(3)
VARIABLES	ln_fin_asset	ln_fin_asset	ln_fin_asset
self-control	1.387***	0.932*	0.896*
	(0.536)	(0.550)	(0.521)
age		0.674***	0.221
		(0.204)	(0.219)

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age^2		-0.008***	-0.003
		(0.003)	(0.003)
ln_income			2.045***
			(0.288)
sex			-0.785
			(0.558)
married			0.737
			(0.645)
higher education			0.444
			(0.544)
Constant	9.772***	-1.381	-23.463***
	(2.033)	(3.768)	(5.094)
Observations	396	396	396
R-squared	0.020	0.066	0.175
F	6.712***	8.070***	11.14***
Standard errors in parentheses (). Asterisk (***), (**) and (*) indicate statistically significant at 1%, 5%, and 10% significance level.			

(Source: primary data, processed)

Does self-control have difference effect on different kind of asset? In Table 5, we attempted to reveal whether self-control still relevant when the characteristic of financial asset, illiquid and liquid, was considered. Here, we categorized financial asset into two categories, illiquid and liquid asset. Illiquid asset was computed by natural logarithm of time-deposit and liquid asset was measured by natural logarithm of saving account. For illiquid asset, self-control had no significant coefficient, while the coefficient of age^2 was negative significant in model 2 and model 3 (P-value<5% and P-value<5%). In contrast, self-control had positive significant effect on liquid asset in all model, while the significancy of age^2 was disappear when control variables are included. Our control variables showed that ln_income had positive effect on illiquid and liquid asset accumulation (p-value<1%). Furthermore, there are two dummy variables which had significant coefficient, such as sex and married. The coefficient of sex was negative significant on illiquid asset (p-value<5%), while married was positive significant on liquid asset (p-value<5%). The negative coefficient of sex on illiquid financial asset implied that male tend to have less illiquid asset than female, whereas the positive coefficient of married on liquid asset indicated that married people tend to have higher liquid financial asset than unmarried.

Table 5. Regression for Illiquid and Liquid Asset

VARIABLES	(1) ln_time_dep	(2) ln_time_dep	(3) ln_time_dep	(4) ln_sav	(5) ln_sav	(6) ln_sav
self-control	-0.255	-0.606	-0.455	1.759***	1.366**	1.284**

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	(0.647)	(0.656)	(0.643)	(0.516)	(0.533)	(0.506)
age		0.559**	0.513*		0.599***	0.094
		(0.220)	(0.278)		(0.198)	(0.212)
age2		-0.007**	-0.006*		-0.007***	-0.002
		(0.003)	(0.003)		(0.003)	(0.003)
ln_income			1.879***			1.888***
			(0.485)			(0.278)
sex			-1.691**			-0.768
			(0.760)			(0.549)
married			-1.501			1.239**
			(1.042)			(0.622)
higher education			-0.373			0.650
			(0.929)			(0.529)
Constant	5.251**	-3.878	-30.377***	7.930***	-1.928	-20.763***
	(2.397)	(4.102)	(7.401)	(1.958)	(3.648)	(4.993)
Observations	396	396	396	396	396	396
R-squared	0.000	0.017	0.074	0.034	0.070	0.177
F	0.155***	2.639**	3.927***	11.60***	8.817***	10.77***

Standard errors in parentheses (). Asterisk (***), (**) and (*) indicate statistically significant at 1%, 5%, and 10% significance level. (Source: primary data, processed)

Based on the hypothesis testing, our study confirms several interesting findings related on the self-control and wealth accumulation. Self-control has positive significant effect on financial wealth accumulation. However, self-control has no significant effect on illiquid asset, while it has positive significant effect on liquid asset. This results confirm with Ameriks et al., (2007) and Biljanovska & Palligkinis (2016)for the positive effect of self-control on financial wealth accumulation, whereas Ameriks et al., (2007) for the distinct impact of self-control on different kind of asset which based on its liquidity. Another interesting finding, inverted U-shaped relationship between age and wealth accumulation are only confirmed in illiquid asset. These results align with Ameriks, Caplin, & Leahy (2003). These findings indicate that BLCH is confirmed, though it is applied specifically on liquid asset accumulation. The trait of illiquid asset replaces the function of self-control is supported as self-control has no significant relationship with illiquid asset accumulation. LCH also confirmed only on illiquid asset accumulation as the coefficient of age squared is negative and significant in explaining illiquid asset accumulation. One of the control variables, income, shows interesting finding. Income variable (ln_income) has positive relationship with financial wealth accumulation. This result can be implied as individuals with higher income may have higher opportunity to accumulate wealth more than individuals with less income. The coefficient of income remains positive

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significant in explaining illiquid and liquid asset accumulation.

5. Conclusion

Our study aims to reveal whether self-control has positive relations with financial wealth accumulation. In addition, we attempt to examine the role of self-control in illiquid and liquid asset. Our finding shows that self-control has positive significant relationship with financial wealth accumulation and liquid financial wealth accumulation. However, self-control has no relations with illiquid asset. This finding is a proof that specifically BLCH only relevant on liquid asset. Another interesting finding, LCH is only confirmed on illiquid financial asset. This finding may indicate that illiquid asset, such as time deposit, may become important financial resource for individuals to prepare their old age rather than liquid asset (i.e., saving account).

Based on those findings, we can formulate three implications. First, individual who have low ability to resist temptation may be better to save their financial asset more to illiquid asset, such as time-deposit. The difficulties of illiquid asset to turn into cash immediately may make difficult individuals to spend. Second, financial institution could design a product makes a saving automatically. For illustration, some amount of monthly customers' salary or revenue which is placed on liquid asset (i.e., saving account) will be automatically transferred to illiquid asset (i.e., time deposit). By conducting this scheme, individuals will have sufficient fund in retirement age, while for financial institution; they can reduce liquidity risk since cash that placed in illiquid asset has less fluctuation or less withdrawal than liquid asset. Third, using nudge paradigm, financial institution could design a service that ease customer to transfer their fund from liquid asset (i.e., saving account) to illiquid asset (i.e., time deposit). For illustration, financial institution could offer a service in their mobile banking that allow customer to replace their fund from saving account (liquid asset) to time deposit (illiquid asset) anytime and anywhere.

Our study is not free from limitation. There are several limitations that need to be addressed. First, our study uses self-reported measures in collecting data. Thus, this type of data relies heavily on honesty of respondent. Moreover, to the best of our knowledge, there is no secondary data in Indonesia, such as survey database, that provide self-control measurement.

For future research, personal in-home surveys need to be employed. By using this method, enumerators are able confirm respondent answer which increase the validity of data. Take for example, they can observe and take notes of respondents' assets which are placed on their residences. Then, they can compare the answer of respondent and notes from observation.

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