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The Able Worry More? Debt Delinquency, Financial Capability, and Financial Stress

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Abstract

Research on the link between debt and financial stress is emerging. This study was one of the first attempts to examine the association between debt delinquency and financial stress and the moderating role of financial capability in the association. Delinquencies in three types of debts were examined: (a) mortgage, (b) credit card, and (c) student loan. With data from the 2018 U.S. National Financial Capability Study, multivariate regression results showed that payment delinquencies of mortgage, credit card and student loans were positively, while financial capability was negatively associated with financial stress. Further, surprisingly, the results implied that among consumers with debt delinquencies, financial capability may increase financial stress. If both financial capability's direct and interactive effect were considered, financial capability may decrease financial stress at much smaller rates than those without debt delinquencies. The situation was the worst among consumers with multiple delinquencies, in which the potential net effect of financial capability on financial stress was positive. The results of this study have implications for consumer financial service practices.

Keywords Debt delinquency · Financial stress · Financial capability · National Financial Capability Study

JEL Classification G51 · G53

Introduction

Debt is an indicator of resource deficiency and negatively associated with subjective wellbeing or positively associated with financial distress (Tay et al., 2017) and psychological distresses (Brown et al., 2005). In the research literature, factors are identified to help reduce distress or improve mental health such as financial capability (Taylor et al., 2011) and family financial efficacy (Stevenson et al., 2020). Researchers also find that positive financial behaviors such as making ends meet is an important mediator to help reduce financial

worry (de Bruijn & Antonides, 2020). Research on the association between debt behavior and subjective wellbeing including financial stress is emerging but still understudied.

Debt holdings are common among American households. Based on the 2018 National Financial Capability Study (NFCS), 35% of American families held mortgage, 37% held credit card debt, and 26% held student loans (FINRA IEF, 2019). Consumers worry about personal finance issues and expressed financial anxiety, stress or distress. In 2018, 53% of respondents reported that “Thinking about my personal finances can make me feel anxious” and 44% said “Discussing my finances can make my heart race or make me feel stressed” (FINRA IEF, 2019). Debt delinquency is an indicator of financial burden that may hurt consumer financial and overall wellbeing. The current COVID-19 crisis makes the situation worse. Many earlier indicators show the substantial decline of economy that will worsen economic status of consumers. Previous research shows positive associations between debt and distress, financially or non-financially (e.g., Tay et al., 2017). In this study, debt delinquency refers to being late in debt repayment (Xiao & Yao, 2014). Researchers use different terms for perceived

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financial difficulties such as financial anxiety, stress, or distress (Archuleta et al., 2013; Friedline et al., 2020; Serido et al., 2014a). To be consistent with the literature of family economics, we use financial stress defined as a psychological state worrying about personal finance. It is important to understand to what extent that debt delinquency is associated with financial stress and identify factors that can help mitigate the association and reduce financial stress. This study focuses on one of such factors, financial capability.

The purposes of this study were to examine the association between debt payment delinquency and financial stress and explore the moderating role of financial capability in the association. Specifically, we examined delinquencies in three types of debts: (a) mortgage, (b) credit card, and (c) student loan. For empirical analyses, we used the 2018 U.S. National Financial Capability Study (NFCS) dataset which contains detailed information on the financial capability, financial stress and other socioeconomic characteristics of American households. Unique contributions of this study included that we examined the association between debt delinquency and financial stress, and the moderating role of financial capability in the association between debt delinquency and financial stress, which is understudied in the existing literature. In addition, we constructed a more comprehensive measure of financial stress based on newly available variables from the 2018 NFCS, providing new information for this important topic. Finally, based on results of this study, we discussed implications for consumer financial service practices.

Literature Review, Conceptual Framework, and Hypotheses

Literature Review on Financial Stress

Financial stress has been defined variously by researchers. For example, it is defined as “the extent to which individuals perceive that their financial demands exceed their ability to meet those demands (Serido et al., 2014a, p. 339) or “financial-related psychological stress or distress when they do not have adequate income, wealth, or debt to afford economic hardship” (Friedline et al., 2020, p. 10). Also, various researchers use different terms to indicate similar construct such as financial strain (Serido et al., 2014b), financial anxiety (Archuleta et al., 2013), financial uncertainty (Romo, 2014), and economic worry (Lai, 2011). In this study, we define financial stress as a psychological state worrying about personal finance.

Financial stress is an indicator of financial subjective wellbeing while financial subjective wellbeing is an indicator of subjective wellbeing. More specifically, subjective wellbeing is defined as a state of being mentally healthy that includes three components: having positive affect, lack

of negative affect, and life satisfaction (Diener, 1984). Subjective wellbeing can be measured by indicators in various life domains including finance such as financial satisfaction (Diener & Biswas-Diener, 2002). Financial stress can be considered a negative aspect in the finance domain, which is considered an indicator of financial subjective wellbeing in this study.

Financial stress has been studied in the family economic literature from different perspectives such as potential effects of financial stress on alcohol behavior (Serido et al., 2014a), financial coping behavior (Serido et al., 2014b), workplace absenteeism (Kim et al., 2006), psychological wellbeing (Stein et al., 2013), subjective wellbeing (Robb, 2017), couple relationship (Park & Kim, 2018), marital stress (Dew & Yorgason, 2010), college dropout (Britt et al., 2017), and fintech use (Heo et al., 2020). Further, predictors of financial stress are examined by previous research such as general stress (Norvilitis et al., 2003), depression (Valentino et al., 2014), financial hardship (Stack & Meredith, 2018). Researchers also described financial stress expressed in couple communications (Afifi et al., 2018; Romo, 2014) and examined the structure of financial anxiety (Shapiro & Burchell, 2012). For a recent review of research on financial stress, see Friedline et al. (2020). However, research is limited to examine the association between debt delinquency and financial stress and potential moderating effect of financial capability on the association. This study attempts to fill out this research gap.

Conceptual Framework

From the economic perspective on the life-cycle theory of saving (Modigliani, 1986), consumer income level over lifespan is stable so as their consumption level. However, consumers face many risks that result in income shocks, in that case, consumers need to borrow to smooth consumption. In addition, consumers need to borrow to live a normal life (Xiao & Yao, 2020). Normal life means in a society, certain portions of consumers borrow for certain consumption purposes such as mortgage for housing or student loan for attending college. Even though borrowing is essential for many consumers over lifespan, researcher have found a negative association between debt holding and subjective wellbeing. Debts could be harmful to consumers if they are out of control that may result in financial difficulties, sometimes even bankruptcy (Pace & Lown, 2016).

Tay et al. (2017) conducted a meta-analysis and confirmed the negative association between debt holding and subjective wellbeing or positive association between debt and distress. They also developed a conceptual framework to depict the relationship between debt and subjective wellbeing. According to their framework, debt is positively associated with subjective debt burden, subjective debt burden is

negatively associated with financial satisfaction, and financial satisfaction has a spillover effect on life satisfaction. In addition, financial resources (such as income) serve as a moderator on the association between debt and financial satisfaction. We developed a similar conceptual framework following the logic of the debt-happiness conceptual model proposed by Tay et al. (2017) and integrating relevant concepts in the literature of stress (Lazarus, 1999; Serido et al., 2014a, 2014b). In the context of this study, debt delinquency is considered as a stressor. Financial stress is considered the outcome of this adverse life event, an indicator of subjective financial wellbeing. To reduce financial stress, people seek available resources to cope the situation. In this study, we focus on financial capability, a form of human capital (Huston, 2010) as a helpful resource to be used to overcome life difficulties. We assumed that debt delinquency will increase financial stress and financial capability will moderate the association between debt delinquency and financial stress. This conceptual framework is demonstrated in Fig. 1.

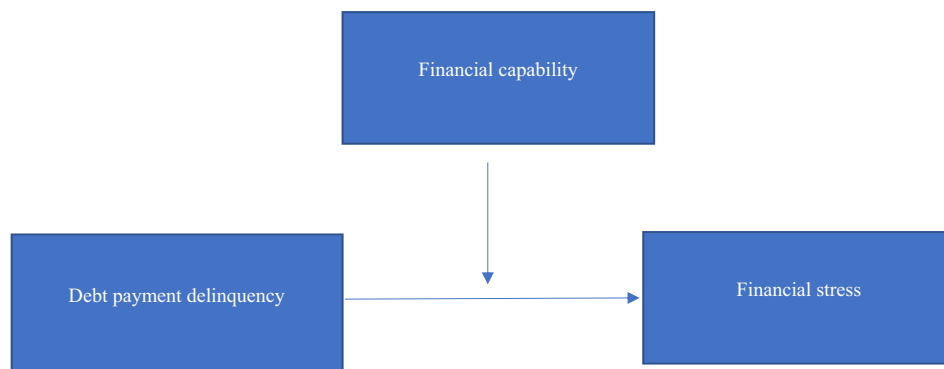
Debt Delinquency and Financial Stress

Previous research shows that debt holding is positively associated with health problems and negatively associated with subjective wellbeing. Using Polish data, Białowolski et al. (2019) found that debt made people suffer from both physical and emotional health problems. Tsai et al. (2016) with data from Taiwan found that debt had a direct negative influence on happiness and health behaviors. Kim and Chatterjee (2019) used data from the Panel Study of Income Dynamics (PSID) and found that student loan debt was negatively associated with life satisfaction and psychological wellbeing of respondents. Zhang and Kim (2019), using data from five biannual waves from the Transition into Adulthood Study and showed that increases of \$1000 in student loan and credit card debt resulted in 6% and 4% higher odds of distress, respectively. Britt et al. (2015), based on a sample of college students at a midwestern university, showed that students having student loan debts were more likely to experience financial stress compared to those with no student

loan debt. Brown et al. (2005) used the British Household Panel Survey and found that those household heads who had outstanding and more (non-mortgage) credit were associated with lower level of psychological wellbeing. With the same data set, Taylor et al. (2011) showed that financial capability had significant and substantial effects on psychological health over and above those associated with income and material wellbeing.

Using panel data from a county in the US, Drentea and Reynolds (2012) found indebtedness was associated with more symptoms of depression, anxiety, and anger. Similarly, Hiilamo and Grundy (2018) used data of older adults from Belgium, France and Germany, and found that low or substantial financial debt was associated with a higher number of depressive symptoms. Leung and Lau (2017) used nine waves of the Health and Retirement Study from 1992 to 2008 in the US and concluded that high mortgage loan to home value probably leads to depression and hypertension. Meltzer et al. (2011) used data from England and found that adults in debt were twice as likely to think about suicide. Using a national sample of British undergraduate students, Richardson et al. (2017) found that stress from debt was associated with poor mental health. Sweet et al. (2013) used data from the National Longitudinal Study of Adolescent Health (Add Health) in the US and found that debt was harmful to both mental and physical health including stress, depression and high diastolic blood pressure. Berger et al. (2016) used data from the National Survey of Families and Households in the United States and found that short-term (unsecured) debt is positively associated with depressive symptoms. Xiao et al. (2019) used data from the 2016 China Family Panel Study and found that holding housing debt, non-housing debt, or both is associated with lower life satisfaction or higher stress. Xiao et al. (2020) using data from the China Household Finance Survey showed that negative associations between debt holdings of four types of debts and happiness, which in the order from higher to lower associations, were medical, education, other, and housing debt. Grable and Joo (2006) showed that among college students, credit card debt was positively related to

Fig. 1 Conceptual framework



both negative financial behaviors and financial stress. Bell et al. (2014) using primary data gathered from a large Army installation in the Midwest demonstrated that soldiers with higher credit card debts and lower perceived net worth had lower levels of subjective wellbeing.

Debt delinquency is not uncommon among American households. Based on the 2018 NFCS (FINRA IEF, 2019), 19% of households were late in mortgage payment, 16% were charged late fees for credit card payment, and 42% were late in student loan payments among each type of debt holders. Consumer heterogeneity is also shown in debt delinquency among families with various lifecycle stages (Xiao & Yao, 2014) and structures (Xiao & Yao, 2020). Debt delinquency is an indicator of financial difficulty that can be related to financial stress. Based on the above discussions, we propose the following hypothesis:

H1 Debt delinquency is positively associated with financial stress.

Financial Capability and Financial Stress

Financial capability can be defined in various ways (FINRA IEF, 2019). It sometimes used as a synonym of financial literacy. Financial literacy refers to consumer ability to make optimal financial decisions (Lusardi & Mitchell, 2014). It also refers to financial knowledge and application of the knowledge (Huston, 2010). In this study, we define financial capability as the individual ability to apply appropriate financial knowledge and engage in desirable financial behavior for achieving financial wellbeing (Xiao et al., 2014). Financial capability contributes to consumer positive outcomes such as financial satisfaction (Xiao & Porto, 2017; Xiao et al., 2014). As the components of financial capability, financial knowledge contributes to desirable financial behaviors (Henager & Cude, 2016). In turn, desirable financial behaviors contribute to financial satisfaction and life satisfaction (Xiao et al., 2009). With a Dutch sample, de Bruijn and Antonides (2020) showed that making ends meet, an indicator of desirable financial behavior, may reduce financial worries. If informed consumers can apply appropriate financial knowledge and engage in desirable financial behaviors, they should be able to manage their finance well and their debts should be under control. If that is the case, then higher financial capability should be associated with lower financial stress. Then, the following hypothesis is proposed:

H2 Financial capability is negatively associated with financial stress.

Financial Capability as a Moderator Between Debt Delinquency and Financial Stress

To study the moderating role of financial capability in the relationship between debt delinquency and financial stress, the potential effect of the interaction term between debt delinquency and financial capability on financial stress is examined. As H1 and H2 suggest that debt delinquency would be positively while financial capability would be negatively associated with financial stress, the actual outcome of the interaction term cannot be predicted theoretically. Based on our conceptual framework, we considered financial capability as a resource to help battle the difficult financial situation so that hopefully reduce financial stress. Previous research suggests that financial resources such as savings and investments (Dew & Yorgason, 2010) or debt-to-income ratios (Norvilitis et al., 2003) may help reduce financial stress. In this study, financial capability is a personal ability, a resource resulted from human capital. We do not expect the extents of effects of both factors (financial capability and debt delinquency) that have effects in opposite directions. Thus, we propose the following hypothesis:

H3 The moderating effect of financial capability in the association between debt delinquency and financial stress is determined by empirical analyses.

Method

Dataset and Sample Selection

We used the 2018 National Financial Capability Study (NFCS) dataset sponsored by the FINRA Investor Foundation Education. The 2018 NFCS dataset was collected between June and October 2018, from roughly 500 respondents from each state and District of Columbia with oversamples of Oregon and Washington. The 2018 NFCS survey included several new questions on financial stress that were used in this study. The total sample size was 27,091 and the final analytic sample included 19,816 respondents excluding observations with missing responses for variables used in this study.

Dependent Variables: Financial Stress

We used four dependent variables of financial stress. The first three dependent variables are measured on a 7-point scale and defined based on the following questions related to financial stress available in the 2018 NFCS; (1) J33_1: “I worry about running out of money in retirement,” (2)

J33_40: “Thinking about my personal finances can make me feel anxious,” and (3) J33_41: “Discussing my finances can make my heart race or make me feel stressed.” Among three stress variables, the last two (J33_40 and J33_41) are new variables only available from the 2018 NFCS. In addition, we created the composite financial stress index estimated by summing Z scores of three financial stress measures.

Independent Variables

Debt Payment Delinquency

The 2018 NFCS provides three types of debt delinquencies such as mortgage (E15), credit card (F2_4) and student loan (G35). We created three binary indicators of debt delinquency coded as 1 if respondents were behind in each type of debt payment over the last 12 months, and 0 otherwise (i.e., no delinquency problem or non-borrowers). In addition, multiple categories were coded because some respondents could experience delinquency problems from multiple sources. Eight categories were created as follows; (1) no delinquency problems, (2) mortgage payment delinquency (MD) only, (3) credit card payment delinquency (CCD) only, (4) student loan payment delinquency (SLD) only, (5) MD and CCD only, (6) MD and SLD only, (7) CCD and SLD only and (8) MD, CCD, and SLD.

Financial Capability Index

Following previous research (Xiao et al., 2015; Xiao & O’Neill, 2016), the financial capability index was estimated by summing Z scores of four financial capability measures; (1) objective financial knowledge (0–6), subjective financial knowledge (1–7), perceived financial capability (1–7) and desired financial behavior (0–6). Detailed descriptions of variables are presented in Table 1.

Control Variables

Following variables were included as control variables; age, gender (male, female), marital status (married, single, separated/divorce/widow), presence of dependent children (yes, no), race/ethnicity (White, Black, Hispanic, Asian/others), education (high school diploma or lower, some college, associate degree, bachelor’s degree, post-bachelor’s degree), employment status (self-employed, full-time employee, part-time employee, homemaker, student, disabled, unemployed, retired), household income, experience of unexpected large drop in income (yes, no), banking status (yes, no), financial education (yes, no), homeownership (yes, no), credit card ownership (yes, no), student loan ownership (yes, no) and state of residence.

Table 1 Description of selected variables, 2018 NFCS

Variables	Description
Dependent variables: Financial stress (FS)	
FS1: Worry (1–7)	(J33_1) I worry about running out of money in retirement
FS2: Anxious (1–7)	(J33_40) Thinking about my personal finances can make me feel anxious
FS3: Stressed (1–7)	(J33_41) Discussing my finances can make my heart race or make me feel stressed
FS4: Composite index	Sum of Z scores of three financial stress measures
Debt payment delinquency	
Mortgage payment delinquency	(E15) How many times have you been late with your mortgage payments in the past 12 months? (If you have more than one mortgage on your home(s), please consider them all.)
Credit card payment delinquency	(F2_4) In some months, I was charged a late fee for late payment
Student loan payment delinquency	(G35) How many times have you been late with a student loan payment in the past 12 months? (If you have more than one student loan, please consider them all.)
Financial capability measures	
Objective financial knowledge	(M6) compounding, (M7) inflation, (M8) bond, (M9) mortgage, (M10) stock and (M31) time value of money. The sum of correct answers to the six financial literacy questions, ranging from 0 to 6
Subjective financial knowledge	(M4) On a scale from 1 to 7, where 1 means very low and 7 means very high, how would you assess your overall financial knowledge?
Perceived financial capability	(M1_1) I am good at dealing with day-to-day financial matters, such as checking accounts, credit and debit cards, and tracking expenses
Desirable financial behaviors	(B4, J3, J5) Short-term behavior (B14, C1_2012, J8/J9) Long-term behavior Each answer was coded as a binary variable and responses were summed to construct one index that ranged from 0 to 6
Financial capability index	Sum of Z scores of four financial capability measures

Empirical Model Specification

In this study, we constructed four ordinary least squares regression models to analyze the association between independent variables (debt delinquency, financial capability, control variables) and four dependent variables, level of financial stress (baseline model, Model 1). Further, we investigated the moderating role of financial capability by adding the interaction terms between debt delinquency problems and financial capability (Model 2).

Model 1: Financial stress = f (debt delinquency, financial capability, socioeconomic status, state of residence)

Model 2: Financial stress = f (debt delinquency, financial capability, interaction terms, socioeconomic status, state of residence)

Results

Descriptive Statistics of the Sample

As shown in Table 2, the average score of financial stress variables were 4.53 (FS1), 4.49 (FS2) and 4.08 (FS3). The mean of composite financial stress index (z-score index) was zero with a range of -4.89 to 3.82 . About 12.7% of respondents had credit card payment delinquency in the past 12 months, followed by student loan delinquency (8.1%) and mortgage payment delinquency (6.1%). The mean score of financial capability index (z-score index) was zero with a range of -10.68 to 5.19 . Other sample characteristics are displayed in Table 2.

Multivariate Regression Results

Table 3 shows results from four multivariate OLS regressions on financial stress. The coefficients were standardized by subtracting the mean from the variable and dividing by its standard deviation. Respondents with delinquency problems such as mortgage, credit card and student loans had higher level of financial stress consistently across four regression models. Specifically, those with mortgage delinquency had higher financial stress score by 0.0826 – 0.0955 followed by 0.0595 – 0.0922 (credit card delinquency) and 0.0223 – 0.0382 (student loan delinquency), consistent with H1. The findings suggest that mortgage and credit card debts may increase more worries than student loan debt by comparing the coefficient estimates. For example, in model 4 (FS4), the estimates of mortgage and credit card debt delinquencies are triple ($.0955/.0308 = 3.1$) or almost triple ($.0846/.0308 = 2.7$) of that of student loan debt delinquency. The financial capability index was negatively associated with financial stress across four regression results,

confirming H2. Interesting to see that the coefficient estimates of the financial capability index were 2.8–8.8 times ($.2716/.0955 = 2.8$, $.2716/.846 = 3.2$, $.2716/.0308 = 8.8$) of those of debt delinquency variables in model 4 (FS4). The findings suggest that positive effects of financial capability are much greater than negative effects of debt delinquencies on financial stress.

Among control variables, males and minorities had lower while those with dependent children had higher level of financial stress than their counterparts. Education, being full-time employees, experiencing substantial income shock, being banked, and student loan ownership were positively while higher income (\$75,000 or above) and homeownership were negatively associated with financial stress across four regression models consistently. Recipients of financial education had lower score of financial stress than those without financial education, but it was found to be significant only in FS1 (financial worry about retirement security) and FS3 (Discussing finances can make heart race).

Table 4 presents regression results with interaction terms between debt delinquency and financial capability. Given consistent patterns of results across four regressions, we focused on the composite index of financial stress (full results are available from authors upon requests). Similar to results in Table 3, delinquencies of mortgage, credit card and student loan debts were positively associated with financial stress (the estimated standardized coefficients were 0.0876 , 0.1088 , and 0.0440 , respectively). Financial capability was negatively associated with the level of financial stress. Thus, H1 and H2 were supported again.

Based on H3, the effect of interaction term between debt delinquency and financial capability will be decided by empirical analyses. The results are unexpected. When the study was designed, we expected that financial capability could mitigate the positive association between debt delinquency and financial stress and hoped the estimated coefficients of the interaction terms between debt delinquencies and financial capability index would be negative. However, the results showed positive values for these interaction terms (Table 4), implying that among people with debt delinquencies, higher financial capability may add additional financial stress. If the potential net effect of financial capability was considered, the positive effect of interaction term was offset fully by negative effect of financial capability among debt delinquents. In other words, considering both the coefficients of financial capability and the interaction term between financial capability and debt delinquency variables, for consumers with debt delinquencies, financial capability may decrease financial stress at much smaller rates offset by the positive interaction effect than consumers without debt delinquencies.

To consider some consumers may have several debt delinquencies at the same time, we conducted an additional analysis by adding more refined delinquency variables to

Table 2 Descriptive statistics of the sample, 2018 NFCS

Variables	Mean (S.D.)	Percentage
Dependent variables: Financial stress (FS)		
FS1: Worry (1, 7)	4.5294 (2.0547)	–
FS2: Anxious (1, 7)	4.4932 (2.0464)	–
FS3: Stressed (1, 7)	4.0793 (2.1006)	–
FS4: Composite index (– 4.89, 3.82)	0 (2.6986)	–
Debt payment delinquency		
Mortgage payment delinquency	–	6.12
Credit card payment delinquency	–	12.67
Student loan payment delinquency	–	8.14
Multiple debt payment delinquency		
No delinquency problem or non-borrowers	–	80.29
Mortgage payment delinquency (MD) only	–	2.14
Credit card payment delinquency (CCD) only	–	7.84
Student loan payment delinquency (SLD) only	–	4.10
MD and CCD only	–	1.58
MD and SLD only	–	0.80
CCD and SLD only	–	1.66
MD, CCD, and SLD	–	1.59
Financial capability index (– 10.68, 5.19)	0 (2.9099)	–
Age of respondent, mean (S.D)	48.2 (16.7)	–
Gender		
Male	–	45.1
Female	–	54.9
Marital status		
Married	–	54.8
Single	–	28.2
Separated/divorce/widow	–	17.0
Presence of dependent child	–	35.7
Race/ethnicity		
White	–	74.9
Black	–	9.1
Hispanic	–	8.5
Asian/others	–	7.5
Education		
High school or lower	–	26.6
Some college	–	26.7
Associate degree	–	10.5
Bachelor degree	–	22.4
Post-bachelor degree	–	13.8
Employment status		
Full-time worker	–	41.5
Self-employed	–	7.3
Part-time worker	–	8.5
Homemaker	–	7.4
Student	–	3.1
Disabled	–	4.9
Unemployed	–	4.1
Retired	–	23.2
Household income		
\$15,000–\$24,999	–	16.8
\$25,000–\$34,999	–	9.6

Table 2 (continued)

Variables	Mean (S.D.)	Percentage
\$35,000–\$49,999	–	10.6
\$50,000–\$74,999	–	14.8
\$75,000–\$99,999	–	19.9
\$100,000–\$149,999	–	14.8
\$150,000 or more	–	13.5
Had unexpected large drop in income in past 12 months	–	19.8
Banking status	–	94.1
Financial education	–	24.3
Homeownership	–	63.6
Credit card ownership	–	82.9
Student loan ownership	–	25.7

Unweighted results, 2018 NFCS

the regression models. The results are shown in Table 5. All delinquency variables were positively associated with financial stress. Comparisons of standardized coefficient estimates suggest that the three delinquency combination had the largest effect, .1023, followed by credit card debt delinquency only (.0998) and mortgage and credit card debt delinquency (.0753). Similar to the results in Table 4, all interaction terms between financial capability and debt delinquency were positive, suggesting financial capability may increase financial stress among consumers with debt delinquencies. In addition, when both financial capability's direct effect and interactive effect with debt delinquency were considered, positive values of interaction terms were not fully offset by the negative direct effect of financial capability for those with multiple delinquencies. The findings suggest that among consumers with multiple debt delinquency problems, more important factors to reduce stress may be factors beyond financial capability.

Robustness Tests

To examine the robustness of the results, we conducted additional analyses among only debtors (those holding at least one type of debt). The results are similar to those in Tables 4 and 5. Full results are available in Appendix Tables 6 and 7.

Discussion

This study has used a large scale of survey data representative of American consumers to examine the association between debt delinquency and financial stress and explore if financial capability could moderate the association. Results show that debt delinquencies, or more specifically, delinquencies of three types of debts, mortgage, credit card, and student loan, are positively associated with financial stress, suggesting being late in repaying these types of debts may

result in financial stress. In addition, results show that financial capability is negatively associated with financial stress, suggesting financial capability may reduce financial stress since it can help consumers better manage debts so that reduce distress caused by debt problems. Finally, surprisingly, financial capability shows a significant positive moderating effect in the association between debt delinquency and financial stress. The results suggest that financial capability may increase financial stress among consumers with debt delinquencies. If both financial capability's direct and interactive effects are considered together, among consumers with debt delinquency, financial capability may decrease financial stress at much smaller rates than those without delinquency problems. In addition, among consumers with multiple debt delinquencies, the situation is the most serious in which higher financial capability may be related to more financial stress.

The findings support the three proposed hypotheses, consistent with previous research on similar topics and contributing to the literature with new information. Previous research documented the negative association between debt and subjective wellbeing or positive association between debt and distress (Tay et al., 2017, also see the literature review section of this paper). This study provided another piece of supporting evidence showing the positive association between debt delinquency and financial stress, an indicator of subjective financial wellbeing. The findings also suggest that effects of delinquencies may vary among debt types. Based on the findings reported in Table 4, the estimated coefficients of mortgage is the largest, that of credit card debt is the second largest, and that of student loan is the smallest (almost half the size of credit card debt), suggesting mortgage delinquency may hurt consumer subjective financial wellbeing most compared to other debts. In a similar vein, results from an additional regression show that the estimated coefficients of multiple delinquency problems

Table 3 Ordinary least squares regressions on financial capability, 2018 NFCS

Variables	FS1: Worry			FS2: Anxious			FS3: Stressed			FS4: Composite index		
	Coeff.	Stand. coeff.	S.E.	Coeff.	Stand. coeff.	S.E.	Coeff.	Stand. coeff.	S.E.	Coeff.	Stand. coeff.	S.E.
Debt payment delinquency	0.7123***	0.0831	0.0626	0.7056***	0.0826	0.0588	0.8056***	0.0919	0.0603	1.0749***	0.0955	0.0761
Mortgage payment delinquency	0.3675***	0.0595	0.0444	0.4709***	0.0765	0.0417	0.5821***	0.0922	0.0428	0.6860***	0.0846	0.0540
Credit card payment delinquency	0.1673**	0.0223	0.0582	0.1705**	0.0228	0.0547	0.2930***	0.0382	0.0561	0.3042***	0.0308	0.0708
Student loan payment delinquency	-0.1323***	-0.1874	0.0061	-0.1870***	-0.2660	0.0057	-0.2018***	-0.2796	0.0059	-0.2519***	-0.2716	0.0074
Financial capability index	0.0103***	0.0839	0.0013	-0.0039**	-0.0318	0.0012	-0.0023	-0.0180	0.0013	0.0020	0.0126	0.0016
Age of respondent	-0.2515***	-0.0609	0.0281	-0.3226***	-0.0784	0.0264	-0.3165***	-0.0750	0.0271	-0.4307***	-0.0794	0.0341
Male (ref: female)												
Marital status (ref: married)												
Single	-0.0023	-0.0005	0.0385	0.0046	0.0010	0.0361	-0.0210	-0.0045	0.0370	-0.0089	-0.0015	0.0467
Separated/divorce/widow	0.0430	0.0079	0.0404	-0.0214	-0.0039	0.0380	-0.0181	-0.0032	0.0389	0.0019	0.0003	0.0491
Presence of dependent child (ref: No)	0.2362***	0.0551	0.0322	0.2094***	0.0490	0.0302	0.2355***	0.0537	0.0310	0.3294***	0.0585	0.0391
Race/ethnicity (ref: White)												
Black	-0.5489***	-0.0768	0.0501	-0.5281***	-0.0741	0.0471	-0.5513***	-0.0754	0.0483	-0.7876***	-0.0839	0.0609
Hispanic	-0.1428**	-0.0193	0.0505	-0.1443**	-0.0196	0.0475	-0.1602***	-0.0212	0.0487	-0.2162***	-0.0223	0.0614
Asian/others	-0.1107*	-0.0142	0.0536	-0.1581**	-0.0204	0.0503	-0.0361	-0.0045	0.0516	-0.1483*	-0.0145	0.0651
Education (ref: high school diploma or lower)												
Some college	0.1677**	0.0361	0.0372	0.1747***	0.0378	0.0349	0.1522***	0.0321	0.0358	0.2394***	0.0393	0.0452
Associate degree	0.0475	0.0071	0.0490	0.1087*	0.0163	0.0460	0.0806	0.0118	0.0472	0.1146	0.0130	0.0595
Bachelor degree	0.0915*	0.0186	0.0411	0.1728***	0.0352	0.0386	0.0834*	0.0166	0.0396	0.1687***	0.0261	0.0499
Post-bachelor degree	0.0946	0.0159	0.0488	0.2046***	0.0345	0.0458	0.1170*	0.0192	0.0470	0.2017***	0.0258	0.0593
Employment status (ref: full-time worker)												
Self-employed	-0.2027***	-0.0257	0.0531	-0.1013*	-0.0129	0.0499	-0.1309*	-0.0162	0.0511	-0.2105**	-0.0203	0.0645
Part-time worker	-0.2963***	-0.0402	0.0510	-0.1266**	-0.0172	0.0479	-0.1346**	-0.0179	0.0491	-0.2701***	-0.0279	0.0620
Homemaker	-0.4066***	-0.0517	0.0564	-0.2328***	-0.0297	0.0530	-0.2410***	-0.0300	0.0543	-0.4264***	-0.0413	0.0685
Student	-0.5118***	-0.0430	0.0826	-0.2761***	-0.0233	0.0776	-0.2782***	-0.0229	0.0795	-0.5164***	-0.0331	0.1003
Disabled	-0.1212	-0.0127	0.0685	0.2408***	0.0254	0.0644	0.2575***	0.0265	0.0660	0.1813*	0.0145	0.0833
Unemployed	-0.1856*	-0.0179	0.0726	0.0293	0.0028	0.0683	-0.0338	-0.0032	0.0700	-0.0921	-0.0068	0.0883
Retired	-1.0786***	-0.2217	0.0455	-0.5236***	-0.1081	0.0427	-0.4744***	-0.0954	0.0438	-1.0067***	-0.1576	0.0552
Income (ref: less than \$15,000)												
\$15,000–\$24,999	0.1325*	0.0190	0.0611	0.1498**	0.0216	0.0574	0.0224	0.0031	0.0589	0.1483*	0.0162	0.0743
\$25,000–\$34,999	0.1549*	0.0232	0.0622	0.0817	0.0123	0.0584	0.0845	0.0124	0.0599	0.1555*	0.0177	0.0755
\$35,000–\$49,999	0.0260	0.0045	0.0606	0.0167	0.0029	0.0569	-0.0198	-0.0034	0.0584	0.0114	0.0015	0.0736
\$50,000–\$74,999	-0.0866	-0.0168	0.0611	-0.1150*	-0.0224	0.0574	-0.1096	-0.0208	0.0589	-0.1505*	-0.0223	0.0743
\$75,000–\$99,999	-0.2227***	-0.0385	0.0664	-0.1728**	-0.0300	0.0624	-0.1484*	-0.0251	0.0640	-0.2635***	-0.0347	0.0807
\$100,000–\$149,999	-0.4124***	-0.0685	0.0697	-0.3024***	-0.0504	0.0655	-0.2995***	-0.0487	0.0671	-0.4910***	-0.0621	0.0847
\$150,000 or more	-0.8669***	-0.1102	0.0798	-0.7254***	-0.0926	0.0750	-0.5830***	-0.0725	0.0768	-1.0539***	-0.1020	0.0970

Table 3 (continued)

Variables	FS1: Worry		FS2: Anxious		FS3: Stressed		FS4: Composite index				
	Coeff.	Stand. coeff.	S.E.	Coeff.	Stand. coeff.	S.E.	Coeff.	Stand. coeff.	S.E.		
Had unexpected large drop in income in past 12 months (ref: No)	0.7239***	0.1403	0.0360	0.8030***	0.1562	0.0338	0.8213***	0.0347	1.1356***	0.1675	0.0438
Banking status (ref: No)	0.1795**	0.0205	0.0610	0.3632***	0.0417	0.0573	0.2783***	0.0311	0.3973***	0.0346	0.0742
Financial education (ref: No)	-0.1016**	-0.0212	0.0318	-0.0375	-0.0079	0.0299	-0.0053***	-0.0011	-0.0703	-0.0112	0.0386
Homeownership (ref: No)	-0.1185***	-0.0278	0.0346	-0.1763***	-0.0415	0.0325	-0.1500*	-0.0344	-0.2152***	-0.0384	0.0420
Credit card ownership (ref: No)	0.0304	0.0056	0.0426	-0.0764	-0.0140	0.0400	-0.0849	-0.0152	-0.0630	-0.0088	0.0518
Student loan ownership (ref: No)	0.2553***	0.0543	0.0379	0.3178***	0.0679	0.0356	0.3128***	0.0651	0.4285***	0.0694	0.0461
Constant	4.2583***	0.0000	0.1204	4.5008***	0.0000	0.1132	3.9804***	0.0000	-0.1750	0.0000	0.1464
State fixed effect	Included			Included			Included		Included		
Adjusted R-squared	0.2071			0.2944			0.2962		0.3211		
F-value	61.19***			97.11***			97.95***		109.97***		

Unweighted results. Coefficients are standardized

* $p < .05$, ** $p < .01$, *** $p < .001$

with mortgage payment is larger than other combinations of delinquency problems.

Results also show the negative association between financial capability and financial stress, consistent with previous research that financial knowledge contributes to financial behaviors (Henager & Cude, 2016; Kim et al., 2019) and financial capability contributes to subjective financial wellbeing (Xiao & Porto, 2017). Findings of this study provided supportive evidence to show financial capability may reduce financial stress, which implying increasing subjective financial wellbeing.

Results highlight the significant moderating role of financial capability in the association between debt delinquency and financial stress, which is the unique contribution of this study to the literature since previous research did not focus on this topic (Tay et al., 2017; Xiao & Yao, 2020; Xiao et al., 2019). Surprisingly, the results suggest that among consumers with debt delinquencies, financial capability is positively associated with financial stress. The moderating roles of financial capability vary too among three types of debts; the largest effect is found in mortgage, then credit card, then student loan. The results are unexpected that need future research to explain the mechanisms behind it. Possible explanations may be that more financially capable consumers, when they face debt delinquencies, are more aware of negative consequences of the problems and worry more financially, which may motivate them more to repay the debt. Note that this surprising finding is only for consumers with debt delinquencies. For consumers without debt delinquency problems, financial capability is still negatively associated with financial stress, implying financial capability could reduce financial distress.

Limitations of this study need to be acknowledged before implications are discussed. First, this study used cross-sectional data so that findings cannot be interpreted as direct evidence of the causality between debt delinquency and financial stress. Second, the dataset used has only information about debt ownership and delinquency. If information about debt amount is available, more detailed research could be conducted. Third, the data only has consumer self-reported behavior and perception information. To thoroughly understand consumer debt behaviors and their consequences on consumer financial wellbeing, data from diverse sources such as administrative data or observational data may be utilized. Fourth, as discussed before, the surprising result of the positive association between financial capability and financial stress among consumers with debt delinquencies should be further explored with other datasets and with different analytic procedures and see if it is a general fact. If so, more research is needed to see if this is a good sign or bad sign for consumer financial wellbeing. These limitations can be addressed in future research with different datasets and research designs.

Table 4 Ordinary least squares regressions on financial capability with interaction terms, 2018 NFCS

Variables	FS 4: Composite index		
	Coefficient	Standardized coefficient	S.E.
Debt payment delinquency			
Mortgage payment delinquency (MD)	0.9870***	0.0876	0.08
Credit card payment delinquency (CCD)	0.8826***	0.1088	0.0579
Student loan payment delinquency (SLD)	0.4340***	0.0440	0.0781
Financial capability index (FCI)	– 0.3136***	– 0.3382	0.0081
Interaction terms			
MD*FCI	0.2337***	0.0534	0.0289
CCD*FCI	0.1950***	0.0773	0.0185
SLD*FCI	0.1548***	0.0493	0.0226
Constant	– 0.3506***	0.0000	0.1454
Control variables	Included		
State fixed effect	Included		
Adjusted R-squared	0.3334		
F-value	112.37***		

Unweighted results. Control variables are the same as Table 3

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 5 Ordinary least squares regressions on financial capability, multiple delinquency problems, 2018 NFCS

Variables	FS 4: Composite index		
	Coefficient	Standardized coefficient	S.E.
Debt payment delinquency (reference: No delinquency problem)			
Mortgage payment delinquency (MD) only	1.0527***	0.0565	0.1169
Credit card payment delinquency (CCD) only	1.0025***	0.0998	0.0675
Student loan payment delinquency (SLD) only	0.4768***	0.0350	0.1032
MD and CCD only	1.6266***	0.0753	0.1407
MD and SLD only	1.6288***	0.0539	0.1827
CCD and SLD only	0.9262***	0.0438	0.1659
MD, CCD, and SLD	2.2074***	0.1023	0.1512
Financial capability index (FCI)	– 0.3132***	– 0.3378	0.0081
Interaction terms			
MD only*FCI	0.1917***	0.027	0.0443
CCD only*FCI	0.2224***	0.072	0.0213
SLD only*FCI	0.1616***	0.0396	0.0294
MD and CCD only*FCI	0.3739***	0.0489	0.0491
MD and SLD only*FCI	0.5383***	0.0386	0.0817
CCD and SLD only*FCI	0.2223***	0.036	0.0475
MD, CCD, and SLD*FCI	0.6572***	0.066	0.0659
Constant	– 0.3483	0.0000	0.1455
Control variables	Included		
State fixed effect	Included		
Adjusted R-squared	0.3340		
F-value	103.43***		

Unweighted results. Control variables are the same as Table 3

* $p < .05$, ** $p < .01$, *** $p < .001$

Implications for Practitioners

Beware of the Consequences of Debt Delinquency on Financial Distress

Both previous studies and current research show that debt delinquencies are positively related to financial stress. Then to reduce financial stress, financial practitioners working with consumers having debt problems need to help their clients understand negative consequences of repaying debt late. Results also suggest that delinquencies in different types of debts may result in different degrees of financial distress. Potential increases of financial stress by mortgage and credit card debt delinquencies are much larger than that of student loan delinquency. Practitioners may beware of these findings and treat their clients having different debt problems with different strategies. Consumer financial practitioners should emphasize the negative consequences of debt delinquency when they counsel, educate, and work with consumers with debt problems.

Understand the Potential Positive Effects of Financial Capability on Subjective Financial Wellbeing

Results of this study, consistent with previous research, show that financial capability, the ability to apply appropriate financial knowledge and perform desirable financial behavior, help reduce financial stress, implying that financial capability may be a cure for relieving financial distress. In addition, results show that potential effects of financial capability on financial stress are much larger than those of debt delinquency variables, suggesting greater potential of financial capability in reducing financial distress. When financial practitioners counsel, educate, and work with consumers with debt issues, they may emphasize the knowledge about debt management and encourage their clients to engage in desirable debt management behaviors, such as making more than minimum payment, make payment on time, and being mindful in paying debt bills.

Beware of the Moderating Role of Financial Capability in the Relationship Between Debt Delinquencies and Financial Stress

A surprising finding of this study is that among consumers with debt delinquencies, financial capability and financial

stress are positively associated. As we discussed before, this finding is unexpected, and more research should be done to confirm if this is a fact in general. If this is the fact, financial practitioners may need to first acknowledge the fact and then work with their clients to solve the debt delinquency issues to reduce financial stress. Some stress researchers argue that stress, while having many negative aspects for mental health, may also have a few benefits such as for the complex operations of human brain (Petrick et al., 2020; Ursin & Eriksen, 2010). Given other conditions, because of worry, raising consciousness and being mindful may be good to prepare for behavior change to reduce debt and improve financial wellbeing (Xiao et al., 2004).

Consider Other Factors Besides Financial Capability to Reduce Financial Distress

The results of this study suggest that improving financial capability may be helpful in improving both debt management behavior and subjective financial wellbeing. But practitioners may also want to understand the limitation of financial capability and consider other factors to reduce financial distress, such as family resource levels and individual personalities. Results of this study, consistent other studies, suggest that debt delinquencies are not only associated with financial stress but also other factors such as family economic resources (families with income over \$50,000 tend to have lower scores of financial stress). Certain psychological attributes may also cause responsible or irresponsible debt behaviors that are not shown in this study because of data limitation. However, previous research shows that consciousness is positively associated with wealth accumulation (Letkiewicz & Fox, 2014) and self-efficacy is related to help-seeking behavior (Lim et al., 2014). These factors may also be considered when consumer financial practitioners help consumers with debt problems.

Appendix

See Tables 6 and 7.

Table 6 Ordinary least squares regressions on financial capability with interaction terms, among debt holders, 2018 NFCS

Variables	FS 4: Composite index		
	Coefficient	Standardized coefficient	S.E.
Debt payment delinquency			
Mortgage payment delinquency (MD)	0.9544***	0.0894	0.0795
Credit card payment delinquency (CCD)	0.8661***	0.1121	0.0574
Student loan payment delinquency (SLD)	0.4384***	0.0468	0.0773
Financial capability index (FCI)	− 0.3542***	− 0.3588	0.0087
Interaction terms			
MD*FCI	0.2508***	0.0607	0.0287
CCD*FCI	0.2213***	0.0928	0.0185
SLD*FCI	0.1832***	0.0617	0.0227
Constant	− 0.3514***	0.0000	0.1765
Control variables	Included		
State fixed effect	Included		
Adjusted R-squared	0.3508		
F-value	108.2***		

Unweighted results. Control variables are the same as Table 3

Significance level: * $p < .05$, ** $p < .01$, *** $p < .001$

Table 7 Ordinary least squares regressions on financial capability, multiple delinquency problems, among debt holders, 2018 NFCS

Variables	FS 4: Composite index		
	Coefficient	Standardized coefficient	S.E.
Debt payment delinquency (reference: No delinquency problem)			
Mortgage payment delinquency (MD) only	1.0100***	0.0573	0.1161
Credit card payment delinquency (CCD) only	0.9758***	0.1024	0.0668
Student loan payment delinquency (SLD) only	0.4769***	0.0370	0.1026
MD and CCD only	1.6007***	0.0784	0.1393
MD and SLD only	1.6085***	0.0563	0.1808
CCD and SLD only	0.9467***	0.0474	0.1640
MD, CCD, and SLD	2.1962***	0.1077	0.1504
Financial capability index (FCI)	− 0.3559***	− 0.3605	0.0089
Interaction terms			
MD only*FCI	0.2356***	0.0351	0.0440
CCD only*FCI	0.2597***	0.0889	0.0213
SLD only*FCI	0.2077***	0.0539	0.0296
MD and CCD only*FCI	0.4140***	0.0573	0.0486
MD and SLD only*FCI	0.5825***	0.0443	0.0809
CCD and SLD only*FCI	0.2630***	0.0451	0.0470
MD, CCD, and SLD*FCI	0.6897***	0.0733	0.0652
Constant	− 0.3386	0.0000	0.1781
Control variables	Included		
State fixed effect	Included		
Adjusted R-squared	0.3513		
F-value	99.61***		

Unweighted results. Control variables are the same as Table 3

Significance level: * $p < .05$, ** $p < .01$, *** $p < .001$

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

Research Involving Human and Animal Participants This article does not contain any studies with human participants or animals performed by any of the authors.

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