The Economics of Financial Stress*

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Abstract

We study the psychological costs of financial constraints and their economic consequences. Using a representative survey of U.S. households, we document the prevalence of financial stress in U.S. households and a strong relationship between financial stress and measures of financial constraints. We incorporate financial stress into an otherwise standard dynamic model of consumption and labor supply. We emphasize two key results. First, both financial stress itself and naivete about financial stress are important components of a psychology-based theory of the poverty trap. Sophisticated households, instead, save extra to escape high-stress states because they understand that doing so alleviates the economic consequences of financial stress. Second, the financial stress channel dampens or reverses the counterfactual large negative wealth effect on labor earnings because relieving stress frees up cognitive resources for productive work. Financial stress also has macroeconomic implications for wealth inequality and fiscal multipliers.

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1 Introduction

Financial constraints are a painful reminder that our wishes are limited by our means. Finding ways to reduce the pain from stressful tradeoffs is the bread and butter of economics. And yet, financial stress, the number one source of stress for Americans (American Psychological Association, 2022*a*), is not a key object for macroeconomics and household finance.[1] Although the traditional approach does focus on financial constraints as a pervasive limiting factor for consumption smoothing and portfolio allocations, stress itself is out of the picture. This status quo is striking, given that behavioral economics has underscored a wide spectrum of negative effects stemming from financial stress. For example, Mani et al. (2013) and Mullainathan and Shafir (2013) argue that financial stress leads to a "scarcity" of cognitive resources and pushes people into a state of tunneling (i.e., neglecting activities outside the "financial stress" tunnel).[2] As a result, financially stressed individuals have difficulty focusing, perform poorly in economic tasks, and make poor decisions. These factors lead to significant economic consequences for productive labor supply and earnings, as well as consumption and saving decisions (Haushofer and Fehr, 2014; Ong, Theseira and Ng, 2019; Lichand and Mani, 2020; Banerjee et al., 2020; Kaur et al., 2022).[3]

To broaden the perspective and link behavioral and traditional takes on financial constraints, we develop a tractable theoretical model incorporating the psychological costs of financial constraints, i.e., financial stress. In this framework, financial stress negatively affects households close to financial constraints by draining cognitive resources and impacting economic behavior. This impact is especially costly for those not sophisticated enough to make complex optimization decisions considering the impact of stress. Using our survey of U.S. households to discipline the model, we show that financial stress can significantly alter household consumption, saving, and labor supply decisions and lead to extra welfare costs. Together, our analysis sheds new light on the causes of wealth inequality and the impact of stimulus checks issued to households during the COVID-19 crisis and previous recessions.

[1] According to a Capital One CreditWise survey (CNBC, 2021), 73 percent of Americans rank finances as the No.1 stress in life. The post-COVID inflation makes things worse. American Psychological Association (2022*a*) shows that 87 percent of Americans were stressed about their finances in March 2022, the highest number in the history of APA's Stress in America survey.

[2] Our paper uses the term "financial stress" to broadly capture the psychological costs of financial constraints. This includes but is not limited to, the narrow notion of stress, capturing the physiological stress response involving hormones such as cortisol (Mullainathan and Shafir, 2013).

[3] Popular personal finance books also discuss financial stress and its impact extensively. For example, Chilton (1998, p.171) writes: "And, not only can excessive borrowing tap your cash flow, it can also cause stress." Olen and Pollack (2016, p.21) add: "The harder it is to make it through to the next day financially – whatever the reason – the harder you will find it to make careful and disciplined decisions." In a similar spirit, The Washington Post (2023) also emphasized the psychological toll of inflation: "US households are frustrated by how much more attention they must pay to these rising costs — attention that is itself costly."

In the first step, we conduct a large-scale survey targeting American prime-age workers to document a series of facts about financial stress. The survey is representative of the general population in terms of gender, age, region, total household income, and education. We introduce questions that help quantify the consequences of financial stress, a valuable contribution that provides a more direct mapping between data and theory. We find that the majority of survey respondents feel financially stressed (in line with Yakoboski, Lusardi and Hasler, 2020 and Hasler, Lusardi and Valdes, 2021), and they suffer negative economic consequences from financial stress along a number of metrics. For example, survey respondents spend a median of 6 hours per week worrying about and dealing with issues related to household finances, draining valuable time and cognition from productive work. We also observe that measures of financial stress are strongly correlated with measures of whether households are at their financial constraints. Another innovation of our survey is to use hypothetical questions to elicit information about how respondents' financial stress would change if they received additional money (e.g., a stimulus check).

Informed by the survey evidence and previous work (e.g., Kaur et al., 2022), we introduce financial stress into an otherwise standard dynamic model of consumption, labor supply, and wealth distribution (Achdou et al., 2022). The model has three novel features. First, financial stress enters our model by crowding out valuable cognitive resources and time (i.e., "bandwidth" in Mullainathan and Shafir, 2013). Second, financial stress decreases with the distance to financial constraints. Third, households' degrees of sophistication versus naivete can vary (O'Donoghue and Rabin, 1999, 2001). We calibrate our model in different ways: based on our survey results and based on the evidence in Kaur et al. (2022).

We show that the sophistication-naivete dimension is a key determinant of how financial stress shapes household behavior. In our context, sophisticated households ("sophisticates") have a strong incentive to save to avoid future financial stress because they understand that doing so alleviates future stress and its negative impact on productive labor and earnings. Because of this extra saving motive, under sophistication, financial stress leads to fewer households facing financial constraints despite its negative direct effect on earnings. On the other hand, naive households ("naifs") fail to internalize possible future financial stress and hence do not have this extra-saving motive. Due to the negative direct effect of stress on productive labor and earnings, naifs save less, resulting in more households at the financial constraint.

The sophistication-naivete dimension is also crucial in determining the welfare costs of financial stress. For this purpose, we develop a money-metric measure of the welfare costs of financial stress. We find that the welfare costs of naifs' financial stress are an order of magnitude larger than the costs of sophisticates' financial stress, as naifs may become persistently trapped in the state of financial stress. Together, our results mean that both financial stress itself and naivete about financial stress are important components of a psychology-based theory of poverty traps (Mullainathan and Shafir, 2013).

The financial stress channel can attenuate or reverse the large negative wealth effect on labor earnings in benchmark models. This is because relieving financial stress frees up cognitive resources for productive work and increases productive labor and earnings. This channel helps bridge the gap between the prediction of benchmark models and the relatively small empirical estimates of the marginal propensity to earn (Cesarini et al., 2017; Auclert, Bardóczy and Rognlie, 2023). This channel is particularly strong for naive households close to financial constraints. It can help explain the finding in Banerjee et al. (2020) and Kaur et al. (2022) that poor households in developing countries exhibit a positive marginal propensity to earn and the finding in Golosov et al. (2024) that poor households exhibit a less negative marginal propensity to earn compared to rich households. By the same token, the financial stress channel introduces a new transmission mechanism for fiscal policy: lump-sum fiscal transfers can relieve financial stress, increase productive labor, and boost aggregate output. This channel breaks the Ricardian Equivalence and provides a new rationale for using fiscal transfers to stimulate the economy.

Our baseline approach focuses on the impact of financial stress on cognitive resources and time available for productive labor since it is the most studied and documented channel in the behavioral literature (Banerjee et al., 2020; Kaur et al., 2022). But financial stress can matter through other channels: direct utility costs, quality of economic decisions (Mani et al., 2013; Haushofer and Fehr, 2014), impulsive spending to alleviate the stress (e.g., "stress spending" documented in Credit Karma, 2017), and a lower probability of promotion (and a higher probability of demotion) because stress impacts performance. In a series of extensions, we modify our model to accommodate these alternatives. We find that the main insight on how sophistication versus naivete about financial stress affects household behavior is robust to alternative channels of financial stress.

Our paper builds upon and contributes to the literature that documents how psychological costs of financial constraints can adversely affect the lives of the poor (e.g., Shah, Mullainathan and Shafir, 2012; Mani et al., 2013; Mullainathan and Shafir, 2013; Haushofer and Fehr, 2014; Schilbach, Schofield and Mullainathan, 2016). In this literature, particularly relevant for us is the evidence on how financial stress negatively impacts productive labor and earnings. Directly related is Kaur et al. (2022), who stagger when wages of Indian manufacturing workers are paid out. Some workers are paid earlier, while others are paid later, remaining liquidity-constrained. In other words, they vary the *timing* of wage payments without affecting the total. They find that early wage payment reduces workers' financial stress, and these less stressed workers become more productive at work. The output and earnings of earlier-paid workers increase by an average of 7 percent, and by 13 percent for the most stressed households. The authors report additional evidence suggesting that the increase comes from improved cognition: earlier-paid workers make fewer costly mistakes and become more attentive. Banerjee et al. (2020) and Fink, Jack and Masiye (2020) find similar evidence that relaxing financial constraints increases workers' productive labor supply and earnings.[4][5]

Our contributions to this literature are twofold. First, we argue that similar forces are relevant for US households, in addition to those in developing countries. Second, we build the first tractable intertemporal model of financial stress, which allows us to study implications for endogenous consumption, labor supply, saving decisions, and wealth distribution. This also enables us to unearth the important role of sophistication versus naivete in determining the economic impact of financial stress. Our modeling approach is inspired by the static model of Banerjee and Mullainathan (2008), in which households may be distracted at work because they worry about problems at home. However, the static nature of Banerjee and Mullainathan (2008) means that they do not address endogenous saving decisions, wealth distribution, or the important role of the sophistication-naivete dimension.

Our paper also contributes to the literature on poverty traps. The earlier theories focus on non-psychological forces: Galor and Zeira (1993) and Banerjee and Newman (1993) emphasize the role of credit market imperfections, lumpy technologies, and occupational choices. Dasgupta and Ray (1986, 1987) emphasize the role of nutrition. Most empirical evidence does not support these types of poverty traps (e.g., surveyed in Kraay and Raddatz, 2007 and Kraay and McKenzie, 2014). At the same time, Balboni et al. (2022) recently found support for the mechanism in Banerjee and Newman (1993).

Our paper is more closely related to the recent theories of poverty trap focusing on psychological forces. Our main contribution is to build the first model incorporating financial stress while featuring endogenous intertemporal decisions. This allows us to formalize the conditions for a poverty trap (e.g., the role of naivete) and to formally study a wide range of economic implications. Two other conceptually distinct types of psychology-based poverty traps have been studied: Banerjee and Mullainathan (2010), Bernheim, Ray and Yeltekin (2015), and Thakral and Tô (2020) focus on temptation and present bias, while Dalton, Ghosal and Mani (2016) and Genicot and Ray (2017) focus on reference dependence and aspirations. These theories build upon completely different

[4] Fehr, Fink and Jack (2022) provide empirical evidence that being financially constrained can improve household decision-making in certain areas, e.g., reducing exchange asymmetries. However, consistent with the channel we focus on, Fink, Jack and Masiye (2020) find that being financially constrained lowers households' productive labor supply and earnings, using the same empirical setting conditions as in Fehr, Fink and Jack (2022).

[5] In the United States, Maturana and Nickerson (2020) and Bernstein, McQuade and Townsend (2021) find that financial stress negatively affects workers' productive labor supply. Dobbie and Song (2015) find that debt relief during personal bankruptcy increases earnings. In Finland, Knupfer et al. (2023) find that the collapse of a Ponzi scheme leads to labor earning losses for investors. These losses are attributed to the financial stress caused by the collapse.

psychological foundations and empirical evidence. They do not focus on cognitive scarcity as the source of the poverty trap and are not designed to address relevant empirical evidence (e.g., Kaur et al., 2022). They also offer insights into the sophistication-naivete dimension that differ from those related to financial stress.[6] Another contribution of ours to the psychology-based poverty trap literature is to make the model tractable enough to directly connect to the large body of literature on intertemporal choices and wealth distribution, as well as to bridge with mainstream macroeconomic analysis.

Financial stress differs from present bias (e.g., Laibson, 1997). Present bias per se does not depend on proximity to financial constraints and does not generate any psychological costs of financial constraints. It is not related to how financial stress crowds out valuable cognitive resources. Moreover, present bias affects all households at any level of financial assets, while financial stress only impacts households close to constraints. This leads to different implications for household behavior and wealth distribution. Finally, the implications of the sophistication-naivete dimension for financial stress differ significantly from its implications for present bias. Under financial stress, sophisticates unambiguously save more and suffer smaller welfare costs compared to naifs, independent of the elasticity of intertemporal substitution (EIS). This arises from an income effect, as sophisticates understand that their future selves will be poorer due to stress and will benefit from additional savings. Under present bias, the implications of the sophistication-naivete dimension instead depend on the EIS. In particular, when the EIS is above one, the implications for present bias are the opposite of those for financial stress. Under present bias, sophisticates save less compared to naifs and suffer greater welfare costs (Maxted, 2023). This occurs because of a substitution effect that dominates the income effect when the EIS is above one. Sophisticates are discouraged from saving because they understand that their future selves will exhibit present bias and consume additional savings sub-optimally (O'Donoghue and Rabin, 1999). This substitution effect is absent in the context of financial stress, as stress itself will not lead to future suboptimal consumption smoothing.

Complementary to us, Caplin and Leahy (2001) study how to incorporate anticipatory feelings (e.g., anxiety) into expected utility theory and examine their impact on decision-making. They focus on how anxiety affects portfolio choice: households are anxious about unresolved uncertainty and derive negative anticipatory utility from it; as a result, households save less in risky assets and more in safe assets to alleviate their anxiety. Our paper complements but also differs from

[6] As discussed above, the temptation-based poverty trap requires sophistication rather than naivete. The aspiration-based poverty trap in Dalton, Ghosal and Mani (2016) does require naivete, but it is based on a mechanism completely different from the income effect under financial stress mentioned above: poor individuals do not exert enough effort because they do not understand that greater effort leads to higher aspirations. Moreover, we go one step further than Dalton, Ghosal and Mani (2016) and are able to deliver quantitative lessons regarding intertemporal choices and wealth distribution.

the wealth-in-utility literature in macroeconomics (e.g., Mian, Straub and Sufi, 2021; Michaillat and Saez, 2021). We focus on how financial stress crowds out the time and cognition available for productive labor. In that literature, the utility of wealth and the disutility of labor are instead treated as separable, with the wealth effect on labor supply and earnings remaining negative.

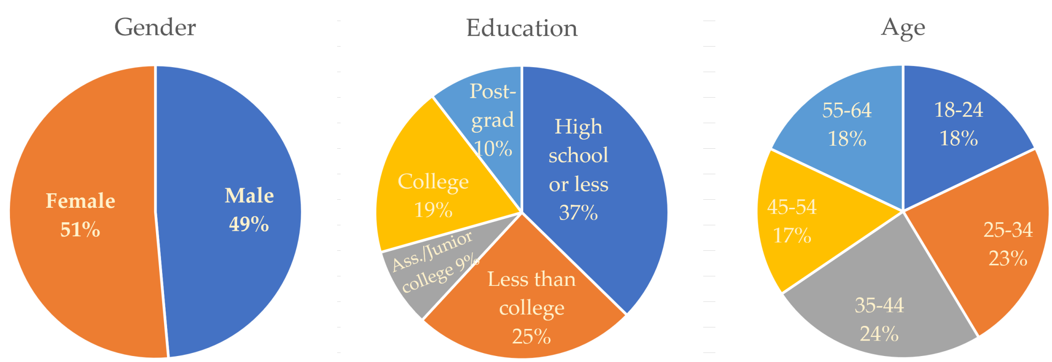
2 Survey Design and Results

We first introduce our large-scale survey of US households. We document that most survey respondents feel financially stressed, leading to negative economic consequences. Measures of financial stress are also strongly correlated with whether households are financially constrained.

2.1 The Survey Sample and Structure

Our survey has a sample of 10,000 respondents who are prime-age, employed US workers.[7] The sample is representative of the US population in terms of gender, age, region, total household income, and education. We collected the data between early April and late May 2022 in collaboration with Dynata, an online panel provider commonly used in economics (Andre et al., 2022). Respondents start the survey by completing a series of demographic questions. Then, they answer our key questions regarding financial stress and how it affects their economic lives. To obtain high-quality responses, the survey is relatively short. It has 21 questions and can be finished in under 10 minutes. Dynata pays respondents (roughly minimum wage) to complete the survey.

Figure 1: Sample Characteristics: Demographics



Notes: The pie charts represent the sample characteristics based on the full sample of our survey.

Figure 1 and Table 1 present the summary statistics of the respondents' characteristics and

[7] This paper focuses on how financial stress affects employed workers. However, financial stress could also affect the search behavior of unemployed workers. For example, it has the potential to reconcile the theoretical prediction that unemployment benefits should decrease job search efforts and the empirical evidence that the COVID-19 stimulus payments and unemployment benefits had small effects on job search efforts and sometimes made the unemployed search for jobs more intensively (Coibion, Gorodnichenko and Weber, 2020; Ganong et al., 2022).

Online Appendix Table B.1 shows that the demographic characteristics in our sample are close to those in the 2019 American Community Survey. Supplementary Appendix E contains the full survey questionnaire.[8]

Table 1: Sample Characteristics: Household Size, Income, and Wealth

	Obs	Mean	Median	Std	Min	Max	q25	q75
Household size	9,992	3.42	3	1.78	1	14	2	4
Annual income	10,000	62,432	45,000	61,692	5,000	600,000	25,000	75,000
Net financial assets	9,959	66,791	5,000	219,362	-55,000	1,100,000	-45,000	45,000

Notes: The table shows the sample characteristics based on the full sample of our survey. The number of observations does not always equal 10,000 because respondents can skip questions. To compute the statistics for the income and assets questions, we use the midpoints of the intervals chosen by the respondents (see questions Q4 and Q11 in Supplementary Appendix E). For the open intervals "$500,000 or more, "-$50,000 or less," and "$1,000,000 or more," we use $550,000, -$55,000, and $1,100,000, respectively, to compute summary statistics.

2.2 The Prevalence of Financial Stress

We start with a qualitative measure of financial stress. We elicit the degree of financial stress on a 1 (not concerned) to 10 (extremely concerned) scale using the following question:

> *Q12: On a scale from 1 to 10, how concerned are you about your current financial situation? 1 represents the lowest level of concern, and 10 represents the highest level of concern.*

The majority of survey respondents feel a nontrivial degree of financial stress. Figure 2 shows the distribution. Approximately 15 percent of respondents are extremely concerned, and only 7 percent are not concerned. The median answer is 6. These results suggest that most respondents are concerned about their finances.[9]

To explore whether financial stress is correlated with financial constraints, we ask the respondents the following question:[10]

> *Q9: If your household experienced an unexpected emergency, would you need to borrow money in order to pay for a $2,000 expense?*

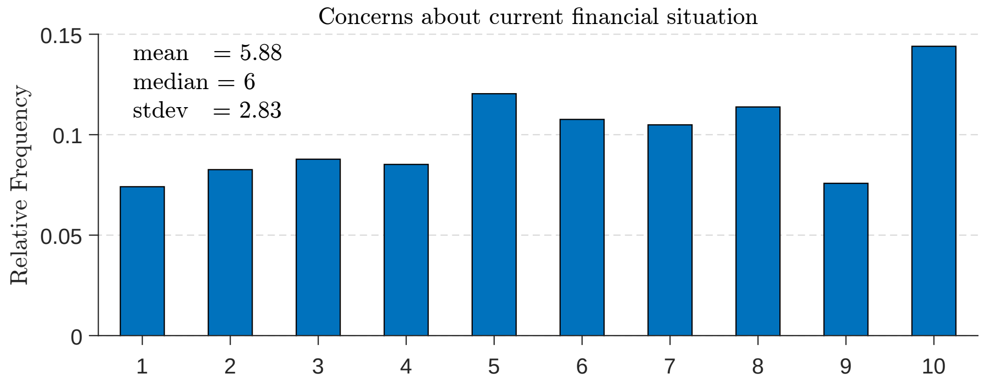
The respondents can choose from "no need to borrow," "need to borrow," and "cannot pay." Approximately 9.8 percent of households in our sample are severely financially constrained ("cannot

[8] We also incorporate an attention check in the survey. In the main text, we focus on the full sample because our sampling procedure is designed so that the demographics of the full sample match the demographics of the general population. In Supplementary Appendix D, we report all analyses for the restricted sample of respondents who pass the attention check. The results are similar to the full sample.

[9] This result is consistent with Hasler, Lusardi and Valdes (2021). Based on qualitative measures in a national representative survey conducted in 2018, they find that 53% of U.S. adults indicated that thinking about their finances makes them anxious and 44% indicated that discussing their finances is stressful.

[10] The question we use is based on Lusardi, Schneider and Tufano (2011) and Clark, Lusardi and Mitchell (2021), and it is shown to be a good indicator of whether households are financially constrained.

Figure 2: Qualitative Measure of Financial Stress



Notes: The figure shows the histogram of the answers to question Q12 of the survey.

pay"). Approximately 44.0 percent of households are somewhat constrained ("need to borrow"). The rest, 46.2 percent of households, are unconstrained.

We find that financial stress is strongly correlated with being financially constrained. Specifically, we regress the qualitative measure of stress Q12 on the indicator variables corresponding to the three answers to question Q9 above. The results are in column (1) of Table 3. On average, the respondents who "cannot pay" the emergency expense have a stress level of 7.4, stress declines to 6.8 for those who "need to borrow," and to 4.7 for those who "do not need to borrow." These results suggest that financial stress is related to financial constraints.[11]

To further explore factors associated with financial stress, we introduce several demographic controls (age, sex, educational attainment, etc.), as well as household income and net financial assets, into the regression of financial stress on measures of financial constraints (column (2) of Table 3). The coefficients on measures of financial constraints (Q9) remain roughly unchanged. In addition, we observe that financial stress declines with income and net financial assets. Financial stress has a clear inverted-U age profile with a peak at approximately 50 years. Women are more stressed than men. Financial stress exhibits a nonlinear relationship with educational attainment. Having children in the household and being married are associated with more stress.

2.3 Consequences of Financial Stress and the Role of Financial Constraints

As discussed in the introduction and documented in the behavioral-development literature, financial stress can drain valuable time and cognitive resources and incur negative economic consequences. For example, in a recent Stress in America Survey (American Psychological Association, 2022*b*), 37% of US adults reported that when they are stressed, they cannot bring themselves to

[11]Table B.3 in Online Appendix B.3 presents results where measures of financial stress are normalized by their standard deviations.

do anything. To quantify this impact, we ask respondents two questions:

> *Q17a-Q17b: Over the past week, how many working hours were you distracted by your financial concerns?*
>
> *Q17c: Over the past week, how many hours did you spend thinking about and dealing with issues related to your household's finances?*

The first question is motivated directly by the evidence from Kaur et al. (2022). The second question is a broader measure of the impact of financial stress and is motivated by Yakoboski, Lusardi and Hasler (2020). Our survey randomizes which of the two questions is given to a respondent. The first question is given to 75 percent of the sample, and the rest of the sample answers the second question. We cap the possible responses at 20 hours to minimize measurement errors.

Table 2: Quantitative Measures of the Consequences of Financial Stress

	Obs	Mean	Median	Std	Min	Max	q25	q75
Hours worked	9,991	39.6	40	15.1	0	100	31	45
Working hours distracted	7,428	6.4	5	6.1	0	20	1	10
Hours on financial issues	2,517	7.7	6	5.9	0	20	3	11
Stress spending	9,979	211.2	100	265.0	0	1000	25	300

Notes: "Hours worked" represent the answers to question Q16: "How many hours do you typically work in a week these days?", "Working hours distracted" to question Q17a, "Hours on financial issues" to question Q17b, and "Stress spending" to question Q20.

Table 2 shows that the respondents spend a sizable number of hours being distracted by financial issues or dealing with them. Specifically, for the working-hours-distracted (Q17a-Q17b) question, the average distraction is 6.4 hours per week (median is 5 hours per week). For the question about hours spent on financial issues (Q17c), the average is higher and it equals 7.7 hours (median is 6 hours). This magnitude is consistent with the TIAA Institute-GFLEC Personal Finance Index survey. In their 2020 Report, Yakoboski, Lusardi and Hasler (2020) found that survey respondents spend an average of 6.7 hours per week thinking about and dealing with financial issues.[12]

[12] To compute this average, we use Figure 3 (the distribution of the financial literacy index) and Figure 17 (average hours per week thinking about and dealing with issues by financial literacy index) in Yakoboski, Lusardi and Hasler (2020). The emphasis of Yakoboski, Lusardi and Hasler (2020) is on financial literacy, not financial stress, following the tradition of Lusardi and Mitchell (2014, 2017).

Table 3: Predictors of Financial Stress.

	Qual. measure of stress (1)	(2)	Working hours distracted (3)	(4)	Hours on fin. issues (5)	(6)
Financial Constraint (omitted: Intercept)						
Cannot pay	7.417***	7.324***	9.592***	8.934***	10.116***	9.839***
	(0.083)	(0.107)	(0.255)	(0.308)	(0.388)	(0.477)
Need to borrow	6.831***	6.717***	8.218***	7.380***	9.278***	8.945***
	(0.038)	(0.078)	(0.108)	(0.207)	(0.176)	(0.341)
No need to borrow	4.654***	4.794***	4.104***	3.902***	5.584***	5.890***
	(0.038)	(0.080)	(0.084)	(0.200)	(0.150)	(0.349)
Controls						
Income		-0.075*		-0.207*		0.105
		(0.036)		(0.082)		(0.160)
Net financial assets		-0.114***		-0.127***		-0.127**
		(0.009)		(0.019)		(0.033)
Non-primary earner		-0.497***		-0.687**		-1.35***
		(0.082)		(0.210)		(0.334)
Age		0.026***		-0.040***		-0.014
		(0.002)		(0.005)		(0.009)
$\text{Age}^2/100$		-0.111***		-0.235***		-0.339***
		(0.017)		(0.044)		(0.075)
Female		0.212***		0.357**		0.515*
		(0.052)		(0.132)		(0.221)
Education (omitted: Some college)						
High school or less		-0.170**		-0.003		0.002
		(0.062)		(0.165)		(0.273)
College		-0.067		-0.261		-1.038**
		(0.074)		(0.177)		(0.299)
Post-graduate		0.159		0.292		-0.345
		(0.097)		(0.239)		(0.404)
Married		0.131*		0.394**		0.158
		(0.056)		(0.144)		(0.244)
Have at least one child		0.203***		0.697***		0.738**
		(0.055)		(0.143)		(0.242)
Have at least one parent		0.064		0.632***		0.710**
		(0.052)		(0.133)		(0.224)
Observations	9962	9924	7428	7369	2517	2513
R^2	0.167	0.209	0.131	0.168	0.108	0.149

Notes: Each column presents the results of a separate OLS regression. Robust standard errors are in parentheses. Each regression omits an intercept because the first three dummy variables sum up to one. The income control is demeaned and divided by the mean, the net financial assets control is demeaned and divided by the mean income, and the age variable is demeaned. * indicates $p < 0.05$, ** – $p < 0.01$, *** – $p < 0.001$. For each regression, the coefficients on the regressors "Cannot pay," "Need to borrow," and "No need to borrow" are statistically different from each other. Online Appendix Table B.2 provides details of the corresponding tests.

Table 4 shows that distracted hours at work and hours spent on financial issues are strongly associated with the qualitative measure of financial stress (Q12). A one-unit increase in the qualitative measure of stress predicts an increase in distracted hours at work and hours spent on financial issues by approximately one hour (columns (1) and (3) of the table). This magnitude does not change if we control for demographic characteristics (columns (2) and (4) of the table).

Table 4: Consequences of Financial Stress

	Working hours distracted (1)	(2)	Hours on financial issues (3)	(4)
Qual. measure of stress	1.08***	1.06***	1.052***	1.005***
	(0.023)	(0.023)	(0.038)	(0.037)
Controls				
Non-primary earner		-0.196		-1.050***
		(0.195)		(0.312)
Age		-0.070***		-0.040**
		(0.005)		(0.008)
$Age^2/100$		-0.194***		-0.236***
		(0.040)		(0.068)
Female		0.264*		0.285
		(0.123)		(0.201)
Education (omitted: Some college)				
High school or less		0.260		0.448
		(0.151)		(0.250)
College		-0.745***		-0.905**
		(0.161)		(0.270)
Post-graduate		-0.379		-0.681
		(0.206)		(0.347)
Married		0.155		-0.140
		(0.132)		(0.219)
Have at least one child		0.436***		0.825***
		(0.132)		(0.223)
Have at least one parent		0.604***		0.615**
		(0.122)		(0.205)
Intercept	✓	✓	✓	✓
Observations	7408	7408	2511	2511
R^2	0.250	0.289	0.254	0.290

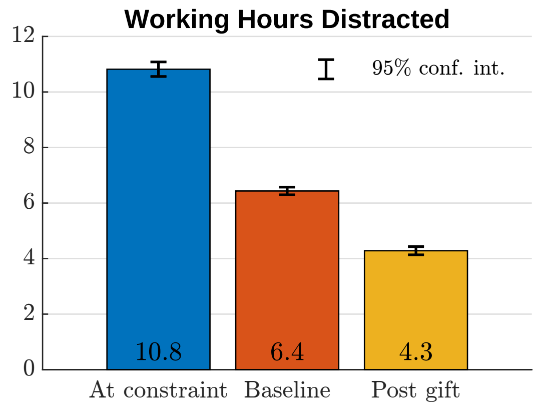
Notes: Robust standard errors in parentheses. The income control is demeaned and divided by the mean, the assets control is demeaned and divided by the mean income, and the age variable is demeaned. * indicates $p < 0.05$, ** – $p < 0.01$, *** – $p < 0.001$.

Similarly to the qualitative measure of financial stress, whether the household is financially constrained is a strong predictor of distracted hours at work and hours spent on financial issues (columns (3)-(6) of Table 3). The respondents who "cannot pay" the emergency expense report a weekly average of 9.6 hours distracted at work and 10.1 hours spent on financial issues. The respondents who "need to borrow" report a weekly average of 8.2 hours distracted at work and 9.3 hours spent on financial issues. The respondents who "do not need to borrow" report a weekly average of 4.1 hours distracted at work and 5.6 hours spent on financial issues. The magnitudes do not change much if we control for demographic characteristics (columns (4) and (6) of the table).

To further gauge the relationship between financial stress and distance to financial constraints, we ask two hypothetical questions.

> *Q19a: Now, I want you to imagine that your household's financial situation becomes worse, and you would struggle to quickly raise any additional money in the case of an*

Figure 3: Financial Stress and Distance to Financial Constraints



Notes: The histogram presents averages of distracted hours at work in a hypothetical scenario where the household has no assets to cover an emergency (question Q19a of our survey), the baseline level of distracted hours at work (questions Q17a and Q17b of our survey), and distracted hours at work in a hypothetical scenario where the household receives a gift of \$2,000 (question Q19b of our survey).

> *emergency (for example, bank accounts have been depleted and credit cards are maxed out). In this alternate scenario, how many working hours would you have been distracted by your financial stress over the course of a week?*
>
> *Q19b: Now, I want you to imagine that you were gifted \$2,000 at the start of last week. In this alternate scenario where you started the week with \$2,000 more money, how many working hours would you have been distracted by your financial stress?*

The first question aims to quantify the number of distracted hours at financial constraints. The second question aims to quantify how a \$2,000 transfer can alleviate the impact of financial stress on distracted hours. These two statistics will inform our model calibration later. The magnitude of the transfer (\$2,000) mimics the stimulus checks received by U.S. households during the COVID-19 crisis.

We summarize the results in Figure 3.[13] On average, respondents report that they would be distracted for 10.8 hours (Q19a) per week at financial constraints. Reassuringly, this number based on hypothetical questions is consistent with the average distracted hours reported by the "cannot pay" group in Table 3. A \$2,000 gift check, on average, would reduce the distracted hours by 2.1 hours per week from 6.4 hours (Q17a-Q17b) to 4.3 hours (Q19b), with the difference being precisely estimated. These answers corroborate that financial stress decreases with the distance to financial constraints and help calibrate our model below.

To further assess the effects of stress, we elicit the impact of financial stress on spending:

> *Q20: How much money do you typically spend per week in order to alleviate the stress driven by your financial concerns, which you would not spend if you were not financially stressed?*

[13] Clustering standard errors at the respondent level changes the reported standard errors by less than 0.01%.

As documented in Credit Karma (2017), impulsive spending can be a way to alleviate financial stress for some people. This question helps us to quantify the significance of this channel. Such stress spending is fairly significant in our sample (Table 2): on average, \$211 per week with a median of \$100 per week.[14] Like working hours distracted and hours spent on financial issues, impulse spending increases with the qualitative measure of financial stress. In our sample, an additional unit of financial stress (Q12) is associated with a \$7-\$8 increase in impulse spending.[15] This pattern suggests that the negative economic consequences of financial stress go beyond draining cognition and time.

Together, the survey results suggest that the impact of financial stress is significant. Financial stress drains valuable time and cognition from productive work and is strongly correlated with whether households are financially constrained. The findings are not sensitive to the exact wording of questions.

3 A Tractable Model of Financial Stress

In this section, we tractably incorporate financial stress into an otherwise standard model of intertemporal decision and wealth distribution. Motivated by our survey results, and the results in Kaur et al. (2022) and Banerjee et al. (2020), the model has three key features. First, financial stress enters our model by draining valuable cognitive resources and time from productive work. Second, financial stress decreases with the distance to financial constraints. Third, households' sophistication versus naivete about financial stress can vary.

3.1 Setup and Interpretations

Our model builds upon the standard continuous-time heterogenous-agent model in Achdou et al. (2022). Households are infinitely lived with the subjective discount rate ρ, and the flow utility function

$$u\left(c_t,\ell_t;\Theta\left(a_t\right)\right)=\frac{c_t^{1-\frac{1}{\sigma}}}{1-\frac{1}{\sigma}}-\varphi\frac{\left(\ell_t+\Theta\left(a_t\right)\right)^{1+\frac{1}{\psi}}}{1+\frac{1}{\psi}}, \tag{1}$$

where c_t is consumption at instant t, ℓ_t is productive labor supply at t, σ and ψ determine the intertemporal elasticity of substitution and the Frisch elasticity of labor supply, and the non-standard element $\Theta\left(a_t\right)>0$ captures the amount of cognition and/or time drained by finance-

[14] To put these magnitudes into perspective, we note that a pack of cigarettes (a common way to relieve stress) costs about \$10 in many states, and households in the two lowest income quintiles spend on average \$56 per month on lottery tickets in 2019 according to the Consumer Expenditure Survey.

[15] This range comes from regressing the amount of stress spending on the qualitative measure of financial stress, analogous to columns (1) and (3) of Table 4.

related issues at instant t (as a function of current net financial assets a_t). Compared to Dasgupta and Ray (1986, 1987), Banerjee and Mullainathan (2008), and Dalton, Ghosal and Mani (2016), we introduce an endogenous consumption and saving choice and show that it plays a crucial role in determining the conditions for poverty traps.

In equation (1), the household derives disutility from both productive labor supply and worrying about/dealing with financial issues, because both utilize scarce cognition and time (i.e., "bandwidth" in Mullainathan and Shafir, 2013).[16] The financial stress term $\Theta(a_t)$ can capture both the psychological costs of financial constraints, our focus here, and more broadly, non-psychological time costs associated with being financially constrained, e.g., longer commutes due to reliance on public transportation and more time spent on childcare due to the inability to afford daycare. The bandwidth interpretation also explains why the impact of financial stress takes an additive form in (1). However, this is not crucial for the main economic lessons, as explained in Section 4.2 for the case where the impact of financial stress takes the form of a multiplicative productivity loss.

Consistent with our survey evidence and the evidence in Kaur et al. (2022), a household's financial stress $\Theta(a_t)$ is assumed to be a decreasing function of net financial assets a_t. In addition, we assume that this function is continuously differentiable. When we calibrate the model, we use an exponential stress function (12). However, the exact functional form of financial stress is unimportant, and alternative functional forms are explored in Section 4.2.

Here, we treat the financial stress function $\Theta(\cdot)$ as exogenous. This maps to the *involuntary* capture of attention view in Mullainathan and Shafir (2013) and Kaur et al. (2022), the prevalent view in the scarcity literature. That is, financial stress captures cognitive resources automatically. Households close to financial constraints involuntarily worry about their finances and they cannot consciously control this worry. However, the benchmark model with exogenous $\Theta(\cdot)$ is in fact equivalent to a model with *voluntary* capture of attention akin to rational inattention. That is, the amount of cognitive resources devoted to alleviating financial stress $\Theta(\cdot)$ is chosen endogenously. This result is formally stated in Section 4.2.

The household can borrow and save through a risk-free asset. Its budget constraint is given by

$$\dot{a}_t = ra_t - c_t + wz_t\ell_t \tag{2}$$

[16] The specification in (1) is flexible enough to connect with both of our survey questions about the impact of financial stress. For Q17a-Q17b, one can interpret ℓ_t as productive working hours and $\Theta(a_t)$ as working hours distracted. The household derives disutility from total working hours $\ell_t + \Theta(a_t)$. For Q17c, one can again interpret ℓ_t as productive working hours, but $\Theta(a_t)$ as the total number of hours spent thinking about and dealing with financial issues. The household again derives disutility from $\ell_t + \Theta(a_t)$, which now includes hours spent on financial issues both during and outside of work. We use the first interpretation throughout the paper when mapping our model to our survey evidence.

and is subject to the financial constraint

$$a_t \geq \underline{a}, \tag{3}$$

where w is the wage (treated as a constant), r is the interest rate, z_t is idiosyncratic productivity following a two-state Poisson process with support where $z_1 < z_2$ and transition intensity λ, and $\underline{a}$ represents the lower bound of net financial assets. Stochastic idiosyncratic productivity is introduced so there is a meaningful stationary wealth distribution.[17] In the main analysis, we study a partial equilibrium setting with exogenous interest rate r. Online Appendix C.11 reports the results with endogenous r à la Huggett (1993). In our calibration, we focus on the case where $r < \rho$ so that a stationary wealth distribution exists.

We model financial stress through its impact on time/cognition available for productive work because this channel receives the most attention and support in the existing behavioral development literature. It is also consistent with our survey evidence and easy to calibrate. But our modeling approach can be easily applied to alternative channels of financial stress. We explore several such channels in Section 4.2 and Online Appendix C. First, financial stress can lead to direct utility costs independent of labor supply. Second, as our survey question Q20 suggests, to alleviate financial stress, the household may spend on items that it would not buy if it were not financially stressed. Third, instead of directly affecting labor earnings, financial stress can impact the transition intensity between different idiosyncratic income states, which can better capture salaried workers. Fourth, financial stress can also lead to worse economic decisions (Mani et al., 2013; Mullainathan and Shafir, 2013; Haushofer and Fehr, 2014; Kansikas, Mani and Niehaus, 2023). Section 4.2 shows that, even with these alternative channels, the main insight into how sophistication versus naivete about financial stress affects household behavior remains.

3.2 Sophistication and the Extra Saving Motive

The impact of financial stress on household behavior depends crucially on whether households understand the negative consequences of future financial stress and take this into consideration when making current decisions. The behavioral economics literature has developed two standard benchmarks regarding such understanding: sophistication and its opposite, naivete (O'Donoghue and Rabin, 1999, 2001). In the context of financial stress, sophisticates understand that future financial stress crowds out future cognitive and time resources, which negatively impacts future productive labor supply and earnings. They understand that extra savings can alleviate future financial stress and its negative economic consequences. On the other hand, naifs fail to internalize the negative consequences of future financial stress when making current consumption and saving

[17] The two-state process follows Achdou et al. (2022) and is used for simplicity.

decisions.

We start our analysis with the case of (full) sophistication.[18] Sophisticates choose consumption and labor to maximize the present value of (1)

$$\mathbb{E}_0\left[\int_0^{+\infty} e^{-\rho t} u\left(c_t, \ell_t; \Theta\left(a_t\right)\right) dt\right], \tag{4}$$

subject to the budget constraint (2), the financial constraint (3), and the process for z_t. We use $v_j\left(a\right)$ to denote the optimal value of the objective (4) as a function of the initial asset $a_0 = a$ and the initial productivity $z_0 = z_j$ for $j \in \{1,2\}$. The Hamilton-Jacobi-Bellman (HJB) equation of the problem is, for $j \in \{1,2\}$ and $a \geq \underline{a}$,

$$\rho v_j\left(a\right) = \max_{c,\ell}\left\{u\left(c, \ell; \Theta\left(a\right)\right) + \left(ra - c + wz_j\ell\right) v_j'\left(a\right) + \lambda\left(v_{-j}\left(a\right) - v_j\left(a\right)\right)\right\}, \tag{5}$$

where $-j$ is the complement of j. That is, when j is 1, then $-j$ is 2 and vice versa.

Sophisticates' consumption $c_j\left(a\right)$ (and hence saving) solves (5) by trading off between the marginal utility of current consumption and the marginal value of saving. The latter takes into account its impact on stress. That is, additional saving alleviates future financial stress and its negative economic consequences. Formally,

$$c_j^{-\frac{1}{\sigma}}\left(a\right) = v_j'\left(a\right) \quad \text{for} \quad j \in \{1,2\} \quad \text{and} \quad a > \underline{a}. \tag{6}$$

The labor supply $\ell_j\left(a\right)$ also solves (5). Financial stress $\Theta\left(a\right)$ crowds out time and cognition from productive labor by increasing the marginal disutility of labor for each value of $\ell_j\left(a\right)$. Formally,

$$\varphi\left(\ell_j\left(a\right) + \Theta\left(a\right)\right)^{\frac{1}{\psi}} = wz_j c_j^{-\frac{1}{\sigma}}\left(a\right) \quad \text{for} \quad j \in \{1,2\} \quad \text{and} \quad a \geq \underline{a}. \tag{7}$$

The borrowing constraint in equation (3) gives rise to the boundary condition: $v_j'\left(\underline{a}\right) \geq \left[wz_j\ell_j\left(\underline{a}\right) + r\underline{a}\right]^{-\frac{1}{\sigma}}$, which guarantees that saving is non-negative at $\underline{a}$ and the financial constraint is not violated (Achdou et al., 2022). Differentiating the HJB equation (5) with respect to a and using the consumption optimality (6), we obtain the modified Euler equation:

[18] In Online Appendix C.1, we also study the case of partial sophistication (O'Donoghue and Rabin, 2001), where households partially understand the impact of future financial stress.

Proposition 1. *The optimal consumption under full sophistication satisfies*

$$\underbrace{-\frac{\mathbb{E}_t\left[d\left(c_j^{-\frac{1}{\sigma}}(a)\right)\right]}{c_j^{-\frac{1}{\sigma}}(a)}}_{\text{saving motive}} = \left[\underbrace{r-\rho}_{\text{intertemporal subtitution}} \qquad \underbrace{-wz_j\Theta'(a)}_{\text{extra saving motive, }>0}\right]dt. \tag{8}$$

Compared to the standard Euler equation in Achdou et al. (2022), sophisticates' Euler equation (8) has one additional term $-wz_j\Theta'(a)$. This term is positive since financial stress $\Theta(a)$ is decreasing in a. This term captures sophisticates' extra saving motive to save out of high financial stress states. Understanding that additional savings can alleviate financial stress and its negative economic consequences, sophisticates want to save more. This extra saving channel is so strong that, in the benchmark calibration below, sophisticates' net saving in the neighborhood of the financial constraint $\underline{a}$ is positive. As a result, there are no sophisticates at the financial constraint in the stationary wealth distribution. In other words, with sophistication, financial stress surprisingly leads to fewer households at the financial constraint compared to the case without financial stress. This happens despite the negative direct effect of financial stress on productive labor and earnings. Sophisticated stressed households do not fall into the poverty trap.

3.3 Naivete and the Poverty Trap

Now we turn to the case of (full) naivete. Naifs fail to internalize the negative consequences of future financial stress, making current consumption and saving decisions as if financial stress will not crowd out cognitive and time resources in the future. This implies that naifs' consumption policy $c_j(a)$ is determined by (9), trading off current consumption and the perceived future value $v_j^p(a)$:

$$c_j^{-\frac{1}{\sigma}}(a) = \left(v_j^p\right)'(a), \tag{9}$$

where the perceived future value is given by the frictionless, no-stress value function $v_j^p(a) = v_j^{\text{no-stress}}(a)$. That is, naifs perceive that the future impact of stress is zero, or $\Theta(a) = 0$ for all a. To find $v_j^{\text{no-stress}}(a)$ for $j \in \{1,2\}$, we solve

$$\rho v_j^{\text{no-stress}}(a) = \max_{c,\ell}\left\{u(c,\ell;0) + (ra - c + wz_j\ell)\left(v_j^{\text{no-stress}}\right)'(a) + \lambda\left(v_{-j}^{\text{no-stress}}(a) - v_j^{\text{no-stress}}(a)\right)\right\}. \tag{10}$$

Naifs' current labor supply is still given by equation (7). Current financial stress still crowds out cognitive and time resources, reducing current productive labor supply and earnings. Together with (9), we establish:

Proposition 2. *The optimal consumption under naivete satisfies*

$$\underbrace{-\frac{\mathbb{E}_t\left[d\left(c_j^{-\frac{1}{\sigma}}(a)\right)\right]}{c_j^{-\frac{1}{\sigma}}(a)}}_{\text{saving motive}} = \left[\underbrace{r-\rho}_{\text{intermporal subtitution}} \underbrace{-\frac{1}{\sigma}wz_j\Theta(a)\frac{c_j^{'}(a)}{c_j(a)}}_{\text{less net saving, } <0}\right]dt. \tag{11}$$

Compared to sophisticates' Euler equation in (8), naifs do not have the extra saving motive: failing to understand the impact of future financial stress dispenses naifs' incentive to engage in extra saving to alleviate future financial stress. In fact, naifs' saving motive is even weaker than the no-stress case: the last term in the square bracket on the right-hand side of equation (11) is negative. This is because naifs' current earnings are lowered by current financial stress, resulting in lower net saving compared to no-stress households. In the benchmark calibration below, naifs' net saving in the neighborhood of the financial constraint $\underline{a}$ is negative, and they fall into a poverty trap. The case of naivete can generate an empirically large number of financially constrained and stressed households.

It is worth noting that the specification here closely follows the present bias literature (e.g., Harris and Laibson, 2013 and Maxted, 2023), where naifs' perceived future value function is given by the frictionless, no-present-bias value function.[19] However, the analysis also accommodates two broader interpretations of naivete about future financial stress. First, naifs do not understand that lower saving results in increased future financial stress. Second, even if naifs understand the aforementioned connection, they fail to understand that financial stress incurs negative economic consequences in the future (e.g., it reduces cognition and time available for productive labor).

Analytical results on poverty traps. Before turning to a numerical solution to the household's problem, we analytically evaluate whether a stressed household falls into a poverty trap in the deterministic case where idiosyncratic productivity z_t is a constant z. To be precise, we say that a household falls into a poverty trap when the household's net saving is negative in the neighborhood to the right of the constraint $\underline{a}$. Formally, a household falls into a poverty trap if and only if $\lim_{a\to(\underline{a})^+} s(a) < 0$, where $s(a) \equiv ra - c(a) + wz\ell(a)$ is *net flow* saving. That is, the change in net financial asset a is negative for a household close to the financial constraint (i.e., $\dot{a} < 0$ in (2)). This definition is consistent with the standard definition of a poverty trap (Kraay and McKenzie, 2014).[20]

[19] We also follow Harris and Laibson (2013) and Maxted (2023) and let the transition rate from the present to the future be infinity. This captures the economic essence in a simple way.

[20] There, they define a poverty trap as gross flow saving, in poverty, falling below the depreciation of capital, which means negative net flow saving.

Proposition 3. *Let idiosyncratic productivity z be constant, the financial stress function $\Theta(a)$ be continuously differentiable and decreasing, and $r < \rho$. In this case:*

1. *Sophisticates do not fall into poverty traps, i.e.,* $\lim_{a \to (\underline{a})^+} s(a) > 0$, *if* $r - \rho - wz\Theta'(\underline{a}) > 0$.
2. *Naifs fall into poverty traps, i.e.,* $\lim_{a \to (\underline{a})^+} s(a) < 0$.
3. *Without financial stress, i.e.,* $\Theta(a) = 0$ *for all* a, *net saving converges to* 0 *at* $\underline{a}$, *i.e.,* $\lim_{a \to (\underline{a})^+} s(a) = 0$.

Proposition 3 analytically summarizes the main insight in this section. It is worth noting that the condition $r - \rho - wz\Theta'(\underline{a}) > 0$ (under which sophisticates do not fall into the poverty trap) is satisfied when $\Theta(a)$ is sensitive to a in the neighborhood of $\underline{a}$. This is supported by Kaur et al. (2022). They find that earning losses driven by financial stress are pronounced for the most financially constrained group but decrease relatively quickly with respect to financial wealth. This condition is also satisfied in our benchmark calibration.

3.4 Calibration

We solve the model numerically based on the finite-difference method developed in Achdou et al. (2022). Table 5 displays the parameter values we use for the calibration, which are from standard references. Most non-stress parameters are from Kaplan and Violante (2022), with two exceptions. First, we switch to the more realistic borrowing constraints in Kaplan, Moll and Violante (2018) since Kaplan and Violante (2022) does not allow borrowing. Second, we use Guerrieri and Lorenzoni (2017) for productivity and labor supply parameters since Kaplan and Violante (2022) does not allow flexible labor supply. Following the standard practice for a one-asset model in the literature (e.g., Kaplan and Violante, 2022), we calibrate ρ such that the average wealth to average income ratio in the model is equal to the average liquid wealth to average income ratio in the data.[21] We normalize average income and labor hours in our model to be 1.

[21] Specifically, we calibrate ρ such that the average wealth to average income ratio in the naive financial stress case of our model is equal to the average liquid wealth to average income ratio in the data. We then keep ρ constant across all other cases (e.g., sophisticated financial stress and no financial stress) to isolate the impact of financial stress. This calibration is justified because, as we argue further below, the naive financial stress case appears to be more empirically relevant than the sophisticated case, and the majority of households seem to be naive. In the baseline analysis, we also keep the interest rate r constant across all cases to isolate the impact of financial stress. In Online Appendix C.11, we endogenize r such that the average wealth to average income ratio in the economy is fixed across cases. The main results are similar.

Table 5: Calibration Parameters

Parameters	Justifications
$\sigma = 1$	Kaplan and Violante (2022)
$\underline{a} = -1/4$	Kaplan, Moll and Violante (2018)
$r = 0.01$	Kaplan and Violante (2022)
$\psi = 1$	Guerrieri and Lorenzoni (2017)
$(\lambda, z_1, z_2) = (0.57, 0.87, 1.13)$ [22]	Guerrieri and Lorenzoni (2017)
$(\bar{\Theta}, \alpha) = (0.27, 11.9)$	Our survey
$\rho = 0.0131$	Match avg a/avg $y = 0.56$ (Kaplan and Violante, 2022) in the naivete about financial stress case.
$w = 1.05$, $\varphi = 1.05$	Normalize average income and total labor hours to 1 in the naivete about financial stress case.[23]

In the main analysis, we use our survey to calibrate the financial stress function:

$$\Theta(a) = \bar{\Theta} e^{-\alpha(a-\underline{a})}. \tag{12}$$

First, we set $\bar{\Theta}$—the maximum level of financial stress at the financial constraints—based on our survey question Q19a (hours distracted "at constraint"). Specifically, we let $\bar{\Theta}$ be equal to 0.27 by dividing the average answer to this question in Figure 3 by the average working hours in Table 2. This is because we normalize the average total labor hours in our model to be one.

Second, we calibrate α—the slope of the financial stress function—based on the log difference between the survey question Q17ab and Q19b. That is, as shown in Figure 3, a \$2,000 gift check, on average, would reduce hours distracted by financial stress by 2.2 hours. Specifically, given the functional form in (12), we find[24]

$$\alpha = \frac{\overline{\log\left(Q17ab/Q19b\right)}}{2000/\overline{\text{income}}} = 11.9, \tag{13}$$

[22] These parameters reflect a two-state discretization of the labor productivity process employed in Guerrieri and Lorenzoni (2017), who assume that the log of productivity follows an AR(1) process with normal disturbances, the persistence ρ of 0.967, volatility σ^2 of 0.017 at quarterly frequency, and the average level of productivity of one. Following Maxted (2023), we transform this discrete-time process into a continuous-time Ornstein-Uhlenbeck (OU) process with the rate of mean reversion ρ^{OU} such that $\rho = \exp(-\rho_{\mathrm{OU}}\Delta)$ and the volatility σ^2_{OU} such that $\sigma^2 = \sigma^2_{\mathrm{OU}}(1 - \exp(-2\rho_{\mathrm{OU}}\Delta))/(2\rho_{\mathrm{OU}})$, where $\Delta = 0.25$ is the duration of one quarter in continuous time. Then we discretize the OU process into two states using finite-difference methods. The mean of the productivity z is normalized to one.

[23] The average income and average total labor hours are defined as $\frac{1}{2} w z_1 \int \ell_1(a) g_1(a) da + \frac{1}{2} w z_2 \int \ell_2(a) g_2(a) da$ and $\frac{1}{2} \int [\ell_1(a) + \Theta(a)] g_1(a) da + \frac{1}{2} \int [\ell_2(a) + \Theta(a)] g_2(a) da$, where $\{g_j(a)\}_{j=1}^2$ is the stationary probability density function of net wealth a for each productivity state $j \in \{1, 2\}$. We use the fact that, in the stationary distribution, exactly half of the household is at each idiosyncratic productivity state.

[24] To make the average in the numerator of (13) well defined, we drop anyone who reports zero in either question Q17ab or Q19b. Conceptually, this procedure means that we exclude respondents who are not affected by financial stress when estimating the additional \$2000's impact on financial stress. The average income appears in the denominator in (13) because we normalize the average income in our model to be 1.

which means that net assets at the level of 0.7 monthly income halves financial stress. In Section 4.3, we explored three alternative calibrations and show that the main results about how sophistication versus naivete affects the impact of financial stress are not sensitive to these alternative calibrations.

4 The Impact of Financial Stress: Saving Behavior and Wealth Distribution

In this section, we explain how financial stress affects a household's saving behavior and wealth distribution. We show that the household's sophistication versus naivete about its financial stress is an important determinant of the economic impact of financial stress. Moreover, the impact of the sophistication-naivete dimension is robust to various extensions and alternative calibration strategies. Finally, we contrast the impact of financial stress with the impact of present bias.

4.1 The Impact of Financial Stress: Sophistication versus Naivete

Sophistication. The left panel of Figure 4 plots the net flow saving function, defined as $s_j(a) \equiv ra - c_j(a) + wz_j\ell_j(a)$, for each idiosyncratic income state, $j \in \{1, 2\}$. That is, the time derivative of a (i.e., $\dot{a}$ in (2)). We compare a sophisticated stressed household with a no-stress household (by no-stress, we mean the household that does not suffer from the psychological cost of financial constraints, i.e., $\Theta(a) = 0$ for all levels of net asset a.)

Two dashed lines in the left panel of Figure 4 capture the net flow saving of the no-stress household. Consistent with the permanent income hypothesis, households in the low-income state z_1 dis-save/borrow, $s_1(a) < 0$, while households in the high-income state z_2 save, $s_2(a) > 0$.[25]

Two solid lines in the left panel of Figure 4 capture the net flow saving of sophisticated stressed households. They have a very strong extra saving motive to alleviate financial stress. Its net saving is *higher* than that of the no-stress household. This is despite the negative direct effect of financial stress on earnings.[26]

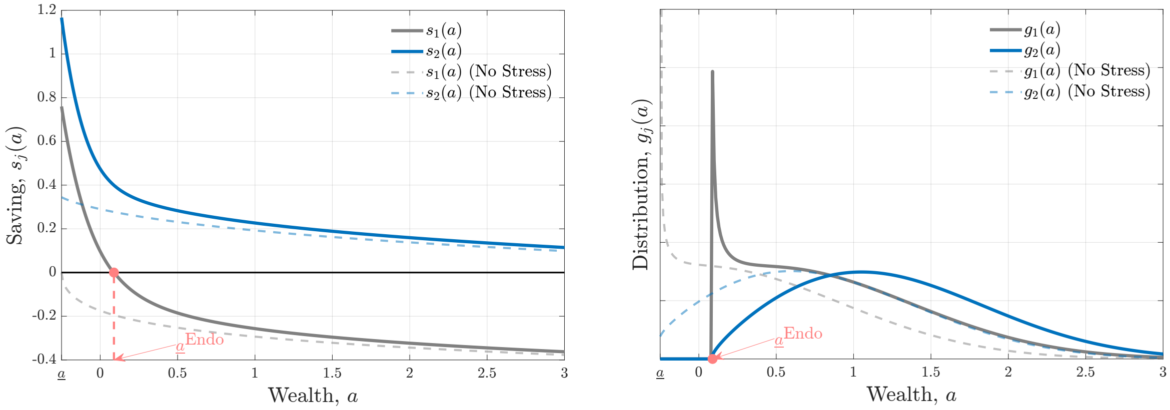
Moreover, because of this extra saving motive, even households in the low-income state z_1 are net savers ($s_1(a) > 0$) for all $a < \underline{a}^{\text{Endo}}$, where $\underline{a}^{\text{Endo}}$ is the point at which the net saving of the sophisticated stressed household with low income is zero:

$$s_1\left(\underline{a}^{\text{Endo}}\right) = r\underline{a}^{\text{Endo}} - c_1\left(\underline{a}^{\text{Endo}}\right) + wz_1\ell_1\left(\underline{a}^{\text{Endo}}\right) = 0. \tag{14}$$

[25] The net saving $s_j(a)$ decreases with net asset a because the household is impatient ($r < \rho$) and the precautionary saving motive (driven by the potential for binding financial constraints in the traditional sense, as in Carroll (1997) and Gourinchas and Parker (2002), rather than financial stress) decreases with net asset a.

[26] Specifically, there are two reasons why a sophisticated stressed household's net saving is higher than that of a no-stress household: the extra saving motive in (8), and the extra labor supply motive in Figure 11.

Figure 4: Saving Behavior and Stationary Wealth Distribution (Sophistication).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress, and the solid lines capture the case with financial stress under sophistication.

In other words, there is no poverty trap for sophisticates. No matter the idiosyncratic income state, all sophisticated stressed households are net savers around the financial constraint. They all save out of the financial constraint in the stationary wealth distribution illustrated in the right panel of Figure 4.

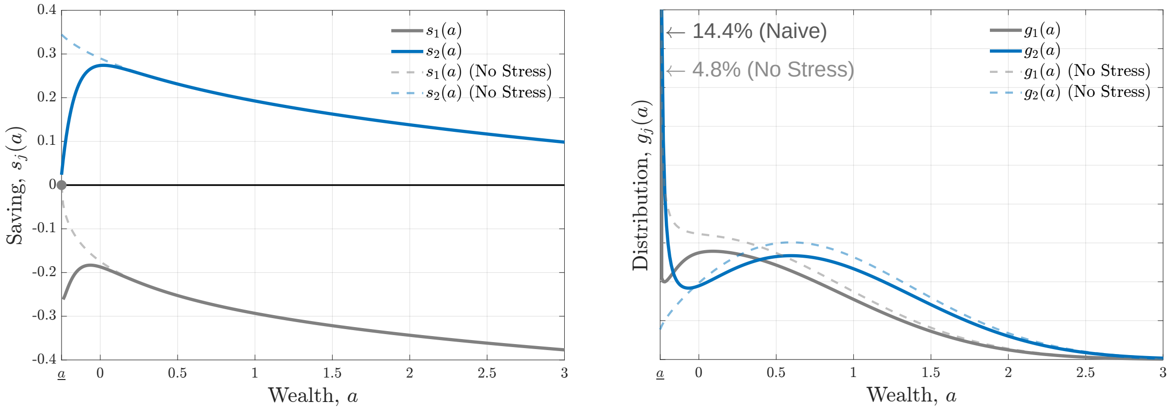
Specifically, the right panel of Figure 4 plots the stationary probability density function of net wealth $g_j(a)$ for each productivity state $j \in \{1,2\}$.[27] We compare sophisticated stressed households with the no-stress benchmark. Consistent with the no-poverty-trap discussion above, the extra saving motive for sophisticated stressed households is so strong that *none* of them are close to the financial constraint $\underline{a}$. The wealth level $\underline{a}^{\text{Endo}}$, where the net saving $s_1\left(\underline{a}^{\text{Endo}}\right)$ in equation (14) is zero, serves as an endogenous lower bound on wealth in the stationary wealth distribution for the sophisticated stressed households.

Naivete. Now we turn to the case of naivete. The left panel of Figure 5 plots the net flow saving function $s_j(a)$ for each productivity state. We compare naive stressed households with no-stress households.

Two solid lines in the left panel of Figure 5 capture the net flow saving of naive stressed households. Naive stressed households do not have the extra saving motive. They have a *lower* net saving than no-stress households, because of the negative direct effect of financial stress on earnings. Naifs' lower net saving in the left panel of Figure 5 contrasts with sophisticates' higher net saving in Figure 4. Finally, it is worth noting that the gray dot in the left panel of Figure 5 (and similar figures in the rest of the paper) captures that the net saving $s_1(\underline{a})$ is zero for a low-productivity naif exactly at the constraint $\underline{a}$. This ensures that the financial constraint in (3)

[27] The stationary probability density function of net wealth $\{g_j(a)\}_{j=1}^2$ can be found through the Kolmogorov forward equation as in Achdou et al. (2022): $0 = -\frac{d[s_j(a)g_j(a)]}{da} - \lambda_j g_j(a) + \lambda_{-j} g_{-j}(a)$ for $j \in \{1,2\}$.

Figure 5: Saving Behavior and Stationary Wealth Distribution (Naivete).



Notes: The left panel plots the net saving function $s_j(a)$, and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress, and the solid lines capture the case with financial stress under naivete.

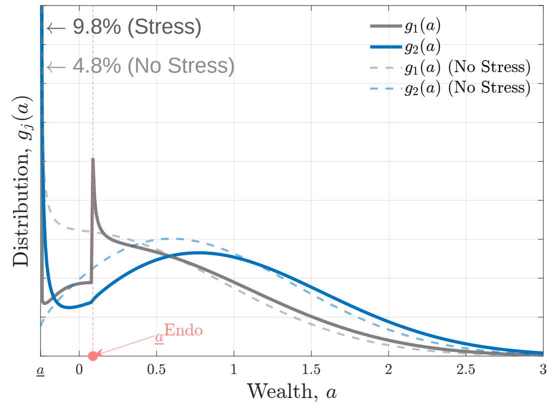
is not violated. Such a jump in the net saving function $s_1(a)$ exactly at the constraint is standard for naive households (Harris and Laibson, 2013; Maxted, 2023).

The right panel of Figure 5 plots the stationary wealth distribution. We compare naive stressed households with the no-stress benchmark. Financial stress together with naivete significantly increases the proportion of financially constrained households. Even in the context of the one-asset model here, we are able to obtain a significant share of households at their financial constraints (14.4%). This resolves one shortcoming of one-asset models: too few financially constrained households (Krusell and Smith, 1998; Kaplan, Moll and Violante, 2018). In sum, financial stress and naivete together generate a psychology-based theory of poverty traps.

Stationary wealth distribution with a mixture of sophisticates and naifs. We now analyze the stationary wealth distribution of our model with a mixture of naifs and sophisticates. It is well known that directly differentiating sophisticates from naifs is challenging (Heidhues and Strack, 2021; Carrera et al., 2022; Allcott et al., 2022). We henceforth resort to a more indirect approach to calibrate the proportion of sophisticates. That is, we choose the proportion of sophisticates to match the share of households at their financial constraints in the stationary wealth distribution with the share of households in our sample reporting that they are severely financially constrained and cannot pay the $2,000 expenses (9.8%). This leads to a proportion of 32.2% of sophisticates. Figure 6 plots the stationary wealth distribution. The main lesson is that all households at their financial constraints are naifs. Sophisticates, instead, save out of their financial constraints.

In Supplementary Appendix F, we also consider an alternative calibration strategy, leveraging a supplementary survey question about the top reasons for saving, to calibrate the proportion of sophisticates, which leads to similar results as in Figure 6 (a proportion of 26.4% of sophisticates).

Figure 6: Stationary Wealth Distributions with a Mixture of Sophisticates and Naifs.



Notes: The figure plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states with a mixture of sophiscates and naifs.

Again, all households at their financial constraints are naifs. Sophisticates, instead, save out of their financial constraints.

Together, we believe that the evidence indicates a significant proportion of households are naifs. Consistent with our findings, other evidence also suggests so in the context of financial stress. For example, Pew Charitable Trusts (2016) find that the share of Americans who feel financially stressed rises steadily over the course of the month (as cash-on-hand dwindles), and then drops sharply by 53 percent at the start of the next month when paychecks arrive. This is consistent with a significant proportion of naifs since paychecks are anticipated regular payments and sophisticates would have smoothed out the impact of financial stress evenly over a month. Bhargava and Conell-Price (2021) find that most employees reported substantial financial stress about their current financial situation yet expressed optimism about achieving relief from such financial stress in the future.

4.2 Robustness and Extensions

This section verifies that the main results about how sophistication versus naivete affects the impact of financial stress are robust to our modeling choices. We maintain the parameter values in Table 5, unless specifically mentioned.

Endogenizing the amount of time/cognition spent to alleviate financial stress. The benchmark model with exogenous $\Theta(\cdot)$ and sophistication is equivalent to a model where $\Theta(\cdot)$ is chosen endogenously. Specifically, consider an infinitely-lived household with discount rate ρ and flow utility:

$$\frac{c_t^{1-\frac{1}{\sigma}}}{1-\frac{1}{\sigma}} - \varphi \frac{\left(\ell_t + \Theta_t\right)^{1+\frac{1}{\psi}}}{1+\frac{1}{\psi}} - W_{j_t}\left(a_t, \Theta_t\right), \tag{15}$$

where j_t in $\{1, 2\}$ captures the idiosyncratic income state at t and $W_{j_t}(a_t, \Theta_t)$ captures the disutility of financial stress. The household endogenously chooses consumption c_t, labor supply ℓ_t, and Θ_t to maximize its expected discount utility, subject to the budget constraint (2), the financial constraint (3), and the transition intensity between idiosyncratic states. This specification is motivated by the static model in Banerjee and Mullainathan (2008), where the household can endogenously choose to spend time/cognition Θ_t to alleviate disutility of financial stress $W_{j_t}(a_t, \Theta_t)$.[28] Proposition 7 in Online Appendix C.2 shows the equivalence between this model of endogenous choice and our baseline model with exogenous $\Theta(\cdot)$. That is, there exists a disutility function $\{W_j(a, \Theta)\}_{j=1}^{2}$ such that the household problem with endogenously chosen Θ, (15), leads to the same optimal consumption and labor supply $\{c_j(a), \ell_j(a)\}_{j=1}^{2}$ as the household problem with exogenously decreasing stress function $\Theta(\cdot)$ under sophistication.

Partially productive during hours affected by financial stress. In the main analysis, households are unproductive during hours affected by financial stress. Here, we consider an extension where this assumption is relaxed and households are partially productive during hours affected by financial stress. That is, the household budget constraint (2) becomes

$$\dot{a}_t = ra_t - c_t + wz_t (\ell_t + \chi\Theta(a_t)), \tag{16}$$

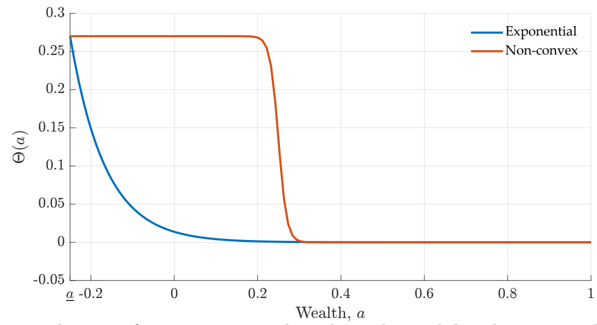
where χ captures the productivity during hours affected by financial stress, and the baseline analysis is nested with $\chi = 0$. In Online Appendix C.3, we study the case with $\chi = 0.5$, i.e., households are half as productive during hours affected by financial stress. Other parts of the model are the same as in the main analysis. Figures C.1 and C.2 show the main results on sophistication versus naivete hold. The only difference from the main analysis is that the impact of financial stress is somewhat more limited. It is also worth noting that the calibration in Online Appendix C.14, based on the estimates of Kaur et al. (2022) regarding the effect of financial stress on earnings, is agnostic about the value of χ.

Multiplicative productivity loss. We consider a robustness check where the impact of financial stress takes the form of a multiplicative productivity loss. That is, the flow utility function in equation (1) takes the standard form of $u(c_t, \ell_t) = c_t^{1-1/\sigma}/(1-1/\sigma) - \varphi\ell_t^{1+1/\psi}/(1+1/\psi)$ and the budget in equation (2) becomes

$$\dot{a}_t = ra_t - c_t + wz_t [1 - \Theta(a_t)] \ell_t, \tag{17}$$

[28] This model is also similar to Becker and Murphy (1988), where the decision maker can spend costly resources to alleviate addiction.

Figure 7: A Non-convex Stress Function



Notes: The blue line shows the exponential stress function in our benchmark model. The orange line plots a non-convex stress function $\Theta(a)$. Equations (C.4) and (C.5) in Online Appendix C provide the exact functional form.

which features a multiplicative productivity loss driven by financial stress. Other parts of the model are as in the main analysis. Figures C.3 and C.4 in Online Appendix C.4 modify Figures 4 and 5. Sophisticates' saving behavior and wealth distribution are similar to the main analysis. Naifs still fall into the poverty trap, but in an extreme fashion: all naive stressed households are at the financial constraint. This is because the multiplicative productivity loss significantly decreases incentives to work and hence earnings at the financial constraint. As a result, even households in the high-income state z_2 have negative net savings in the neighborhood of the financial constraint.

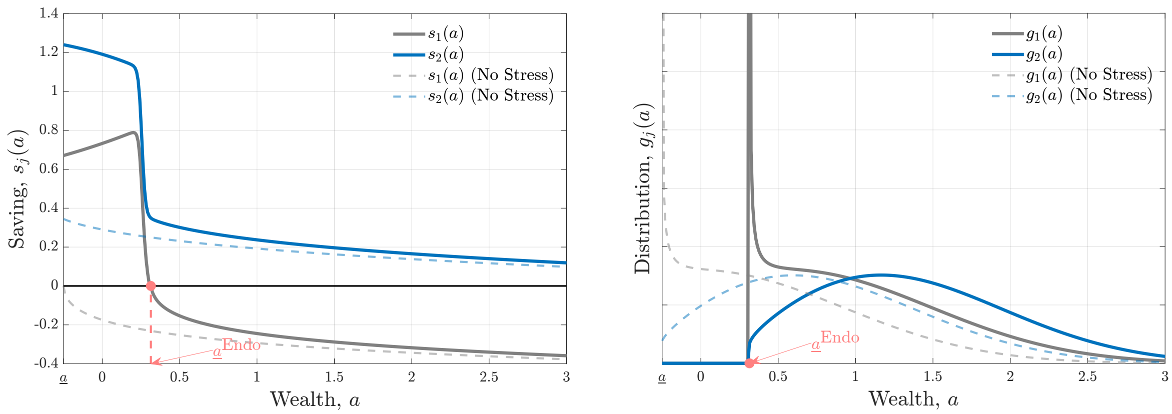
Alternative functional forms of stress: more difficult to save out of the financial stress region. One may wonder whether our result that sophisticates save out of the financial stress region continues to hold if it is more difficult for them to save out of the region. We consider a robustness check with a non-convex stress function $\Theta(a)$ in Figure 7, where the stress $\Theta(a)$ only starts to significantly decrease with a far away from the financial constraint $\underline{a}$ (see Online Appendix C.5 for the exact functional form). Is it impossible for a sophisticated household close to the financial constraint $\underline{a}$ to accumulate enough savings to be out of the financial stress region?

Figure 8 shows that sophisticates still save out of the financial stress region and that there are no sophisticates at the financial constraint in the stationary wealth distribution. To see this, the sophisticated household's Euler equation in (8) implies that their consumption only starts to increase at wealth levels with a high $\Theta'(a)$, away from the financial constraint. Close to the financial constraint $\underline{a}$, the sophisticated household's consumption is low and its net saving is high as in the left panel of Figure 8. This is why sophisticates still save out of the financial stress region.[29,30]

[29]One way to generate a poverty trap under sophistication is to introduce indivisibility in technology choice. For example, this can be a discrete choice about whether to pay a fixed cost to invest in human capital as in Galor and Zeira (1993). However, such a poverty trap is not robust to income uncertainty, as explained in Acemoglu (2008) (Chapter 21.6).

[30]Naifs still fall into the poverty trap with the non-convex stress function $\Theta(a)$. See Online Appendix C.5.

Figure 8: Saving Behavior and Stationary Wealth Distribution (A Non-convex Stress Function under Sophistication).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under sophistication. The stress function $\Theta(a)$ is non-convex as specified in equations (C.4) and (C.5) of Online Appendix C.

Alternative channels of financial stress: stress spending. We study an alternative impact channel of financial stress through spending. As our survey question Q20 suggests, households may spend money on items that they would not buy if they were not financially stressed. This is called "stress spending" in Credit Karma (2017) and CNBC (2022), i.e., "impulsively shopping to help deal with feeling anxious or stressed out."[31] In this case, the utility function in equation (1) is $u(c_t, \ell_t) = c_t^{1-1/\sigma}/(1-1/\sigma) - \varphi \ell_t^{1+1/\psi}/(1+1/\psi)$ and the budget in equation (2) becomes

$$\dot{a}_t = ra_t - c_t - C^{\Theta}(a_t) + wz_t\ell_t, \tag{18}$$

where $C^{\Theta}(a_t)$ captures this type of stress spending, with the key property that it does not directly enter the utility. In Online Appendix C.6, we use the survey responses to Q20 to calibrate $C^{\Theta}(a_t)$ and study the impact of financial stress through stress spending. Figures C.6 and C.7 show that sophisticates still save out of financial stress states while naifs still fall into the poverty trap ("cycle of stress spending" in Credit Karma, 2017).

Alternative channels of financial stress: transition intensity between idiosyncratic income states. Instead of directly affecting labor earnings, financial stress can impact transition intensity between different idiosyncratic income states. That is, a stressed household is more likely to transition from the high-income state to the low-income state and is less likely to transition from the low-income state to the high-income state. This case better captures salaried workers: because financial stress affects their performance, a stressed worker may face a lower chance of

[31]Credit Karma (2017) find that more than half (52 percent) of respondents have impulsively shopped to deal with feelings of stress, anxiety, or depression.

being promoted to a higher-salary job and a higher chance of being demoted to a lower-salary job.

To capture this intuition in the context of our model, in Online Appendix C.7, we assume that the transition intensity from the low-income state z_1 to the high-income z_2 is given by $\lambda - \bar{\lambda} e^{-\alpha(a_t - \underline{a})}$, while the transition intensity from z_2 to z_1 is given by $\lambda + \bar{\lambda} e^{-\alpha(a_t - \underline{a})}$. Other parts of the model are identical to those in the main analysis. We calibrate $\overline{\lambda}$ by setting it to $\lambda\bar{\Theta}$, where $\bar{\Theta}$ is the same as in the main analysis in Section 3.4. This means that, at the financial constraint, the maximum impact of financial stress on the transition intensity is proportional to the maximum impact of financial stress on time and cognition available for productive work in the benchmark model. The calibration of α and other parameters are identical to those in the main analysis.

Figure C.8 in Online Appendix C.7 shows that sophisticates' saving behavior and wealth distribution are very similar to those in the main analysis. For naifs in Figure C.9, financial stress does not directly affect their saving behavior anymore because financial stress does not directly affect their current labor earnings and does not prompt any extra saving motive. However, financial stress makes naifs more likely to be in the low-income state and eventually lowers their wealth. In fact, the stationary wealth distribution for naive stressed households is very similar to the main analysis in Figure 5. In other words, even if financial stress only affects the transition intensity between different idiosyncratic income states, naive stressed households still fall into the poverty trap.

Alternative channels of financial stress: quality of decisions and degree of sophistication. A key theme of the scarcity literature is that financial stress can lead to worse economic decisions by crowding out valuable cognitive resources (Mani et al., 2013; Mullainathan and Shafir, 2013; Haushofer and Fehr, 2014; Kansikas, Mani and Niehaus, 2023). In the environment discussed here, we can capture this channel by allowing financial stress to impact households' probability of being sophisticated, which in turn affects the quality of consumption and saving decisions. Specifically, in Online Appendix C.8, we expand upon our baseline environment by letting households stochastically transition between states of sophistication and naivete. The intensity of these transitions is influenced by financial stress. That is, a stressed household is more likely to transition from being sophisticated to being naive, and is less likely to transition from being naive to being sophisticated. Details on the model specification and calibration can be found in Online Appendix C.8.

Figure C.10 in Online Appendix C.8 plots the net flow saving of sophisticates and naifs and demonstrates that the main results regarding how sophistication versus naivete impacts the effect of financial stress continue to hold. Sophisticates still save out of financial stress states, now also because they understand that higher saving reduces their likelihood of becoming naive, thereby improving the quality of their future consumption and saving decisions. Naive households, on the other hand, lack this additional saving motive, have lower net savings compared to no-stress households, and can fall into poverty traps. The stationary wealth distribution in Figure C.11 is similar to the case with a mixture of sophisticated and naifs in Figure 6. A significant share of households are at their financial constraints (14.7%), and almost all households at their financial constraints are naifs.

Other extensions and robustness checks. We verify that the main lessons—that sophisticates save out of financial stress states while naifs may fall into poverty traps—remain true in the following extensions: i) under different elasticities of intertemporal substitution ($\sigma = 0.5$ or $\sigma = 2$ instead of $\sigma = 1$) in Online Appendix C.9; ii) under different borrowing and saving interest rates as in Kaplan, Moll and Violante (2018) in Online Appendix C.10; iii) under an endogenous interest rate r as in Huggett (1993) and Achdou et al. (2022) in Online Appendix C.11; iv) under an alternative stress function $\Theta(a)$, which decreases with net wealth a up to a point, after which it equals zero, in Online Appendix C.12.

4.3 Alternative Calibration Strategies

We explore three alternative calibrations of the financial stress function $\Theta(a)$. First, we calibrate $\left(\bar{\Theta}, \alpha\right) = (0.29, 15.5)$ based on the restricted sample of respondents who pass all attention checks (see Supplementary Appendix D). Second, instead of using within-subject variation based on hypothetical questions Q19a and Q19b, we use between-subject variation based on how respondents' hours distracted by financial stress (question Q17ab) depend on their financial situations (question Q9). This cross-sectional approach is explained in detail in Online Appendix C.13 and leads to $\left(\bar{\Theta}, \alpha\right) = (0.26, 1.1)$. Third, we use the estimates in Kaur et al. (2022) to calibrate $\left(\bar{\Theta}, \alpha\right) = (0.26, 5.25)$. As further explained in Online Appendix C.14, Kaur et al. (2022) estimate the effect of an interim payment on Indian manufacturing workers' hourly earnings by the status of financial constraints. This calibration based on the measured effect of financial stress in a real-life situation is conceptually distinct from calibration based on our survey measures.

The main results about how sophistication versus naivete affects the impact of financial stress are not sensitive to these alternative calibrations. The maximum level of financial stress at the financial constraints, $\bar{\Theta}$, is remarkably consistent across different calibrations. Alternative calibrations lead to lower α, i.e., financial stress decreases slower with net financial assets. As explained in Online Appendix C.13, a lower α strengthens the main result that sophisticates exhibit strong extra saving motives while naifs fall into the poverty trap. Under sophistication, a lower α further increases the extra saving motive, since it takes more to save out of high financial stress states. Under naivete, a lower α leads to more constrained and stressed households in the stationary wealth distribution, since financial stress affects households over a wider range of net financial assets.

4.4 Financial Stress vs Present Bias

Does financial stress have implications similar to present bias (e.g., Strotz, 1955, and Laibson, 1997), which may also result in more households facing financial constraints? It turns out that it does not. This section highlights the key differences between the two behavioral frictions.

As noted in the introduction, the first key difference is that present bias does not depend on proximity to financial constraints and affects households at all levels of financial assets, whereas financial stress impacts only households close to constraints. By the same token, present bias does not address empirical evidence about the psychological effects of financial constraints on cognition and productive labor supply (e.g. Kaur et al., 2022).

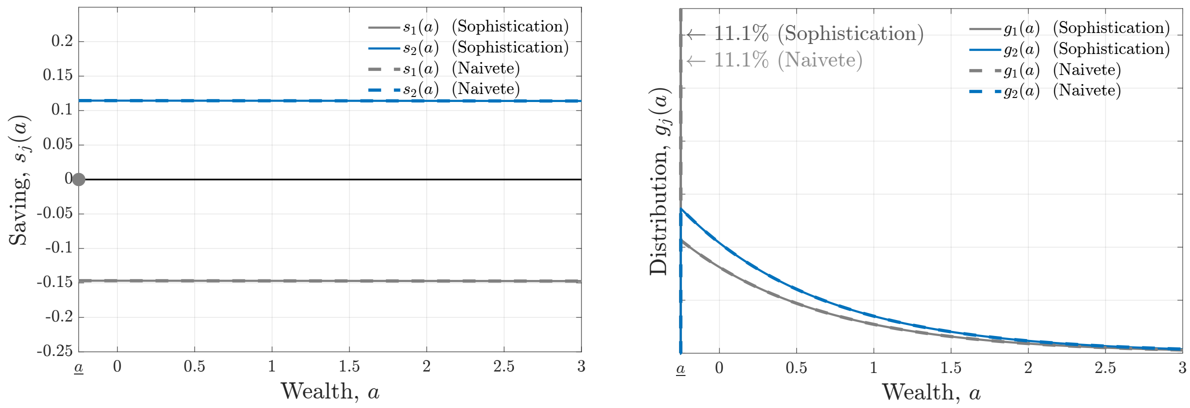
Crucially, the implications of the sophistication-naivete dimension for present bias differ significantly from its implications for financial stress. For financial stress, as illustrated above and in Online Appendix C.9, sophisticates unambiguously save more than naifs, independent of the elasticity of intertemporal substitution (EIS). Intuitively, this arises from an income effect: sophisticates understand that their future selves will be poorer due to stress and will benefit from additional savings. For present bias, the impact of the sophistication-naivete dimension instead depends on the EIS. When the EIS is above one, sophisticates save less than naifs, opposite to how the sophistication-naivete dimension impacts financially stressed households. This occurs because of the presence of a substitution effect that dominates the aforementioned income effect when the EIS is above one. According to this substitution effect, sophisticates are discouraged from saving because they understand that their future selves will exhibit present bias and consume additional savings sub-optimally (O'Donoghue and Rabin, 1999). In the case when the EIS equals one, the income and substitution effects cancel each other out, resulting in identical saving functions for sophisticates and naifs (Maxted, 2023). When the EIS is below one, the income effect dominates the substitution effect, and sophisticates save more than naifs, similar to how the sophistication-naivete dimension impacts financially stressed households.

To further illustrate, we present the model from Section 3 extended with present bias. We follow the state-of-the-art treatment in Harris and Laibson (2013) and Maxted (2023) and consider a continuous-time formulation of present bias, known as instant gratification.[32] To maintain minimal deviation from Harris and Laibson (2013) and Maxted (2023), the model introduces financial stress but excludes endogenous labor supply. Consequently, we can employ the $\widehat{u}$-agent solution method for the intra-personal game as used in the aforementioned papers.[33] The details of the model and solution are explained in Online Appendix C.15.

[32] That is, the transition rate from the present to the future equals infinity.

[33] Following Maxted (2023), we allow the borrowing limit to be flexible, meaning that the household can potentially reduce its assets below $\underline{a}$. However, this comes at such a prohibitively high cost that the household will never opt to do so. Consequently, $\underline{a}$ remains the lower bound of the stationary wealth distribution.

Figure 9: Saving Behavior and Stationary Wealth Distribution (Present Bias Only).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states in the case of present bias only. The dashed lines capture the case when the household is fully naive. The solid lines show the case when the household is fully sophisticated. The present bias parameter β is set to 0.75, the subjective discount factor ρ is set to 0.0076 to match the average liquid wealth to income ratio of 0.56 in the case of full naivete, and the productive labor supply is set to 1. All the other parameters are similar to those in Table 5.

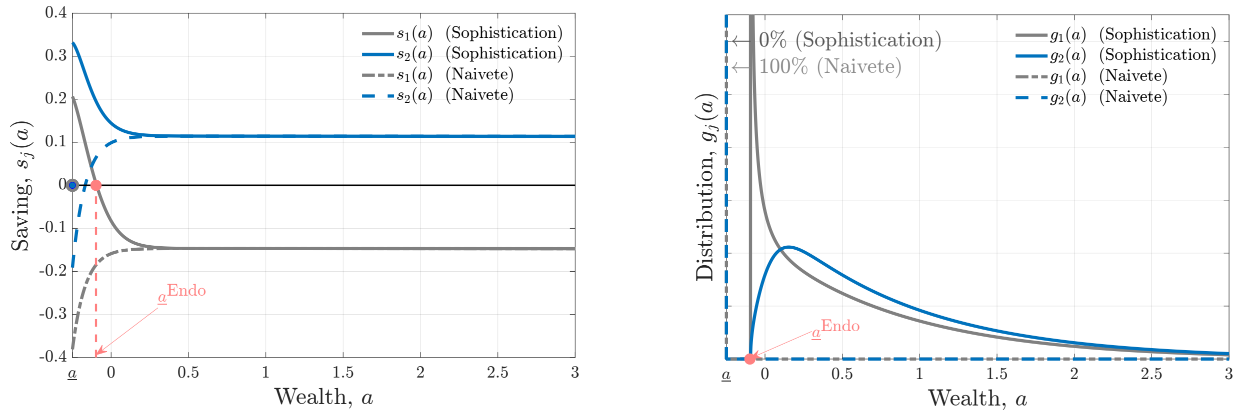
We first consider the case of present bias only, without financial stress. Figure 9 plots the net flow of savings and stationary wealth distribution for present-biased households, given the parameter values in Table 5 and the degree of present bias β of 0.75, as in Maxted (2023).[34] As in our main analysis, the EIS σ is equal to one. Figure 9 illustrates that sophisticates and naifs share *identical* saving functions and stationary wealth distributions.[35] Online Appendix C.16 study the case of present bias only with alternative elasticities of intertemporal substitution. Figure C.28 shows that when the EIS is above one, specifically $\sigma = 2$, sophisticated present-biased households save less than naive present-biased households. Figure C.27 shows that when the EIS is below one, specifically $\sigma = 0.5$, sophisticated present-biased households save more than naive present-biased households. In sum, the implication of the sophistication-naivete dimension differs from the case of financial stress.

We next present the joint implications of present bias and financial stress. Figure 10 plots the net flow saving and stationary wealth distribution for the present bias parameter β of 0.75, the subjective discount factor ρ of 0.0076, and the productive labor supply of $1 - \Theta(a_t)$, with the rest of the parameters identical to those in Table 5 (in particular, the EIS σ is equal to one.). We assume that sophisticates here are sophisticated about both financial stress and present bias, and naifs here are naive about both financial stress and present bias. With both present bias and financial stress, the implications of the sophistication-naivete dimension now resemble those of the

[34] Similar to the main analysis, we recalibrate ρ to match avg a/avg $y = 0.56$ for the naive present-bias case and keep this level of ρ, which equals 0.0076, constant across all other cases in this section. Compared to Table 5, there is no labor supply elasticity because we exclude endogenous labor supply here. We normalize the productive labor supply and w to 1.

[35] Although the saving functions appear flat, they are slightly negatively sloped. It is straightforward to show, following the analysis in Maxted (2023), that the derivative of the saving function with respect to wealth a is $ds_j(a)/da = (r\beta - \rho)/\beta$. Under our calibration, it approximately equals -0.00013.

Figure 10: Saving Behavior and Stationary Wealth Distribution (Present Bias and Financial Stress).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states in the presence of financial stress and present bias. The dashed and dashed-dotted lines capture the case when the household is fully naive. The solid lines show the case when the household is fully sophisticated. The present bias parameter β is set to 0.75, the subjective discount factor ρ is set to 0.0076 to match the average liquid wealth to income ratio of 0.56 in the case of full naivete and only present bias, and the productive labor supply is set to $1-\Theta(a)$. All the other parameters are similar to those in Table 5.

main analysis. Sophisticates save out of the financial constraint, while naifs fall into the poverty trap in an extreme fashion: all naive, stressed-and-present-biased households are at the financial constraint. With both present bias and financial stress, even households in the high-income state z_2 have negative net savings in the neighborhood of the financial constraint, contributing to the degenerate stationary distribution.

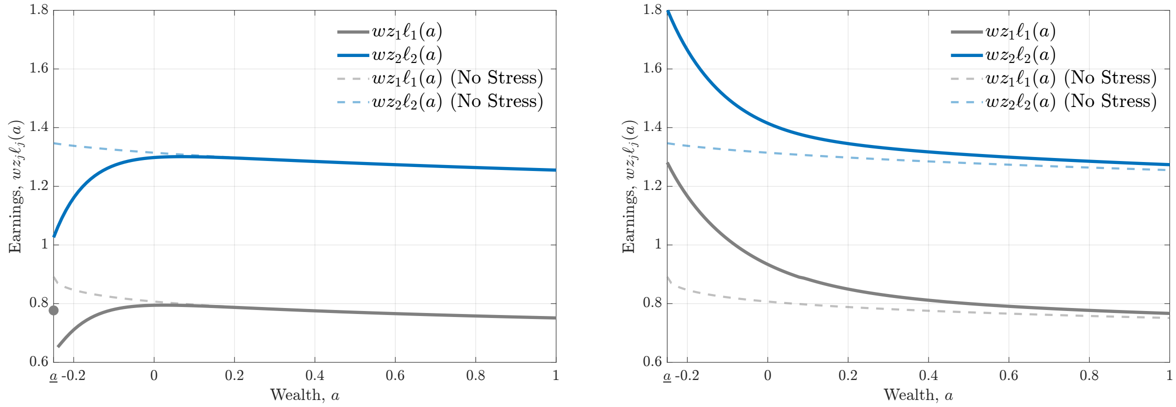
5 The Impact of Financial Stress: Labor Earnings, Welfare, and Fiscal Stimulus

This section presents three additional implications of financial stress. First, the financial stress channel dampens or reverses the counterfactual large negative wealth effect on labor earnings. Second, financial stress generates non-trivial welfare costs, especially for naifs. Finally, financial stress can make lump-sum fiscal transfers expansionary even without nominal rigidities.

5.1 Financial Stress and the Wealth Effect on Labor Earnings

Benchmark models with separable utility functions of consumption and labor predict a large negative wealth effect on labor supply and earnings. That is, since leisure is a normal good, higher wealth increases the demand for leisure, crowding out labor supply and earnings. Nevertheless, the empirical estimates of the wealth effect on labor earnings (i.e., the marginal propensity to earn) are often close to zero or even positive (Cesarini et al., 2017; Auclert, Bardóczy and Rognlie, 2023;

Figure 11: Labor Earnings: Naivete (left) vs Sophistication (right).



Notes: The left panel plots the earnings function $wz_j\ell_j(a)$ at each idiosyncratic income state for the naive stressed households (solid lines) and no-stress households (dashed lines). The right panel plots the earnings function $wz_j\ell_j(a)$ at each idiosyncratic income state for the sophisticated stressed households (solid lines) and no-stress households (dashed lines).

Banerjee et al., 2020; Kaur et al., 2022).[36]

The financial stress channel can attenuate or reverse the large negative wealth effect on labor earnings in benchmark models, helping to reconcile it with the relatively small empirical estimates. Relieving financial stress frees up cognitive capacity and time for productive work and increases productive labor supply and earnings. To see this, we take a derivative with respect to the wealth a in the optimality condition (7) for the productive labor supply $\ell_j(a)$, which holds both for naifs and sophisticates. We arrive at the following expression for the marginal propensity to earn:

$$\frac{d\left(wz_j\ell_j(a)\right)}{da} = \underbrace{-wz_j \cdot \frac{\ell_j(a)+\Theta(a)}{c_j(a)} \cdot \frac{\psi}{\sigma} \cdot \frac{dc_j(a)}{da}}_{<0,\ \text{wealth effect}} \qquad \underbrace{-wz_j \cdot \frac{d\Theta(a)}{da}}_{>0,\ \text{alleviating financial stress}} . \tag{19}$$

The first term captures the standard negative wealth effect on labor supply and earnings. The second term captures the positive wealth effect of alleviating financial stress.

The left panel of Figure 11 plots labor earnings $wz_j\ell_j(a)$ as a function of net wealth a for each productivity state $j \in \{1,2\}$. We compare a naive stressed household with a no-stress household. For a naive stressed household, the second channel in (19) dominates around financial constraints: the wealth effect on labor earnings is positive in the neighborhood of $\underline{a}$. Relieving financial stress frees up cognitive capacity and time for productive work. This positive wealth effect on labor earnings around financial constraints is consistent with the empirical evidence in Kaur et al. (2022) and Banerjee et al. (2020). Away from financial constraints, the canonical negative first term in equation (19) dominates, and the wealth effect on labor earnings turns negative. Interestingly,

[36] Labor earnings are often more clearly defined and reliably measured than labor supply, hence they are the focal point of the empirical literature.

Golosov et al. (2024) also find that, contrary to benchmark models,[37] poor households exhibit a less negative marginal propensity to earn compared to rich households.[38]

The right panel of Figure 11 compares a sophisticated stressed household's labor earnings with a no-stress household's. For a sophisticated stressed household, the first term in equation (19) dominates. The wealth effect on labor earnings is always negative, even more so than the no-stress case. Akin to the extra saving motive in Figure 4, the sophisticated stressed household has an extra incentive to work because it wants to save more to alleviate future selves' financial stress. This channel contributes to the counterfactually large and negative wealth effect on labor earnings.[39] Together, these observations further strengthen our belief that the evidence (Cesarini et al., 2017; Banerjee et al., 2020; Kaur et al., 2022) points in the direction that a significant portion of households are naive in the context of financial stress.

5.2 Welfare Costs of Financial Stress

Financial stress generates non-trivial welfare costs, especially for naifs. To show this formally, we evaluate the welfare of a stressed household based on the expected discounted value of its utility in equation (1) given its consumption $c_j(a)$, labor supply $\ell_j(a)$, and the initial state $a_0 = a$ and $z_0 = z_j$ for $j \in \{1, 2\}$:

$$\omega_j(a) \equiv \mathbb{E}\left[\int e^{-\rho t} u\left(c_j(a_t), \ell_j(a_t); \Theta(a_t)\right) dt \middle| a_0 = a, z_0 = z_j\right]. \tag{20}$$

subject to the law of motion of assets (2) and the transition of idiosyncratic states. Two points are worth clarifying. First, (20) holds under both sophistication and naivete. The differences between sophistication and naivete are summarized by decision rules $\{c_j(a), \ell_j(a)\}_{j=1}^2$. Second, under naivete, the welfare function $\{\omega_j(a)\}_{j=1}^2$ in (20) differs from the perceived value function in (10). The welfare function in (20) is evaluated from a paternalistic viewpoint based on the correct understanding of the impact of future financial stress. The perceived value function in (10) is, instead, based on the naive household's neglect of the impact of future financial stress.

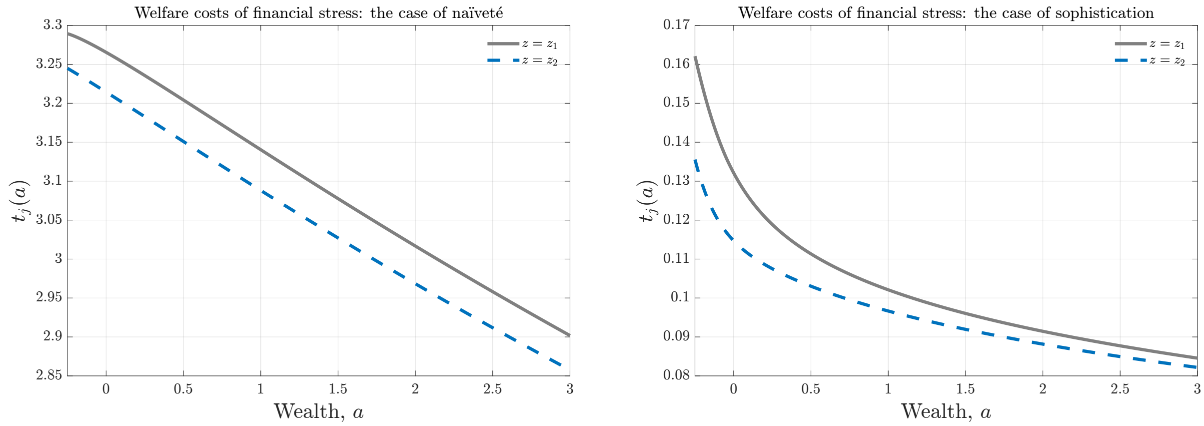
We then develop a money-metric measure of the welfare costs of financial stress. Given the

[37]Benchmark models predict that poor households exhibit a more negative marginal propensity to earn compared to rich households. This can be seen from the no-stress version of (19), $\frac{d(wz_j\ell_j(a))}{da} = -wz_j \cdot \frac{\ell_j(a)}{c_j(a)} \cdot \frac{\psi}{\sigma} \cdot \frac{dc_j(a)}{da}$, and the fact that poor households have a higher MPC $\frac{dc_j(a)}{da}$.

[38]In Table 3.1 of Golosov et al. (2024), the authors provide estimates for the marginal propensity to earn (out of \$100 lottery earnings) in different pre-win income quartiles. The estimate for the first quartile is half as negative as the estimate for the fourth quartile. It is worth noting that the estimates of marginal propensity for the first quartile remain negative, pointing to the direction that, in this context, the financial stress channel attenuates but does not reverse the large negative wealth effect on labor earnings.

[39]Based on the left panel of Figure 4, we can infer that the sophisticated stressed household's consumption $c_j(a)$ is very sensitive to a in the neighborhood of $\underline{a}$. The first term in (19) is then large and dominant.

Figure 12: Welfare Costs of Financial Stress (Naivete vs Sophistication).



Notes: The left panel plots the welfare cost of stress $t_j(a)$ at each idiosyncratic income state for the naive stressed households. The right panel does so for sophiscated stressed households.

initial state $a_0 = a$ and $z_0 = z_j$ for $j \in \{1, 2\}$, $t_j(a)$ captures the transfer needed to fully compensate the household for the impact of financial stress:

$$\omega_j (a + t_j (a)) = \omega_j^{\text{no-stress}} (a), \tag{21}$$

where $\omega_j^{\text{no-stress}} (a)$ captures the welfare in equation (20) without financial stress, i.e., $\Theta (a) = 0$.

Figure 12 plots the welfare costs of financial stress $\{t_j (a)\}_{j=1}^{2}$ under naivete and sophistication. The welfare costs of naifs' financial stress are much larger, roughly twenty times larger than sophisticates. Naivete significantly worsens the welfare costs of financial stress because naifs' consumption and labor decisions are suboptimal, leading them to fall into poverty traps and to incur negative effects from financial stress persistently. On the other hand, sophisticates, who save themselves from poverty traps, only incur negative effects temporarily, and only in the proximity to the financial constraint.

Related to Section 4.4, the welfare implications of the sophistication-naivete dimension for financial stress differ significantly from those for present bias. For present bias, the welfare impact of the sophistication-naivete dimension depends on the EIS (see the state-of-the-art treatment in Maxted, 2023). When the EIS is above one, sophisticates suffer a larger welfare cost from present bias than naifs do (O'Donoghue and Rabin, 1999), because they are discouraged from saving, as discussed in Section 4.4. When the EIS equals one, sophisticates and naifs suffer the same welfare cost from present bias. When the EIS is below one, sophisticates suffer a smaller welfare cost from present bias. For financial stress, sophisticates always suffer a smaller welfare cost than naifs, independent of the EIS.

5.3 The Financial Stress Channel of Fiscal Stimulus

A natural implication of the positive wealth effect on productive labor supply and earnings for stressed households in Section 5.1 is a new transmission mechanism for fiscal policy: a lump-sum fiscal stimulus relieves financial stress, increases productive labor supply, and boosts aggregate output. In fact, in Biden's speech about the American Rescue Plan Act of 2021, he mentioned that "so many people need help, because (the pandemic) caused an enormous *stress*," and a key role of the stimulus check is to relieve the stress caused by the pandemic.

To motivate this exercise, we ask in our survey the following question.

> *Q21b: On a scale from 1 to 10, how much did those checks alleviate your financial concerns?*

The respondents answered that these stimulus checks significantly alleviated their financial stress. Figure B.1 shows that the median answer is 5.

To illustrate how financial stress introduces a new transmission mechanism for fiscal stimulus, we first consider a general equilibrium model with a representative financially stressed agent. That is, we consider the model in Section 3 but temporarily shut down the idiosyncratic productivity shock and treat z as a constant that equals one. We introduce a lump sum fiscal transfer T_t financed by public debt b_t, where a positive T_t means a lump sum transfer and a negative T_t means a lump sum tax.

The household's budget constraint (2) becomes $\dot{a}_t = r_t a_t - c_t + T_t + w\ell_t$, while the government budget constraint and asset market clearing are given by $\dot{b}_t = r_t b_t + T_t$ and $b_t = a_t$. On the production side, we make things simple and consider a competitive representative firm with linear production technology: $y_t = \ell_t$. Finally, good market clearing implies $c_t = y_t$.

We first revisit the no-stress benchmark.

Proposition 4. *Without financial stress, i.e., $\Theta(a) = 0$ for all a, equilibrium aggregate spending, labor supply, and output paths $\{c_t, \ell_t, y_t\}_{t=0}^{+\infty}$ are independent of the paths of fiscal stimulus and aggregate debt $\{b_t, T_t\}_{t=0}^{+\infty}$.*

Proposition 4 is the famed Ricardian Equivalence result in Barro (1974). Fiscal transfers financed by public debt do not change the household's present value of its lifetime post-tax income, because an increase in public debt leads to increases in future taxes. As a result, these fiscal transfers do not affect the household's consumption and labor supply. Equilibrium aggregate spending, labor supply, and output are hence unchanged.

Now, we show how the financial stress channel breaks the Ricardian Equivalence and provides a new rationale for using fiscal transfers to stimulate the economy.

Proposition 5. *With a continuously differentiable and increasing financial stress function $\Theta(a)$, fiscal stimulus financed by public debt stimulates aggregate spending and output:*

$$\frac{dy_t}{db_t} = -\frac{\varphi^{\psi}}{\varphi^{\psi} + \frac{\psi}{\sigma} y_t^{-\frac{\psi}{\sigma}-1}} \Theta'(b_t) > 0.$$

To understand this result, note that asset market clearing $a_t = b_t$ means that the equilibrium stress level $\Theta(a_t) = \Theta(b_t)$ decreases with the level of public debt b_t. Public debt-financed stimulus checks boost private assets and alleviate financial stress. This increases productive labor supply and boosts aggregate output. Consistent with this prediction, Coibion, Gorodnichenko and Weber (2020) found that the unemployed searched harder for jobs in response to stimulus checks during the COVID-19 crisis.

We now turn to the heterogeneous-agent version of our model with idiosyncratic risk, as in the main analysis. Taking into account the taxes, the budget constraint of a household $i \in [0, 1]$ becomes $\dot{a}_{i,t} = ra_{i,t} - c_{i,t} + wz_{i,t}\ell_{i,t} + T_t$. The production side of the economy is similar to the above: the competitive representative firm produces given the linear technology: $y_t = A \int z_{i,t}\ell_{i,t} di$, where A is the productivity, which equals the wage w in equilibrium. The goods and asset market clear: $y_t = c_t$, $\int a_{i,t} di = b_t$, and the interest rate r_t adjusts to ensure market clearing as in Online Appendix C.11.

To assess the effect of an increase in public debt, we compare the aggregate output level in two stationary equilibria where the only exogenous variable that differs is the level of outstanding public debt B. In one case, public debt level $b_t = B = 0.56$, the same as the aggregate asset level in Table 5 in the main analysis. In another case, public debt rises to the new steady level of $b_t = B + \Delta B$, where $\Delta B = 0.25$ (e.g., similar to the expansion of public debt to GDP during the COVID-19 pandemic). In each case, the government keeps the level of government debt at a constant level by collecting taxes $-T_t = r_t b_t$ in every instant t. These taxes are levied uniformly across all agents in the economy.

The economy is populated by a mixture of sophisticates and naifs, as in Figure 6. All the calibration parameters (except the endogenous real interest rate) are identical to our benchmark calibration in Table 5. We find that

$$\frac{y(B + \Delta B) - y(B)}{y(B)} = 0.98\%,$$

where $y(B)$ is the level of aggregate output in a stationary equilibrium with outstanding public debt B. In other words, an increase in public debt similar to the expansion of public debt during the COVID-19 pandemic can boost aggregate output by 0.98 percent. It is worth noting that this calculation isolates *one* channel: the supply-side channel of financial stress on productive labor supply. Introducing a demand-side channel through nominal rigidities can make the effect larger.

6 Conclusion

Although financial stress is a feature of life for many people in developed and developing countries, it remains understudied in economics. To shed more light on this matter, we investigate the psychological costs of being financially constrained and their economic consequences. We document that the majority of US households experience financial stress, and that financial stress is strongly correlated with measures of financial constraints. A key innovation of our survey is to introduce questions that allow us to quantify the consequences of financial stress and map them into theory. The main bulk of our contribution is to develop a tractable model of intertemporal decisions and wealth distribution incorporating financial stress. We show that a psychology-based theory of poverty traps requires not only financial stress itself but also naivete. The financial stress channel can reverse the counterfactual negative wealth effect on labor earnings. Financial stress also has macroeconomic consequences on wealth inequality and fiscal multipliers.

Our findings suggest several avenues for future research and potential policy recommendations. For example, we focus on how financial stress crowds out valuable time and cognition from productive work, but we also lay out alternative channels for the impact of financial stress. Further exploring these channels empirically and theoretically appears to be a fertile area for future work. The key role of naivete suggests that policies such as default choices that encourage saving and the promotion of financial literacy (Lusardi and Mitchell, 2014, 2017) could be powerful antidotes to the negative consequences of financial stress. By highlighting the increasing welfare costs experienced by naive financially stressed households, our results may also diverge from standard business cycle models which imply small, if not trivial, welfare costs of business cycles (Lucas, 2003). As a result, there could be more scope for targeted countercyclical policies to ensure that recessions do not push vulnerable households into poverty traps.

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The Economics of Financial Stress

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Online Appendix

A Proofs

This Appendix section collects the proofs omitted from the main text of the paper.

A.1 Proof of Proposition 1

Differentiating the HJB equation (5) and using the envelope theorem, we obtain

$$\begin{aligned}\rho v_j'(a) =& -\varphi\left[\ell_j(a)+\Theta(a)\right]^{\frac{1}{\psi}}\Theta'(a)+rv_j'(a)+\left[ra-c_j(a)+wz_j\ell_j(a)\right]v_j''(a)\\&+\lambda\left(v_{-j}'(a)-v_j'(a)\right).\end{aligned} \tag{A.1}$$

Together with optimal consumption in (6) and the optimal labor supply in (7), we have:

$$\begin{aligned}\rho c_j^{-\frac{1}{\sigma}}(a) =& \left[r-wz_j\Theta'(a)\right]c_j^{-\frac{1}{\sigma}}(a)-\frac{1}{\sigma}\left[ra-c_j(a)+wz_j\ell_j(a)\right]c_j^{-\frac{1}{\sigma}-1}(a)\,c_j'(a)\\&+\lambda\left[c_{-j}^{-\frac{1}{\sigma}}(a)-c_j^{-\frac{1}{\sigma}}(a)\right].\end{aligned}$$

From the budget (2) and the transition intensity of the idiosyncratic productivity, we know

$$\mathbb{E}_t\left[d\left(c_j^{-\frac{1}{\sigma}}(a)\right)\right]=\left[-\frac{1}{\sigma}\left(ra-c_j(a)+wz_j\ell_j(a)\right)c_j^{-\frac{1}{\sigma}-1}(a)\,c_j'(a)+\lambda\left(c_{-j}^{-\frac{1}{\sigma}}(a)-c_j^{-\frac{1}{\sigma}}(a)\right)\right]dt.$$

Together, we have

$$-\frac{\mathbb{E}_t\left[d\left(c_j^{-\frac{1}{\sigma}}(a)\right)\right]}{c_j^{-\frac{1}{\sigma}}(a)}=\left[r-\rho-wz_j\Theta'(a)\right]dt.$$

A.2 Proof of Proposition 2

Differentiating the HJB equation (10) and using $v_j^p(a)=v_j^{\text{no-stress}}(a)$ and the envelope theorem, we get

$$\rho\left(v_j^p\right)'(a) = r\left(v_j^p\right)'(a)+\left[ra-c_j^p(a)+wz_j\ell_j^p(a)\right]\left(v_j^p\right)''(a)+\lambda\left[\left(v_{-j}^p\right)'(a)-\left(v_j^p\right)'(a)\right],$$

where $c_j^p(a)$ and $\ell_j^p(a)$ solve the HJB equation (10) and are given by the following first order optimality conditions

$$\varphi\left(\ell_j^p(a)\right)^{\frac{1}{\psi}} = wz_j\left(c_j^p(a)\right)^{-\frac{1}{\sigma}}$$
$$\left(c_j^p(a)\right)^{-\frac{1}{\sigma}} = \left(v_j^p\right)'(a).$$

From equations (7) and (9), we know that

$$c_j^p(a) = c_j(a) \quad \text{and} \quad \ell_j^p(a) = \ell_j(a) + \Theta(a).$$

Combining these insights, we obtain

$$\rho c_j^{-\frac{1}{\sigma}}(a) = rc_j^{-\frac{1}{\sigma}}(a) - \frac{1}{\sigma}\left[ra - c_j(a) + wz_j\left(\ell_j(a) + \Theta(a)\right)\right] c_j^{-\frac{1}{\sigma}-1}(a)\, c_j'(a) + \lambda\left[c_{-j}^{-\frac{1}{\sigma}}(a) - c_j^{-\frac{1}{\sigma}}(a)\right]. \tag{A.2}$$

From the budget (2) and the transition intensity of the idiosyncratic productivity, we know

$$\mathbb{E}_t\left[d\left(c_j^{-\frac{1}{\sigma}}(a)\right)\right] = \left[-\frac{1}{\sigma}\left(ra - c_j(a) + wz_j\ell_j(a)\right) c_j^{-\frac{1}{\sigma}-1}(a)\, c_j'(a) + \lambda\left(c_{-j}^{-\frac{1}{\sigma}}(a) - c_j^{-\frac{1}{\sigma}}(a)\right)\right] dt. \tag{A.3}$$

Using equation (A.3), we can rewrite equation (A.2) in a more compact form

$$\rho c_j^{-\frac{1}{\sigma}}(a) = rc_j^{-\frac{1}{\sigma}}(a) + E_t\left[d\left(c_j^{-\frac{1}{\sigma}}(a)\right)\right] - \frac{1}{\sigma} wz_j\Theta(a)\, c_j^{-\frac{1}{\sigma}-1}(a)\, c_j'(a),$$

which simplifies to

$$-\frac{\mathbb{E}_t\left[d\left(c_j^{-\frac{1}{\sigma}}(a)\right)\right]}{c_j^{-\frac{1}{\sigma}}(a)} = \left[r - \rho - \frac{1}{\sigma} wz_j\Theta(a)\frac{c_j'(a)}{c_j(a)}\right] dt.$$

A.3 Proof of Proposition 3

Part 1. Note that with a deterministic z, Proposition 1 implies

$$-\frac{dc_j^{-\frac{1}{\sigma}}(a)}{c_j^{-\frac{1}{\sigma}}(a)} = \frac{1}{\sigma}\cdot\frac{dc_j(a)}{c_j(a)} = \frac{1}{\sigma}\cdot\frac{c_j'(a)\, s(a)\, dt}{c_j(a)} = \left(r - \rho - wz_j\Theta'(a)\right) dt.$$

Because $c_j'(a) > 0$, $s(a)$ has the same sign as $r - \rho - wz_j\Theta'(a)$. Part 1 of Proposition 3 then follows from the fact $\Theta(\cdot) \in \mathcal{C}^1(\mathbb{R}^+)$.

Part 2. Note that, with a deterministic z and Proposition 2,

$$-\frac{dc_j^{-\frac{1}{\sigma}}(a)}{c_j^{-\frac{1}{\sigma}}(a)} = \frac{1}{\sigma}\cdot\frac{dc_j(a)}{c_j(a)} = \frac{1}{\sigma}\cdot\frac{c_j^{'}(a)\,s(a)\,dt}{c_j(a)} = \left[r-\rho-\frac{1}{\sigma}wz_j\Theta(a)\frac{c_j^{'}(a)}{c_j(a)}\right]dt.$$

Because $r<\rho$ and $c_j^{'}(a)>0$, $s(a)$ has the same sign as $r-\rho-\sigma^{-1}wz_j\Theta(a)\,c_j^{'}(a)/c_j(a)<0$. This proves part 2 of Proposition 3.

Part 3. See Part 1 of Proposition 1 in Achdou et al. (2022).

A.4 Proof of Proposition 4

Optimal labor supply implies

$$\varphi\ell_t^{\frac{1}{\psi}} = wc_t^{-\frac{1}{\sigma}}.$$

Technology $y_t=\ell_t$ and market clearing $c_t=y_t$ imply

$$w=1 \text{ and } c_t=\ell_t=y_t.$$

Together, we have

$$\varphi y_t^{\frac{1}{\psi}} = y_t^{-\frac{1}{\sigma}} \Longrightarrow y_t = \varphi^{-1/\left(\frac{1}{\sigma}+\frac{1}{\psi}\right)}.$$

As a result, $\{c_t,\ell_t,y_t\}_{t=0}^{+\infty}$ are independent of the path of fiscal stimulus and aggregate debt $\{b_t,T_t\}_{t=0}^{+\infty}$.

A.5 Proof of Proposition 5

Optimal labor supply and asset market clearing imply

$$\varphi\left[\ell_t+\Theta(b_t)\right]^{\frac{1}{\psi}} = wc_t^{-\frac{1}{\sigma}}.$$

Technology $y_t=\ell_t$ and market clearing $c_t=y_t$ imply

$$w=1 \text{ and } c_t=\ell_t=y_t.$$

Together, we have

$$\varphi\left(y_t+\Theta(b_t)\right)^{\frac{1}{\psi}} = y_t^{-\frac{1}{\sigma}}.$$

After taking a derivative of both sides of the last equation with respect to the level of debt b_t, we obtain

$$\frac{dy_t}{db_t} = -\frac{\varphi^{\psi}\Theta'(b_t)}{\varphi^{\psi} + \frac{\psi}{\sigma} y_t^{-\frac{\psi}{\sigma}-1}}.$$

B Additional Survey Analysis

B.1 Our Surveys Compared to the 2019 American Community Survey

As designed, we want to highlight that the individual characteristics in our full sample are close to those of the general US population as seen in the 2019 American Community Survey (ACS) along five key dimensions: gender, age, household income, education, and region. These results, which are based on the 2022 version of the ACS data (Ruggles et al., 2022), are presented in Table B.1. For example, the median income in the ACS is \$41,600, while the median in our sample is \$40,000-49,999, which we code using the midpoint of \$45,000.

Table B.1: Summary Statistics

	(1) ACS	(2) Survey: full sample	(3) Survey: restricted sample	(4) Supp. survey
Gender				
Female	0.51	0.51	0.52	0.46
Age				
18-34	0.38	0.41	0.40	0.50
35-54	0.41	0.41	0.40	0.39
55-64	0.21	0.18	0.20	0.11
Household's income				
Median income, USD	41,600	45,000	55,000	45,000
Education				
College or more	0.26	0.29	0.32	0.47
Region				
Northeast	0.18	0.17	0.17	0.16
Midwest	0.21	0.23	0.24	0.21
South	0.38	0.43	0.42	0.41
West	0.23	0.16	0.17	0.22
Observations	3,239,553	10,000	6,686	1,001

Notes: The table compares the individual characteristics of Americans in the 2019 American Community Survey (ACS) in column (1) to the characteristics in the full (column (2)) and restricted (column (3)) samples in our main survey, and the supplementary survey in Supplementary Appendix F (column (4)). The ACS statistics were computed using the full sample of unique individuals. Household income sums up the gross earnings of all (non-institutionalized) members within households, resulting in 1,276,643 household-level observations. The shares across the age groups were normalized by the mass of people in these groups so that they sum up to one (e.g., 0.38 + 0.41 + 0.21 = 1).

B.2 Financial Stress and Financial Constraints

Table B.2 shows the p-values of the test for the equality of the regression coefficients on measures of financial constraints ("Cannot pay," "Need to borrow," and "No need to borrow") in Table 3.

Table B.2: Predictors of Financial Stress: Testing the Difference (p-values).

	Qual. measure of stress (1)	(2)	Working hours distracted (3)	(4)	Hours on fin. issues (5)	(6)
H_0: Cannot pay =Need to borrow	<0.001	<0.001	<0.001	<0.001	0.030	0.019
H_0: Need to borrow =No need to borrow	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
H_0: No need to borrow =Cannot pay	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Observations	9962	9924	7428	7369	2517	2513

Notes: The table shows the p-values of the test for the equality of the regression coefficients on "Cannot pay," "Need to borrow," and "No need to borrow" in Table 3. For example, "H_0: Cannot pay =Need to borrow" tests whether the regression coefficient on the dummy variable "Cannot pay" equals the regression coefficient on the dummy variable "Need to borrow."

B.3 Predictors of Financial Stress (Normalized)

Table B.3 re-estimates the specification underlying Table 3 when the left-hand side variable is demeaned and normalized by its standard deviation. The table indicates that in all six regressions, respondents who cannot cover a $2,000 emergency expense even by borrowing are nearly one standard deviation more stressed (based on three different stress measures) compared to those who do not need to borrow to cover the emergency expense.

B.4 Stimulus Check and Financial Stress

Figure B.1 shows the histogram of answers to the following question in the full sample of our main survey.

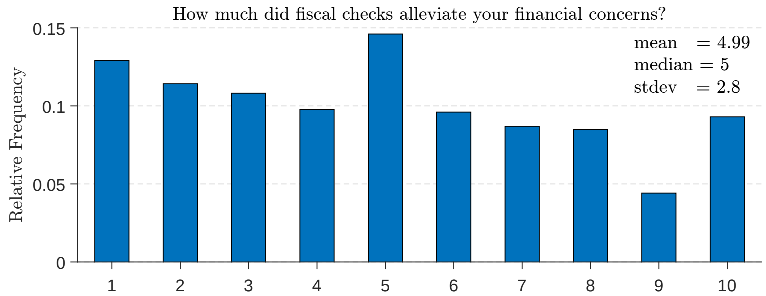
> *Q21b: On a scale from 1 to 10, how much did those checks alleviate your financial concerns?*

Table B.3: Predictors of Financial Stress (Normalized)

	Qual. measure of stress (1)	(2)	Working hours distracted (3)	(4)	Hours on fin. issues (5)	(6)
Financial Constraint (omitted: Intercept)						
Cannot pay	0.544***	0.514***	0.518***	0.411***	0.411***	0.368***
	(0.029)	(0.038)	(0.042)	(0.051)	(0.066)	(0.081)
Need to borrow	0.336***	0.300***	0.292***	0.157***	0.269***	0.216***
	(0.014)	(0.027)	(0.018)	(0.034)	(0.030)	(0.058)
No need to borrow	-0.434***	-0.381***	-0.382***	-0.414***	-0.356***	-0.301***
	(0.014)	(0.028)	(0.014)	(0.033)	(0.025)	(0.059)
Controls						
Income		-0.026*		-0.034*		0.018
		(0.013)		(0.013)		(0.027)
Net financial assets		-0.040***		-0.021***		-0.021**
		(0.003)		(0.003)		(0.006)
Non-primary earner		-0.175***		-0.112**		-0.228***
		(0.029)		(0.034)		(0.056)
Age		0.009***		-0.007***		-0.002
		(0.001)		(0.001)		(0.001)
$\text{Age}^2/100$		-0.038***		-0.039***		-0.057***
		(0.006)		(0.007)		(0.013)
Female		0.073***		0.058**		0.085*
		(0.019)		(0.022)		(0.038)
Education (omitted: Some college)						
High school or less		-0.063**		-0.001		-0.003
		(0.021)		(0.027)		(0.046)
College		-0.025		-0.043		-0.178**
		(0.026)		(0.029)		(0.051)
Post-graduate		0.054		0.047		-0.061
		(0.034)		(0.039)		(0.068)
Married		0.046*		0.065**		0.027
		(0.020)		(0.024)		(0.041)
Have at least one child		0.071***		0.114***		0.125**
		(0.020)		(0.023)		(0.041)
Have at least one parent		0.023		0.104***		0.120**
		(0.018)		(0.022)		(0.038)
Observations	9962	9924	7428	7369	2517	2513
R^2	0.166	0.208	0.131	0.168	0.108	0.149

Notes: Each column presents the results of a separate OLS regression. Robust standard errors are in parentheses. The dependent variable is demeaned and normalized by its cross-sectional standard deviation. Each regression omits an intercept because the first three dummy variables sum up to one. The income control is demeaned and divided by the mean, the net financial assets control is demeaned and divided by the mean income, and the age variable is demeaned. * indicates $p < 0.05$, ** – $p < 0.01$, *** – $p < 0.001$. For each regression, the coefficients on the regressors "Cannot pay," "Need to borrow," and "No need to borrow" are statistically different from each other.

Figure B.1: Stimulus Checks and Financial Stress.



Notes: The figure shows the histogram of the answers to question Q21b of our survey.

C Additional Model Analysis

C.1 Partial Sophistication

Here we extend the naivete case in Section 3.3 and allow for partial sophistication, similar to O'Donoghue and Rabin (1999, 2001). That is, the household partially understands the impact of future financial stress. We use parameter $\mu \in [0,1]$ to capture the degree of sophistication. That is, the current self thinks that the future impact of financial stress is captured by $\mu\Theta(a)$ instead of $\Theta(a)$. The naivete case is nested by imposing $\mu = 0$.

In the continuous-time model here, we follow Harris and Laibson (2013) and Maxted (2023) and let the transition rate from the present to the future be ∞. This captures the economic essence in a simple way. In this case, the optimal consumption policy $c_j(a)$ is determined by (C.1), trading off between current consumption and the perceived future value function $v_j^p(a)$:

$$c_j^{-\frac{1}{\sigma}}(a) = \left(v_j^p\right)'(a). \tag{C.1}$$

The HJB for the perceived value function $v_j^p(a)$ is given by

$$\rho v_j^p(a) = \max_{c,\ell}\left\{u\left(c,\ell;\mu\Theta(a)\right) + \left(ra - c + wz_j\ell\right)\left(v_j^p\right)'(a) + \lambda\left(v_{-j}^p(a) - v_j^p(a)\right)\right\}, \text{ for } j \in \{1,2\}. \tag{C.2}$$

This is effectively the same HJB as the full sophistication case in (5), but the impact of stress is given by $\mu\Theta(a)$ instead of $\Theta(a)$. Together with (C.1), we establish:

Proposition 6. *The optimal consumption under partial sophistication satisfies*

$$-\frac{\mathbb{E}_t\left[d\left(c_j^{-\frac{1}{\sigma}}(a)\right)\right]}{c_j^{-\frac{1}{\sigma}}(a)} = \left[r - \rho - wz_j\Theta'(a) + \underbrace{(1-\mu)\,wz_j\left(\Theta'(a) - \frac{1}{\sigma}\Theta(a)\frac{c_j'(a)}{c_j(a)}\right)}_{<0,\ \textit{less extra saving motive}}\right]dt, \tag{C.3}$$

and the optimal labor supply is still given by equation (7).

Compared to the Euler equation in (8), we find that partial sophistication attenuates the extra saving motive. A smaller degree of sophistication μ means a smaller extra saving motive. This is intuitive: underestimating the impact of future financial stress undercuts the household's incentive to engage in extra saving to alleviate financial stress. In the case of full naivete, i.e., $\mu = 0$, (C.3) becomes (11) in Proposition 2.

C.2 Endogenizing the Amount of Time/Cognition Spent to Alleviate Financial Stress

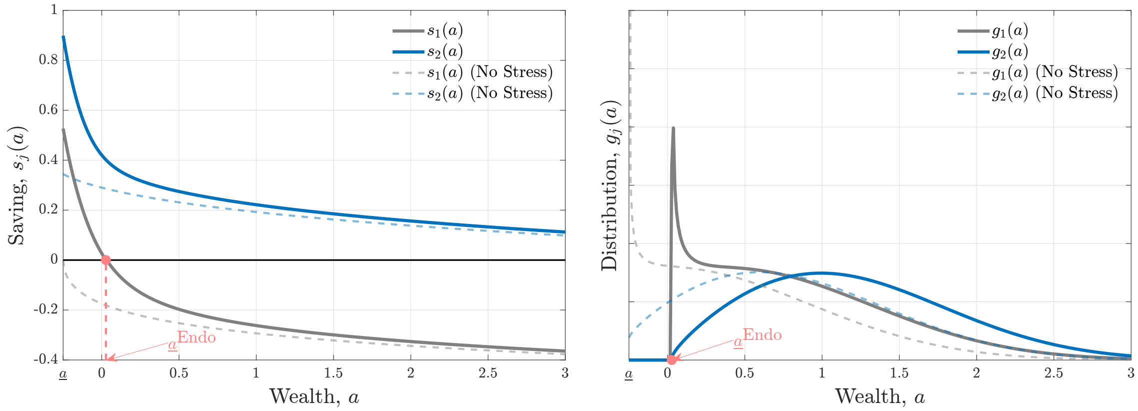
Consider an infinitely-lived household with discount rate ρ and flow utility (15). The household endogenously chooses consumption c_t, labor supply ℓ_t, and Θ_t to maximize its expected discount utility, subject to the budget constraint (2), the financial constraint (3), and the transition intensity between idiosyncratic states. The following Proposition 7 shows the equivalence between this model of endogenous choice and our baseline model with exogenous $\Theta(\cdot)$. The proof can be found in Supplementary Appendix G.

Proposition 7. *There exists a disutility function $\{W_j(a,\Theta)\}_{j=1}^{2}$ such that the household problem with endogenously chosen Θ, (15), leads to the same optimal consumption and labor supply $\{c_j(a), \ell_j(a)\}_{j=1}^{2}$ as the household problem with exogenously decreasing stress function $\Theta(\cdot)$ under sophistication.*

C.3 Partially Productive during Hours Affected by Financial Stress

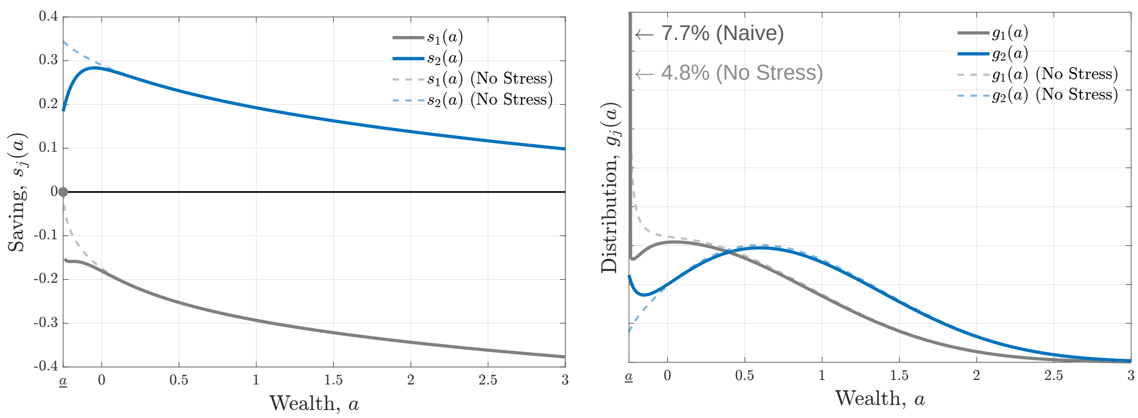
In the main analysis, households are unproductive during hours affected by financial stress. Here, we consider an extension where this assumption is relaxed and households are partially productive during hours affected by financial stress. Specifically, we study the case with $\chi = 0.5$ in (16), i.e., households are half as productive during hours affected by financial stress. We take all the calibration parameters from Table 5. As explained in the main text, Figures C.1 and C.2 re-plot Figures 4 and 5. The main lessons that sophisticates save out of financial stress states and naifs fall into the poverty trap remain to be true. The only difference from the main analysis is that the impact of financial stress is somewhat more limited.

Figure C.1: Partially Productive during Hours Affected by Financial Stress (Sophistication).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under sophistication. Households are partially productive during hours affected by financial stress (16).

Figure C.2: Partially Productive during Hours Affected by Financial Stress (Naivete).

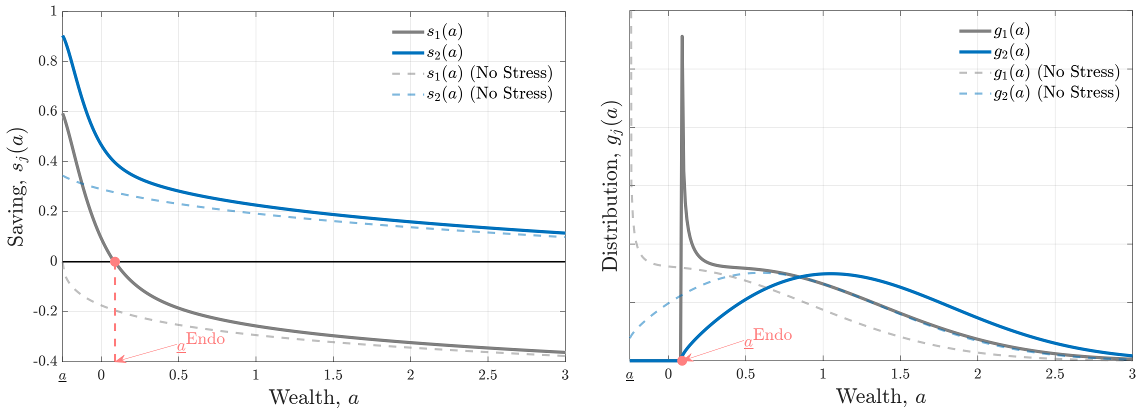


Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under naivete. Households are partially productive during hours affected by financial stress (16).

C.4 Multiplicative Productivity Loss

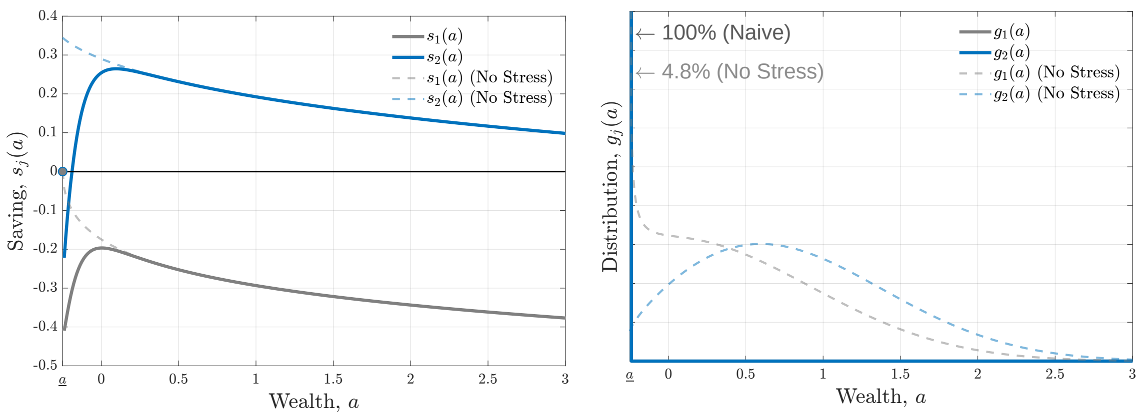
As explained in the main text, we consider a robustness check where the impact of financial stress takes the form of a multiplicative productivity loss. We postulate that the multiplicative productivity loss takes the same functional form as in equation (12) with the same parameters as in Table 5. Moreover, we assume that all the other parameters in the model are identical to those in Table 5. Figures C.3 and C.4 re-plot Figures 4 and 5. The main lessons that sophisticates save out of financial stress states and naifs fall into the poverty trap remain to be true. Naifs fall into the poverty trap in an extreme fashion: all naive stressed households are at the financial constraint. This is because the multiplicative productivity loss significantly decreases incentives to work and hence earnings at the financial constraint. As a result, even households in the high-income state z_2 have negative net saving in the neighborhood of the financial constraint.

Figure C.3: Multiplicative Productivity Loss (Sophistication).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under sophistication. The impact of financial stress takes the form of a multiplicative productivity loss as in (17).

Figure C.4: Multiplicative Productivity Loss (Naivete).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under sophistication. The impact of financial stress takes the form of a multiplicative productivity loss as in (17).

C.5 Alternative Functional Forms: More Difficult to Save out of the Financial Stress Region

The non-convex stress function $\Theta(a)$ in Figure 7 takes the following functional form:

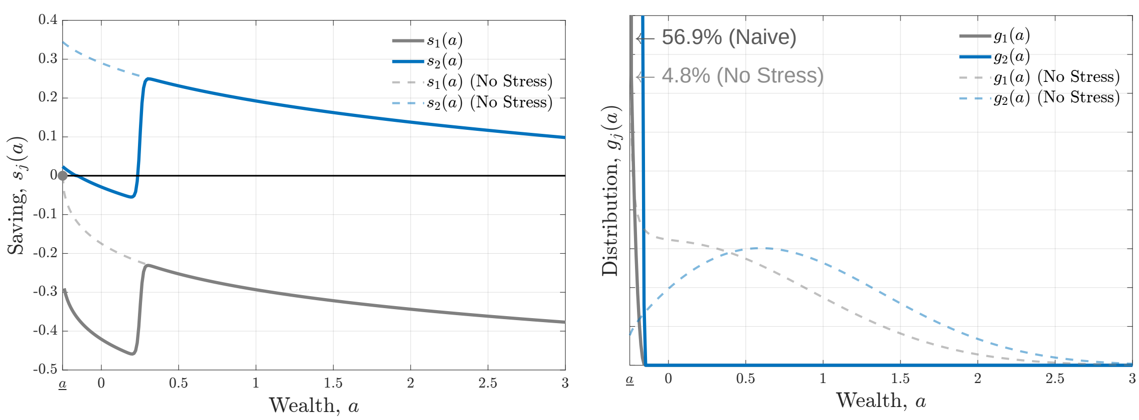
$$\Theta(a) = \begin{cases} \bar{\Theta} & \frac{a-(\underline{a}+b)}{\delta} < 0, \\ F\left(1 - \frac{a-(\underline{a}+b)}{\delta}\right), & \frac{a-(\underline{a}+b)}{\delta} \in [0,1), \\ 0 & \frac{a-(\underline{a}+b)}{\delta} \geq 1. \end{cases} \tag{C.4}$$

where $F(\cdot)$ is a normalized logistic function

$$F(x) = \left[\frac{1}{1+e^{-\beta\left(x-\frac{1}{2}\right)}} - \frac{1}{1+e^{-\beta\left(0-\frac{1}{2}\right)}}\right]\left[\frac{1}{1+e^{-\beta\left(1-\frac{1}{2}\right)}} - \frac{1}{1+e^{-\beta\left(0-\frac{1}{2}\right)}}\right]^{-1}, \tag{C.5}$$

and b is a shift parameter, δ is the width of the support of the function on which the function value $\Theta(a)$ changes, and β is the speed of change of the function. In Figure 7, we consider the case with $\overline{\Theta} = 0.27$, $b = 0.5$, $\beta = 50$, and $\delta = 0.5$. Figure 8 in the main text shows that sophisticates still save out of the financial stress region. Figure C.5 here shows that naifs still fall into poverty traps.

Figure C.5: Saving Behavior and Stationary Wealth Distribution (Non-convex Stress Function under Naivete).

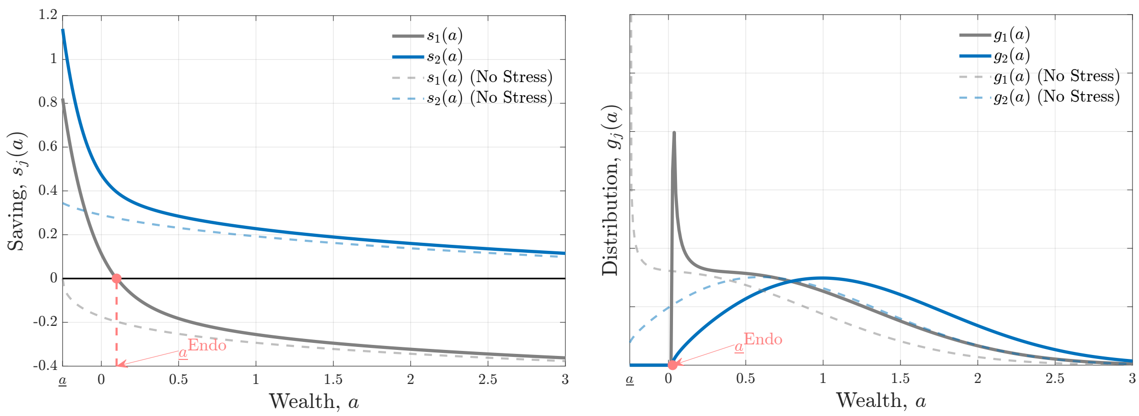


Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under naivete. The stress function takes the non-convex form as in equations (C.4)-(C.5).

C.6 Alternative Channels of Financial Stress: Stress Spending

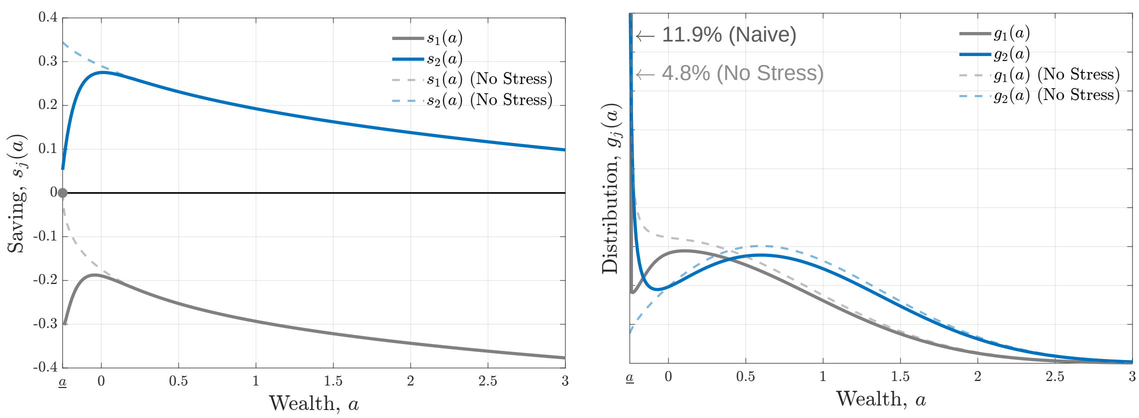
As explained in the main text, we study an alternative channel of the impact of financial stress through spending. For the calibration, we assume that $C^{\Theta}(a) = \bar{C}e^{-\alpha(a-\underline{a})}$, where α is the same as the main analysis in Table 5. We find the amount of stress spending at financial constraints $\bar{C}$ based on $\bar{C}/\text{avg } C^{\Theta}$ in Q20 $= \bar{\Theta}/\text{avg } \Theta$ in Q17a and stressed hours at financial constraints $\bar{\Theta}$ from the main analysis in Table 5. As explained in the main text, Figures C.6 and C.7 re-plot Figures 4 and 5. The main lessons that sophisticates save out of financial stress states and naifs fall into the poverty trap remain to be true.

Figure C.6: Stress Spending (Sophistication).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under sophistication. Financial stress enters the budget constraint in the form of stress spending as in equation (18).

Figure C.7: Stress Spending (Naivete).

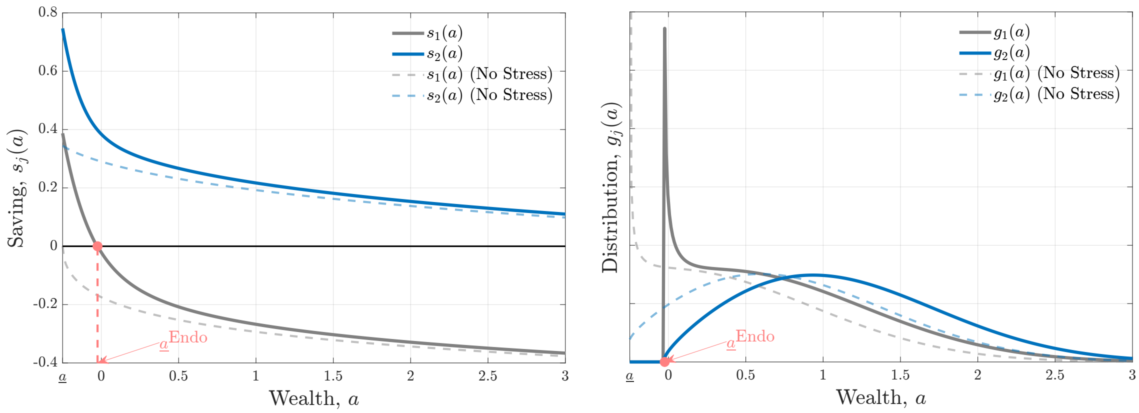


Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under naivete. Financial stress enters the budget constraint in the form of stress spending as in equation (18).

C.7 Alternative Channels of Financial Stress: Transition Intensity between Individual Productivity States

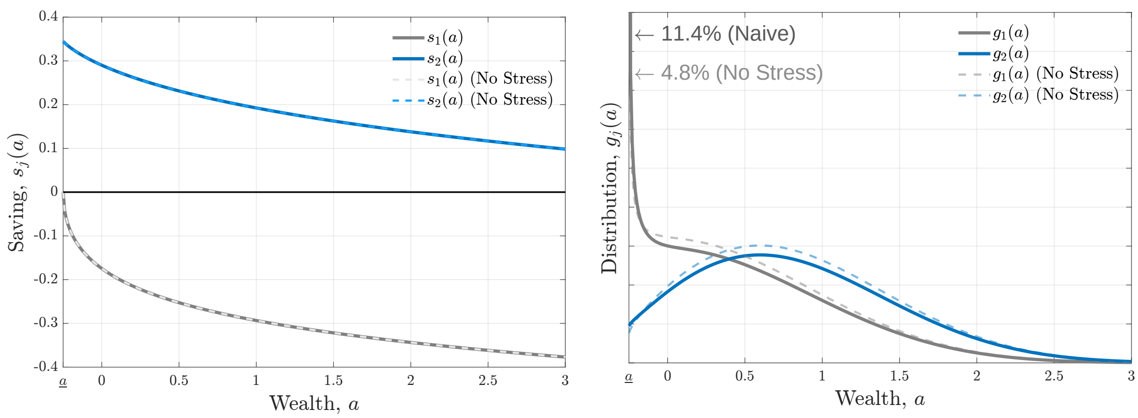
As explained in the main text, we study an alternative channel of the impact of financial stress through the impact on the transition intensity between different individual income states (z_1 and z_2). Figures C.8 and C.9 re-plot Figures 4 and 5. The main lessons that sophisticates save out of financial stress states and naifs fall into the poverty trap remain to be true.

Figure C.8: Stress Affects Transition Intensity (Sophistication).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under sophistication. In this scenario, the transition probability between income states λ depends on stress and, hence, net assets. Specifically, we assume that the transition intensity from z_1 to z_2 is given by $\lambda - \bar{\lambda}e^{-\alpha(a_t - \underline{a})}$, while the transition intensity from z_2 to z_1 is given by $\lambda + \bar{\lambda}e^{-\alpha(a_t - \underline{a})}$.

Figure C.9: Stress Affects Transition Intensity (Naivete).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under naivete. In this scenario, the transition probability between income states λ depends on stress and, hence, net assets. Specifically, we assume that the transition intensity from z_1 to z_2 is given by $\lambda - \bar{\lambda}e^{-\alpha(a_t - \underline{a})}$, while the transition intensity from z_2 to z_1 is given by $\lambda + \bar{\lambda}e^{-\alpha(a_t - \underline{a})}$.

C.8 Alternative Channels of Financial Stress: Quality of Decisions and Degree of Sophistication

Here, we expand upon our baseline environment by allowing households to stochastically transition between states of sophistication and naivete. The intensity of these transitions is influenced by financial stress. That is, a stressed household is more likely to transition from being sophisticated to being naive, and is less likely to transition from being naive to being sophisticated.

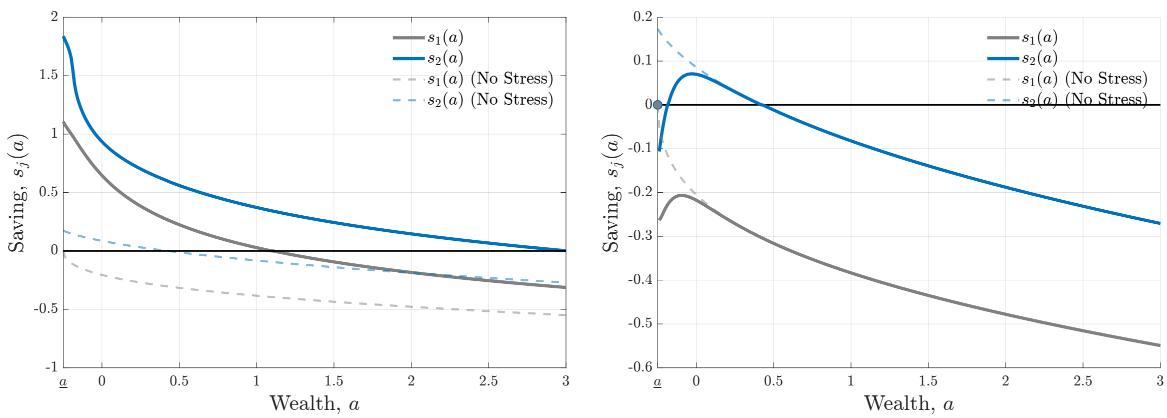
Specifically, the transition intensity between being sophisticated (s) and being naive (n) is given by

$$\mu_{sn}(a) = \mu_0 + \overline{\mu} e^{-\alpha(a-\underline{a})} \quad \text{and} \quad \mu_{ns}(a) = 1 - \mu_0 - \overline{\mu} e^{-\alpha(a-\underline{a})}, \tag{C.6}$$

as functions of current net financial assets a. Similar to Online Appendix C.7, we calibrate $\overline{\mu}$ by setting it to $\overline{\Theta}\mu_0$, where $\bar{\Theta}$ is the same as in the main analysis in Section 3.4. We calibrate μ_0 to match the share of sophisticates of 32.2% as in Figure 6. The calibration of α and other parameters are identical to those in the main analysis.[40] The right panel of Figure C.11 visualizes (C.6).

As in the main analysis, sophisticates understand the negative economic consequences of future financial stress, both in terms of crowding out future cognitive and time resources and in terms of being more likely to transition to naivety. Naifs, on the other hand, fail to internalize the negative consequences of future financial stress, making consumption and saving decisions as if there will be no financial stress in the future, similar to (9).

Figure C.10: Quality of Decisions and Degree of Sophistication: Sophistication (left) vs. Naivete (right).



Notes: Both panels plot the net saving function $s_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress, and the solid lines capture the case with financial stress (under sophistication in the left panel and under naivete in the right panel). Financial stress affects the transition intensity between sophiscates and naifs.

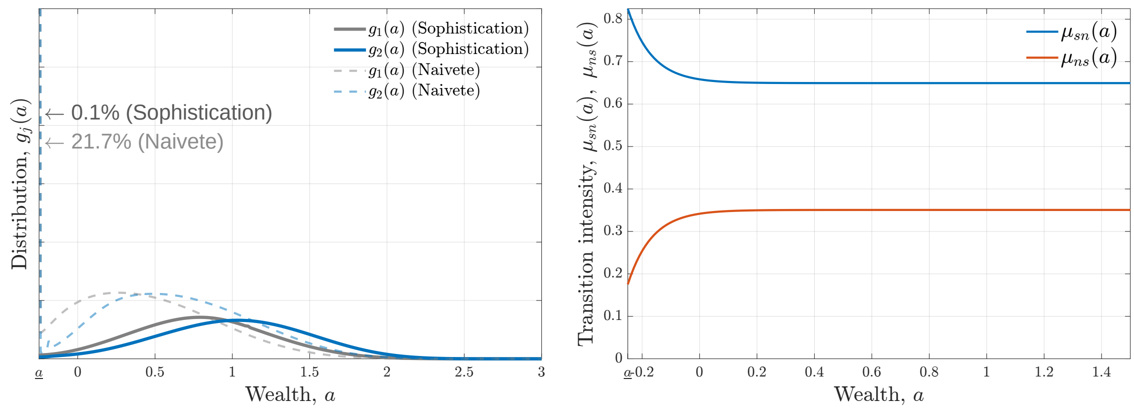
Specifically, Figure C.10 plots the net flow saving of sophisticates and naifs and the left panel of Figure C.11 plots the stationary wealth distribution.[41] The main results regarding how sophistication versus naivete impacts the effect of financial stress continue to hold. Sophisticates still save out of financial stress states, now also because they understand that higher saving reduces their likelihood of becoming naive, thereby improving the quality of their future consumption and saving decisions. Naive households, on the other hand, lack this additional saving motive, have lower net savings compared to no-stress households, and can fall into poverty traps. A significant share of

[40] ρ is recalibrated to make sure that the average wealth to average income ratio is equal to the average liquid wealth to average income ratio in the data, 0.56, as in the main analysis. w and φ are recalibrated so that average income and labor hours in our model are 1, as in the main analysis.

[41] There is a small spike in the stationary wealth distribution for households conditional on currently being naive and the high-income state z_2 near the financial constraint $\underline{a}$ (dashed blue line in the left panel of Figure C.11). This is the point where their net saving is zero (see the right panel of Figure C.10), which leads to the jump in the probability density function.

naive households (21.7%) are at their financial constraints, whereas virtually no sophisticates are. In total, 14.7% of households are at their financial constraints.

Figure C.11: Quality of Decisions and Degree of Sophistication (Stationary Wealth Distribution and Transition Intensity between Sophisticates and Naifs).



Notes: The left panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the distribution conditioning on households currently being naive, and the solid lines capture the distribution conditioning on households currently being sophisticated. The right panel plots the transition intensity between sophisticates and naifs. Financial stress affects the transition intensity between sophiscates and naifs.

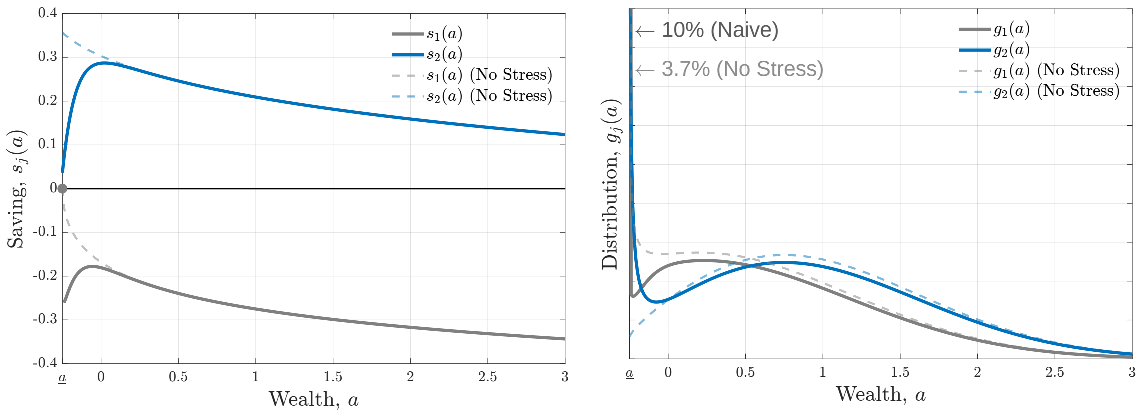
C.9 Alternative Elasticities of Intertemporal Substitution

The Section shows that the main results in Figures 4 and 5 are qualitatively unchanged if we set the elasticity of intertemporal substitution (EIS) σ to two alternative values of 0.5 and 2 instead of assuming that it equals one. The other parameters are identical to those in Table 5. The main lessons that sophisticates save out of financial stress states and naifs fall into the poverty trap remain to be true.

Figures C.12 and C.13 present the case of naive households. The saving functions and stationary wealth distribution are again similar to benchmark calibration when the EIS σ equals 1. When the EIS σ is 0.5, there are fewer households at the financial constraint compared to our benchmark calibration when the EIS σ equals 1. When the EIS σ is 2, there are more households at the financial constraint compared to our benchmark calibration.

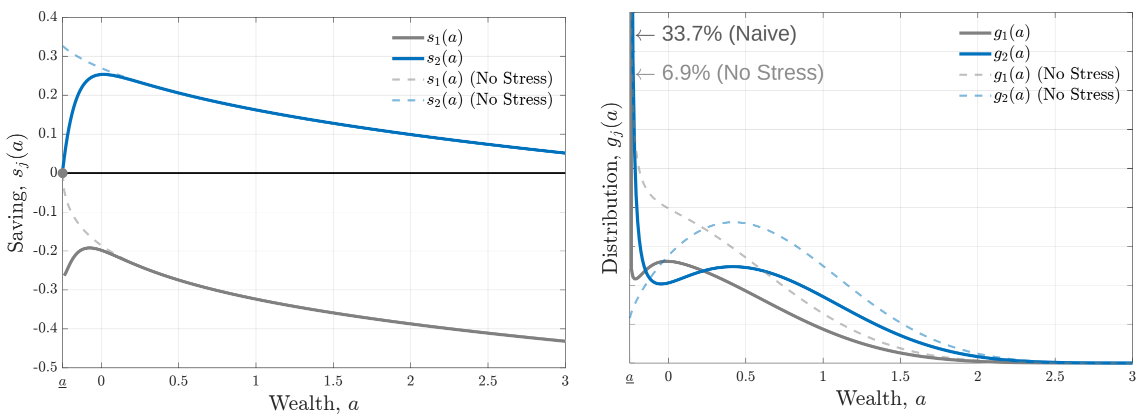
Figures C.14 and C.15 present the case of sophisticated households. The saving functions and stationary wealth distribution are again similar to benchmark calibration when the EIS σ equals 1. The endogenous borrowing limit $\underline{a}^{\text{Endo}}$ is higher in the case of a higher EIS.

Figure C.12: Alternative Elasticity of Intertemporal Substitution (Naivete): $\sigma = 0.5$.



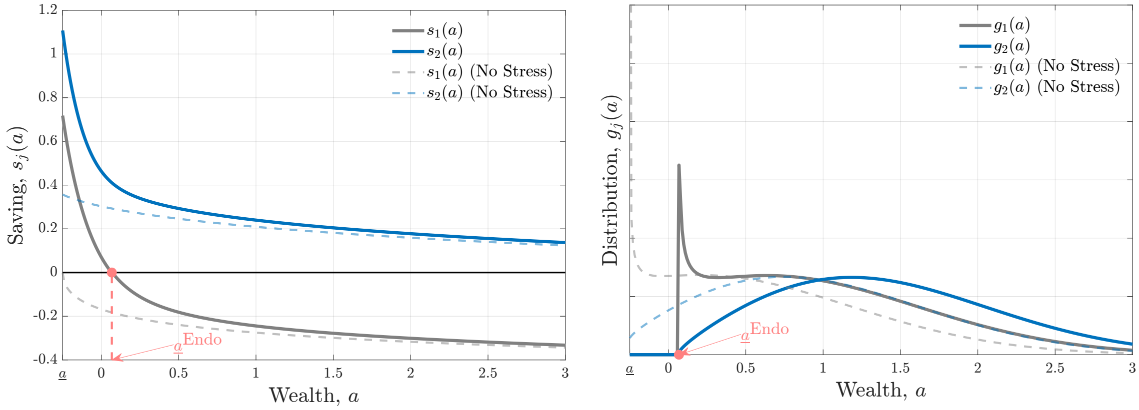
Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under naivete. The intertemporal elasticity of substitution σ equals 0.5.

Figure C.13: Alternative Elasticity of Intertemporal Substitution (Naivete): $\sigma = 2$.



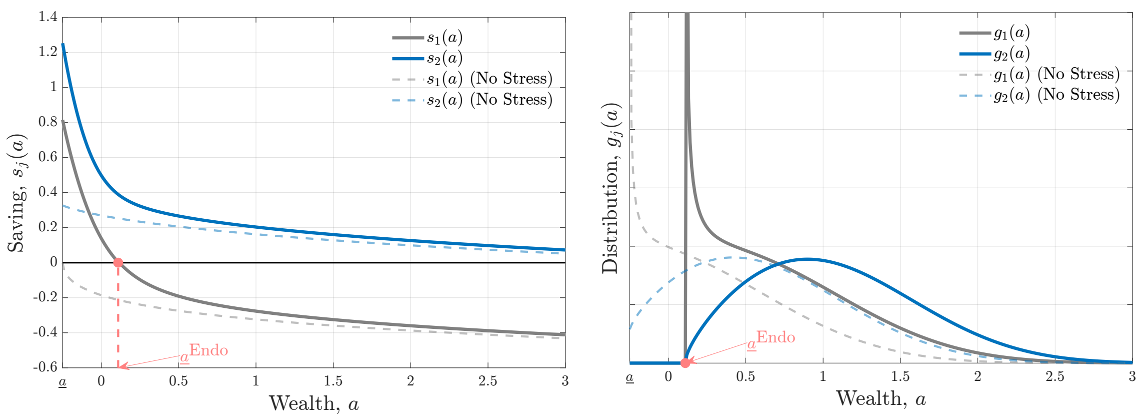
Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under naivete. The intertemporal elasticity of substitution σ equals 2.

Figure C.14: Alternative Elasticity of Intertemporal Substitution (Sophistication): $\sigma = 0.5$.



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under sophistication. The intertemporal elasticity of substitution σ equals 0.5.

Figure C.15: Alternative Elasticity of Intertemporal Substitution (Sophistication): $\sigma = 2$.



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under sophistication. The intertemporal elasticity of substitution σ equals 2.

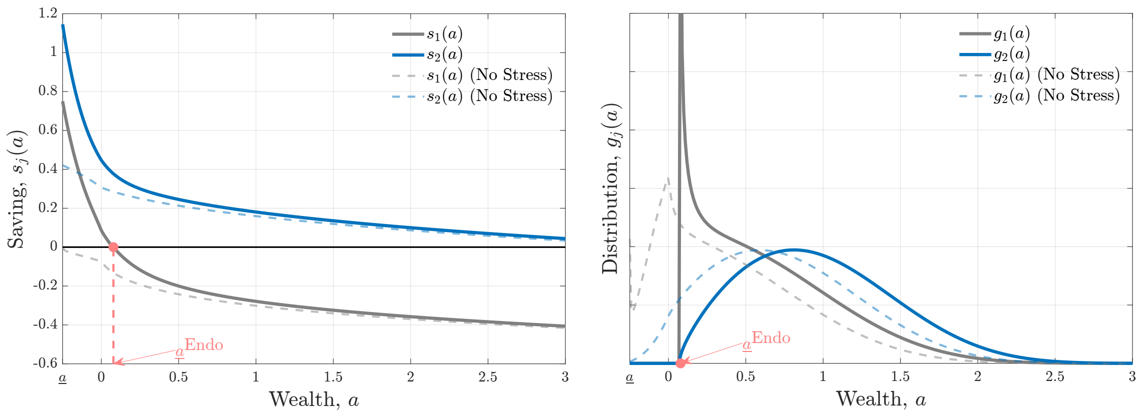
C.10 Different Saving and Borrowing Rates

Here, we consider a case where the household faces different borrowing and saving interest rates (Kaplan, Moll and Violante, 2018). That is, if households are net borrowers ($a_t < 0$), they face a higher rate $r^b = r + \kappa$, where κ is an exogenous wedge between borrowing and saving rates. A higher κ increases the saving motive (regardless of whether households are financially stressed or not) because of the standard intertemporal substitution channel. The other parameters are identical to those in Table 5.[42]

[42] ρ is recalibrated to make sure that the average wealth to average income ratio in the naivete about financial stress case is equal to the average liquid wealth to average income ratio in the data, 0.56, as in the main analysis. w and φ are recalibrated so that average income and labor hours in our model are 1, as in the main analysis.

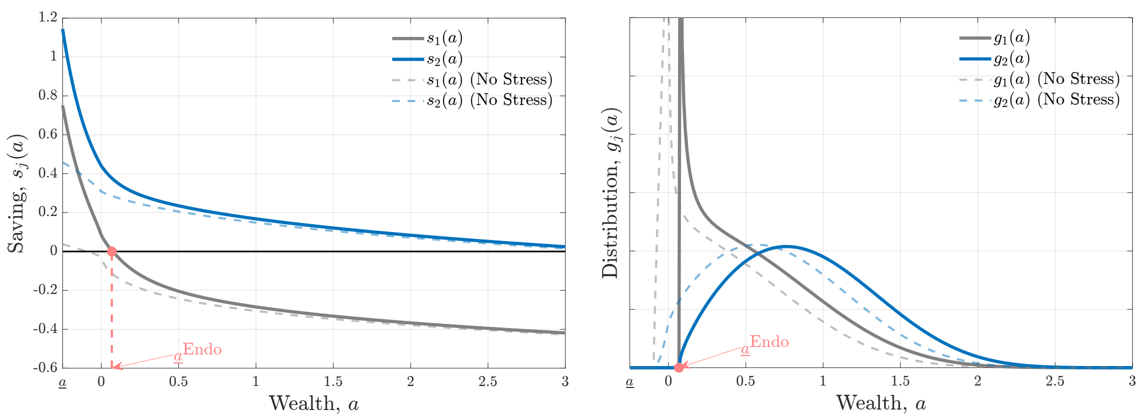
Figures C.16 ($\kappa = 4\%$) and C.17 ($\kappa = 6\%$, as in Kaplan, Moll and Violante, 2018) re-plot Figure 4 under sophistication. Our main results that sophisticates save more than the no-stress households and out of financial stress states in the stationary wealth distribution continue to hold.

Figure C.16: Different Saving and Borrowing Rates (Sophistication, $\kappa = 4\%$).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress, and the solid lines capture the case with financial stress under sophistication. Households face a borrowing rate 4% higher than the saving rate.

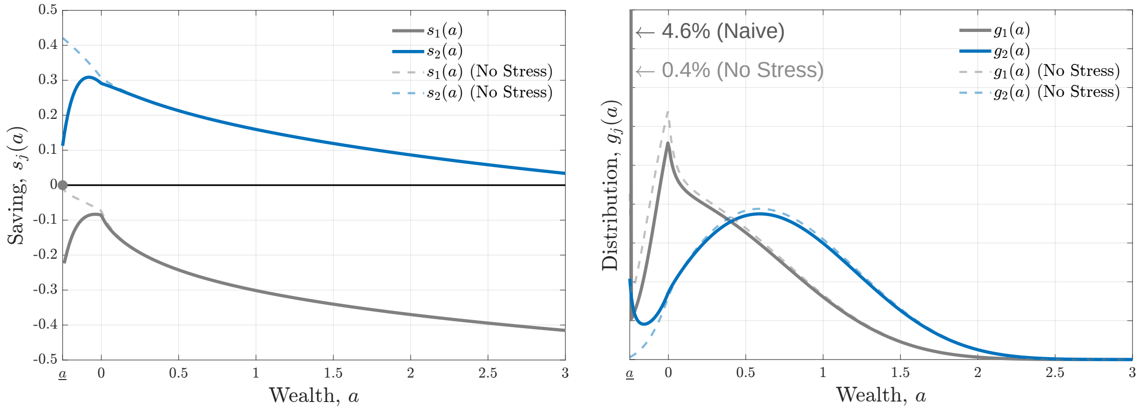
Figure C.17: Different Saving and Borrowing Rates (Sophistication, $\kappa = 6\%$).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress, and the solid lines capture the case with financial stress under sophistication. Households face a borrowing rate 6% higher than the saving rate.

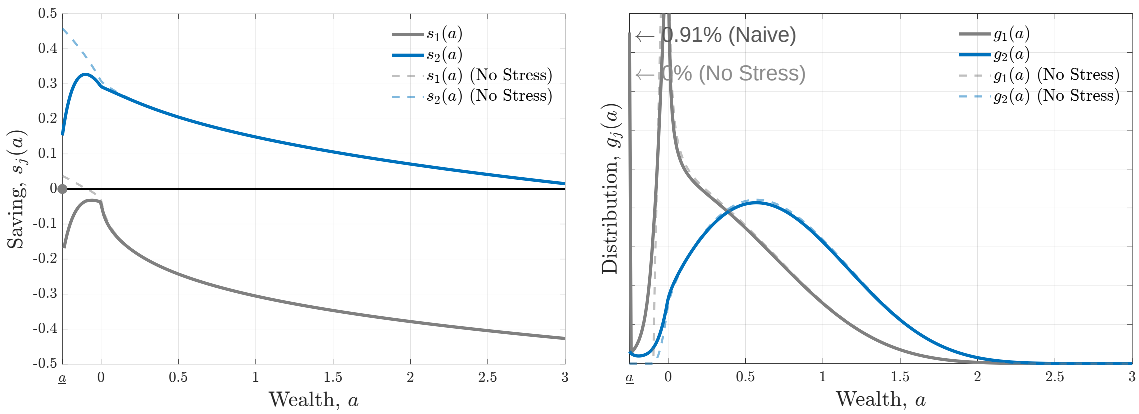
Figures C.18 ($\kappa = 4\%$) and C.19 ($\kappa = 6\%$, as in Kaplan, Moll and Violante, 2018) re-plot Figure 5 under naivete. Our main results that naifs have lower net saving compared to no-stress households continue to hold. However, since a higher κ increases the saving motive due to the standard intertemporal substitution channel, there are fewer households at financial constraints. Nonetheless, financial stress combined with naivete still significantly increases the proportion of financially constrained households compared to the no-stress case.

Figure C.18: Different Saving and Borrowing Rates (Naivete, $\kappa = 4\%$).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under naivete. Households face a borrowing rate 4% higher than the saving rate.

Figure C.19: Different Saving and Borrowing Rates (Naivete, $\kappa = 6\%$).



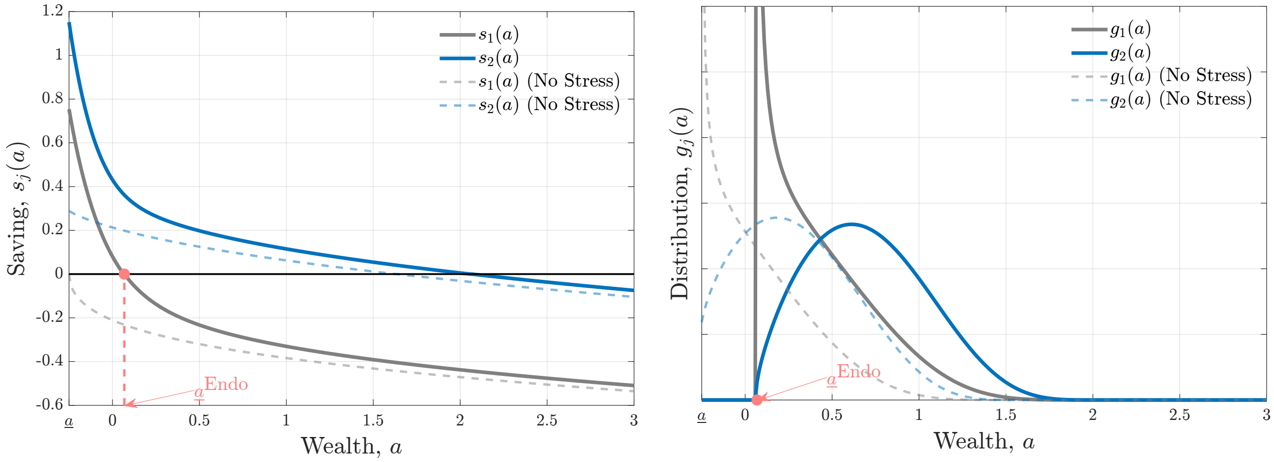
Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under sophistication. Households face a borrowing rate 6% higher than the saving rate.

C.11 Endogenous r

In the main analysis, the interest rate r is fixed. Here, we follow Huggett (1993) and Achdou et al. (2022) and endogenize the interest rate r such that the average wealth in the economy is fixed at $\int_{i\in[0,1]} a_{i,t}di = B = 0.56$, the value we use for calibrating the subjective discount factor ρ in the benchmark model in Table 5.[43] The other parameters are also identical to those in Table 5. Figure C.20 updates Figure 4 under the endogenous r, which equals 0.0027. The main lesson that sophisticates save out of the financial stress states remains true.

[43] For the naivete case, since the total wealth in the economy is already set to be 0.56 in the benchmark calibration, the endogenous interest rate r equals the exogenous interest rate r in Table 5.

Figure C.20: Endogenous Interest Rate r (Sophistication).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under sophistication. The interest rate adjusts endogenously to satisfy asset market clearing conditions.

C.12 Alternative Functional Forms of Stress: a Weakly Decreasing Function

We consider an alternative functional form of the stress function $\Theta(a)$ in (C.7), which takes the form of:

$$\sqrt{\Theta(a)} = \max\left\{\sqrt{\bar{\Theta}} - \alpha\left(a - \underline{a}\right), 0\right\}. \tag{C.7}$$

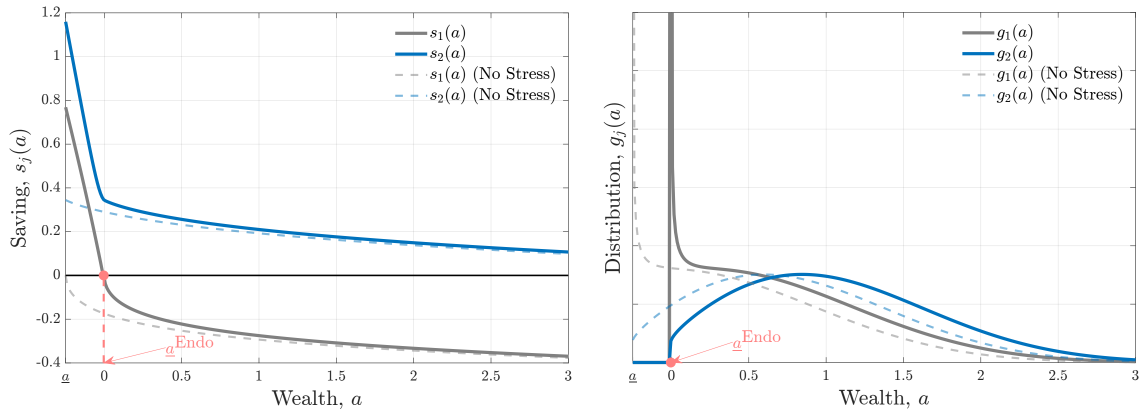
This stress function decreases with net wealth a up to a point after which it equals zero. This contrasts with the exponential stress function in (12), which is positive for all a. Similar to Section 3.4, we calibrate the stress function parameters based on survey questions Q17ab, Q19a, and Q19b. Specifically, $\bar{\Theta} = 0.27$ is the same as the main analysis in Table 5. To calibrate α, we use survey questions Q19a and Q19b. Similar to (13), we find[44]

$$\alpha = \frac{\text{avg}\ \left(\sqrt{Q17a} - \sqrt{Q19b}\right)}{2000/\left(\text{avg income}\right)} = 2.06. \tag{C.8}$$

From Figures C.21 and C.22, the main lessons that sophisticates save out of financial stress states and naifs fall into the poverty trap remain to be true.

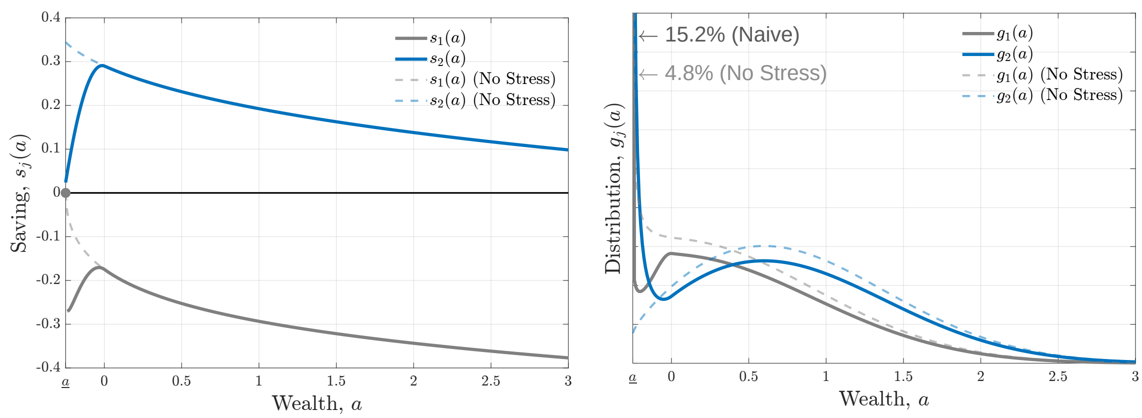
[44] Similarly to Section 3.4, we drop anyone who reports zero in either Q17ab or Q19b. Conceptually, this procedure means that we exclude respondents who are not affected by financial stress. From (C.7), this means we estimate α using households with positive $\sqrt{\bar{\Theta}} - \alpha\left(a - \underline{a}\right)$.

Figure C.21: Alternative Functional Forms of Stress: a Weakly Decreasing Function. (Sophistication).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under sophistication. The stress function takes the weakly-decreasing form as in equation (C.7).

Figure C.22: Alternative Functional Forms of Stress: a Weakly Decreasing Function (Naivete).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under naivete. The stress function takes the weakly-decreasing form as in equation (C.7).

C.13 Cross-sectional Calibration

Here, we consider an alternative calibration strategy based on cross-sectional variations in our survey. This approach differs from the baseline calibration in Section 3.4, which uses within-subject variations based on hypothetical questions Q19a and Q19b. Here, we use between-subject variations based on how different respondents' reported consequences of financial stress depend on their status of financial constraints, similar to Table 3.

Specifically, we leverage the finding in Table 3 that whether the household is financially constrained is a strong predictor of financial stress. First, we calibrate $\bar{\Theta}$—the maximum level of financial stress at the financial constraint—based on the average hours distracted at work for those who "cannot pay" the emergency expense in Q9. That is, we find $\bar{\Theta} = 0.26$ by letting the first row in column (3) of Table 3 be normalized by the average working hours in Table 1. Reassuringly, this is very similar to $\bar{\Theta} = 0.27$ in the main analysis, calibrated based on hypothetical questions Q19a.

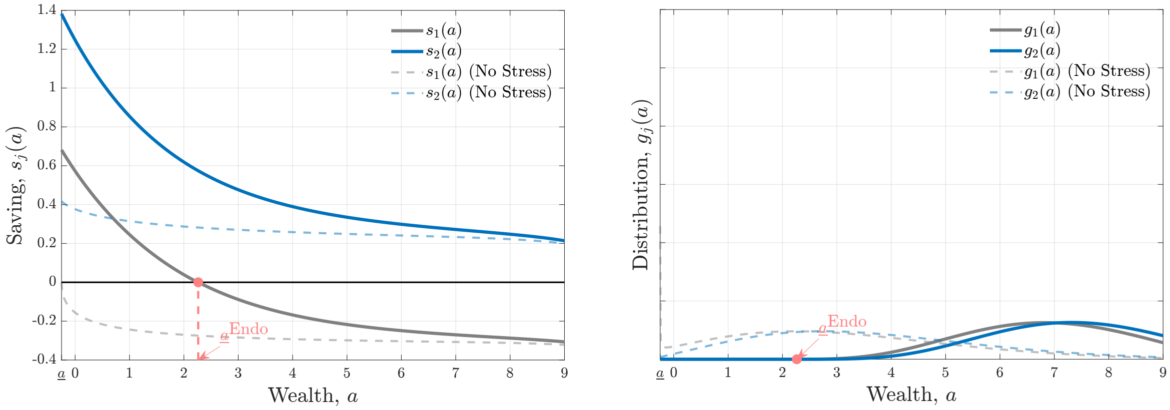
Second, we calibrate α—the slope of the financial stress function—based on the differences between those who "cannot pay" the emergency expense in Q9 and those who "need to borrow". Given the functional form in (12), we find the log difference of the average hours distracted at work between two groups, $\log(9.592) - \log(8.218)$, from the two rows in column (3) of Table 3.[45] We also need to find the difference between the net assets of the two groups. For those who "cannot pay" the \$2,000 expense even by borrowing, their net assets should be within \$2,000 from their borrowing constraints, or within 0.032 units of average income in Table 1 (which we use for normalization). We approximate the net liquid assets of this group by the mid-point between $\underline{a} = -0.25$ and $-0.25 + 0.032$, which is -0.234. For those who "need to borrow" to pay the \$2,000 expense, their net liquid assets are larger than $-0.25 + 0.032$ but lower than 0.032 (in units of average income). We approximate the net assets of this group by the mid-point of these two numbers, which is -0.093. Together, we find $\alpha = [\log(9.592) - \log(8.218)]/(-0.093 - (-0.234)) = 1.1$. This is lower than the α in the main analysis. That is, financial stress decreases slower with net financial assets.

We keep the rest of the parameters the same as in Table 5 for consistency.[46] From Figures C.23 and C.24, we can see that a lower α strengthens the main result: sophisticates exhibit strong extra saving motives while naifs fall into the poverty trap. Under sophistication, a lower α further increases the extra saving motive, since it takes more to save out of high financial stress states. Under naivete, a lower α leads to more constrained and stressed households in the stationary wealth distribution, since financial stress affects households with a wider range of net financial assets.

[45] Normalizing the average working hours is irrelevant for the log difference.

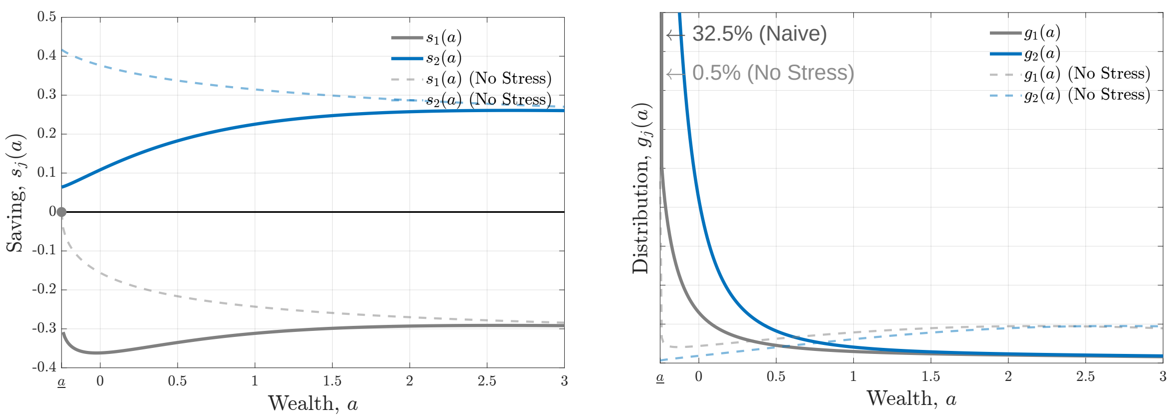
[46] For ρ, similar to Table 5, we match avg a/avg $y = 0.56$ in the naivete about financial stress case. w and φ are recalibrated so that average income and labor hours in our model are 1, as in the main analysis.

Figure C.23: Cross-sectional calibration (Sophistication).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under sophistication. The calibration is based on the cross-sectional distribution of answers to Q9 and Q17a-Q17b in our survey.

Figure C.24: Cross-sectional calibration (Naivete).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under naivete. The calibration is based on the cross-sectional distribution of answers to Q9 and Q17a-Q17b in our survey.

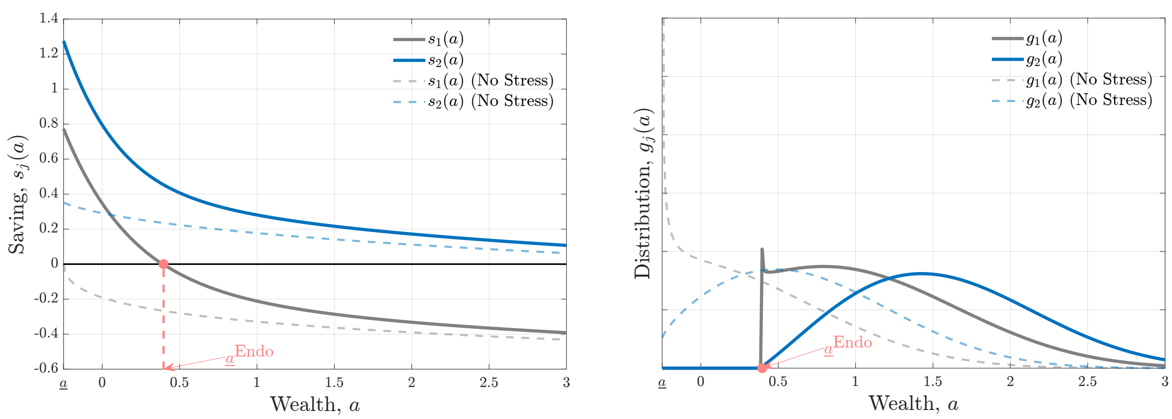
C.14 Calibration based on Kaur et al. (2022)

Here, we explore an alternative calibration of our baseline model based on Kaur et al. (2022)'s estimates. They vary the *timing* of wage payment without affecting the total: some workers are paid earlier while others are paid later and remain liquidity-constrained. They then estimate the effect of the interim payment on Indian manufacturing workers' hourly earnings by measures of financial constraints. This calibration based on the measured effect of financial stress in a real-life situation is conceptually distinct from calibration based on our survey measures.

We re-calibrate $(\rho, \bar{\Theta}, \alpha)$ to match Kaur et al. (2022)'s estimates with the model predictions of the naive financial stress case. We keep the rest of the parameters the same as Table 5 for consistency. For ρ, we match Kaur et al. (2022)'s estimates that 64.5% of households in their sample cannot come up with 1000 Rs. of emergency funds (Table I) and find $\rho = 0.0145$. For $\left(\bar{\Theta}, \alpha\right)$, we match the two estimates in Table A.X of Kaur et al. (2022). First, the effect of an interim payment (1,400 Rs.) on a worker's hourly earnings for households that cannot come up with an emergency fund of 1,000 Rs. is a 9.18 percent increase (0.145 standard deviations). Second, the effect of an interim payment on a worker's hourly earnings for households that can come up with an emergency fund of 1,000 Rs. is a 1.46 percent increase (0.023 standard deviations). This calibration, based on the effect on earnings, is also agnostic regarding several modeling choices, such as whether the impact of stress takes an additive or multiplicative form and whether households are unproductive or partially productive during hours affected by stress.[47]

Since the average income in our model is normalized to 1, we normalize the data accordingly. We calculate the average household income of workers with characteristics similar to those in Kaur et al. (2022) based on the Indian Sample Survey (77th round): (1) rural; (2) in the state of Odisha; (3) who are scheduled caste or scheduled tribe members; (4) whose primary occupation is casual labor in agriculture; (5) who own less than one acre of land. We find that the average household income for the restricted sample is 16871.6 Rs.[48] We then normalize all Rupee values by 16871.6 Rs., e.g., the size of the interim payment is $\Delta = 1400/16871.6 \approx 0.083$.

Figure C.25: Calibration based on Kaur et al. (2022) (Sophistication).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under sophistication. The calibration is based on Kaur et al. (2022).

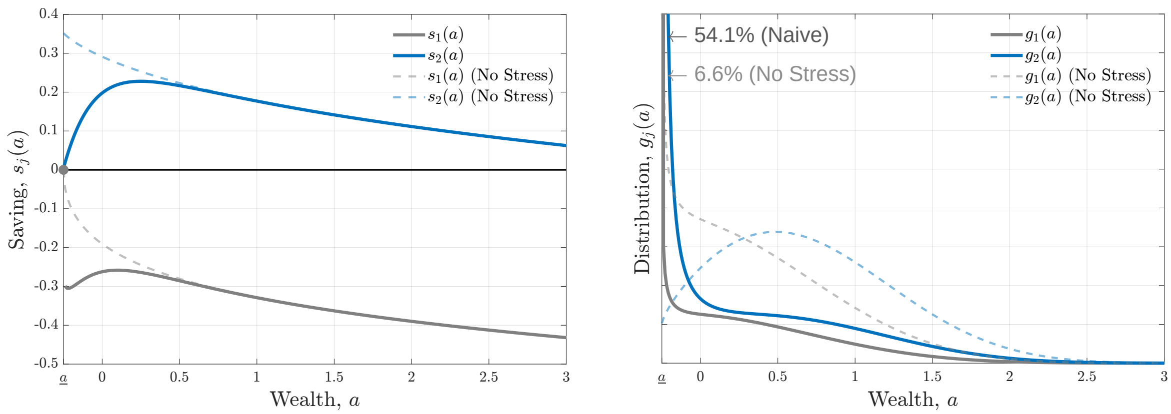
Given this calibration strategy, we find $\left(\bar{\Theta}, \alpha\right) = (0.26, 5.25)$. Compared to the main calibration in Table 5, the maximum level of financial stress $\bar{\Theta}$ is similar. Financial stress decreases with net assets somewhat slower here ($\alpha = 5.25$ v.s. $\alpha = 11.9$ in the main analysis). From Figures C.25

[47] Kaur et al. (2022) study piece-rate workers, so hourly earnings are proportional to hourly production. The counterpart of hourly earnings in our model is $wz_j\ell_j(a)/[\ell_j(a)+\Theta(a)]$. The effect of an interim payment on workers' hourly earnings in the model is then given by $wz_j\ell_j(a+\Delta)/[\ell_j(a+\Delta)+\Theta(a+\Delta)] - wz_j\ell_j(a)/[\ell_j(a)+\Theta(a)]$, where Δ is the size of the interim payment.

[48] Results are winsorized at the top and bottom 1 percent.

and C.26, we can see that the main lessons that sophisticates save out of financial stress states and naifs fall into the poverty trap remain to be true. There are more households at financial constraints for the naive case here. This is because we match Kaur et al. (2022)'s estimates that 64.5% of households in their sample cannot come up with 1,000 Rs. of emergency fund, a number significantly higher than its US counterpart (e.g., ten percent based on our survey question Q9).

Figure C.26: Calibration based on Kaur et al. (2022) (Naivete).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress, and the solid lines capture the case with financial stress under naivete. The calibration is based on Kaur et al. (2022).

C.15 Present Bias and Financial Stress

This appendix details the model with present bias. We closely follow the exposition in Maxted (2023) with only one deviation: financial stress. As a result, the household's total time available for work and financial stress is exogenously set to one, as in Maxted (2023). This assumption implies that the productive labor supply is $\ell_t = 1 - \Theta(a_t)$. The real wage w is also normalized to be 1. The notation is the intersection of the notation in our paper and in Maxted (2023).

We next provide formal details. The perceived continuation value function of the household is

$$v_t^p \equiv \mathbb{E}_t \left[\int_0^\infty e^{-\rho s} \frac{(c_{t+s}^p)^{1-\frac{1}{\sigma}}}{1-\frac{1}{\sigma}} ds \right], \tag{C.9}$$

where c_{t+s}^p is a perceived consumption choice that the household thinks it will choose when instant $t+s$ arrives.

The perceived current value function relevant for the current consumption decision (equation (C.14) below) is

$$w_t^p = \beta v_t^p,$$

which means that the household discounts the utility of all future selves by the degree of present bias $\beta \leq 1$, representing the short-run discount factor that creates the difference between utility now and utility later. $\beta = 1$ corresponds to the standard time-consistent exponential discounting, while $\beta < 1$ creates a sharp distinction between the present and the future. The perceived current value function w_t^p does not depend on the current consumption because it has no measurable impact on the value function in the continuous-time limit.

The perceived future consumption in (C.9) may deviate from actual future consumption if the household is not fully sophisticated about its future behavior. Similar to the main analysis, we focus on two cases. First, the household is sophisticated about the present bias and takes into account that future selves will have a degree of present bias $\beta^p = \beta$. Second, the household is naive and perceives no future present bias, such that $\beta^p = 1$.

The perceived evolution of household assets is

$$\dot{a}_{t+s}^p = z_{t+s}\left[1 - \mu\Theta(a_{t+s}^p)\right] + r a_{t+s}^p - c_{t+s}^p, \tag{C.10}$$

for all $s > 0$ and where the parameter $\mu \in [0, 1]$ indexes sophistication about financial stress: $\mu = 0$ corresponds to full naivete, while $\mu = 1$ to full sophistication. Note that the perceived productive labor supply is given by $1 - \mu\Theta(a_{t+s}^p)$, because the household's total time available for productive labor and financial stress is exogenously set to one.

Equilibrium definition. In the context of a strategic interaction between current and future-selves, we will look for stationary Markov-perfect equilibria in two states: assets a and idiosyncratic productivity z_j. An intra-personal stationary Markov-perfect equilibrium under present bias and stress constitutes perceived functions $\left\{c_j^p(a), v_j^p(a), w_j^p(a)\right\}_{j=1}^2$ and actual consumption functions $\{c_j(a)\}_{j=1}^2$ that satisfy the following four conditions in every state $j \in \{1, 2\}$:

1. the perceived continuation value function solves the HJB equation for the problem in (C.9)

$$\rho v_j^p(a) = \frac{\left[c_j^p(a)\right]^{1-\frac{1}{\sigma}}}{1-\frac{1}{\sigma}} + \frac{dv_j^p(a)}{da}\left(z_j\left(1-\mu\Theta(a)\right) + ra - c_j^p(a)\right) + \lambda\left[v_{-j}^p(a) - v_j^p(a)\right]; \tag{C.11}$$

2. the perceived consumption function for the problem in (C.9) given the perceived degree of future present bias β^p and (C.10) is

$$\left[c_j^p(a)\right]^{-\frac{1}{\sigma}} = \begin{cases} \beta^p \frac{dv_j^p(a)}{da} & a > \underline{a} \\ \max\left\{\beta^p \frac{dv_j^p(a)}{da}, \left(z_j\left(1-\mu\Theta(\underline{a})\right) + r\underline{a}\right)^{-\frac{1}{\sigma}}\right\}, & a = \underline{a} \end{cases} \tag{C.12}$$

3. the perceived current value function at the decision-making moment is

$$w_j^p(a) = \beta v_j^p(a); \tag{C.13}$$

4. the actual consumption function $c_j(a)$ given $w_j^p(a)$ satisfies

$$c_j(a)^{-\frac{1}{\sigma}} = \begin{cases} \frac{dw_j^p(a)}{da}, & a > \underline{a} \\ \max\left\{\frac{dw_j^p(a)}{da}, \left[z_j\left(1 - \Theta(\underline{a})\right) + r\underline{a}\right]^{-\frac{1}{\sigma}}\right\}, & a = \underline{a} \end{cases} \tag{C.14}$$

$\widehat{u}$-agent. The standard finite-difference algorithms have difficulty solving the above problem due to the violation of the monotonicity assumption. To overcome this issue, we introduce a fictitious household with standard exponential discounting of future utility flows but a non-standard utility function. Following the literature (Harris and Laibson, 2013; Maxted, 2023), we call this household a $\widehat{u}$-agent. An appropriate choice of the utility function for such a household ensures that its choices will coincide with those of the stressed present-biased household.

First, we introduce a modified flow utility function

$$\widehat{u}_j\left(\widehat{c}, \widehat{\ell}; a\right) = \begin{cases} \widehat{u}_+\left(\widehat{c}\right), & \text{if } a > \underline{a}, \\ \widehat{u}_+\left(\widehat{c}\right), & \text{if } a = \underline{a} \text{ and } \widehat{c} \leq \psi_c\left(wz_j\widehat{\ell}_j(\underline{a}) + r\underline{a}\right), \\ -\infty, & \text{if } a = \underline{a} \text{ and } \widehat{c} \in \left(\psi_c\left(wz_j\widehat{\ell}_j(\underline{a}) + r\underline{a}\right), wz_j\widehat{\ell}_j(\underline{a}) + r\underline{a}\right), \\ u\left(\widehat{c}\right), & \text{if } a = \underline{a} \text{ and } \text{ and } \widehat{c} \geq wz_j\widehat{\ell}_j(\underline{a}) + r\underline{a}, \end{cases} \tag{C.15}$$

where $\widehat{u}_+\left(x\right) \equiv \frac{\psi_c}{\beta}u\left(\frac{x}{\psi_c}\right) + \frac{\psi_c - 1}{\beta}$, $\psi_c \equiv 1 - \sigma\left(1-\beta\right) \in (0,1]$, and $u\left(c\right) \equiv \frac{c^{1-\frac{1}{\sigma}}}{1-\frac{1}{\sigma}}$.

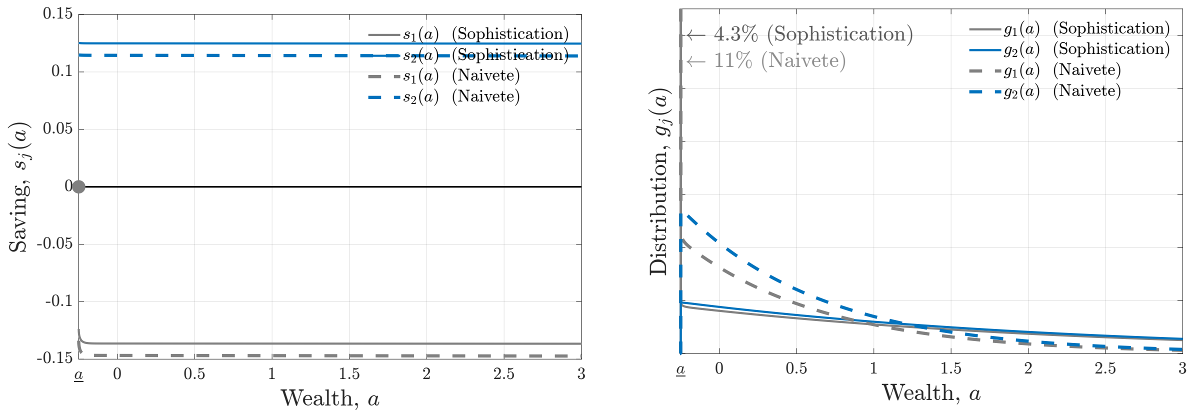
Next, we solve for the consumption function of an agent with standard exponential discounting but with the flow utility of consumption represented by equation (C.15), which turns out to be identical to the actual consumption function of the stressed present-biased agent. See Harris and Laibson (2013) and Maxted (2023) for the proof of this result.

C.16 Alternative Elasticities of Intertemporal Substitution (Present Bias)

This section studies the case of present bias only (without financial stress), with alternative elasticities of intertemporal substitution. Figure C.27 verifies that when the EIS is below one, specifically $\sigma = 0.5$, sophisticated present-biased households save more than naive present-biased households. Figure C.28 verifies that when the EIS is above one, specifically $\sigma = 2$, sophisticated present-biased households save less than naive present-biased households.

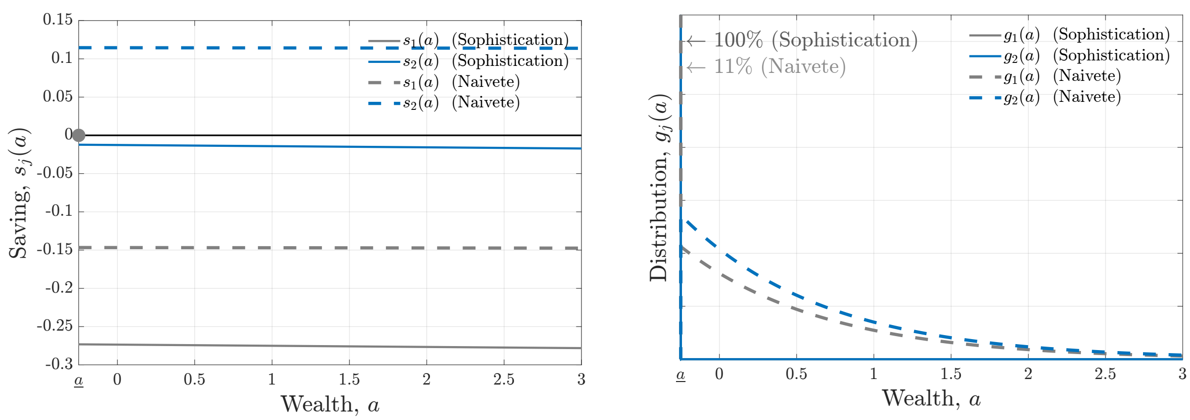
Similar to the main text in Section (4.4), we set the present bias parameter β to 0.75, recalibrate the subjective discount factor ρ to match the average liquid wealth to income ratio of 0.56 for the naive present-bias case (for each σ), and set the productive labor supply to be 1. All the other parameters are the same to those in Table 5.

Figure C.27: Saving Behavior and Stationary Wealth Distribution (Present Bias Only): $\sigma = 0.5$



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states in the case of present bias only. The dashed lines capture the case when the household is fully naive. The solid lines show the case when the household is fully sophisticated. The present bias parameter β is set to 0.75, the subjective discount factor ρ is set to match the average liquid wealth to income ratio of 0.56 in the case of full naivete, and the productive labor supply is set to 1. The intertemporal elasticity of substitution σ is 0.5. All the other parameters are similar to those in Table 5.

Figure C.28: Saving Behavior and Stationary Wealth Distribution (Present Bias): $\sigma = 2$



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states in the case of present bias only. The dashed lines capture the case when the household is fully naive. The solid lines show the case when the household is fully sophisticated. The present bias parameter β is set to 0.75, the subjective discount factor ρ is set to match the average liquid wealth to income ratio of 0.56 in the case of full naivete, and the productive labor supply is set to 1. The intertemporal elasticity of substitution σ is 2. All the other parameters are similar to those in Table 5.

The Economics of Financial Stress

Dmitriy Sergeyev ⓡ Chen Lian ⓡ Yuriy Gorodnichenko

Supplementary Appendix

D Analysis based on the Restricted Sample

We incorporate an attention check in the survey. We first say:

> *Q14. The next question is about the following problem. In questionnaires like ours, sometimes there are participants who do not carefully read the questions and just quickly click through the survey. This means that there are a lot of random answers which compromise the results of research studies. To show that you read our questions carefully, please enter turquoise as your answer to the next question.*

We then ask what for the respondent's favorite color. In this Supplementary Appendix, we report all analyses for the restricted sample of respondents who pass the attention check. The analysis is very similar to the full sample reported in the main text.

D.1 Demographics

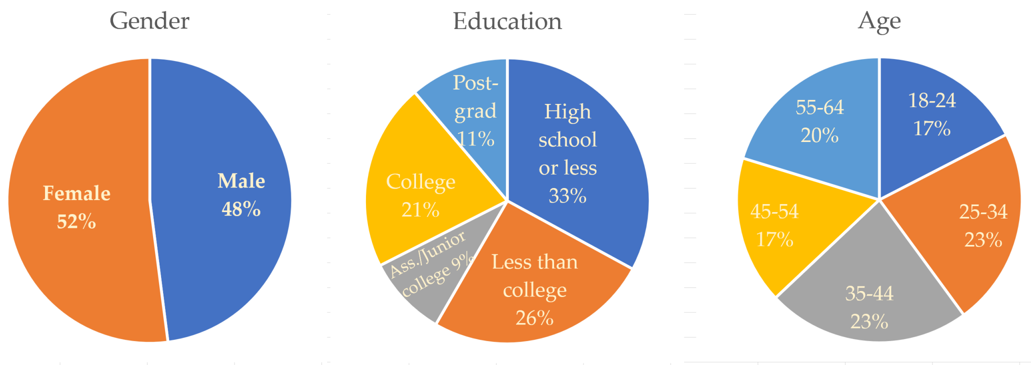
In Figure D.1 and Table D.1, we report the demographics of the restricted sample. Compared to Figure 1 and Table 1 based on the full sample, this sample is slightly more educated. It also has a somewhat higher average annual income ($66,649 versus $62,432 in the full sample) and average net asset ($83,092 versus $66,791 in the full sample).

Table D.1: Restricted Sample Characteristics: Household Size, Income, and Wealth

Vars	Obs	Mean	Median	Std	Min	Max	q25	q75
Household size	6,684	3.35	3	1.73	1	12	2	4
Annual income	6,686	66,649	55,000	63,332	5,000	600,000	25,000	85,000
Net assets	6,667	83,092	5,000	236,668	-55,000	1,100,000	-25,000	55,000

Notes: This table shows the sample characteristics based on the subsample of respondents who answered the screener question Q14 (see above and Supplementary Appendix E) correctly. The number of observations does not always equal because respondents can skip questions. To compute the statistics for the income and assets questions, we use the midpoints of the intervals chosen by the respondents (see questions Q4 and Q11 in Supplementary Appendix E). For the open intervals "$500,000 or more," "- $50,000 or less," and "$1,000,000 or more," we set $550,000, -$55,000, and $1,100,000, respectively.

Figure D.1: Restricted Sample Characteristics: Demographics

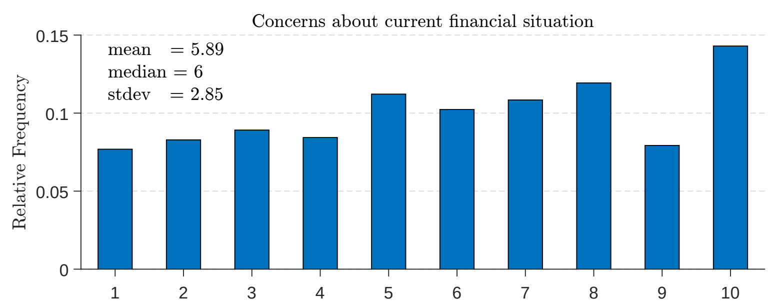


Notes: These pie charts represent the sample characteristics based on the subsample of respondents who answered the screener question Q14 (see above and Supplementary Appendix E) correctly.

D.2 The Prevalence of Financial Stress

In Figure D.2, we report the prevalence of financial stress in the restricted sample of respondents who pass all attention checks. The qualitative measure of financial stress based on this sample is very similar to Figure 2 based on the full sample.

Figure D.2: Qualitative Measure of Financial Stress, the Restricted Sample



Notes: The figure shows the histogram of the answers to question Q12 of the survey based on the subsample of respondents who answered the screener question Q14 (see above and Supplementary Appendix E) correctly.

For question Q9 about whether respondents are financially constrained, 9 percent of households in our restricted sample are severely financially constrained ("cannot pay"). 43 percent of households are somewhat constrained ("need to borrow"). The rest, 48 percent of households, are unconstrained. This is similar to the full sample reported in the main text.

Similarly to Table 3, we find that measures of financial stress are strongly correlated with being financially constrained (columns (1) and (2) of Table D.2). On average, the people who "cannot pay" the emergency expense have a stress level of 7.7 (versus 7.4 in the full sample). This number drops to 7.0 for those who "need to borrow" (versus 6.8 in the full sample), and 4.6 for the respondents "who do not need to borrow" (versus 4.7 in the full sample). Similar to the full sample, adding individual characteristics as controls does not change these magnitudes much.

Table D.2: Predictors of Financial Stress, the Restricted Sample

	Qual. measure of stress		Working hours distracted		Hours on fin. issues	
	(1)	(2)	(3)	(4)	(5)	(6)
Financial Constraint (omitted: Intercept)						
Cannot pay	7.723***	7.578***	9.963***	9.417***	10.401***	10.27***
	(0.103)	(0.131)	(0.324)	(0.379)	(0.487)	(0.604)
Need to borrow	6.974***	6.870***	7.928***	7.335***	9.086***	8.964***
	(0.047)	(0.094)	(0.131)	(0.247)	(0.221)	(0.431)
No need to borrow	4.560***	4.796***	3.515***	3.632***	5.018***	5.534***
	(0.046)	(0.0956)	(0.092)	(0.233)	(0.168)	(0.420)
Controls						
Income		-0.111**		-0.207		0.188
		(0.046)		(0.091)		(0.203)
Net financial asset		-0.121***		-0.098***		-0.104*
		(0.011)		(0.021)		(0.039)
Non-primary earner		-0.415***		-0.699**		-1.922***
		(0.107)		(0.261)		(0.438)
Age		0.025***		-0.042***		-0.018
		(0.002)		(0.006)		(0.011)
$\text{Age}^2/100$		-0.120***		-0.255***		-0.347***
		(0.021)		(0.051)		(0.089)
Female		0.251***		0.521***		0.581*
		(0.063)		(0.156)		(0.267)
Education (omitted: Some college)						
High school or less		-0.158*		0.060		0.001
		(0.075)		(0.204)		(0.322)
College		-0.099		-0.328		-0.885*
		(0.086)		(0.200)		(0.382)
Post-graduate		-0.050		-0.213		-0.759
		(0.112)		(0.254)		(0.485)
Married		0.058		0.289		0.091
		(0.067)		(0.170)		(0.289)
Have at least one child		0.190**		0.638***		0.611*
		(0.066)		(0.167)		(0.287)
Have at least one parent		0.072		0.303		0.634**
		(0.062)		(0.158)		(0.270)
Observations	6671	6654	4982	4966	1678	1678
R^2	0.205	0.248	0.166	0.200	0.138	0.178

Notes: Each column presents the results of a separate OLS regression. Robust standard errors in parentheses. Each regression omits an intercept because the first three dummy variables sum up to one. The income control is demeaned and divided by the mean, the assets control is demeaned and divided by the mean income, and the age variable is demeaned. * indicates $p < 0.05$, ** – $p < 0.01$, *** – $p < 0.001$. For each regression, the coefficients on the regressors "Cannot pay," "Need to borrow," and "No need to borrow" are statistically different from each other. Table D.3 provides details of the corresponding tests.

D.3 Consequences of Financial Stress and the Role of Financial Constraints

For quantitative measures of the consequences of financial stress, the restricted sample is slightly less affected by financial stress (Table D.4 compared to Table 2): the average working hours

Table D.3: Predictors of Financial Stress: Testing the Difference (p-values).

	Qual. measure of stress (1)	(2)	Working hours distracted (3)	(4)	Hours on fin. issues (5)	(6)
H_0: Cannot pay =Need to borrow	<0.001	<0.001	<0.001	<0.001	0.006	0.006
H_0: Need to borrow =No need to borrow	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
H_0: No need to borrow =Cannot pay	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Observations	6671	6654	4982	4966	1678	1678

Notes: The table shows the p-values of the test for the equality of the regression coefficients on "Cannot pay," "Need to borrow," and "No need to borrow" in Table D.2. For example, "H_0: Cannot pay = Need to borrow" tests whether the regression coefficient on the dummy variable "Cannot pay" equals the regression coefficient on the dummy variable "Need to borrow."

distracted is 6.0 hours (versus 6.4 hours in the full sample) per week, the average hours spent on financial issues is 7.3 hours (versus 7.7 hours in the full sample) per week, and the average amount of dollars spent on alleviating financial stress is 198.4 dollars (versus 211.2 dollars in the full sample) per week.

Similarly to Table 4, we find that distracted hours at work and hours spent on financial issues strongly increase with the qualitative measure of financial stress (Q12) in the restricted sample. These results are in Table D.5. The magnitudes are quite close to the full sample ones: a one-unit increase in the qualitative measure of stress increases distracted hours at work and hours spent on financial issues by approximately one hour.

Columns (3)-(6) of Table D.2 demonstrate that whether the household is financially constrained is a strong predictor of distracted hours at work and hours spent on financial issues, similar to the full sample.

Table D.4: Quantitative Measures of the Consequences of Financial Stress, the Restricted Sample

	Obs	Mean	Median	Std	Min	Max	q25	q75
Hours worked	6,681	39.0	40	13.3	0	100	32	45
Working hours distracted	4,982	6.0	5	6.0	0	20	1	10
Hours on financial issues	1,678	7.3	5	5.9	0	20	3	10
Stress spending	6,679	198.4	100	257.1	0	1000	25	250

Notes: "Hours worked" represent the answers to the question Q16: "How many hours do you typically work in a week these days?", "Working hours distracted" to the question Q17a, "Hours on financial issues" to the question Q17b, and "Stress spending" to question Q20. The restricted sample is a subsample of respondents who answered the screener question Q14 (see above and Supplementary Appendix E) correctly.

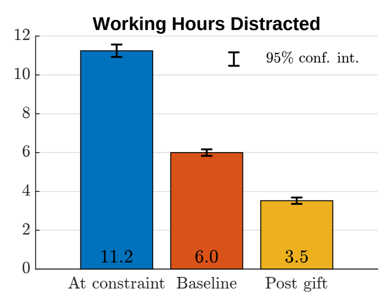
Figure D.3 summarizes the responses to Q19a and Q19b. Compared to Figure 3, respondents in the restricted sample report that they would be distracted for 11.2 hours (versus 10.8 hours in the full sample) per week at financial constraints. A $2,000 check on average would reduce the distracted hours by 2.6 hours (versus 2.2 hours in the full sample) per week.

Table D.5: Consequences of Financial Stress, the Restricted Sample

	Working hours distracted		Hours on financial issues	
	(1)	(2)	(3)	(4)
Qual. measure of stress	1.117***	1.077***	1.068***	1.005***
	(0.026)	(0.027)	(0.043)	(0.044)
Controls				
Non-primary earner		-0.308		-1.730***
		(0.233)		(0.402)
Age		-0.070***		-0.039***
		(0.005)		(0.009)
Age^2/100		-0.191***		-0.264**
		(0.047)		(0.081)
Female		0.373*		0.394
		(0.145)		(0.241)
Education (omitted: Some college)				
High school or less		0.362*		0.471
		(0.185)		(0.307)
College		-0.721***		-0.777*
		(0.182)		(0.317)
Post-graduate		-0.638**		-0.839*
		(0.228)		(0.399)
Married		0.117		-0.056
		(0.155)		(0.260)
Have at least one child		0.348*		0.740**
		(0.154)		(0.265)
Have at least one parent		0.304*		0.451
		(0.145)		(0.243)
Intercept	✓	✓	✓	✓
Observations	4976	4976	1675	1675
R^2	0.278	0.318	0.273	0.310

Notes: Each column presents the results of a separate OLS regression. Robust standard errors are in parentheses. The income control is demeaned and divided by the mean, the assets control is demeaned and divided by the mean income, and the age variable is demeaned. * indicates $p < 0.05$, ** – $p < 0.01$, *** – $p < 0.001$.

Figure D.3: Financial Stress and Distance to Financial Constraints

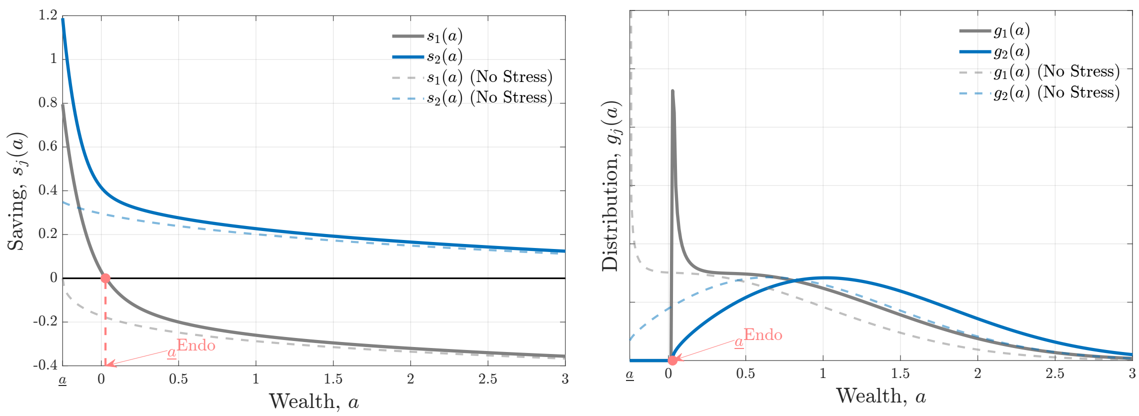


Notes: The histogram presents averages of distracted hours at work in a hypothetical scenario where the household has no assets to cover an emergency (question Q19a of our survey), the baseline level of distracted hours at work (questions Q17ab of our survey), distracted hours at work in a hypothetical scenario where the household receives a gift of $2,000 (question Q19b of our survey). The averages are based on the subsample of respondends who answered the screener question Q14 (see above and Supplementary Appendix E) correctly. The standard errors are clustered at the respondent level.

D.4 The Impact of Financial Stress: Household Behavior, Wealth Distribution, and Welfare Costs

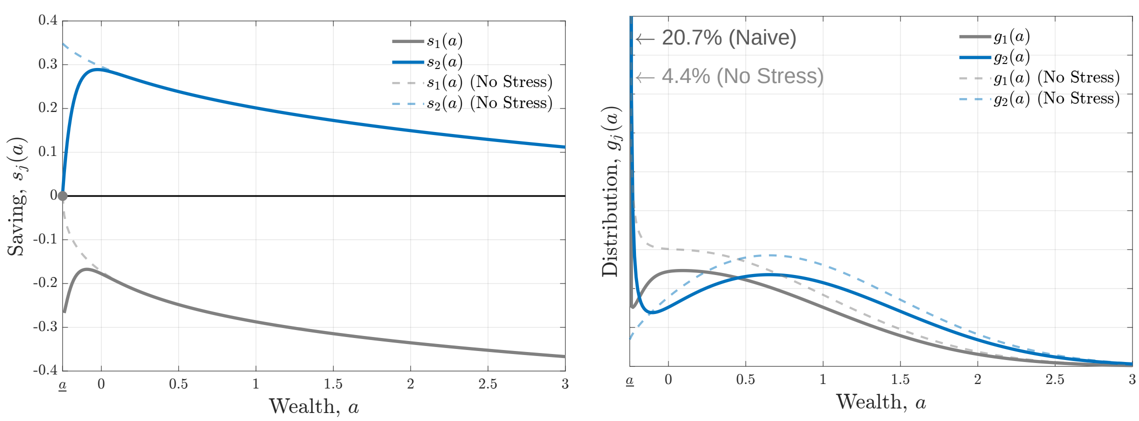
Here, we use the same parameters as in Section 3.4 with the exception of $(\bar{\Theta}, \alpha)$ which we calibrate to $(0.29, 15.5)$ based on the restricted sample of respondents. Other parameters are the same as in Table 5. From Figures D.4 and D.5, the main lessons that sophisticates save out of the financial stress states while naifs fall into the poverty trap remain to be true.

Figure D.4: Calibration based on the Restricted Sample (Sophistication).



Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress under sophistication. The calibration is based on the sample restricted to those who answered the screener question Q14 correctly. The details are in Supplementary Appendix D.4.

Figure D.5: Calibration based on the Restricted Sample (Naivete).

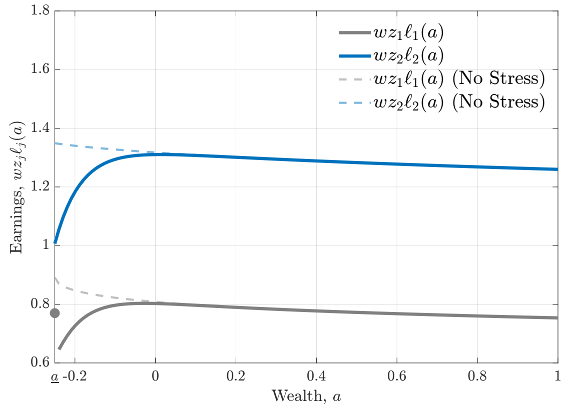


Notes: The left panel plots the net saving function $s_j(a)$ and the right panel plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states of a naive household. The dashed lines capture the case without financial stress and the solid lines capture the case with financial stress. The calibration is based on the sample restricted to those who answered the screener question Q14 correctly. The details are in Supplementary Appendix D.4.

Comparing Figure D.6 to Figure 11, we observe that the financial stress channel still reverses the counterfactual large negative wealth effect on labor earnings for naifs (but not for sophisticated).

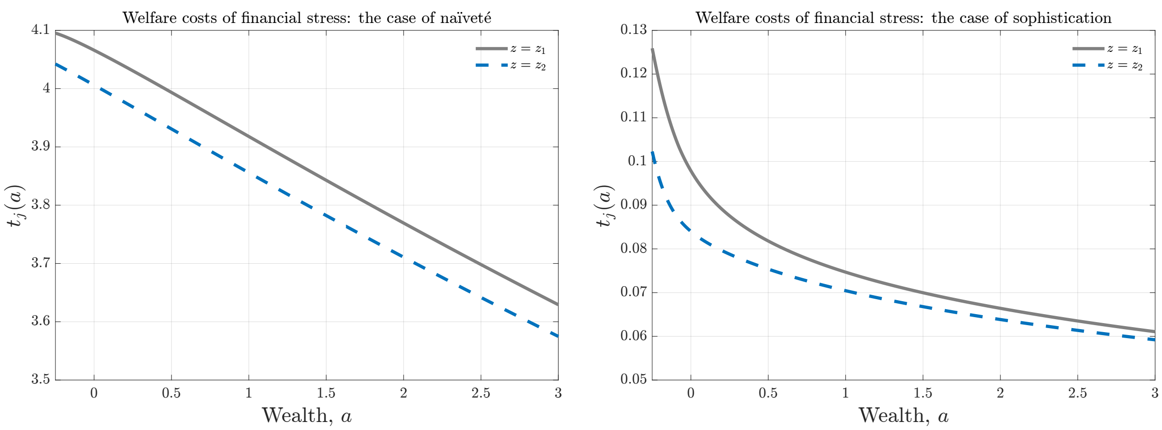
Comparing Figure D.7 to Figure 12, we observe that the welfare costs of naifs' financial stress are still much larger than the welfare costs of sophisticates' financial stress.

Figure D.6: Calibration based on the Restricted Sample (Labor Earnings: Naivete vs Sophistication)



Notes: The left panel plots the earnings function $wz_j\ell_j(a)$ at each idiosyncratic income state for the naive stressed households (solid lines) and no-stress households (dashed lines). The right panel plots the earnings function $wz_j\ell_j(a)$ at each idiosyncratic income state for the sophisticated stressed households (solid lines) and no-stress households (dashed lines). The calibration is based on the sample restricted to those who answered the screener question Q14 correctly. The details are in Supplementary Appendix D.4.

Figure D.7: Calibration based on the Restricted Sample (Welfare Costs: Naivete vs Sophistication)



Notes: The left panel plots the welfare cost of stress $t_j(a)$ at each idiosyncratic income state for the naive stressed households. The right panel does so for sophisticated stressed households. The calibration is based on the sample restricted to those who answered the screener question Q14 correctly. The details are in Supplementary Appendix D.4.

E Survey Questionnaire

The text in ALL CAPS, square brackets, and section titles contains technical information that was not shown to respondents. The order of questions presented in this section corresponds to the order of questions in the survey.

[RANDOMLY SPLIT ALL PARTICIPANTS INTO THREE GROUPS AND DENOTE THEM: GROUP1 (MAX STRESS QUESTION), GROUP2 (GIFT QUESTION), GROUP3 (TOTAL HOURS QUESTION)]

University of California at Berkeley
Consent to Participate in Research
The Economics of Financial Stress
CPHS #2021-11-14868

Key Information

- You are being invited to participate in a research study. Participation in research is completely voluntary.
- The purpose of the study is to investigate how financial concerns affect work performance.
- The study will take a total of 6-12 minutes, and you will be asked a series of questions regarding your financial situation, the extent to which it worries you, and how your worries may change depending on hypothetical scenarios.
- Risks and/or discomforts may include thinking about imaginary scenarios that change your financial situation.

Introduction and Purpose My name is Chen Lian, and my research colleagues are Yuriy Gorodnichenko and Dmitriy Sergeyev. Yuriy Gorodnichenko and I are faculty members at the University of California, Berkeley in the Department of Economics, and Dmitriy Sergeyev is a faculty member at Bocconi University in the Department of Economics. We would like to invite you to participate in our research study, which concerns the effects of financial stress on work performance.

Procedures If you agree to participate in our research, we will ask you to complete the attached online survey. The survey will involve questions about individual characteristics (e.g., year of birth, household size, and marital status), financial situation (e.g., typical income, financial holdings), work performance (employment status, hours worked, hours distracted by financial concerns), as well as several hypothetical questions (e.g., whether and how additional liquid assets reduce hours distracted by financial stress), and should take about 6-12 minutes to complete.

Risks/Discomforts Some of the research questions may make you think about your concerns. You are free to decline to answer any questions you don't wish to, or to stop participating at any time.

As with all research, there is a chance that confidentiality could be compromised; however, we are taking precautions to minimize this risk.

Confidentiality Your study data will be handled as confidentially as possible. If the results of this study are published or presented, individual names and other personally identifiable information will not be used.

To minimize the risks to the confidentiality, the data that we collect will not contain individual identifiers. Upon receiving the answers to our survey, the data will only be shared amongst the project's authors using password-protected computers until the project is completed. Upon completion, de-identified data will be retained for possible use in future research done by ourselves or others. Upon completion, de-identified data will be retained indefinitely for possible use in future research done by ourselves or others.

Your personal information may be released if required by law. Authorized representatives from the following organizations may review your research data for purposes such as monitoring or managing the conduct of this study:

- Sponsor: Chen Lian
- University of California

Rights ***Participation in research is completely voluntary.*** You are free to decline to take part in the project. You can decline to answer any questions and are free to stop taking part in the project at any time. Whether or not you choose to participate, answer any particular question, or continue participating in the project, there will be no penalty to you or loss of benefits to which you are otherwise entitled.

Questions If you have any questions about this research, please contact us. You can reach me, Chen Lian, at chenlianyy@gmail.com.

If you have any questions about your rights or treatment as a research participant in this study, please contact the University of California at Berkeley's Committee for Protection of Human Subjects at 510-642-7461 or by e-mail at subjects@berkeley.edu.

If you agree to participate in the research, please save a copy of this page for future reference, then click on the "Yes" button below. [ADD Yes/No BUTTONS]

Please tell us about yourself.

S1. What is your current age? [ADD A DROP-DOWN MENU]

- Years old: 16,17,...,100.

S2. What best describes your current employment situation?

- Working full-time (for someone or self-employed)
- Working part-time (for someone or self-employed)
- Not working

Q1. In which state is your primary residence?

- AL Alabama (1)
- AK Alaska (2)
- ...
- WI Wisconsin (50)
- WY Wyoming (51)
- I live outside the US (99)

Q2. What is the highest level of school you have completed, or the highest degree you have received? [RESPONDENTS CHOOSE ONE OF THE FOLLOWING OPTIONS]

- Some high school or less
- High school diploma (or equivalent)
- Some college but no degree (including academic, vocational, or occupational programs)
- Associate/Junior College degree (including academic, vocational, or occupational programs)
- Bachelor's degree (For example: BA, BS)
- Post-graduate degree (For example: MA, MS, PhD, MD, JD)

Q3. What is your gender?

- Male
- Female

Q4. How much income does your household **normally** earn **in a year** (before tax)? If you do not know, please estimate and choose an appropriate range. [ADD A DROPDOWN MENU WITH THE FOLLOWING INTERVALS]

- [$0;$9,999]
- [$10,000;$19,999]
- ...
- [$90,000;$99,999]
- [$100,000;$124,999]
- [$125,000;$149,999]
- [$150,000;$174,999]
- [$175,000;$199,999]
- [$200,000;$299,999]
- [$300,000;$499,999]
- $500,000 or more

Q5. Over the past few months, was your household's income different from what your household normally earns?

- My household's income was **about normal**.
- My household's income was **higher than normal**.
- My household's income was **lower than normal**.

Q6. Are you currently married or living as a partner with someone?

- Yes
- No

Q7. Please tell us how many of the following people usually live in your current primary residence, other than yourself (including those who are temporarily away)?

- Children _______
- Your or your spouse/partner's parents _______
- Others _______

Q8. Does your household have debt?

- Yes
- No

Q8b. [ASK IF Q7 = Yes] What types of debt does your household owe? (select all that apply)

- mortgage
- student loan
- car loan
- credit card debt (that you do not expect to repay by the due date)
- loan from a friend or a family member
- other (please specify) [ADD A TEXTBOX]

Q9. If your household experienced an unexpected emergency, would you need to borrow money in order to pay for a $2,000 expense?

- No, I would not need to borrow money to cover a $2,000 expense
- Yes, I would need to borrow money to cover a $2,000 expense
- I could not pay for this expense, even by borrowing

Q10. [ASK IF Q9 != "I simply cannot pay for this expense, even by borrowing"] If your household had to borrow $2,000 in the case of an emergency, what interest rate do you expect to be charged?

[ADD A SLIDER WITH THE RANGE [0%;30%]]

Q11. What is the value of your household's **total financial investments** (checking and savings accounts, stocks, bonds, 401(k), real estate, etc.) minus **total financial liabilities** (credit card debt, mortgages, student loans, consumer loans, etc.)? If you are not sure, please estimate.

You should choose a negative range if the the value of your liabilities is greater than the value of your investments.

[ADD A DROPDOWN MENU]

- - $50,000 or less
- - ($49,999;$39,999)
- ...
- - ($9,999;$0)
- [$0;$9,999]
- [$10,000;$19,999]
- ...
- [$90,000;$99,999]
- [$100,000;$124,999]
- ...
- [$175,000;$199,999]
- [$200,000;$299,999]
- [$300,000;$499,999]
- [$500,000;$999,999]
- $1,000,000 or more

Q12. On a scale from 1 to 10, how concerned are you about your household's current financial situation? 1 represents the lowest level of concern (or no concerns), and 10 represents the highest level of concern.

[ADD A SLIDER WITH THE VALUES (1,2,..., 10)]

Q14. The next question is about the following problem. In questionnaires like ours, sometimes there are participants who do not carefully read the questions and just quickly click through the survey. This means that there are a lot of random answers which compromise the results of research studies. To show that you read our questions carefully, please enter turquoise as your answer to the next question.

What is your favorite color? [ADD A TEXTBOX]

Q15. Are you the primary or co-primary earner in your household?

- Yes
- No

Q16. How many hours do you typically work in a week these days? If you are not sure, please estimate. [ADD A SLIDER WITH THE RANGE [0;100] HOURS]

Q17a. [ASK IF GROUP1 = 1] Over the past week, how many working hours were you distracted by your financial stress?

[ADD A SLIDER WITH VALUES BETWEEN 0 AND 20 HOURS]

Q19a. [ASK IF GROUP1 = 1] You reported that you were distracted for [ANSWER TO Q17a] hours by your financial stress last week.

Now, I want you to imagine that your household's financial situation becomes worse, and you would struggle to quickly raise any additional money in the case of an emergency (for example, bank accounts have been depleted and credit cards are maxed out).

In this alternate scenario, how many working hours would you have been distracted by your financial stress over the course of a week?

[ADD A SLIDER WITH VALUES BETWEEN 0 AND 20 HOURS]

Q17b. [ASK IF GROUP2 = 1] Over the past week, how many working hours were you distracted by your financial stress?

[ADD A SLIDER WITH VALUES BETWEEN 0 AND 20 HOURS]

Q18b. [ASK IF GROUP2 = 1] You reported that you were distracted for [ANSWER TO Q17b] hours by your financial stress last week. **Now, I want you to imagine that you were gifted $2,000** at the start of last week**.**

In this alternate scenario where you started the week with $2,000 **more money**, would you have been

- **less distracted** by your financial stress?
- **distracted by the same amount** by your financial stress?
- **more distracted by** your financial stress?

Q19b_1. [ASK IF GROUP2 = 1 AND Q18b = “less stressed”] In this alternate scenario where you started the week with $2,000 **more money**, how many working hours would you have been distracted by your financial stress? [ADD A SLIDER WITH VALUES BETWEEN 0 AND Q17b HOURS]

(Note that the slider allows you to choose a number between 0 and [ANSWER TO Q17b], highlighted in green, because you answered that you would have been less distracted with extra money compared to your current financial situation.)

Q19b_2. [ASK IF GROUP2 = 1 AND Q18b = “more stressed”] In this alternate scenario where you started the week with $2,000 **more money**, how many working hours would you have been distracted by your financial stress? [ADD A SLIDER WITH VALUES BETWEEN Q17B AND 20 HOURS]

(Note that the slider allows you to choose a number between [ANSWER TO Q17b] and 20, highlighted in green, because you answered that you would have been more distracted with extra money compared to your actual financial situation.)

Q19b_3. [ASK IF GROUP2 = 1 AND Q18b is not answered] In the same alternate scenario where you started the week with $2,000 **more money**, how many working hours would you have been distracted by your financial stress? [ADD A SLIDER WITH VALUES BETWEEN 0 AND 20 HOURS]

Q17c. [ASK IF GROUP3 = 1] Over the past week, how many hours did you spend thinking about and dealing with issues related to your household’s finances? If you are not sure, please estimate. [ADD A SLIDER WITH VALUES BETWEEN 0 AND 20 HOURS]

Q20. How much money do you typically spend per week in order to alleviate the stress driven by your financial concerns, which you would not spend if you were not financially stressed? [RESTRICT ANSWERS TO $0-$1,000]

Q21. Over the last few years, your household may have received stimulus checks from the U.S. government.

Please let us know if your household has received any of those checks.

- Yes, my household has received at least one of those checks.
- No, my household has not received any of those checks.

Q21b. [ASK IF Q23 = YES] On a scale from 1 to 10, how much did those checks alleviate your financial concerns?

1 represents that they had very little effect on your financial concerns, and 10 represents that they fully alleviated your financial concerns. [ADD A SLIDER WITH THE VALUES (1,2,. . ., 10)]

F The Supplementary Survey

Our supplementary survey consists of a sample of 1,001 respondents who are employed US workers. The sample is representative of the US population in terms of gross household income.[49] Table B.1 in Online Appendix B.1 compares the respondents' characteristics across our surveys and the 2019 American Community survey. We collected the data in April 2023 in collaboration with Prolific, a standard online survey provider. The novel question in the supplementary survey pertains to reasons for saving. We have adapted this question from the Making Ends Meet Survey conducted by the Consumer Financial Protection Bureau, adding an extra option related to targeted financial stress: "Relieve financial stress to maintain focus at work." The remainder of the survey is similar to the main survey, as described in Section 2.

Specifically, the new question is:[50]

Q. People have different reasons for saving, even though they may not be saving all the time. What are your most important reasons for saving? Please pick **up to three reasons** and rank them. [RANDOMIZE THE ORDER]

- Education (for yourself, child, grandchild, or another family member);
- Buy a car or other vehicle;
- Emergencies or unexpected needs;
- Buy a home;
- Home improvements/repairs;
- Buy household goods, appliances, home furnishings;
- Travel/take a vacation;
- Taxes;
- Retirement;
- Start a business;
- Relieve financial stress to maintain focus at work;
- Pay off debt;
- Other (please specify)

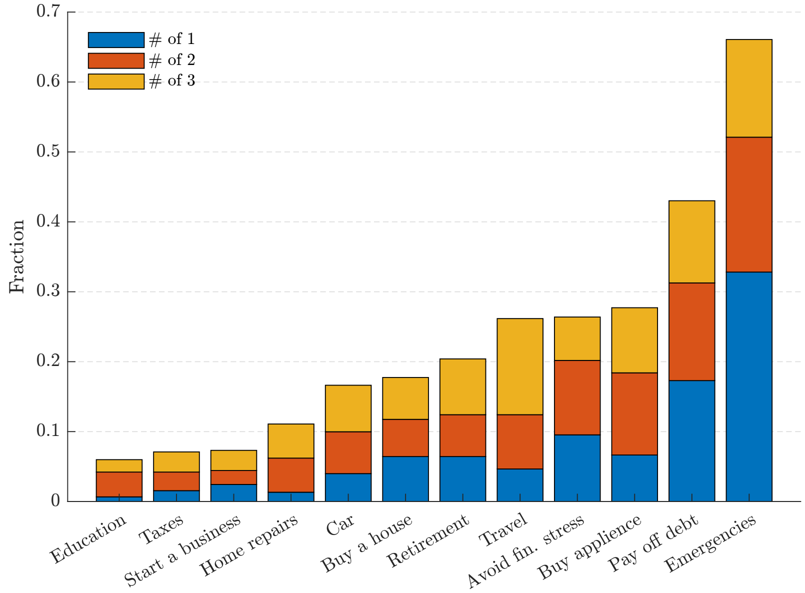
Calibrate the proportion of sophisticates. We classify a household as sophiscated if it mentions "Relieve financial stress to maintain focus at work" as one of the top three reasons for saving.[51] This results in a proportion of 26.4% of sophisticates. Specifically, in Figure F.1, 26.4% of households that are somewhat financially constrained (i.e., reporting "need to borrow" and "cannot pay" in response to Question Q9 about covering a $2,000 emergency expense) mention "relieve financial stress to maintain focus at work" as one of the top three reasons for saving. The

[49] For Prolific, an online survey platform that we use, ensuring representativeness is practical for a single characteristic; thus, we have opted to focus on household income. The supplementary survey statistics broadly track those of the main survey with the exception of a larger share of young and educated respondents.

[50] Note that on Qualtrics, our respondents first choose up to three options and on the next screen rank these three options. All options except for the "other" option are presented in random order.

[51] Specifically, we borrow this question from the Making Ends Meet Survey conducted by the Consumer Financial Protection Bureau. We retain the original survey's options for reasons for savings but also introduce an additional option related to relieving financial stress.

Figure F.1: Most Important Reasons for Saving.



Notes: The figure plots the proportion of survey participants who chose each option as the most important reason for saving, among households reporting "need to borrow" and "cannot pay" in response to Question Q9 about covering a $2,000 emergency expense.

reason we calculate the proportion of sophisticated households based on this restricted sample is that households away from financial constraints may not choose "relieve financial stress" as a top three reason for saving, even if they are sophisticated. For the entire sample, the proportion of sophisticates (report "relieve financial stress" as a top three reason for saving) is 20.7%.

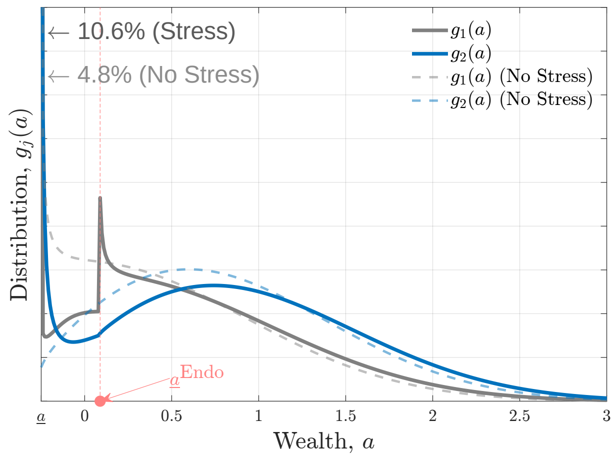
Figure F.2 plots the stationary wealth distribution given this mixture. The share of households at their financial constraints (10.6%) mimics the 9.8% of households in our survey reporting that they are severely financially constrained and cannot pay the $2,000 expenses (and used for the calibration in Figure 6 in the main text). In fact, Figure F.2 closely resembles Figure 6 in the main text, based on a different calibration strategy for the proportion of sophisticates. The main lesson remains: all households at their financial constraints are naifs. Sophisticates instead save out of their financial constraints.

Other survey results. Figure F.3 replicates Figure 2, which plots the histogram of the qualitative measure of financial stress, based on the supplementary survey sample. The mean, median, and standard deviation are approximately the same across the two surveys.

Table F.1 presents the same statistics as Table 2 but for the supplementary survey. The comparison of these two tables reveals that financial stress still negatively affects supplementary survey respondents' cognitive capacity, which leads to negative economic consequences. For the working-hours-distracted (Q17a-Q17b) question, the average distraction is 4.5 hours per week. For the question about hours spent on financial issues (Q17c), the average is 5.7 hours. The magnitude is within the ballpark, though somewhat smaller than that of the main survey, partly due to the supplementary survey participants working fewer hours on average (35.6 hours per week) compared to the main survey participants (39.6 hours per week).

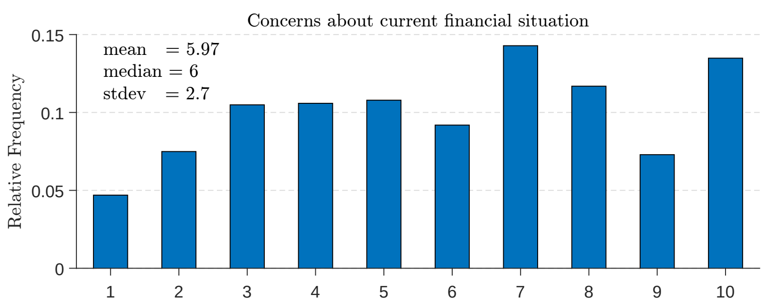
Table F.2 confirms that whether the household is financially constrained, represented by the answers to the question Q9 in the main survey, is still a good predictor of the three measures of financial stress in the supplementary survey. This is similar to Table 3 in the main survey.

Figure F.2: Stationary Wealth Distribution with a Mixture of Sophisticates and Naifs.



Notes: The figure plots the probability density function of stationary wealth distribution $g_j(a)$ for both idiosyncratic income states with a mixture of sophiscates and naifs.

Figure F.3: Qualitative Measure of Financial Stress



Notes: The figure shows the histogram of the answers to question Q12 of the supplementary survey.

Table F.1: Quantitative Measures of the Consequences of Financial Stress

	Obs	Mean	Median	Std	Min	Max	q25	q75
Hours worked	1,001	35.6	40	12.3	0	100	29	40
Working hours distracted	505	4.5	3	5.2	0	20	1	6
Hours on financial issues	496	5.7	4	5.1	0	20	2	8
Stress spending	998	96.7	30	165.6	0	1000	0	100

Notes: "Hours worked" represent the answers to the question Q16: "How many hours do you typically work in a week these days?", "Working hours distracted" to the question Q17a (only half of the respondents were asked this question), "Hours on financial issues" to the question Q17b (only half of the respondents were asked this question), and "Stress spending" to question Q20.

Table F.2: Predictors of Financial Stress.

	Qual. measure of stress (1)	Working hours distracted (2)	Hours on fin. issues (2)
Financial Constraint (omitted: Intercept)			
Cannot pay	8.189***	7.738***	10.042***
	(0.224)	(1.043)	(0.925)
Need to borrow	7.108***	6.182***	7.098***
	(0.121)	(0.395)	(0.408)
No need to borrow	4.853***	2.913***	4.044***
	(0.106)	(0.250)	(0.230)
Observations	1,001	505	496
R^2	0.219	0.120	0.153

Notes: Each column presents the results of a separate OLS regression. Robust standard errors are in parentheses. Each regression omits an intercept because the three dummy variables sum up to one. * indicates $p < 0.05$, ** – $p < 0.01$, *** – $p < 0.001$.

G Additional Proofs

Proof of Proposition 6. Differentiating the HJB equation (C.2) and using the envelope theorem, we get

$$\rho\left(v_j^p\right)'(a) = -\varphi\mu\left[\ell_j^p(a)+\mu\Theta(a)\right]^{\frac{1}{\psi}}\Theta'(a)+r\left(v_j^p\right)'(a)+\left[ra-c_j^p(a)+wz_j\ell_j^p(a)\right]\left(v_j^p\right)''(a) + \lambda\left[\left(v_{-j}^p\right)'(a)-\left(v_j^p\right)'(a)\right],$$

where $c_j^p(a)$ and $\ell_j^p(a)$ solve the HJB equation (C.2) and are given by the following first order optimality conditions

$$\varphi\left[\ell_j^p(a)+\mu\Theta(a)\right]^{\frac{1}{\psi}} = wz_j\left(c_j^p(a)\right)^{-\frac{1}{\sigma}}$$
$$\left(c_j^p(a)\right)^{-\frac{1}{\sigma}} = \left(v_j^p\right)'(a).$$

From equations (7) and (C.1), we know that

$$c_j^p(a)=c_j(a) \quad \text{and} \quad \ell_j^p(a)=\ell_j(a)+(1-\mu)\Theta(a).$$

Combining these insights, we obtain

$$\rho c_j^{-\frac{1}{\sigma}}(a) = \left[r-\mu wz_j\Theta'(a)\right]c_j^{-\frac{1}{\sigma}}(a)-\frac{1}{\sigma}\left[ra-c_j(a)+wz_j\left(\ell_j(a)+(1-\mu)\Theta(a)\right)\right]c_j^{-\frac{1}{\sigma}-1}(a)\,c_j'(a) + \lambda\left[c_{-j}^{-\frac{1}{\sigma}}(a)-c_j^{-\frac{1}{\sigma}}(a)\right]. \tag{G.1}$$

From the budget (2) and the transition intensity of the idiosyncratic productivity, we know

$$\mathbb{E}_t\left[d\left(c_j^{-\frac{1}{\sigma}}(a)\right)\right] = \left[-\frac{1}{\sigma}\left(ra-c_j(a)+wz_j\ell_j(a)\right)c_j^{-\frac{1}{\sigma}-1}(a)\,c_j'(a)+\lambda\left(c_{-j}^{-\frac{1}{\sigma}}(a)-c_j^{-\frac{1}{\sigma}}(a)\right)\right]dt. \tag{G.2}$$

Using equation (G.2), we can rewrite equation (G.1) in a more compact form

$$\rho c_j^{-\frac{1}{\sigma}}(a) = \left(r-\mu wz_j\Theta'(a)\right)c_j^{-\frac{1}{\sigma}}(a)+E_t\left[d\left(c_j^{-\frac{1}{\sigma}}(a)\right)\right]-\frac{1-\mu}{\sigma}wz_j\Theta(a)\,c_j^{-\frac{1}{\sigma}-1}(a)\,c_j'(a),$$

which simplifies to

$$-\frac{\mathbb{E}_t\left[d\left(c_j^{-\frac{1}{\sigma}}(a)\right)\right]}{c_j^{-\frac{1}{\sigma}}(a)}=\left[r-\rho-\mu w z_j\Theta'(a)-\frac{1-\mu}{\sigma}wz_j\Theta(a)\frac{c_j'(a)}{c_j(a)}\right]dt.$$

Proof of Proposition 7. Consider our benchmark problem with an exogenously decreasing stress function $\Theta^{\text{benchmark}}(a)$ under sophistication studied in Section 3. Let $\{c_j^{\text{benchmark}}(a), \ell_j^{\text{benchmark}}(a)\}_{j=1}^2$ be the optimal consumption and labor supply and $\{v_j^{\text{benchmark}}(a)\}_{j=1}^2$ be the optimal value function. We can find $\{W_j(a,\Theta)\}_{j=1}^2$ such that

$$W_j(a,\Theta)=W_{0,j}(a)-\Theta W_{1,j}(a)+\frac{\varepsilon}{2}\left(\Theta-\Theta^{\text{benchmark}}(a)\right)^2, \tag{G.3}$$

where Θ is a real number, ε is a small, positive number,

$$W_{1,j}(a)\equiv wz_j\left(c_j^{\text{benchmark}}(a)\right)^{-\frac{1}{\sigma}}=\varphi\left(\ell_j^{\text{benchmark}}(a)+\Theta^{\text{benchmark}}(a)\right)^{\frac{1}{\psi}}=wz_j\left(v_j^{\text{benchmark}}\right)'(a), \tag{G.4}$$

and

$$W_{0,j}(a)\equiv\Theta^{\text{benchmark}}(a)\,wz_j\left(v_j^{\text{benchmark}}\right)'(a)=\Theta^{\text{benchmark}}(a)\,W_{1,j}(a) \tag{G.5}$$

so that

$$W_{0,j}'(a)=wz_j\left(c_j^{\text{benchmark}}(a)\right)^{-\frac{1}{\sigma}}\left(\Theta^{\text{benchmark}}\right)'(a)+\Theta^{\text{benchmark}}(a)\,wz_j\left(v_j^{\text{benchmark}}\right)''(a). \tag{G.6}$$

Now, consider the household problem with endogenous stress choice (15) with (G.3)-(G.5). The corresponding HJB equation of the household problem is

$$\begin{aligned}\rho v_j(a)=\max_{c,\ell,\Theta}\Bigg\{&\frac{c^{1-\frac{1}{\sigma}}}{1-\frac{1}{\sigma}}-\varphi\frac{(\ell+\Theta)^{1+\frac{1}{\psi}}}{1+\frac{1}{\psi}}-W_j(a,\Theta)+(ra-c+wz_j\ell)\,v_j'(a)\\&+\lambda\left[v_{-j}(a)-v_j(a)\right]\Bigg\}.\end{aligned} \tag{G.7}$$

We also consider two alternative household problems. The first alternative problem drops the term $\frac{\varepsilon}{2}\left(\Theta-\Theta^{\text{benchmark}}(a)\right)^2$ term in $W_j(a,\Theta)$, but is otherwise the same as the household problem with endogenous stress choice. Its HJB is given by

$$\rho v_j^1(a) = \max_{c,\ell,\Theta}\Bigg\{\frac{c^{1-\frac{1}{\sigma}}}{1-\frac{1}{\sigma}} - \varphi\frac{(\ell+\Theta)^{1+\frac{1}{\psi}}}{1+\frac{1}{\psi}} - [W_{0,j}(a) - \Theta W_{1,j}(a)] + (ra - c + wz_j\ell)\left(v_j^1\right)'(a) \\ + \lambda\left[v_{-j}^1(a) - v_j^1(a)\right]\Bigg\}, \tag{G.8}$$

where $v_j(a) \le v_j^1(a)$ because $-\frac{\varepsilon}{2}\left(\Theta - \Theta^{\text{benchmark}}(a)\right)^2 < 0$. Let us use $\{c_j^1(a), \ell_j^1(a), \Theta_j^1(a)\}_{j=1}^2$ to denote the optimal consumption, labor supply, and stress choices for the first alternative problem in (A.2). They satisfy:

$$wz_j\left(v_j^1\right)'(a) = wz_j\left(c_j^1(a)\right)^{-\frac{1}{\sigma}} = \varphi\left[\ell_j^1(a) + \Theta_j^1(a)\right]^{\frac{1}{\psi}} = W_{1,j}(a). \tag{G.9}$$

Using the definition (G.4) and the optimality condition (G.9), we deduce that

$$c_j^1(a) = c_j^{\text{benchmark}}(a), \quad \left(v_j^1\right)'(a) = \left(v_j^{\text{benchmark}}\right)'(a), \\ \text{and} \quad \ell_j^1(a) + \Theta_j^1(a) = \ell_j^{\text{benchmark}}(a) + \Theta^{\text{benchmark}}(a). \tag{G.10}$$

Together with (G.4) and (G.5),

$$-W_{0,j}(a) + \Theta_j(a)W_{1,j}(a) + wz_j\ell_j(a)\left(v_j^1\right)'(a) = wz_j\ell_j^{\text{benchmark}}(a)\left(v_j^{\text{benchmark}}\right)'(a).$$

Substituting it and (G.10) into (G.8), we know that

$$\rho v_j^1(a) = \frac{\left(c_j^{\text{benchmark}}(a)\right)^{1-\frac{1}{\sigma}}}{1-\frac{1}{\sigma}} - \varphi\frac{\left(\ell_j^{\text{benchmark}}(a) + \Theta^{\text{benchmark}}(a)\right)^{1+\frac{1}{\psi}}}{1+\frac{1}{\psi}} \\ + \left(ra - c_j^{\text{benchmark}}(a) + wz_j\ell_j^{\text{benchmark}}(a)\right)\left(v_j^{\text{benchmark}}\right)'(a) + \lambda\left[v_{-j}^1(a) - v_j^1(a)\right]. \tag{G.11}$$

Comparing the last equation to the HJB equation of $v_j^{\text{benchmark}}(a)$ in (5), we know that

$$v_j^1(a) = v_j^{\text{benchmark}}(a).$$

The second alternative problem restricts the stress choice $\Theta_j^2(a) = \Theta^{\text{benchmark}}(a)$, but is otherwise the same as the household problem with endogenous stress choice with HJB (G.7). Its HJB is given by

$$\rho v_j^2(a) = \max_{c,\ell}\Bigg\{\frac{c^{1-\frac{1}{\sigma}}}{1-\frac{1}{\sigma}} - \varphi\frac{\left(\ell+\Theta^{\text{benchmark}}(a)\right)^{1+\frac{1}{\psi}}}{1+\frac{1}{\psi}} - W_j\left(a,\Theta^{\text{benchmark}}(a)\right) + (ra-c+wz_j\ell)\left(v_j^2\right)'(a) \tag{G.12}$$

$$+\lambda\left[v_{-j}^2(a)-v_j^2(a)\right]\Bigg\},$$

where $v_j^2(a)\le v_j(a)$ because of the restricted choice set. From (G.3) and (G.5), we know that $W_j\left(a,\Theta^{\text{benchmark}}(a)\right)=0$. As a result, the second alternative problem is the same as benchmark problem under sophistication, which can be seen from the comparison between (5) and (G.12). As a result, $v_j^2(a)=v_j^{\text{benchmark}}(a)$. Because $v_j^2(a)\le v_j(a)\le v_j^1(a)$, we know that $v_j(a)=v_j^{\text{benchmark}}(a)$.

Let us use $\{c_j(a),\ell_j(a),\Theta_j(a)\}_{j=1}^2$ to denote the optimal consumption, labor supply, and stress choices for the household problem with endogenous stress choice with HJB (G.7). They satisfy:

$$wz_j(v_j)'(a) = wz_j(c_j(a))^{-\frac{1}{\sigma}} = \varphi\left[\ell_j(a)+\Theta_j(a)\right]^{\frac{1}{\psi}} = W_{1,j}(a)-\varepsilon\left(\Theta_j(a)-\Theta^{\text{benchmark}}(a)\right).$$

Together with the definition (G.4), the optimality condition (G.9), and the fact that $v_j(a)=v_j^{\text{benchmark}}(a)$, we deduce that

$$c_j(a)=c_j^{\text{benchmark}}(a),\quad \ell_j(a)=\ell_j^{\text{benchmark}}(a),\quad \text{and}\quad \Theta_j(a)=\Theta^{\text{benchmark}}(a).$$

This proves Proposition 7.