

**Online Appendix for**  
**“Cultivating Self-Control in FinTech:  
Evidence from a Field Experiment on Online Consumer Borrowing”**

**Figure A.1: Financial Literacy and Self-control Intervention Sessions**

The figures below show a financial literacy lecture and a small group session in self-control training. The photos were taken during real intervention treatments during 2017.



**Figure A.2: Third-party Mobile PFM App**

The figures below show example screens from third-party mobile personal financial management apps used alongside the self-control interventions to track spending, income, and borrowing behavior.



## **Appendix 1: Intervention Treatments and Description of Activities**

### **1. Sample and treatments**

The total sample (1,972 students) was randomly divided into three groups:

- Group 1 (financial education)  
325 students were randomly assigned to take the financial literacy trainings.
- Group 2 (self-control training)  
325 students were randomly assigned to take the self-control trainings.
- Control group  
1,322 were allocated to a zero-touch control group. No offer of financial education program and/or self-control program was made to this group.

### **2. Schedule and plan for each financial literacy class:**

Class One: 11 March 2017 (Saturday)

- Time value of money
- Compounding of interest

Class Two: 3 June 2017 (Saturday)

- Risk diversification
- Trade-offs between risk and return

Class Three: 28 October 2017 (Saturday)

- Introduction to online consumer loans, fees, and interest rates provided by the main lenders in the market.

### **3. Schedule and plan for each self-control training class:**

Class one: 18 March 2017 (Saturday)

- Participants were instructed to install and sign up a free Personal Financial Management (PFM) mobile app. The app can sync to students' financial accounts including bank accounts, WeChat Pay account, Alipay account, and participants' campus cards. Participants were required to give the app permissions to access all their payment accounts including bank accounts, credit card accounts, WeChat Pay account, Alipay account, and campus cards so that the app could collect all spending data. The app can automatically put each transaction into different categories like utilities, groceries, eating out, cash, movies, tuition, books & magazines, electronics & software, gym, pharmacy, alcohol, travel, shopping. The PFM accurately tracks income and expenses by category much like those used in recent studies (e.g., Olafsson and Pagel (2018), Braeuer, Hackethal, and Hanspal (2019)). In this session, our trainers instructed the participants on how to use the app.
- Participants were then asked to record their spending with the app from March 19, 2017 to May 19, 2017.

Class two: 10 June 2017 (Saturday)

- In this session, participants were required to provide their spending tracked by the app from March 19, 2017 to May 19, 2017, along with their total monthly income, totally monthly expenses, and total monthly savings/deficits for the period. The financial accounting for these two months provided a baseline measure of the participants' personal spending. Based on the spending records, our trainer asked each participant the following questions:
  - ✓ Detail any non-planned purchases, if any, in last two months
  - ✓ How do you feel about those purchases now?
  - ✓ Detail any purchases that cost more than half your monthly income
  - ✓ How do you feel about those purchases now?
  - ✓ Detail any spending categories that cost more than your budget, if any, in last two months.
  - ✓ How do you feel about the spending that cost more than your budget now?
- Our trainers helped the participants to set up goals/budgets in each spending category each month for the following four months.
- Participants were required to keep tracking their spending with the app from June 11, 2017 to October 10, 2017. At the end of each month, the participants were required to submit their spending records to their trainer through WeChat and email.
- The app has a goal-tracking function to help users measure their true spending against a budget.

Class three: 10 October 2017 (Saturday)

- In the last session, participants were required to provide their spending tracked by the app from June 11, 2017 to October 19, 2017, along with their total monthly income, totally monthly expenses, and total monthly savings/deficits to their trainers.
- Participants were asked to compare their true spending to the goal/targets they set in the last session. The following questions were asked:
  - ✓ Detail any non-planned purchases, if any, in last two months
  - ✓ How do you feel about those purchases now?
  - ✓ Detail any purchases that cost more than half your monthly income
  - ✓ How do you feel about those purchases now?
  - ✓ Detail and explain any spending categories that cost more than your goal/budget, if any.
  - ✓ How do you feel about the spending that cost more than you goal/budget now?
- After this session, students were required to complete the following three questions and submit their answers to the trainers two days after the training session.
  - ✓ What level of difficulty, if any, have you experienced complying with the program?
  - ✓ Do you feel you are progressing with the program?
  - ✓ Do you wish to comment on the program generally?

#### **4. Attrition between the first and second survey waves:**

114 initial participants were unavailable for the follow-up survey:

- 59 participants were from control group
- 26 participants were from the financial literacy training group
- 29 participants were from the self-control training group

Reasons:

- 17 initial participants left their university before the follow-up survey.
- 23 initial participants were on sick leave during our visit
- 78 initial participants were not available during our visit for other reasons.

## Appendix 2: Financial Literacy Questions

1. In terms of a deposit amounting to 1,000 yuan, what is the sum of principal and interest at the annual rate of 2% compounded annually after 5 years?
  - A. More than 1,100 yuan
  - B. 1,100 yuan
  - C. Less than 1,100 yuan
  - D. Uncertain
2. If the interest rate of your savings account is 1% and the inflation rate is 2%, what will happen to what you can buy with the same money after a year?
  - A. You can buy more stuff than previous year
  - B. You can buy less stuff than previous year
  - C. You can buy the same stuff as previous year
  - D. Uncertain
3. If the interest rate rises, what is the general change in the price of a fixed-rate bond?
  - A. Rise
  - B. Fall
  - C. No association between bank interest rate and bond price
  - D. No idea
4. True or false: Assume the principles of both a 30-year mortgage and a 15-year mortgage are the same. Compared to the 30-year mortgage, the 15-year mortgage loan features a higher monthly payment while the sum of the interest paid is less than that of the 30-year mortgage loan.
  - A. True
  - B. False
  - C. No idea
  - D. Refuse to answer
5. True or false: Mutual funds normally have lower risk than stocks.
  - A. True
  - B. False
  - C. No idea
  - D. Refuse to answer
6. Does paying only the minimum amount due on your credit card bill negatively impact your credit status?
  - A. Yes
  - B. No
  - C. No, even if the minimum amount was paid 30 days after the grace period
  - D. Yes, even if the minimum amount was paid within the grace period

**Table A.2: Summary Statistics by Intervention**

We report mean values for all participants in wave one of the survey by intervention. For each participant, we find the self-assessed financial and demographic characteristics from September 2016.

	Financial literacy	Self-control	Control
	1	2	3
Male	0.31	0.38	0.33
Financial literacy score	3.43	3.47	3.30
Parents college education	0.15	0.11	0.14
Monthly expenses	2.39	2.39	2.81
Business major	0.53	0.53	0.52
Confidence in daily finances	3.97	3.82	4.09
Read financial news	3.31	3.16	3.16
Numeracy	4.34	4.33	4.27
<i>N</i>	324	326	1,142

**Table A.3: The Effect of Interventions on Online Borrowing**

The table below analyzes the effect of various treatment interventions on subjects' propensity to borrow online before and after participating in the treatment interventions. The dependent variable is an indicator for borrowing online in the previous 12 months. We present marginal effects after a logistic regression. In each column we present indicator variables for receiving a *treatment* and participating in an intervention, the wave of the survey (*post*), and the interaction of the two, *treatment*  $\times$  *post* our variable of interest. In Columns 1-3 the treatment variable indicates any treatment, either financial literacy or self-confidence. In Columns 4-6 the treatment variable indicates the financial literacy treatment and Columns 7-9 the treatment variable indicates the self-control treatment. The sample includes data from both survey waves. We first present results without any control variables then add control variables. Robust standard errors clustered at the individual level are in parentheses. \*\*\*, \*\*, \* denote significance at the 1%, 5%, and 10% levels, respectively.

	Any treatment		Financial literacy		Self-control	
	1	2	3	4	5	6
Treated	0.08*** (0.02)	0.08*** (0.03)	0.04 (0.03)	0.06* (0.03)	0.08*** (0.03)	0.07** (0.03)
Post	0.12*** (0.01)	0.14*** (0.01)	0.09*** (0.01)	0.12*** (0.01)	0.10*** (0.01)	0.12*** (0.01)
Treated $\times$ Post	-0.10*** (0.02)	-0.13*** (0.02)	-0.03 (0.02)	-0.11*** (0.03)	-0.12*** (0.03)	-0.09** (0.03)
Financial literacy score		-0.00 (0.01)		-0.00 (0.01)		-0.00 (0.01)
Male		0.23*** (0.03)		0.23*** (0.03)		0.23*** (0.03)
Monthly expenses		0.03** (0.01)		0.03** (0.01)		0.03** (0.01)
Parents college education		-0.05 (0.04)		-0.05 (0.04)		-0.05 (0.04)
Business major		-0.09*** (0.03)		-0.09*** (0.03)		-0.09*** (0.03)
Confidence in daily finances		-0.11*** (0.01)		-0.12*** (0.01)		-0.11*** (0.01)
Numeracy		0.05*** (0.01)		0.05*** (0.01)		0.05*** (0.01)
Region fixed effects	No	Yes	No	Yes	No	Yes
N	3,471	3,471	3,471	3,471	3,471	3,471



**Table A.4: The Effect of Interventions on Online Borrowing**

The table below analyzes the effect of the financial literacy and self-control treatment interventions on subjects' future borrowing behavior. The dependent variable in Columns 1-3 is an indicator for using borrowing online. Columns 1 and 2 are estimated with OLS while 3-4 present marginal effects after a probit model. *Treated SC* and *Treated FL* indicate the self-control and financial literacy interventions respectively. F-statistics from a test of differences between Treated SC  $\times$  Post and Treated FL  $\times$  Post and the test's  $p$ -value are presented at bottom. Robust standard errors clustered at the individual level are in parentheses. \*\*\*, \*\*, \* denote significance at the 1%, 5%, and 10% levels, respectively.

	OLS		Probit	
	1	2	3	4
Treated SC	0.10*** (0.03)		0.10*** (0.03)	0.08** (0.03)
Treated FL	0.07** (0.03)		0.07** (0.03)	0.08** (0.03)
Post	0.12*** (0.01)	0.12*** (0.01)	0.12*** (0.01)	0.14*** (0.01)
Treated FL $\times$ Post	-0.06*** (0.02)	-0.08*** (0.02)	-0.06*** (0.02)	-0.13*** (0.03)
Treated SC $\times$ Post	-0.14*** (0.03)	-0.13*** (0.02)	-0.14*** (0.03)	-0.11*** (0.03)
Financial literacy score		-0.00 (0.01)		-0.00 (0.01)
Monthly expenses		-0.01 (0.02)		0.03** (0.01)
Confidence in daily finances		-0.02*** (0.01)		-0.11*** (0.01)
Numeracy		0.01 (0.01)		0.05*** (0.01)
Male				0.22*** (0.02)
Parents college education				-0.04 (0.03)
Business major				-0.09*** (0.02)
Individual fixed effects	No	Yes	No	No
Region fixed effects	No	No	No	Yes
$F$ -stat/ $\chi^2$	5.31	2.91	5.32	0.35
$p$ -value	0.02	0.09	0.02	0.55
R <sup>2</sup> / Pseudo R <sup>2</sup>	0.01	0.88	0.01	0.14
$N$	3,471	3,471	3,471	3,471

**Table A.5: The Effect of Interventions on the Intensive Margin of Online Borrowing**

The table below analyzes the effect of various treatment interventions on subjects' online borrowing before and after participating in the treatment interventions. The dependent variable in Panel A the dependent variable is the response to a survey question about on average how much in RMB per month the subject borrows online (where 1 = less than 200, 2 = 200-600, 3=601-1000, and 4 = 1500+), in Panel B it is the response to a survey question about on average how many times per month the subject borrows online (where 1 = less than 1, 2 = 1-2, 3=3-5, and 4 = 5+). We provide ordered-logit regressions and present the marginal effects for the coefficients of interest. In each column we present indicator variables for receiving a *treatment* and participating in an intervention, the wave of the survey (*post*), and the interaction of the two, *treatment*  $\times$  *post* our variable of interest. In Columns 1-3 the treatment variable indicates any treatment, either financial literacy or self-confidence. In Columns 4-6 the treatment variable indicates the financial literacy treatment and Columns 7-9 the treatment variable indicates the self-control treatment. The sample includes data from both survey waves. We first present results without any control variables then add control variables. Robust standard errors clustered at the individual level are in parentheses. \*\*\*, \*\*, \* denote significance at the 1%, 5%, and 10% levels, respectively.

**Panel A: How much do you borrow online?**

	Any treatment		Financial literacy		Self-control	
	1	2	3	4	5	6
<i>Treat</i> $\times$ <i>Post</i>						
...Less than 200	0.04** (0.02)	0.06*** (0.02)	-0.04* (0.02)	-0.01 (0.02)	0.11*** (0.02)	0.10*** (0.02)
...Between 200 and 600	0.02** (0.01)	0.04*** (0.01)	-0.02* (0.01)	-0.01 (0.01)	0.07*** (0.01)	0.06*** (0.02)
...Between 601 and 1000	-0.03** (0.01)	-0.04*** (0.01)	0.03* (0.01)	0.01 (0.02)	-0.08*** (0.02)	-0.08*** (0.02)
...Between 1000 and 1500	-0.02** (0.01)	-0.03*** (0.01)	0.02* (0.01)	0.01 (0.01)	-0.06*** (0.01)	-0.05*** (0.01)
...More than 1500	-0.01** (0.01)	-0.02*** (0.01)	0.01* (0.01)	0.00 (0.01)	-0.04*** (0.01)	-0.03*** (0.01)
Control variables	No	Yes	No	Yes	No	Yes
Region fixed effects	No	Yes	No	Yes	No	Yes
<i>N</i>	1,786	1,786	1,786	1,786	1,786	1,786

**Panel B: How often do you borrow online?**

	Any treatment		Financial literacy		Self-control	
	1	2	3	4	5	6
<i>Treat</i> $\times$ <i>Post</i>						
...Less than once	0.04*** (0.01)	0.06*** (0.01)	-0.03** (0.01)	-0.01 (0.01)	0.09*** (0.02)	0.09*** (0.02)
...Between 1-2	0.06*** (0.02)	0.08*** (0.02)	-0.04** (0.02)	-0.01 (0.02)	0.13*** (0.02)	0.13*** (0.02)
...Between 3-5	-0.01*** (0.00)	-0.02*** (0.01)	0.01** (0.00)	0.00 (0.00)	-0.03*** (0.01)	-0.03*** (0.01)
...More than 5 times	-0.09*** (0.03)	-0.12*** (0.03)	0.06** (0.03)	0.02 (0.03)	-0.19*** (0.03)	-0.19*** (0.03)
Control variables	No	Yes	No	Yes	No	Yes
Region fixed effects	No	Yes	No	Yes	No	Yes
<i>N</i>	1,786	1,786	1,786	1,786	1,786	1,786

**Table A.6: The Effect of Interventions on Online Borrowing: Within Instructor Specification**

The table below analyzes the effect of the financial literacy and self-control treatment interventions on subjects' future borrowing behavior. The dependent variable in Columns 1-7 is an indicator for using borrowing online. Columns 1-4 are estimated with OLS while 5-7 present marginal effects after a probit model. *Treated SC* and *Treated FL* indicate the self-control and financial literacy interventions respectively. Columns 1, 2, and 5 include the full sample, while Columns 3, 4, 6, and 7 include subjects from financial literacy and self-control treatments. Instructor fixed effects indicate a dummy variable for the 10 instructors used in both financial literacy and self-control treatments, or in indicator for no-instructor (Columns 1, 2, and 5). University fixed effects are a dummy variable for 5 universities. Robust standard errors clustered at the individual level are in parentheses. \*\*\*, \*\*, \* denote significance at the 1%, 5%, and 10% levels, respectively.

	OLS				Logit		
	1	2	3	4	5	6	7
Treated-FL	0.54*** (0.04)	0.32*** (0.04)			0.81*** (0.01)		
Treated-SC	0.57*** (0.02)	0.34*** (0.03)	0.03 (0.04)	0.01 (0.04)	0.81*** (0.01)	0.01 (0.04)	0.02 (0.04)
Post	0.12*** (0.01)	0.11*** (0.01)	0.05*** (0.02)	0.04 (0.02)	0.12*** (0.01)	0.04 (0.02)	0.04 (0.03)
Treated-FL $\times$ Post	-0.06*** (0.02)	-0.06*** (0.02)			-0.06*** (0.02)		
Treated-SC $\times$ Post	-0.14*** (0.03)	-0.14*** (0.03)	-0.07** (0.03)	-0.07** (0.03)	-0.15*** (0.03)	-0.08** (0.04)	-0.09** (0.04)
Control variables	No	Yes	No	Yes	Yes	Yes	Yes
Region fixed effects	No	No	No	No	Yes	Yes	Yes
Instructor fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
University fixed effects	No	No	No	No	No	No	Yes
R <sup>2</sup> /Pseudo R <sup>2</sup>	0.01	0.08	0.01	0.09	0.06	0.07	0.08
N	3,471	3,471	1,246	1,246	3,471	1,244	1,244