

# The effect of financial education on students' consumer choices: Evidence from a randomized experiment

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# Introduction

- Financial literacy is considered to be a key competence (i.e. household consumption (Dinkova et al., 2018), saving decisions (Babiarz and Robb, 2014), credit management (Disney and Gathergood, 2013), and retirement planning (van Rooij et al., 2012))
- International evidence shows that many people have low financial literacy levels (Klapper et al., 2015; OECD, 2016, 2017)
- Financial education (FE) as a tool to eradicate financial illiteracy and improve financial well-being
  - Focus FE: improving financial knowledge or stimulating positive financial behaviours (e.g. saving, responsible debt management, ... )
  - Gap: Effect FE on (better) consumer choices
- Better consumer choices defined as decisions in which consumers show a higher price sensitivity, more prudent credit behaviour, more informed decisions, and a lower likelihood to be seduced by promotions.

# Literature

- RCT main evaluation tool for FE initiatives (Fernandes et al., 2014; Kaiser and Menkhoff, 2020; Miller et al., 2015)
- FE at school effective in enhancing financial knowledge (Isterbeke et al, 2020; Maldonado et al., 2021) along with financial behaviours (i.e. credit behaviour (Frisancho, 2020), budgeting behaviour (Bruhn et al., 2016) and saving behaviour (Berry et al., 2018))
- No evidence whether FE has impact on consumer decisions, however previous research has suggested a link between financial literacy and some of the underlying mechanism of consumer decisions:
  - Price (OECD, 2016)
  - Use of credit (Lusardi & Tufano, 2015) & cost of credit (Disney and Gathergood, 2013)
  - Careful considering of all information (OECD, 2016)
  - Promotion (Lam & Lam, 2017)

# Research design (1)

## Randomized controlled trial (RCT)

- Causal evidence on the effect of FE on students' financial literacy levels and their consumer choices
- Schools randomly assigned to treatment and control group
- Treatment group (4 hours financial education course)

	June-August	First half Sept.	Second half Sept.	Oct.-Nov.	End Nov.
Treatment schools	Registration of schools	Randomization to treatment condition	Pre-test	4-hour financial education course	Post-test
Control schools	Registration of schools	Randomization to control condition	Pre-test		Post-test

- **Financial literacy measured by multiple choice test:** (Q1) understanding of inflation, relationship between interest and inflation (Q3), compounded interest calculation (Q4), relationship between risk and return (Q4), relationship between risk and return (Q5 and Q6), careful bank card use (Q7), reliability of information (Q8), and saving strategies (Q9 and Q10)

# Research design (2)

## Discrete choice experiment

- Objective: Analyse the role of price, credit availability, information, and promotion on buying behaviour
    - Discrete Choice Experiment (DCE)
    - Situation: buying of a new smartphone with same characteristics
    - Two options and possibility to opt-out
  - Design DCE consists of two main steps
    - First step: Selection of attributes and levels
    - Second step: Construction of choice sets
      - Full factorial design: 630 possible choice sets
      - Fractional factorial design: 2 blocks of 5 choice-sets
- => Selection with D-optimality criterion

# Description of attributes and their levels

Attribute	Level
Cash price	€300
	€325
	€350
Payment terms	Cash payment
	Payment plan (instead of paying the cash price you pay 5% of the cash price for the next 24 months)
Information	No reviews available
	Positive reviews
	Negative reviews
Promotion	No gifts
	Free pair of earsets (market value €20)

# Example of a choice card

Imagine that you want to buy a new smartphone. Based on technical characteristics you have selected two devices which seem interesting to you. In what follows you will get different choice sets with two options. The devices differ with respect to price, payment condition, information, and promotion. For each of the choice sets, please select which of the two options you prefer ("Option A" or "Option B"). Alternatively, if you are not satisfied with either of the two options, please select "neither of these options". There are no wrong answers, answer every question based on your personal preferences.

	Option A	Option B
Cash price	€325	€350
Payment terms	Cash Payment	Instead of paying the cash price you pay €17 for the next 24 months
Information	No reviews available	Positive reviews
Promotion	Free pair of earsets (market value €20)	No gifts

Which option do you prefer?

- Option A
- Option B
- Neither of these options

# Empirical specification

## Effect of the financial education course

$$y_{is}^1 = \alpha + \beta_1 Treatment_{is} + \beta_2 y_{is}^0 + \beta_3 \sum S_s + \beta_4 \sum X_i + \varepsilon_{is}$$

- $y_{is}^1$  = post-test score of student  $i$  in school  $s$
- $Treatment_{is}$  = FE or not
- $y_{is}^0$  = pre-test score of student  $i$  in school  $s$
- $S_s$  = school characteristics for school  $s$
- $X_i$  = individual characteristics of student  $i$

## Financial education and consumer choices

$$U_{ijt} = \beta_i' A_{ijt} + Treatment * (\beta_i' A_{ijt}) + ASC + \varepsilon_{ijt}$$

- $U_{ijt}$  = utility of student  $i$  from alternative  $j$  in choice task  $t$
- $A_{ijt}$  = vector of attributes that relates to the chosen alternative
- $\beta_i'$  = unobserved for each  $i$  and varies in the population with density  $f(\beta)$
- $ASC$  = *attribute fixed effects and captures the effects of unobserved factors for each of the alternatives*



# Data

- 688 students from 20 schools covering 66 classes
- Questionnaire consists of three parts:
  - Socio-economic background characteristics
  - Financial literacy quiz
  - DCE experiment

# Descriptive statistics

	Control		Treatment		p-value
<b>Number of schools</b>	10		10		
<b>Number of students</b>	329		358		
<b>Number of classes</b>	29		37		
<b>Private education</b>	0.75		0.98		0.020
<b>Fraction of 8<sup>th</sup> grade students</b>	0.55		0.59		0.845
<b>Share by track</b>					
	Academic	310	(0.94)	190	(0.53)
	Technical	19	(0.06)	125	(0.35)
	Vocational	0	(0.00)	44	(0.12)
<b>Student characteristics</b>					
<b>Gender (female)</b>	0.52		0.45		0.435
<b>Age (year)</b>	13.35	(0.79)	13.67	(0.82)	0.113
<b>Language (Dutch)</b>	0.91		0.85		0.168
<b>Dutch grade (5)</b>	3.92	(0.83)	3.69	(0.87)	0.071
<b>Math grade (5)</b>	3.74	(1.03)	3.33	(1.12)	0.029
<b>Socioeconomic status (4)</b>	3.04	(0.92)	2.79	(1.04)	0.015
<b>Financial literacy</b>					
<b>Pre-test financial literacy (10)</b>	4.81	(0.09)	4.46	(0.10)	0.213
<b>Post-test financial literacy (10)</b>	4.83	(0.10)	5.38	(0.10)	0.121

# Intent-to-treat analysis

	Financial literacy	
Treatment	0.378** (0.134)	0.459** (0.162)
Pre-test financial literacy	0.422*** (0.026)	0.336*** (0.031)
Controls	No	Yes
Observations	20,640	20,640
$R^2$	0.198	0.256

# Estimates from mixed logit model (1)

Attributes	Mean	SE	SD
Cash Price	-0.002	(0.003)	
Credit availability (ref: cash payment)			
Payment plan	-0.603***	(0.177)	[1.323***]
Information (ref: no reviews available)			
Positive reviews	1.409***	(0.191)	[0.733***]
Negative reviews	-1.070***	(0.290)	[1.728***]
Promotion (ref: no gifts)			
Free gifts	0.750***	(0.154)	[-0.617***]
ASC	1.129	(0.974)	

# Estimates from mixed logit model (2)

Attributes * Treatment	Mean	SE	SD
Cash Price * Treatment	0.0004	(0.001)	
Credit availability (ref: cash payment)			
Payment plan * Treatment	0.065	(0.334)	[0.911***]
Information (ref: no reviews available)			
Positive reviews * Treatment	0.048	(0.226)	[-1.056***]
Negative reviews * Treatment	0.204	(0.337)	[0.817**]
Promotion (ref: no gifts)			
Free gifts * Treatment	-0.182	(0.220)	[0.942***]
No. of observations	10,320		
No. of respondents	688		

# Predictive probability analysis (1)

	Change in choice probability
Cash price	
325	-2.09% (-8.23%; 4.05%)
350	-4.19% (-1.65%; 8.08%)
Credit availability	
Payment plan	-29.28% <sup>***</sup> (-45.16%; -13.40%)
Information	
Positive reviews	60.73% <sup>***</sup> (48.92%; 72.53%)
Negative reviews	-48.92% <sup>***</sup> (-70.58; -27.27%)
Promotion	
Free gifts	35.84% <sup>***</sup> (22.68%; 49.00%)

# Predictive probability analysis (2)

	Change in choice probability
Cash price	
325 * Treatment	0.05% (-2.35%; 3.30%)
350 * Treatment	0.10% (-4.69%; 6.60%)
Credit availability	
Payment plan * Treatment	3.23% (-29.48%; 35.93%)
Information	
Positive reviews * Treatment	2.41% (-19.75%; 24.56%)
Negative reviews * Treatment	10.18% (-22.47%; 42.82%)
Promotion	
Free gifts * Treatment	-9.06% (-30.42%; 12.30%)

# Conclusion

- Little evidence about the impact of FE on more complex consumer decisions.
- By combining a RCT and DCE we elicit consumer preferences of students and examine whether FE can effect such choices
- Results: FE increases student's financial literacy (0.46 standard deviations) but no effect consumer decisions.
- Behavioural changes need specific attention in FE programs.



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