

Financial Literacy and Buying Behavior: Evidence from a Discrete Choice Experiment

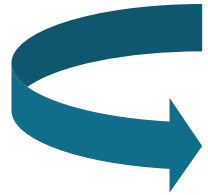
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Motivation

- How make consumers buying decisions?



Standard economic theory: rational consumer maximize utility, given budget constraint

Price, terms of payment, information, and promotions

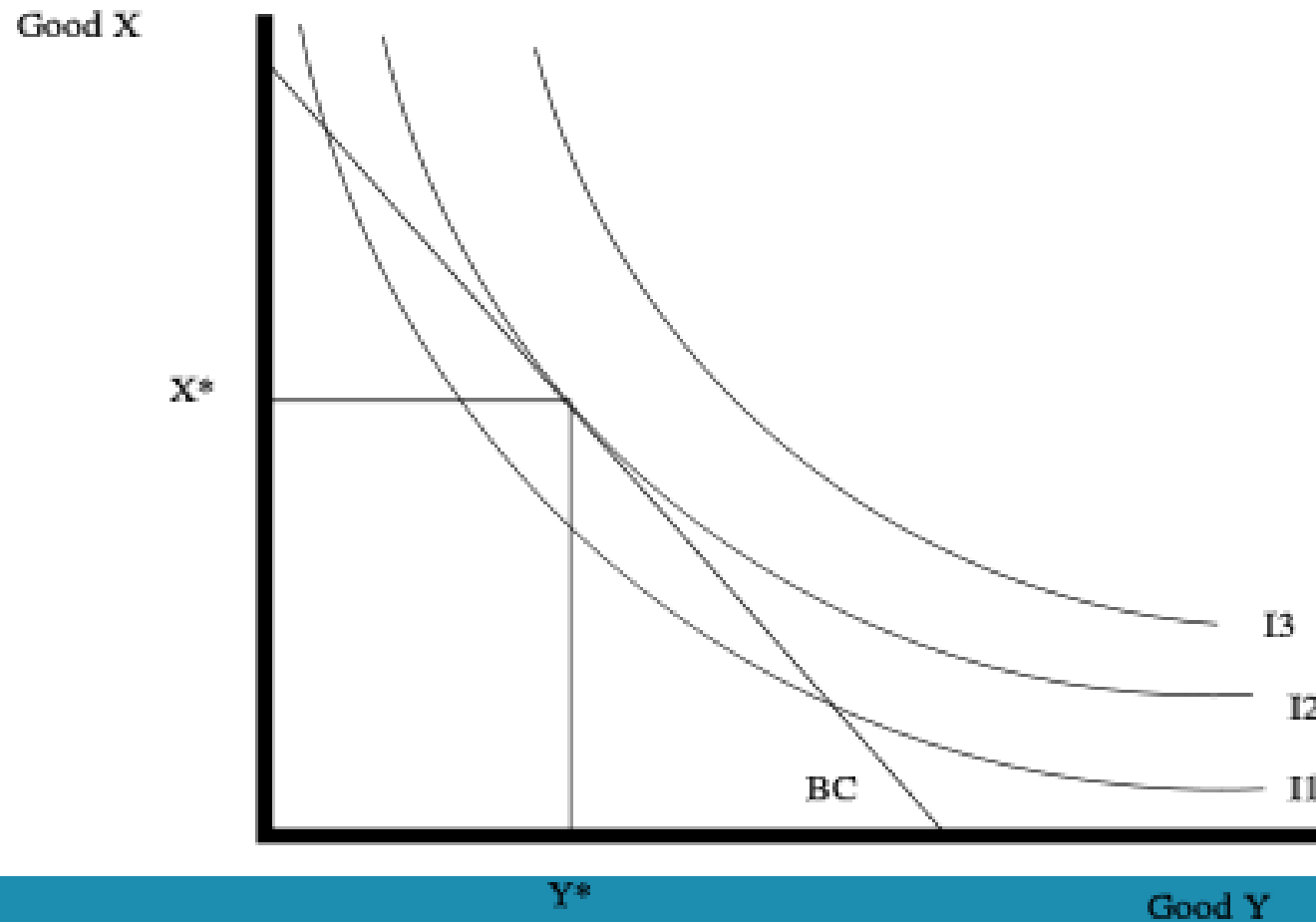
- This study: considers the influence of price, terms of payment, information and promotional incentives on the decision to buy
- Previous research has examined the role of determinants separately, but ignored their mutual impact.
 - Credit/terms of payment (Soman & Cheema, 2002)
 - Information (online recommendations) (Senecal & Nantel, 2004)
 - Pricing and promotion (Darke & Chung, 2005)
- Financial literacy?

Contribution

- First, we take into account the complexity of buying decisions
 - => Trade-off between different attributes
- Second, we focus on the buying behavior of young adolescents, university students in law and in economics, and adults.
 - => Heterogeneity among different aged and different (economic) background?
- Third, we use a discrete choice experiment (DCE)
 - => DCE are perfect to generate and analyse the preferences of individuals (Lancsar, Fiebig, & Hole, 2017; Lancsar & Louviere, 2008)
- Fourth, we link financial literacy to the multi-dimensional nature of consumption decisions.
 - => Financial literacy has positive effect on wealth accumulation (Behrman, Mitchell, Soo, & Bravo, 2012), consumption and investment decisions (Lusardi & Mitchell, 2014), credit management (Disney & Gathergood, 2013) and retirement planning (Lusardi & Mitchell, 2017) etc.

Literature review and theoretical framework (1)

Consumer Theory (Mas-Colell & Whinston, 1995)



Literature review and theoretical framework (2)

Heterogeneous effects related to financial literacy

- Price
 - Financial literate individuals are more likely to compare products across shops → higher price sensitivity (OECD, 2016)
- Credit
 - Financial literacy is negatively associated with the use of payday loans (Kim & Lee, 2018) and credit card use (Robb, 2011)
 - Costs associated with credit are often lower for more literate individuals (Disney & Gathergood, 2013)
- Information
 - Consumers with higher financial literacy are more critical (OECD, 2016)
→ More attention to opinion of other consumers on the quality of a product
- Promotion
 - +: Financial literacy would help to estimate the true value of a gift → increased deal value (Darke & Chung, 2005)
 - -: More literate consumers are less prone to impulsive buying (Lam & Lam, 2017)

Experimental design

- **Objective:** Analyse the role of price, payment terms, 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** (*Mangham, Hanson, & McPake, 2009*)
 - 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

Data

- Pilot study in among 70 respondents
- Final survey was carried out in Fall of 2018 and the Spring and Fall of 2019 among 1665 respondents
- Four subsamples: secondary school students (1199), university students in economics (206), university students in law (140) and adults (120)
- Questionnaire consists of three parts:
 - Socio-economic background characteristics
 - Financial literacy quiz
 - DCE experiment

Econometric model– Base model (M_{Base})

- Mixed logit models (Train, 2009 and Henscher & Greene, 2003)
- The utility of student n from alternative j in choice task t is specified as:

$$U_{njt} = \alpha_j + \beta'_n x_{njt} + \varepsilon_{njt} \quad (1)$$

- α_j : alternative specific constant (ASC) that capture the effect of unobserved factors
- x_{njt} : a vector of attributes
- ε_{njt} : unobserved random error term

Econometric model – Interaction model (M_{FinLit})

- Interaction of attributes in the base model with the standardized financial literacy score to measure impact of financial literacy:

$$U_{njt} = ASC + \beta'_n x_{njt} + Z_FinLit_n * (\beta'_n x_{njt}) + \varepsilon_{njt} \quad (2)$$

- α_j : alternative specific constant (ASC) that capture the effect of unobserved factors
- x_{njt} : a vector of attributes
- Z_FinLit_n : standardized financial literacy score (mean 0 and SD 1)
- ε_{njt} : unobserved random error term

Results (1)

	M_{Base}		$M_{Literacy}$	
	Mean	SD	Mean	SD
Cash price	-0.006*** (0.001)	-	-0.005*** (0.001)	-
Cash price x Z_FinLit			0.0002 (0.0002)	
Payment terms				
Cash payment		Ref.		Ref.
Payment plan	-1.172*** (0.071)	2.028*** (0.085)	-1.180*** (0.070)	1.929*** (0.091)
Payment plan * Z_FinLit	-	-	-0.250*** (0.069)	-0.493*** (0.185)
Information				
No reviews available		Ref.		Ref.
Positive reviews	1.390*** (0.079)	1.576*** (0.079)	1.391*** (0.077)	1.252*** (0.099)
Positive reviews* Z_FinLit	-	-	0.372*** (0.076)	0.804*** (0.144)
Negative reviews	-1.316*** (0.101)	2.012*** (0.110)	-1.308*** (0.100)	1.976*** (0.110)
Negative review * Z_FinLit	-	-	-0.191** (0.085)	0.335 (0.251)

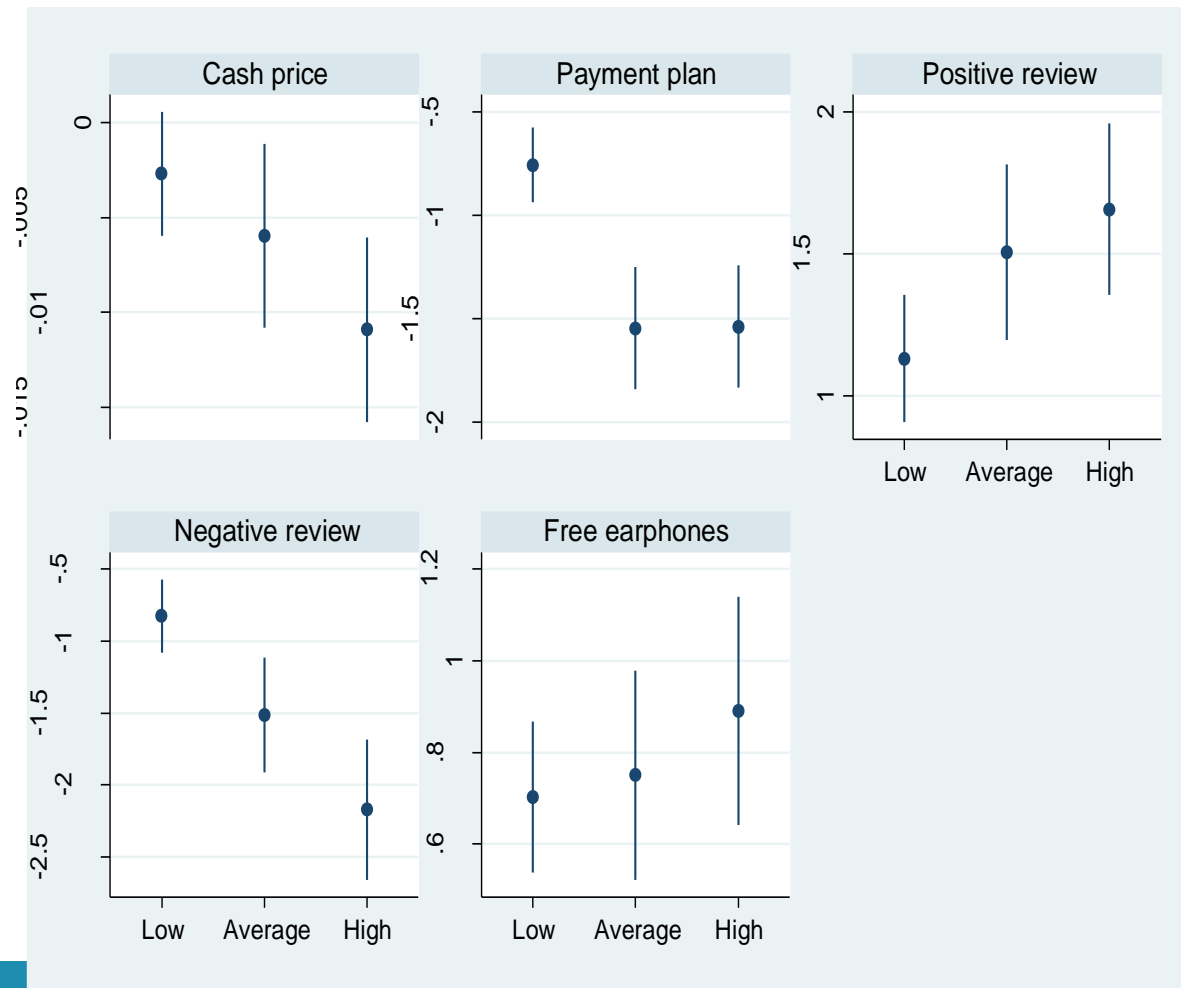
Results (2)

	M_{Base}		$M_{Literacy}$	
	Mean	SD	Mean	SD
Promotion				
No gifts	Ref.		Ref.	
Free pair of earsets	0.784*** (0.0601)	1.373*** (0.0685)	0.801*** (0.060)	1.174*** (0.082)
Free pair of earsets * Z_FinLit	-	-	0.096 (0.061)	0.699*** (0.130)
ASC	2.464*** (0.423)	-	2.388*** (0.421)	-
No. of respondents	1666		1666	

Note: Standard errors are in parentheses.

*p<.05; **p<.01; ***p<.001.

Estimates of coefficients and 95%-confidence intervals by financial literacy level



Predictive probability analysis (1)

	M_{Base}	M_{FinLit}
Cash price		
325	-6.90%*** (-9.84; -3.96%)	-6.69%*** (-9.62; -3.76%)
325 x finlit	-	0.30% (-0.18%; 0.80%)
350	-13.75%*** (-19.54; -7.96%)	-13.32%*** (-19.09%; -7.54%)
350 x finlit	-	0.60% (-0.36%; 1.60%)
Payment terms		
Payment plan	-52.71%*** (-57.73%; -47.68%)	-52.99%*** (-57.94%; -48.04%)
Payment plan x finlit	-	-12.44%*** (-19.13%; -5.75%)

Predictive probability analysis (2)

	M_{Base}	M_{FinLit}
Information		
Positive reviews	60.13%*** (55.15%; 65.10%)	60.16%*** (55.33%; 64.98%)
Positive reviews x finlit	-	18.40%*** (11.17%; 25.63%)
Negative reviews	-57.69%*** (-64.29%; -51.11%)	-57.45%*** (-64.00%; -50.87%)
Negative reviews x finlit	-	-9.50%** (-17.71%; -1.29%)
Promotion		
Free earphones	37.29%*** (32.22%; 42.37%)	38.02%*** (33.02%; 43.01%)
Free earphones x finlit	-	4.78% (-1.20%; 10.77%)

Heterogeneous effects

- Considering the price effect, we observe that the effect of a price change is not significant for high school students and university law students.
- All subgroups take into consideration the cost of credit
- The effect of information on the quality of the product in the form of online reviews is more or less the same in all subgroups. However, we note that the effect of negative reviews is not significant for law students, while adults attach a very high value on negative reviews.
- In general, the inclusion of earphone as a free gift raises the likelihood that someone accepts the offer, however the reverse is true for adults.

Conclusion

- Results
 - Positive (negative) online reviews result in higher (lower) likelihood to buy
 - Most consumers are well aware of the extra costs of credit
 - Inclusion of free gifts stimulates consumption
 - Price has an influence on the likelihood to buy a good, although secondary school students and university law students are rather price inelastic
 - Financial literacy reinforces the impact of reviews and payment terms
- Consumption decisions as a trade-off and impact of financial literacy
- Limitation: DCE lacks (monetary) incentives
- Future research: experimental settings with real (monetary) incentives as this will closer simulate real life
- From a policy perspective, importance of more consumer-oriented policy initiatives related to financial literacy

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