# Financial Literacy and the Demand for Financial Advice

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Financial Innovation and Market Dynamics. The Role of Securities Regulation Università Bocconi – February 10, 2012

# Motivation

- Many households in the US and in Europe display low financial literacy. Concerns that these households may make poor financial decisions (Lusardi and Mitchell 2007; Lusardi and Tufano 2009; Monticone 2010; van Rooij et al. 2011)
- In principle, households can seek advice and guidance from qualified sources, compensating their lack of knowledge
- Professional financial advisors are often relied upon for advice US
   Netherlands Italy
- Is this sufficient to avoid the consequences of financial illiteracy?

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# This paper

This paper analyzes the demand (and supply) of professional financial advice in relation to investors' financial literacy.

- On the supply side, do advisors provide more informative advice to financially literate?
  - $\Rightarrow\,$  According to our model, advisors provide better advice to the most knowledgeable customers
- On the demand side, who seeks advice? How much do households rely on experts' advice?
  - ⇒ We find (theoretically and empirically) that more knowledgeable investors are more likely to consult advisors, while the least knowledgeable either invest by themselves or delegate

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# Background

### Literature on advice:

- Communication game (Dessein 2002)
- Investors' strategic sophistication/naiveté (Ottaviani 2000)
- Effect of perceived financial capability and trust on propensity to rely on advice (Georgarakos and Inderst 2010)
- Effect of financial knowledge and perceived conflicts of interest on propensity to follow recommendations (Hackethal Inderst and Meyer 2010)
- Advice on pensions (Koenen and Bucher-Koenen 2011)

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## Outline

- Theoretical Model
- Data and descriptives
- Empirical analysis
  - 1. Extent of reliance on the advice from professionals
  - 2. Robustness checks
- Conclusions

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- Interaction between an informed advisor and a less informed investor
- The advisor sells a risky asset and provides information to the customer about the asset's return
- The advisor has an incentive to sell the asset but faces a penalty for giving deceptive advice
- The investor has to decide whether to buy the risky asset and how much to rely on the advisor
  - Delegate
  - Consult the advisor (without delegating)
  - Invest based on her own information only

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# Timing

#### t = 0

B receives signal s with given  $\pi$ 

#### t = 1

B decides whether to delegate, ask for advice, or invest by herself

### t = 2

If Advice, then A and B interact in a communication game, where A decides whether to reveal his information or not and B decides her portfolio allocation t = 3

r is realized

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### Setup

- Two assets Two agents
  - One risky asset, with

$$f(\tilde{r}) = \begin{cases} r_H & 1/2 \\ r_L & 1/2 \end{cases}$$

where  $r_H > 0$ ,  $r_L < 0$  and  $E_{f(\tilde{r})}[\tilde{r}] > 0$ 

• One riskless asset:  $r_f = 0$ 

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## Setup

### Advisor A

- Knows the true state of r̃ with certainty
- If consulted, sends a "message"  $\sigma = \{r_H, r_L\}$

## Setup

### ► Investor/Buyer B

- Mean-variance preferences
- Short-selling constraints
- Does not know the true state of r̃, but
- Receives a (private) signal  $s = \{r_H, r_L\}$  with "precision"  $\pi$ , where  $\pi = Pr(s = r_i | r_i) > 1/2$ , i.e. probability that the signal is correct
- Define  $\pi_0 > 1/2$  such that  $\pi_0 r_L + (1 \pi_0)r_H = 0$ .

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# Communication game

- Information sets: the advisor A knows the true state of r̃ and signal's precision π (see MiFID) but not necessarily its realization. The investor B knows π, the realization of s and the payoff function of the advisor.
- Strategies: the advisor decides which message σ = {r<sub>H</sub>, r<sub>L</sub>} to deliver given his type. The investor chooses her optimal portfolio allocation
- Payoffs:

$$U_{A}(r_{i},\sigma) = F_{|\{E[\tilde{r}|I_{B}]>0\}} - [\sigma(r_{i}) - r_{i}]^{2}$$
$$U_{B}(I_{B}) = E[U(W_{3})|I_{B}] = W_{0} + \begin{cases} \frac{1}{2} \frac{(E[\tilde{r}|I_{B}])^{2}}{\gamma Var[\tilde{r}|I_{B}]} & \text{if } E[\tilde{r}|I_{B}] > 0\\ 0 & \text{if } E[\tilde{r}|I_{B}] \le 0 \end{cases}$$

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## Advisor's decision

- The equilibrium of the game depends on the information level π of the buyer
  - ▶ whenever  $\pi \in [1/2, \pi_0)$  there exists a unique pooling equilibrium  $\sigma^*(r_H) = r_H; \sigma^*(r_L) = r_H \Rightarrow$  the equilibrium is not informative
  - ▶ whenever  $\pi \in [\pi_0, 1]$  there exists a unique fully revealing equilibrium  $\sigma^*(r_H) = r_H; \sigma^*(r_L) = r_L \Rightarrow$  the equilibrium is informative
- Implications
  - advisors are not useful to the investors who need them the most, and they fail to be a substitute to learning by one's self.
  - regressive effect on the distribution of information among investors

## Investor's decision

- Given that investors are fully rational and know the payoff function of the advisor, and
- Given that under delegation the advisor buys a positive amount of risky asset on behalf of the customer for any value of the asset's return, inducing an expected loss to the investor when  $\tilde{r} = r_L$ 
  - ▶ when π ∈ [1/2, π₀), the investor either decides without asking advice or delegates the portfolio choice to the advisor;
  - when  $\pi \in [\pi_0, 1]$  the investor strictly prefers to consult the advisor.
- Check whether these results (demand side) hold empirically

### Data

### 2007 Unicredit Customers' Survey (UCS)

- Sample: representative of bank customers with ≥ €10,000 in the bank. N = 1,686.
- Pre-crisis data
- Contains information on socio-demographics, income and wealth (also held outside Unicredit), financial literacy, investment attitudes, etc. but no 'administrative' information on bank advisors
- Italy. Relevant setting to verify model results because banks are the main source of information/advice, while independent/fee-based advice is almost non-existent • Beltratti 2007

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# **Financial literacy**



Financial literacy: test-based (number of correct answers to 8 questions on interest rate, inflation, risk diversification and riskiness of financial products, as in Guiso and Jappelli 2008)

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*Example*: Imagine that a saving account earns an interest of 2 percent per year (net of costs). If the annual inflation rate is 2 percent, after two years (with no withdrawals) do you think you could buy more than what you could buy today, less, the same, do not know? 34% Correct | 55% Incorrect | 11% Do not know

Table: Which of these statements best describes your behaviour in deciding how to invest your savings?

	Percent		Financial literac		
		-		Mean	Std. Dev.
The advisor executes my decisions		12.03		4.97	1.33
I ask for advisor's opinion		30.21		4.98	1.25
I consider advisor's proposals		38.01		5.09	1.32
I mostly rely on advisor		16.1		4.63	1.48
Advisor decides everything		3.65		4.30	1.19
Total (N=1205)		100		4.94	1.34

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Total (N=1205)	100	4.94	1.34

 Empirical specification: generalized ordered probit (Terza 1985; Greene and Hensher 2010)

$$P(D_{i} = 1) = F(-X\beta_{1})$$

$$P(D_{i} = j) = F(\kappa_{j} - X\beta_{j}) - F(\kappa_{j-1} - X\beta_{j-1}), \quad j = 2, ..., J - 1$$

$$P(D_{i} = J) = 1 - F(\kappa_{J} - X\beta_{J})$$

where J = 5, F(.) is the normal cdf, and  $D_i$  is the delegation level of *i*:

 $D_i = 1$  I decide completely autonomously, the bank executes my decisions

 $D_i = 5$  I let bank/advisor decide everything

- Explanatory variables: gender, age, years of education, occupational status, (macro) regions of residence, log individual income, financial wealth categories, experience, whether the respondent works in the financial sector, length of bank relationship, time preference, (objective) financial literacy, self-assessed financial knowledge and trust
- Observations where Unicredit is not the main bank are dropped

	$D_i = 1$	$D_i = 2$	$D_i = 3$	$D_i = 4$	$D_i = 5$
Financial literacy	-0.012**	-0.003	0.037***	-0.017**	-0.005**
Years school	0.004***	0.008***	-0.004***	-0.007***	-0.001***
Self-employed	0.000	0.001	-0.000	-0.001	-0.000
Retired	0.005	0.009	-0.005	-0.008	-0.002
Log tot ind income	-0.007	-0.012	0.007	0.011	0.002
FinW 150-250 th	-0.038***	-0.077**	0.030***	0.068**	0.016*
FinW 250-500 th	-0.033**	-0.064**	0.027***	0.057*	0.013*
FinW 500+ th	-0.014	-0.026	0.012	0.023	0.005
Self-ass knowledge	0.022***	0.039***	-0.021***	-0.033***	-0.007***
Experience	0.000	0.001	-0.000	-0.001	-0.000
Finance sector	0.104**	0.105***	-0.104**	-0.091***	-0.014***
Trust advisor	-0.085***	-0.018	-0.009	0.086***	0.026***
Patience	-0.048	-0.084	0.045	0.072	0.015
Years at UC: 6-10	0.023	0.036	-0.022	-0.030	-0.006
Years at UC: 11-20	0.036*	0.056*	-0.035*	-0.048*	-0.009*
Years at UC: $> 20$	0.024	0.041	-0.022	-0.035	-0.007

Unicredit 2007. Dep Var: probability of delegating financial decisions ( $D_i = 1, ..., 5$ ). Model: Generalized Ordered Probit (marginal effects). Sub-sample of investors holding risky assets. Standard errors are robust to heteroskedasticity. Significance: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

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## Robustness checks

- Alternative indices of financial literacy
- Restrict to sample of respondents who do not have other bank or broker relationships
- Financial literacy endogeneity
- Trust endogeneity

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#### Conclusions

# Concluding remarks

Main result: Financial literacy increases the probability of asking for professional advice, but reduces that of delegating. In contexts where the supply of independent/fee-based financial advice is limited (as in Italy), this is the wisest choice

### Implications:

- Low financial literacy consumers may make sub-optimal decisions in relation to the choice and degree of reliance on sources of advice
- Investors who seek advice are those who need it relatively less. Non-independent advisors are not useful to the investors who need them the most, as they fail to be a substitute to lack of financial knowledge. Financial literacy is needed also in the presence of professional advisors

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Conclusions

# Appendix

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### **United States**

Which sources of information do households use for investment decisions?



Intro

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#### Frequency of cheating by bank/insurance company Germany Spain France 80 00 4 20 Percent 0 UK Italy Netherlands 80 60 6 20 0 Never 1 2 3-4 5+ Never 1 2 3-4 5+ Never 1 2 3-4 5+ Times cheated by bank/insurance company, last 5 yrs Source: ESS 2004 ѕтата™

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# Sources of advice (UCS 2007)



	$D_i = 1$	$D_i = 2$	$D_i = 3$	$D_i = 4$	$D_i = 5$	Selection
Log tot ind income	-0.008	-0.010	0.007	0.009	0.002	-0.003
FinW 150-250 th	-0.051**	-0.077**	0.037**	0.070**	0.021**	0.147***
FinW 250-500 th	-0.046**	-0.067**	0.034**	0.061**	0.018*	0.159***
FinW 500+ th	-0.024	-0.034	0.019	0.030	0.009	0.172***
Financial literacy	-0.000	-0.000	0.000	0.000	0.000	0.045***
Self-confidence	0.026***	0.032***	-0.022***	-0.029***	-0.008**	0.028*
Experience	0.000	0.000	-0.000	-0.000	-0.000	0.008***
Finance sector	0.110**	0.080***	-0.096**	-0.078***	-0.016***	0.056
Trust advisor	-0.076***	-0.094***	0.063***	0.085***	0.022***	0.048***
Patience	-0.064	-0.079	0.053	0.071	0.018	0.312*
Very risk tolerant						0.224***
Risk tolerant						0.127***
Risk averse						0.139***
Saving: 0%						-0.138***
0						
Ν						1581
ρ						0.175
$\stackrel{,}{ ho}$ std. err.						(0.169)

Data: Unicredit 2007. Dependent variable: columns I-V, probability of delegating financial decisions ( $D_i = 1, ..., 5$ ); Column VI, probability of holding risky assets. Model: Ordered Probit with selection. Exclusion restrictions (Column VI) are risk preferences; zero saving rate. Standard errors are robust to heteroskedasticity. Significance: \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

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Table: Investing autonomously or delegating – Robustness on financial literacy index

	$D_i = 1$	$D_i = 2$	$D_i = 3$	$D_i = 4$	$D_i = 5$
Financial literacy 1	-0.0100**	-0.0023	0.0298***	-0.0137**	-0.0039**
Financial literacy 2	-0.0070*	-0.0018	0.0207***	-0.0084	-0.0035**
Financial literacy 3	-0.0032	0.0028	0.0141**	-0.0096*	-0.0040***
Financial literacy 4	-0.0016	0.0023	0.0078	-0.0054	-0.0032**

Unicredit 2007. Dep Var: probability of delegating financial decisions ( $D_i = 1, ..., 5$ ). Model: Generalized Ordered Probit (marginal effects reported). Definition of financial literacy indices: Financial literacy 1: the baseline (Guiso and Jappelli 2008), re-scaled ( $10 \times (Inflation + Interest + Diversif 1 + Diversif 2 + Risk1 + Risk2 + Risk3/)$ (8; Financial literacy 2:  $10 \times [Inflation + Interest + Diversif 1 + Diversif 2 + (Risk1 + Risk2 + Risk3)/4]/5$ ; Financial literacy 3:  $10 \times [Interest + Diversif 1 + Diversif 2 + (Risk1 + Risk2 + Risk3)/4]/4$ ; Financial literacy 4:  $10 \times [Interest + Diversif 1 + Diversif 2 + (Risk1 + Risk2 + Risk3)/4]/4$ ; Financial literacy 4:  $10 \times [Interest + Diversif 1 + Diversif 2]/3$ . Sub-sample of investors holding risky assets. Standard errors reported in parentheses are robust to heteroskedasticity. Significance: \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

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### Table: Investing autonomously or delegating

	$D_i = 1$	$D_i = 2$	$D_i = 3$	$D_i = 4$	$D_i = 5$			
Sample: Unicredit main or only bank (baseline) (N = 1,116)								
Financial literacy	-0.012**	-0.003	0.037***	-0.017**	-0.005**			
	Sample: Un	icredit only	y bank (N =	802)				
Financial literacy	-0.017**	0.005	0.033***	-0.017*	-0.005			
Sample: Unicredit main/only bank								
and u	se broker ne	ver/seldon	n/sometimes	(N = 847)				
Financial literacy	-0.012	0.002	0.032***	-0.016*	-0.005**			
	Sample:	Unicredit r	main/only ba	ink				
	and use brol	ker never/s	seldom (N =	705)				
Financial literacy	-0.012	0.001	0.037***	-0.019*	-0.007**			
Unicredit 2007. Dep Var: probability of delegating financial decisions ( $D_i = 1,, 5$ ). Model: Generalized Ordered Probit. Standard errors are robust to heteroskedasticity. Significance: *** p<0.01, ** p<0.05, * p<0.1.								

# Robustness

Financial literacy endogeneity

- Reverse causality: Financial literacy may be positively correlated with the tendency to consult advisors because individuals *learn* from them (and not because financially literate individuals *choose* to consult them)
- Spurious relation: Unobserved factor driving both decision to invest in acquisition of financial knowledge and demand for advice
  - Instrument financial literacy (Control Function approach). Instruments: average financial literacy at regional level (SHIW) and experience with financial products (UCS).

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### Robustness

Financial literacy endogeneity

#### Table: First stage

	Dependent Variable: Financial Literacy (UCS)
Experience	0.018***
Regional Fin Lit (SHIW)	0.424**
N obs	1116
F excl instr	17.90
Hansen J	1.892
Hansen J p-value	0.169
Endog test	0.240
Endog test p-value	0.624

Unicredit 2007. Dep Var: Financial Literacy (baseline). Model: linear model estimated by GMM (first stage). Standard errors robust to heteroskedasticity and clustering on regions. Significance: \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

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### Robustness

Financial literacy endogeneity

Table: Investing autonomously or delegating (controlling for financial literacy endogeneity)

	$D_i = 1$	$D_i = 2$	$D_i = 3$	$D_i = 4$	$D_i = 5$
Financial literacy	-0.017	-0.024	0.084**	-0.030	-0.014
Residuals	0.006	0.027	-0.056	0.014	0.010

Unicredit 2007. Dep Var: probability of delegating financial decisions ( $D_i = 1, ..., 5$ ). Model: Generalized Ordered Probit, controlling for financial literacy endogeneity via control function approach (marginal effects reported). Instruments for financial literacy: average financial literacy at regional level (SHIW) and experience with financial products (UCS). Bootstrapped standard errors (200 repetitions) are robust to heteroskedasticity and clustering at regional level. Significance: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

#### Table: Dep Var: trust in own financial advisor

	(I)	(11)	(111)	(IV)	(V)	(VI)
Female	0.185***	0.182***	0.183***	0.178***	0.181***	0.178***
Years school	0.003	0.003	0.006	0.006	0.004	0.005
Financial literacy	-0.013	-0.009	-0.013	-0.008	-0.009	-0.006
Self-confidence	0.053	0.053	0.050	0.042	0.050	0.043
Experience	0.003	0.003	0.003	0.002	0.002	0.002
Finance sector	-0.332*	-0.309*	-0.293*	-0.278	-0.291*	-0.279
Years at UC: 6-10	-0.126*	-0.121	-0.136*	-0.137*	-0.130*	-0.132*
Years at UC: 11-20	-0.124*	-0.126*	-0.128*	-0.120*	-0.128*	-0.121*
Years at UC: $> 20$	-0.146**	-0.134**	-0.140**	-0.129*	-0.126*	-0.120*
Generalized trust	0.181***					
Trust in banks (reg)		2.287**			1.767*	1.409
GDP growth			0.016	0.012	0.016	0.012
Referendum 2006 (prov)			0.022***		0.017**	
Senate 2006 (prov)				0.041***		0.035***
Constant	3.838***	3.811***	2.795***	0.567	3.036***	1.078
N obs	1581	1581	1581	1581	1581	1581
Adj. R-Squared	0.051	0.051	0.052	0.058	0.056	0.060

Data: Unicredit 2007. Dep Var: Trust in own financial advisor/bank official. Model: linear model estimated by OLS. Standard errors are robust to heteroskedasticity and clustering on provinces. Significance: \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

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#### Table: Dependent Variable: $Pr(D_i \ge 4)$

Sub-sample:					
	Unicredit customers for $< 5$ years	Unicredit customers for $> 5$ years			
Trust advisor	0.102*** (0.04)	0.114*** (0.02)			
N obs	82	1034			
Unionalit 2007 D	an Man. Duckshility of Delegation El	$(D_{\pi}(D) > 4))$			

Unicredit 2007. Dep Var: Probability of Delegating Financial Decisions  $(Pr(D_i \ge 4))$ . Model: Generalized Ordered Probit. Standard errors are robust to heteroskedasticity. Significance: \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

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Table: Delegating financial decisions	(controlling for trust endogeneity)	ļ
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	First Stage	Second Stage		
Dep Var:	Trust	$Pr(D_i \ge 4)$		Di
Model:	(I)	Probit (II)	LPM (III)	LPM (IV)
Trust in banks Referendum 2006 Trust advisor Fitted residuals	1.784* 0.019***	0.089 0.025	-0.024	0.096
N obs F excl instr Hansen J Hansen J p-value	1116	1116	1116 4.629 0.516 0.472	1116 4.629 0.342 0.559

Unicredit 2007. First column: first stage regression, dep var: trust towards advisor, model: OLS. Second column: second stage regression, dep var: probability of delegating  $(D_i \ge 4)$ , model: probit with CF (Bootstrapped standard errors with 200 repetitions). Third column: second stage regression, dep var: probability of delegating  $(Pr(D_i \ge 4))$ , model: linear probability model by GMM. Fourth column: second stage regression, dep var: delegation  $(D_i)$ , model: GMM. Standard errors are robust to heteroskedasticity and clustering on provinces. Significance: \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

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### Table: Dep Var: $Pr(D_i \ge 4)$

Sub-sample:				
	Financial Literacy Below average ( $\leq$ 4)	Financial Literacy Above average (> 4)		
Trust advisor	0.109*** (0.03)	0.109*** (0.02)		
N obs	384	732		

Unicredit 2007. Dep Var: Probability of Delegating Financial Decisions ( $Pr(D_i \ge 4)$ ). Model: Generalized Ordered Probit. Standard errors are robust to heteroskedasticity. Significance: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

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