Locus of Control and Investment in equity

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Netspar International Pension Workshop 2017

Economic context

- Financial participation in the stock market is relatively common. In the Netherlands +/- 25% of all households participate *(Van Rooij et al. 2011).*

- This requires that we need to understand the determinants of their investment behavior!!

Literature context I

- Traditional models of portfolio choice underline **risk and time preferences** as key determinants of individual investment behavior *(e.g., Merton, 1969; Samuelson, 1969; Bodie et al., 1992; Cocco et al., 2005; Gomes and Michaelides, 2005; Benzoni et al., 2007).*

- Recent studies show the relevancy of
  - Social preferences
  - Financial literacy
  - Optimism
  - Overconfidence

  (e.g., Hong et al., 2004; Guiso et al., 2008; Van Rooij et al., 2011) and (e.g., De Bondt, 1998; Barber and Odean, 2001; Puri and Robinson, 2007).

- A growing literature documents the relevancy of other personality chars in other economic domains. *(e.g., Heckman et al., 2006; Borghans et al., 2008; Almlund et al., 2011).*

Literature context II

- **Internal locus of control**: *i.e., the extent to which a person believes that the outcomes in his or her life are due to one's own personal efforts, as opposed to the result of luck, change, fate, or the intervention and influence of others (Rotter, 1966)*

- **Internal locus of control** has been found to be important in a wide range of economic situations:

  - labor market outcomes *(e.g., Bowles et al., 2001a,b); Coleman and DeLeire, 2003; Heineck and Anger, 2010; Caliendo et al., 2015),*
  - the credit market *(Tokunaga, 1993),*
  - entrepreneurship *(Evans and Leighton, 1989)*
  - savings *(Cobb-Clark et al., 2013)*

Objective of this paper I

- This paper focuses on a person's internal **economic** locus of control as a determinant of investment decisions in equity.

- An **internal economic locus of control** captures the perception that economic outcomes such as the creation of wealth are due to personal efforts *(Furnham, 1986).*

Objective of this paper II

- We use representative household data from the Dutch National Bank Household Survey (DHS) to test the hypotheses:

1. that having an internal economic locus of control, over and beyond risk and time preferences, positively relates to the decision to participate in equity

2. as well as the share of risky investments in a household's total portfolio.

Data I

- Information from all the waves (1994-2015) of the DHS, an annual panel survey of Dutch households

- We restrict our sample to
  - household heads between the ages of 25 and 80 who are neither studying full time, looking for employment for the first time, or solely living on disability benefits.
  - household heads responsible for the household finances.
  - households which report a positive amount of financial wealth and who report some cash holdings.

- Our main estimation sample: 2,947 households, for a total of 16,184 households-year observations.

Data II

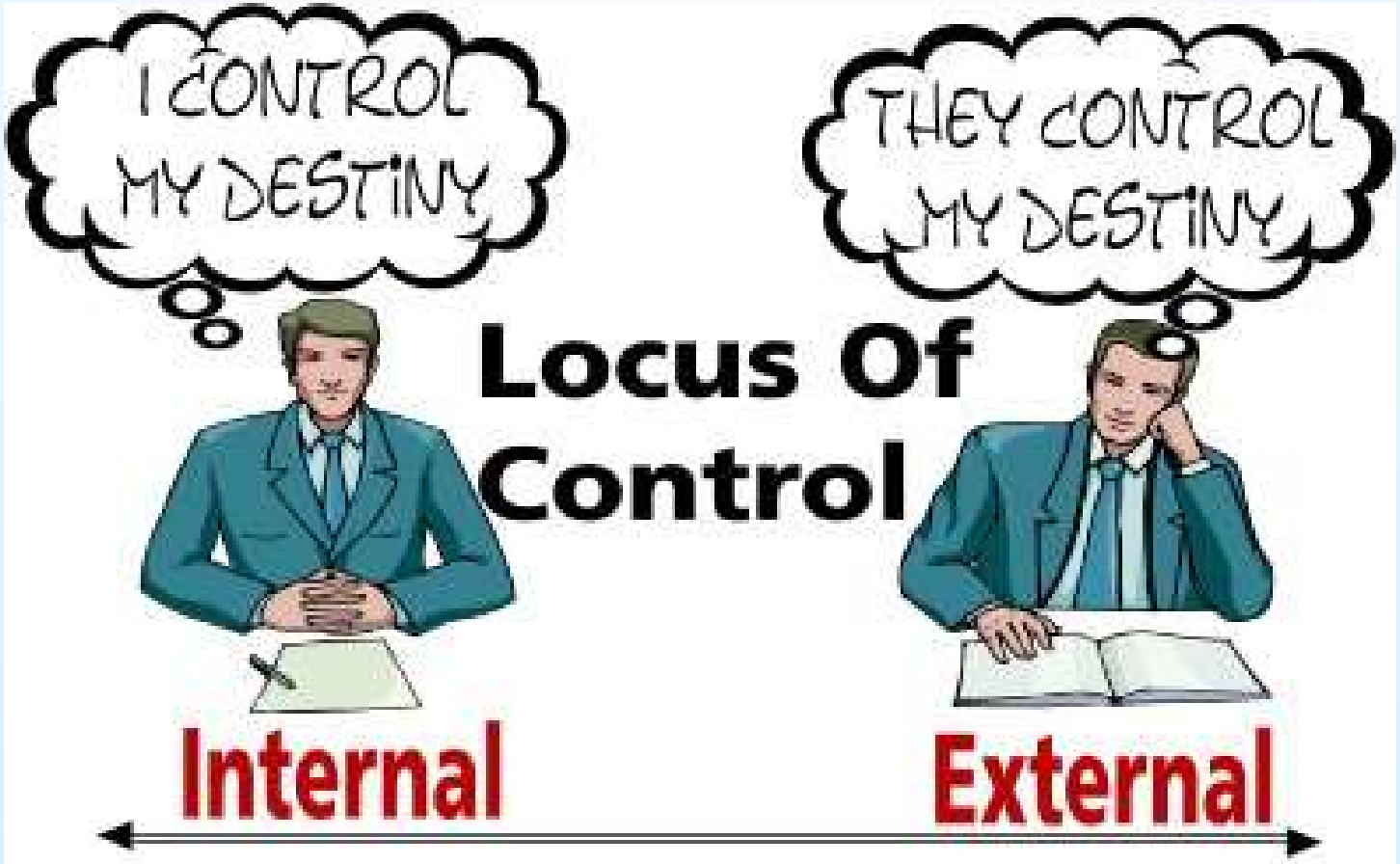
- Dependent variable 1: risky asset participation (dummy)
  - Risky assets = mutual funds and mutual fund accounts, stocks and shares, open put or call option positions, and substantial stock holdings (excluding private equity holdings in their own company).
- Dependent variable 2: portfolio share in risky assets (0-100)

Data III

- Internal economic locus of control (13 items)
  - Becoming rich has nothing to do with luck"
  - There is little one can do to prevent poverty" (reverse)
  - 7-point scale ! Higher number is more internal
  - Index = Standardized mean of all items
  - Average over time

- Data includes validated scales on risk and time preferences, other personality traits etc.

Results


I CONTROL MY DESTINY
THEY CONTROL MY DESTINY
Locus Of Control
Internal
External

Equity ownership and locus

Table 1: The relation between equity ownership and internal economic locus of control

Dependent variable: Equity ownership	(1)	(2)	(3)	(4)
Internal economic locus of control	0.073***	0.062***	0.049***	0.024***
	(0.009)	(0.009)	(0.008)	(0.008)
Risk aversion			−0.157***	−0.144***
			(0.008)	(0.007)
Patience			0.045***	0.031***
			(0.008)	(0.007)
Socio-demographic characteristics:	No	Yes	Yes	Yes
Income and wealth:	No	No	No	Yes
R^2	0.04	0.10	0.21	0.30

A one standard deviation increase in internal economic locus of control is associated with a 2.4 percentage point higher likelihood of investing in equity.

This marginal effect is large. For example, the impact of a one standard deviation increase in internal economic locus of control is similar to the impact of a one standard deviation in numeracy, as reported by *Christelis et al. (2010).*

Share of wealth in risky assets

Table 2: The relation between internal economic locus of control on the share of wealth invested in different assets

Dependent variable: Share of wealth invested in:	Equity (1)	Bonds (2)	Cash (3)	Other assets (4)
Internal economic locus of control	0.013***	0.001	−0.016***	0.001
	(0.004)	(0.001)	(0.004)	(0.001)
Risk aversion	−0.062***	−0.003**	0.067***	−0.002
	(0.004)	(0.001)	(0.004)	(0.001)
Patience	0.006*	0.001	−0.010**	0.002**
	(0.004)	(0.001)	(0.004)	(0.001)
Socio-demographic characteristics:	Yes	Yes	Yes	Yes
Income and wealth:	Yes	Yes	Yes	Yes
Observations	16,184	16,184	16,184	16,184
Households	2,947	2,947	2,947	2,947

Subjective risk perception: mechanism

- Intuition:
  - People who believe they are in control of their outcomes are more likely to think that they can influence these outcomes to their benefit.
  - The ex ante outcome variance, which captures fundamental uncertainty, should be perceived as less pronounced for people with an internal locus of control.

- Several studies supports this mechanism:
  - *Cull et al. (1999):* women with an external locus of control overestimate the chance of getting breast cancer.
  - *Jia et al. (2015):*high self-control results in a lower weighting of the probability of health and disease risks.
  - *Kallmen (2000) and Sjoberg (2000):* Internal locus of control is strongly associated with a lower degree of risk perception

Subjective risk perception: mechanism

- Locus leads to lower risk perception and this increases equity holdings

- Financial options as proxy because they are different: Intuition: options become more valuable when their volatility increases

- High internal locus of control $\longrightarrow$ lower perceived risk variance $\longrightarrow$ high actual cost and price relative to own valuation $\longrightarrow$ less likely to buy and more likely to (short-)sell options

Subjective risk perception: mechanism

Table A.2: Internal economic locus of control and investing in financial options

Investor Outcome:	Option Buyer (1)	Option Seller (2)	Buyer & Seller (3)
Internal economic locus of control	1.017	1.951**	1.758
	(0.247)	(0.615)	(0.616)
Risk aversion	0.482***	0.382***	0.483**
	(0.114)	(0.124)	(0.162)
Patience	1.043	0.920	0.614
	(0.305)	(0.162)	(0.336)
Base outcome:	Has equity but not options		
Socio-demographic characteristics:	Yes		
Risk aversion and patience:	Yes		
Income and wealth:	Yes		
Observations	3,198		
Households	849		

Potential confounders

- Our result is not driven by:
  - Financial literacy (validated scale)
  - Overconfidence (proxy)
  - Optimism (validated scale)
  - Trust (validated scale)
  - Big Five personality traits (validated scale)

Robustness

- Our result robust to :
  - different constructions of internal economic locus of control
    - > 30 years
    - First measure
    - Factor analyses
    - Lagged mean
  - different types of risky financial assets

Conclusion I

- Internal locus of control strongly relates to households decision to invest in risky assets
- This happens because internal locus of control is related to perceiving less risk in risky assets
- Our estimates are robust to alternative explanations and estimation methodologies

Conclusion II

- At this stage, we cannot say whether the investment bias related to internal economic locus of control is ultimately beneficial or harmful for household investors.

Locus of Control – What's your view?