Personality Differences and Investment Decision-making

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April 8, 2024

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Introduction

- Jiang, Peng, and Yan 2024, published in Journal of Financial Economics March Issue
  - surveyed thousands of affluent American investors
  - to examine the relationship between personalities and investment decisions

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A Need to Expand the Characteristics Set

- Household finance literature related heterogeneity in investment decisions to:
  - age, wealth, intelligence and financial literacy
- observed heterogeneity not fully explained
- similar challenge when explaining investor beliefs
  - only a small fraction of investor expectations differences can be explained by an exhaustive list of demographic variables
- $\Rightarrow$ clear need to explore other characteristics to explain how people make investment decisions

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Research Question

- Are persistent differences in personality traits related to persistent differences in both
  - *beliefs*, and
  - *investment decisions*?
- Research has shown that personality traits matter for a variety of life outcomes
  - investment represents a form of life decisions
- personality concepts are related and potentially complementary to economics ones:
  - neuroticism & conscentiousness → risk aversion & time preference?
- these psychology-based concepts can potentially increase the explanatory power of investment decisiions beyond traditional economic measures

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Portfolio Choice Model (1 risk free + 1 stock)

$$\max_{w_i} (1-\alpha)\left(w_i E_i[r] - \frac{1}{2}\gamma_i w_i^2 Var_i[r]\right) - \alpha\frac{1}{2}(w_i - w_i^*)^2 \tag{1}$$

- w_i: weight of stock by investor i
- γ_i: degree of risk aversion
- $E[r_i]$ and $Var[r_i]$: subjective mean and variance of stock
- w_i^*: investor i's allocation to the stock if her decision is entirely determined by non-pecuniary factors, e.g., social and ethical concerns
- $\alpha \in [0, 1]$: the weight that the investor allocates to the non-percuniary factors

Two channels to affect investment decisions

$$\max_{w_i} (1-\alpha)\left(w_i E_i[r] - \frac{1}{2}\gamma_i w_i^2 Var_i[r]\right) - \alpha\frac{1}{2}(w_i - w_i^*)^2 \tag{2}$$

- personality traits affect investment decisions through two channels
  - through their effects on $E_i[r]$, $Var_i[r]$, or γ_i
    - ★ e.g. one with high neuroticism is likely to be pessimistic
    - ★ $\Rightarrow$ lower $E_i[r]$
    - ★ $\Rightarrow$ lower stock allocation
  - through their effects on the target portfolio share w_i^*
    - ★ e.g. more social investors have higher target shares w_i^*
    - ★ $\Rightarrow$ higher allocation to risky asset
- no specific functional form relating personality traits to $E_i[r]$, $Var_i[r]$ and w_i^*
  - a.k.a. left as an exercise for the reader

AAII Survey

- Nationwide survey through the American Association of Individual Investors (AAII)
  - nonprofit of 150,000 members
  - main purpose: assist "individuals in becoming effective managers of their own assets through programs of education, information and research"
- distributed via email and given two weeks to complete
- 3325 valid responses $\Rightarrow$ 2% response rate

Survey Design

A.1. Section I

In this section, you will see a number of different phrases and sentences. Please use the response options to indicate how accurately each phrase or sentence describes you.

1. Usually like to spend my free time with people.
2. Get overwhelmed by emotions.
3. Like order.
4. Am concerned about others.
5. Am full of ideas.
6. Like going out a lot.
7. Am a worrier.
8. Start tasks right away.
9. Sympathize with others' feelings.
10. Am able to come up with new and different ideas.
11. Avoid company.
12. Worry about things.
13. Work hard.
14. Am sensitive to the needs of others.
15. Am an original thinker.
16. Dislike being the center of attention.
17. Panic easily.
18. Neglect my duties.
19. Use others for my own ends.
20. Love to think up new ways of doing things.

Answer options for each question above are the same:

- Very Inaccurate
- Moderately Inaccurate
- Slightly Inaccurate
- Slightly Accurate
- Moderately Accurate
- Very Accurate

Figure: Section 1 of the survey

A.2. Section II

This section asks your opinion about financial markets and the economy in general.

We start with three questions that ask how you make financial decisions under various hypothetical financial situations.

1. First, in your opinion, if a stock's price has risen a lot over the last year, its price over the next year will
   - Continue to rise
   - Start to fall
   - Remain the same
   - Cannot say
2. Second, in your opinion, if a stock's price has fallen a lot over the last year, its price over the next year will
   - Continue to fall
   - Start to rise
   - Remain the same

A.3. Section III

This section asks about your financial decisions.

1. How many years have you been investing in the stock market (including stocks, mutual funds, ETF, etc.)?
   - Less than 5 years
   - 5 to 10 years
   - 11 to 20 years
   - 21 to 30 years
   - More than 30 years

A.4. Section IV

Lastly, we have some questions about your demographic information. (Answer options omitted.)

1. What is your gender?
2. What is your age?
3. In which state do you currently reside?
4. What is the highest level of school you have completed or the highest degree you have received?
5. Choose one or more races that you consider yourself to be.
6. What was your total household income before taxes during the past 12 months?

Figure: Sections 2, 3, and 4 of the survey

Personality Traits Definitions

- Openness (to experience) refers to the tendency to be open to new aesthetic, cultural, or intellectual experiences.
- Conscientiousness refers to the tendency to be organized, responsible, and hardworking.
- Extraversion refers to an orientation of one's interests and energies toward the outer world of people and things rather than the inner world of subjective experiences; it is often characterized by positive affect and sociability.
- Agreeableness refers to the tendency to act in a cooperative unselfish manner.
- Neuroticism refers to a chronic level of emotional instability and proneness to psychological distress.

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Demographic Distribution

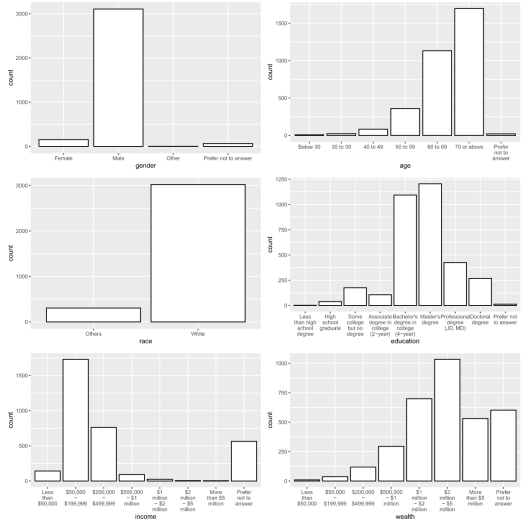

Fig. 1. Distribution of demographic variables in the AAII survey.

Personality Traits Distribution

Table 2
Personality traits and investor characteristics.

	(1) Agreeableness	(2) Conscientiousness	(3) Neuroticism	(4) Extraversion	(5) Openness
Female	0.29***	-0.02	0.25**	0.06	-0.04
	(0.07)	(0.07)	(0.11)	(0.10)	(0.09)
Age	0.01***	-0.01***	-0.01**	0.01***	-0.01**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Log Income	0.03	0.09***	-0.08**	0.09***	0.05
	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)
Log Wealth	-0.04*	0.04**	-0.03	0.02	0.01
	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)
College	0.05	-0.03	0.03	-0.08	0.07
	(0.05)	(0.05)	(0.07)	(0.07)	(0.06)
Race F.E.	Y	Y	Y	Y	Y
State F.E.	Y	Y	Y	Y	Y
Observations	2,607	2,607	2,607	2,607	2,607
R^2	0.04	0.05	0.04	0.05	0.03
Adjusted R^2	0.01	0.02	0.01	0.02	0.002

We regress each personality trait on demographic variables. In these regressions, we use the subsample of the AAII respondents who indicate they are either male or female, and provide their income and wealth information. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Personality traits and investor beliefs

Table 3
Personality traits and investor beliefs.

Panel (a) Benchmark results					
	(1)	(2)	(3)	(4)	(5)
	Stock Return			GDP Growth	Inflation
	Mean	Prob(>20%)	Prob(< −20%)	Mean	Mean
Agreeableness	-0.10	-0.34	-0.09	-0.01	0.002
	(0.24)	(0.40)	(0.46)	(0.03)	(0.03)
Conscientiousness	0.66***	-0.07	-0.99**	0.04	-0.07***
	(0.24)	(0.40)	(0.46)	(0.03)	(0.03)
Neuroticism	-0.79***	-0.21	1.02***	-0.07***	0.05***
	(0.16)	(0.28)	(0.32)	(0.02)	(0.02)
Extraversion	0.82***	1.27***	-1.07***	0.09***	-0.02
	(0.18)	(0.30)	(0.34)	(0.02)	(0.02)
Openness	0.04	1.49***	0.92**	-0.003	0.01
	(0.19)	(0.32)	(0.37)	(0.03)	(0.02)
Demographics F.E.	Y	Y	Y	Y	Y
Observations	3,325	3,325	3,325	3,325	3,325
R^2	0.06	0.06	0.04	0.04	0.04
Adjusted R^2	0.03	0.04	0.01	0.02	0.01
Panel (b) Adjusted R^2 under alternative specifications of explanatory variables					
Personality Traits Only	0.02	0.01	0.01	0.01	0.005
Demographics F.E. Only	0.01	0.02	0.01	0.01	0.01

Panel (a) reports the regressions of investor beliefs on personality traits. Each cell in Panel (b) reports the adjusted R-squared of a regression, with personality traits only or with demographics fixed effects only. Dependent variables are (1) the expected stock return, (2) the probability that the stock market rises by more than 20%, (3) the probability that the stock market falls by more than 20%, (4) the expected GDP growth rate, and (5) the expected inflation. Demographics fixed effects include gender, age, income, wealth, education and location. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Expectation

Table 4
Personality traits and belief formation.

	(1) Extrapolation score
Agreeableness	0.89
	(0.86)
Conscientiousness	-0.38
	(0.87)
Neuroticism	-1.30**
	(0.59)
Extraversion	-0.10
	(0.64)
Openness	1.55**
	(0.69)
Demographics F.E.	Y
Observations	3,325
R^2	0.03
Adjusted R^2	0.01

This table reports results from an OLS regression, in which the dependent variable is a respondent's "extrapolation score" that is constructed based on her responses to the following two questions. 1) "If a stock's price has risen a lot over the last year, its price over the next year will..." 2) "If a stock's price has fallen a lot over the last year, its price over the next year will..." For the first question, a respondent receives a score of 100 if her answer is "Continue to rise;" a score of −100 if her answer is "Start to fall;" or a score of 0 if her answer is "Remain the same" or "Cannot say." Similarly, for the second question, a respondent receives a score of 100 if her answer is "Continue to fall;" a score of −100 if her answer is "Start to rise;" or a score of 0 if her answer is "Remain the same" or "Cannot say." A respondent's extrapolation score is the average of her scores for these two questions. Demographics fixed effects include gender, age, income, wealth, education and location. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

- Following Van Rooij et al. (2011), respondents are asked three questions to elicit their risk aversion.
  - Each question asks the respondents to decide between a safe job and a risky job.
    - Q1: the risky job has a 50% chance to double the income and a 50% chance to cut the income by 20%.
    - Q2: the risky job has a 50% chance to double the income and a 50% chance to cut the income by 33%.
    - Q3: the risky job has a 50% chance to double the income and a 50% chance to cut the income by 50%.

Risk Aversion

Table 5
Personality traits and risk aversion.

	(1) Bet 1	(2) Bet 2	(3) Bet 3	(4) Risk aversion
Agreeableness	-0.03***	-0.04***	-0.01**	0.09***
	(0.01)	(0.01)	(0.01)	(0.02)
Conscientiousness	-0.01	-0.01	0.002	0.02
	(0.01)	(0.01)	(0.01)	(0.02)
Neuroticism	-0.01	-0.02**	-0.002	0.03*
	(0.01)	(0.01)	(0.004)	(0.02)
Extraversion	0.03***	0.03***	0.01	-0.06***
	(0.01)	(0.01)	(0.004)	(0.02)
Openness	0.03***	0.03***	0.02***	-0.08***
	(0.01)	(0.01)	(0.005)	(0.02)
Demographics F.E.	Y	Y	Y	Y
Observations	3,325	3,325	3,325	3,325
R^2	0.06	0.05	0.03	0.06
Adjusted R^2	0.04	0.02	0.003	0.04

In Columns (1)–(3), we regress the dummy variables indicating whether the respondent is willing to take each bet on personality traits and controls. In Column (4), the dependent variable is the implied risk aversion parameter from the survey responses. Demographics fixed effects include gender, age, income, wealth, education, and location. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Social Interaction Tendencies

Table 6
Personality traits and social influence.

	(1) Score	(2) Yes or definitely yes
Agreeableness	0.01	0.001
	(0.02)	(0.01)
Conscientiousness	0.01	-0.003
	(0.02)	(0.01)
Neuroticism	0.04***	0.01**
	(0.01)	(0.004)
Extraversion	0.04***	0.01***
	(0.01)	(0.004)
Openness	0.02*	-0.002
	(0.01)	(0.004)
Demographics F.E.	Y	Y
Observations	3,325	3,325
R^2	0.03	0.04
Adjusted R^2	0.005	0.01

Column (1) reports the result from an OLS regression, in which the dependent variable is the score from 1 (Definitely No) to 5 (Definitely Yes) assigned by respondents to the question, "upon seeing a new type of investment becoming popular among people around you, would you consider investing in it as well?" In Column (2), we replace the dependent variable by the dummy variable indicating if the score is 4 (Yes) or 5 (Definitely Yes). Demographics fixed effects include gender, age, income, wealth, education and location. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Asset Allocation AAII

Table 7
Personality traits and equity allocation: AAII data.

	(1) Total	(2) Retirement	(3) Non-Retirement	(4) Total	(5) Retirement	(6) Non-Retirement
Agreeableness	-0.46	-0.02	-0.70	-0.39	0.12	-0.61
	(0.57)	(0.57)	(0.72)	(0.56)	(0.56)	(0.72)
Conscientiousness	-1.32**	-0.66	-1.00	-1.51***	-0.84	-1.17
	(0.58)	(0.58)	(0.72)	(0.58)	(0.57)	(0.72)
Neuroticism	-1.74***	-2.55***	-0.80	-1.44***	-2.23***	-0.55
	(0.40)	(0.39)	(0.49)	(0.39)	(0.39)	(0.49)
Extraversion	-0.33	0.14	-0.05	-0.65	-0.30	-0.31
	(0.43)	(0.43)	(0.53)	(0.43)	(0.42)	(0.54)
Openness	0.94**	1.50***	1.15**	0.95**	1.40***	1.14**
	(0.46)	(0.46)	(0.57)	(0.46)	(0.45)	(0.58)
Expected Return				0.23***	0.24***	0.22***
				(0.05)	(0.05)	(0.06)
Up Tail				-0.01	0.04	-0.02
				(0.03)	(0.03)	(0.04)
Down Tail				-0.08***	-0.09***	-0.05
				(0.02)	(0.02)	(0.03)
Risk Aversion				-1.17***	-1.44***	-0.90
				(0.44)	(0.44)	(0.56)
Demographic F.E.	Y	Y	Y	Y	Y	Y
Observations	2,807	3,285	3,281	2,807	3,285	3,281
R^2	0.08	0.07	0.09	0.10	0.10	0.10
Adjusted R^2	0.05	0.05	0.07	0.07	0.07	0.08

Regression results based on our AAII survey. We regress each investor's equity-to-wealth ratio on personality traits and controls. Demographics fixed effects include gender, age, income, wealth, education, and location. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Asset Allocation HILDA

Table 8
Personality traits and equity allocation: Australian HILDA data.

	One-person household (1)	Decision maker in the household (2)
Agreeableness	0.04	-0.17
	(0.30)	(0.23)
Conscientiousness	-0.39	-0.35*
	(0.27)	(0.20)
Neuroticism	-0.56**	-0.46**
	(0.27)	(0.20)
Extraversion	0.13	-0.26
	(0.24)	(0.18)
Openness	0.81***	0.63***
	(0.25)	(0.20)
Demographic F.E.	Y	Y
Year F.E.	Y	Y
Observations	5,542	8,924
R^2	0.17	0.16
Adjusted R^2	0.17	0.16

Regression results based on the HILDA survey, which has a panel structure. The dependent variable is the share of stock assets in households' total financial wealth, which is between 0 and 100. In Column (1), we use the subsample of one-person households. In Column (2), we use the subsample of respondents who claim to "always" or "usually" be the one who makes the household's savings, investment and borrowing decisions. Demographics fixed effects include gender, age, income, wealth, and location. We also control for year fixed effects. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Asset Allocation GSOEP

Table 9
Personality traits and equity allocation: German GSOEP data.

	One-person household (1)	Decision maker in the household (2)
Agreeableness	0.30	-0.73
	(0.40)	(0.45)
Conscientiousness	-2.06***	-1.97***
	(0.61)	(0.56)
Neuroticism	-1.07**	-0.94***
	(0.38)	(0.28)
Extraversion	-1.16**	-1.11*
	(0.41)	(0.54)
Openness	1.11***	1.27***
	(0.25)	(0.35)
Demographic F.E.	Y	Y
Year F.E.	Y	Y
Observations	10,250	10,781
R^2	0.15	0.16
Adjusted R^2	0.15	0.15

Regression results based on the GSOEP survey, which has a panel structure. The dependent variable is stock market participation, which is 0 if the person holds no stock assets and 100 if the person holds any stock assets. In Column (1), we use the subsample of one-person households. In Column (2), we use the subsample of respondents who claim to be the head of household. Demographics fixed effects include gender, age, income, wealth, and location. We also control for year fixed effects. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

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Discussion

- correlations of personality traits with beliefs and asset allocation are documented
  - no causal inference established
  - $\Rightarrow$ potential role for personality traits in belief formation and decision making
- opens up a new line of research that relates heterogeneous risk preferences and beliefs to personality traits
  - highlights the need to go beyond traditional channels of beliefs and preferences
- The characteristics proxied by personality traits appear to be domain-specific
  - e.g., Neuroticism and Openess relevant in financial setting,
  - but not in other economics settings in prior literature (wage bargaining, agreeableness $\Rightarrow$ low wages)

Further Questions for Discussion

1. Do you believe? What are personality traits' value and relevance to understanding financial decision making? What is the difference between personality traits and economics preferences?
2. Should we include additional considerations about reliability and validity about these measures? How does the use of self reports affect
3. Other ways to examine this finding - maybe using lab experiments (compared to empirical data)?
4. "Non-financial utility" (hehe)
5. Do you think the use of self reports personality data was done well here? Broadly - how and when should self reports be used?

Jiang, Zhengyang, Cameron Peng, and Hongjun Yan (Mar. 2024). "Personality Differences and Investment Decision-Making". In: *Journal of Financial Economics* 153, p. 103776. ISSN: 0304-405X. DOI: 10.1016/j.jfineco.2023.103776. (Visited on 03/16/2024).