A Proposal to the NBER Household Finance Working Group

Two Studies of Behavioral Factors Influencing Household Portfolios: Ambiguity Aversion and Gambling Motives

Submitted by Kanin Anantanasuwong and Atcha Kamolsareeratana[1]

People increasingly bear responsibility for their own retirement savings, as traditional defined benefit pension plans have been replaced by defined contribution plans, and the proportion of the population not covered by any employer pension plan increases. At the same time, stock markets nowadays provide ample opportunities for individual investors to buy well-diversified funds of stock, bonds and alternative assets for low fees, through ETF's and index funds. The literature shows, however, that many individual investor fail to take advantage of these opportunities for low-cost diversification. Most individual investors hold stocks of only one or two companies in their portfolio, often combined with investments in mutual funds (Polkovnichenko, 2005). Further, many individual investors that trade stocks tend to do so excessively, leading to high costs and relatively poor performance (Barber and Odean, 2000). Some individual investors also prefer so-called lottery stocks (or penny stocks) that offer a small chance of a high return (Kumar, 2009), while having negative average returns (Bali et al, 2011). Within 401k plans, many individuals tend to invest a sizeable share of their portfolio in own-employer company stocks. Gaudecker (2015) shows that the opportunity costs of poor portfolio diversification are large: the return loss is up to 1.8% annually, on average.

A major puzzle in household finance is why many individual investors prefer to hold poorly diversified portfolios and to trade excessively. This research project will investigate to what extent two behavioral factors – ambiguity aversion and gambling motives – can help explain these puzzling investment choices. Further, we will investigate whether financial literacy, advice and investment experience can help mitigate the negative effects of these two factors. This project will consist of two separate studies, sharing the same household financial data collected from a representative sample of investors.

Study 1: The effect of ambiguity preferences and beliefs on household portfolio choice

Part of the dissertation research of Ph.D. student Kanin Anantanasuwong.
Advisor: Roy Kouwenberg, Mahidol University and Erasmus University Rotterdam, Olivia S. Mitchell, University of Pennsylvania, and Kim Peijnenburg, HEC Paris.

One possible explanation for poor household portfolio diversification is that investors try to reduce uncertainty about the probability distribution of future investment returns by sticking to a few familiar stocks. Decision making under risk refers to a situation where the investor knows the return distribution, while decision making under ambiguity concerns situations where the distribution is not exactly known. Experimental evidence shows that most people are *ambiguity averse*: they prefer alternatives where the probabilities of the outcomes are known exactly, compared to prospects with unknown probabilities. Theory suggests that ambiguity aversion can explain several household portfolio choice puzzles, namely non-participation in equity markets, low portfolio fractions allocated to equity, home-bias, own-company stock ownership, and

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portfolio under-diversification.[2] Recently Dimmock, Kouwenberg, Mitchell and Peijnenburg (2016) provided empirical support for these hypotheses using household data. Dimmock et al. (2016) first elicited ambiguity preferences using Ellsberg urns with a custom-designed survey in the RAND American Life Panel (ALP), in a large representative sample of the U.S. population. Then they showed that ambiguity aversion is negatively associated with stock market participation, the fraction of assets allocated to stocks, and foreign stock ownership, but positively related to own-company stock ownership.

A question that is still unaddressed is *how much ambiguity investors perceive* about the returns of different types of investments and to what extent better financial literacy, investment experience and financial advice can mitigate the effects of ambiguity aversion on household portfolios. In this project we will directly elicit the source-specific ambiguity preferences of investors towards three different investments: the domestic stock market, foreign stocks and a familiar individual stock. Using an elicitation method recently developed by Dimmock, Kouwenberg and Wakker (2016) and Dimmock et al. (2015), we separately measure ambiguity aversion (preferences) and the perceived level of ambiguity (beliefs) for each investment. We then test if higher financial literacy and investment experience are associated with lower ambiguity aversion and perceived ambiguity towards these three types of investments. Further, we also test if lower ambiguity aversion and perceived ambiguity are associated with better portfolio diversification and a lower trading frequency.

Expected contribution: In this project we elicit an investor's ambiguity aversion (preferences) and perceived level of ambiguity (beliefs) towards three types of investments: the domestic stock market, foreign stocks and a familiar individual stock. We extend the work of Dimmock et al. (2016), who did not measure ambiguity preferences towards specific investments, but general ambiguity aversion towards Ellsberg urns. Our study will provide insights about which investors tend to be most affected by ambiguity aversion while making investment decisions, and about factors that can potentially alleviate the impact of this bias, such as financial literacy, investment experience and advice by intermediaries.

Study 2: Gambling motives and stock market investing
Part of the dissertation research of Ph.D. student Atcha Kamolsareeratana.
Advisors: Roy Kouwenberg, Mahidol University and Erasmus University Rotterdam,
and Ruben Cox, Authority for Financial Markets and Erasmus University Rotterdam.

Several explanations for the often speculative and unprofitable stock trading strategies of individual investors have been proposed in the literature: learning by trading (Seru, Shumway and Stoffman, 2010), overconfidence (Barber and Odean, 2011), preference for skewness (Mitton and Vorkink, 2007), and overweighting of small probabilities (Polkovnichenko, 2005, Barberis and Huang, 2008). Another possible explanation is that some investors effectively use trading in the stock market as a form of gambling. Kumar (2009) documents that individual investors who prefer lottery stocks tend to have the same socio-demographic characteristics as gamblers. Dorn, Dorn and Sengmueller (2014) and Gao and Lin (2015) show that individual investors in the U.S., Germany and Taiwan tend to trade less actively in the stock market during weeks with large lottery jackpots (e.g., Powerball and Mega Millions in the U.S.).

[2] See, e.g., Dow and Werlang (1992), Boyle, Uppal and Wang (2003), Garlappi, Uppal, and Wang (2007), Cao, Han, Hirshleifer, and Zhang (2011), Boyle, Garlappi, Uppal, and Wang (2012) and Peijnenburg (2016).

If a subset of investors treat trading in the stock market as a form of gambling, this can potentially have negative consequences beyond just poor investment performance. A small but significant fraction of gamblers become addicted and suffer from a medical condition known as gambling disorder: a 'persistent and recurrent counter-productive gambling behaviour' characterized by an inability to control gambling, leading to significant harmful consequences (APA, 2013). Some of the harms it can cause are poor health, depression, as well as higher rates of divorce, job loss and personal bankruptcy (Blaszczynski and Nower, 2002).

A relevant question is whether speculative stock trading can turn into a gambling problem or disorder (addiction), and what the potential consequences are for household finances? Studies conducted in clinics in several countries indeed report about patients who sought treatment with stock market trading as their main gambling problem, giving reasons for concern. However, little is known about the extent of the problem, whether gambling motives can help explain part of the speculative trading behaviour displayed by investors, and what the financial consequences are for households.

In this project we adopt a diagnostic checklist from the American Psychiatric Association (APA) to assess if individual investors show symptoms of excessive gambling problems. Gambling disorder is medically defined, with 9 diagnostic criteria described in the APA's latest version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5). We test if an investor's score for trading addition can help explain the following forms of speculative trading behaviour: high trade frequency, day trading, poor portfolio diversification and buying lottery stocks. We conduct these tests while controlling for other factors known to explain speculative trading from the literature, namely high risk tolerance, overconfidence and low financial literacy, in addition to socio-demographic characteristics.

We have already conducted a pilot test of the gambling checklist among a convenience sample of 285 investors that supports both the existence of the problem and its link with speculative trading behaviour. Using the grant funding, we plan to field our survey in a panel that is representative for investors in the general population. Further, using household financial data, this project will also assess if a higher propensity to treat stock trading as a form gambling is associated with lower savings accumulation and an increased chance of financial distress.

Excepted contribution: Our survey questions for trading addiction can be used to screen for gambling problems among individual investors, and will document the extent of the problem in a representative sample of investors. Our project will also test to what extent trading as a form of gambling is associated with poor portfolio diversification and adverse financial outcomes for households, using information available in the panel dataset.

Data sources for both studies:

For Study 1 Kanin will adapt an elicitation method for ambiguity attitudes that has been developed in the literature (Dimmock et al, 2015, 2016) to measure source-specific ambiguity attitudes. For Study 2 Atcha has already developed a diagnostic checklist for trading as gambling, and tested it among a convenience sample of 285 investors. Using the financial support provided by the grant, we plan to implement the elicitation method for ambiguity attitudes and the gambling screen in a broad nationally-representative population survey, namely the Dutch CentERdata DHS panel, or the RAND ALP in the U.S. Both panels have extensive background information on household socio-demographics, wealth and assets. We will collect any missing information needed for our research as part of a custom-designed survey module.

Because the two planned studies have substantial overlap in their dependent variables (financial assets, portfolio diversification, trading frequency) and control variables (e.g., financial literacy, overconfidence, risk aversion), it is efficient to collect data for both studies in a single survey module, to save costs.

Potential practical implications and relevance for the field of household finance:
This research project will test to what extent two behavioral factors – ambiguity aversion and gambling motives – can explain why many individual investors hold poorly diversified portfolios and tend to trade excessively. Further, we will investigate whether financial literacy, advice from intermediaries and investment experience can help mitigate the negative effects of these factors. In a time when people increasingly bear responsibility for their own retirement savings, it is important to understand why some investors tend to select sub-par investment portfolios and which groups of investors are especially prone to behavioral biases.

References:

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Dimmock, S. G., Kouwenberg, R., Mitchell, O. S., & Peijnenburg, K. (2016). Ambiguity aversion and household portfolio choice puzzles: Empirical evidence. *Journal of Financial Economics, 119*(3), 559-577.

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Mitton, T., & Vorkink, K. (2007). Equilibrium underdiversification and the preference for skewness. *Review of Financial Studies*, *20*(4), 1255-1288.
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Seru, A., Shumway, T., & Stoffman, N. (2010). Learning by trading. *Review of Financial Studies*, *23*(2), 705-739.

Timeline for deliverables:

Pending approval, the project is scheduled to begin June 1, 2017 and will be completed through May 31, 2018. The specific timeline and deliverables proposed are as follows:

Before project start	Two pilot studies, for the development of the gambling screen, and for the elicitation of ambiguity attitudes.
June 1, 2017	Project initiated
October 31, 2017	Data collection completed and progress report to NBER
December 31, 2017	One preliminary working paper submitted to NBER
May 31, 2018	Two final reports/working papers delivered to NBER: one report on ambiguity attitudes, and one on gambling motives
Spring-Summer 2018	Possible presentation at NBER working group meeting

Making the data publicly available:

All data will be made publicly available to other researchers within one year after data collection, with a 1-year delay to allow the research team the write the proposed two papers.

Itemized budget:

All funding received for this research will be used to pay for data collection in a representative sample of investors. Our primary purpose is to field a custom-designed survey in the DNB Household Survey (DHS). The DHS is a panel study among 2000 households in the Netherlands that has been active since 1993, managed by the research institute CentERdata. The DHS offers detailed background information about financial assets, real assets, pensions, income, employment, mortgages, loans and personal characteristics, collected annually. The DHS panel data has been used before in well-known studies in the household finance literature, such as van Rooij et al. (2011) on financial literacy and stock market participation, and von Gaudecker (2015) on portfolio diversification.

Our custom-designed survey will elicit ambiguity preferences and collect information about gambling motives for trading, trading frequency, overconfidence, risk aversion and financial literacy. Our survey will specifically target the sub-group of 372 panel members (17% out of 2243) that in 2016 directly owned financial assets, namely individual stocks, bonds, mutual funds or derivatives. We have already received an initial estimate of the survey module costs from CentERdata, based on the questions for Study 2: EUR 7,260. As we plan to add questions for ambiguity attitudes (Study 1) and offer real monetary incentives for preference elicitation, below we budget the costs for the survey at EUR 10,000.

We expect that with available research funds from Erasmus University (EUR 5,000) and a matching grant of USD 5,300 from NBER, we can finance data collection in the DHS panel.

Research funding, Option 1 with NBER grant of USD 5,300:

	USD	EUR
- Research funds from Erasmus University Rotterdam:	5,300	5,000
- NBER grant funding:	5,300	5,000
- Total funds	10,600	10,000

Expenses, Option 1 with NBER grant of USD 5,300:

	USD	EUR
- Data collection in DNB Household Survey, N = 372:	10,600	10,000
- Total expenses for data collection	10,600	10,000

If we receive a grant of $20,000 USD, we additionally plan to collect a second dataset in the RAND American Life Panel, a representative panel of the U.S. population. This panel has been used in the study by Dimmock et al. (2016), for example. We will target households who directly participate in the stock market (outside of 401k plans). The costs charged by RAND ALP depend on the average time it takes to complete the questions. With a survey time of 7.5 minutes and a budget of USD 14,700, we expect we can collect data for 400 households in the RAND ALP, based on quotes received for a similar research project.

Research funding, Option 2 with NBER grant of USD 20,000:

	USD	EUR
- Research funds from Erasmus University Rotterdam:	5,300	5,000
- NBER grant funding:	20,000	18,850
- Total funds	25,300	23,850

Expenses, Option 2 with NBER grant of USD 20,000:

	USD	EUR
- Data collection in DNB Household Survey, N = 372:	10,600	10,000
- Data collection in RAND American Life Panel, N = 400:	14,700	13,850
- Total expenses for data collection	25,300	23,850

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EDUCATION

2014 – PRESENT: MAHIDOL UNIVERSITY, COLLEGE OF MANAGEMENT, BANGKOK
PHD, FINANCE

2009 - 2010: CHULALONGKORN UNIVERSITY, BANGKOK
MSC, FINANCE; GPA 3.55

2002 - 2006: MAHIDOL UNIVERSITY, INTERNATIONAL COLLEGE, NAKORNPATHOM
BCS, COMPUTER SCIENCE; GPA 3.67

PROFESSIONAL EXPERIENCE

TRADER KGI SECURITIES (THAILAND) LTD.
FROM 2011 TO 2013

Market making, hedging, OTC options, ETFs, derivative warrants

CONSULTANT ACCENTURE
FROM 2006 TO 2009

Technical architecture, functional design, project management

PUBLICATIONS

Anantanasuwong, K. (2016), A systematic risk factor for detecting financial turbulence in the Thai stock market, *NIDA Business Journal, issue 19,* p. 138 – 160

WORK IN PROGRESS

The effect of ambiguity preferences and beliefs on household portfolio choice.

Financial literacy and overconfidence.

The effect of ambiguity preferences and beliefs on household decision on saving for retirements.

Healthcare expenditure and equity market development.

RESEARCH INTERESTS

- Behavioral Finance
- Investment
- Mutual Funds

COURSES TAUGHT

College of Management, Mahidol University

- Business Research
- Marketing Research
- Quantitative Method in Finance

AWARDS

First Class Honor

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Education

- **Mahidol University, College of Management** **2012 – Present**
  Ph.D. in Finance, with full scholarship
- **Mahidol University, College of Management** **2009 – 2012**
  Master of Management in Entrepreneurship Management
- **Mahidol University, International College** **2003 – 2008**
  Bachelor of Business Administration in Finance
- **Burnside High School, New Zealand** **1999 – 2002**
  Year 10 – 13

Work Experience

- **Asian University, Thailand, Lecturer** **2013 – 2014**
  Principles of finance, corporate finance, investment analysis, financial institution management, security and portfolio
- **Mahidol University, College of Management, Teacher Assistant** **2012 – 2013**
  Consulting Practice for MBA students
- **Kasikorn Securities PCL., Equity Wealth Manager** **2011 – 2012**
  Retail investors' portfolio management, investment in equity and derivative market
- **Bangkok Bank PCL., Corporate Loan Analyst** **2010 – 2011**
  Medium-sized corporate loan analysis for business in the east of Thailand
- **Number One (S.) Co.,Ltd, Deputy Managing Director** **2004 – Present**
  Operate 5 Seven-Eleven franchise stores
- **The Siam Commercial Bank PCL., Account Analyst** **2007**
  Large corporate loan (mainly listed firms) analysis in Transportation and Logistic

Research Experience

- 2012 Bangkok International Academic Conference, The Clute Institute.
  Venue: Anantara Resort&Spa, Bangkok, Thailand.

Topic: “The Subprime Crisis and Its Effect on SMEs: an Empirical Study of Firm Performance and Stock Price of Companies Listed in Market for Alternative Investment (Thailand)”

Research Interest

- Behavioral finance
- Investment
- Technical analysis, signals

Work in Progress

- Gambling addiction in the stock market
- Trading addiction

Honors and Awards

- Full Ph.D. academic scholarship, Mahidol University, College of Management
- 16 Semi-Finalists and Best Exhibition Award in “The mai Bangkok Business Challenge 2011”
- 4th place in “The MUIC 20th Year Anniversary Business Plan Competition 2006”
- The National Bank Junior Mathematics Competition (New Zealand)

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March 20, 2017

To whom this might concern,

It is with pleasure that I write this recommendation letter in support of the research proposal submitted by Ph.D. students Kanin Anantanasuwong and Atcha Kamolsareeratana to the NBER Household Finance Working Group.

Kanin and Atcha are Ph.D. students at Mahidol University, the leading public research university in Thailand. The students have asked for financial support to collect data for their dissertation research. Their research questions focus on how behavioral factors influence household portfolios, especially to what extent ambiguity aversion (Kanin) and gambling motives for trading (Atcha) can explain portfolio underdiversification and excessive trading by individual investors. A second important question is whether these biases are associated with lower retirement savings and asset accumulation. For this purpose it is crucial to have good quality household financial data, from a reputable source that tracks household finances through time, and that is representative for investors in general. Two such sources of quality household data are available internationally, namely the CentERdata DHS panel in the Netherlands and the RAND American Life Panel in the U.S. Further, these representative panels can be used by researchers to field new custom-designed survey modules, but this requires funding. To finance new data collection for their research in these panels the students have submitted a proposal for funding to the NBER Household Finance Working Group. Afterwards this data will be made publicly available to other researchers, similar to most studies conducted in the DHS panel and the RAND ALP panel.

As the advisor of the students, I strongly recommend funding the students' research proposal, for several reasons. First, both Ph.D. students were ranked first in their batch of applicants, and they both received a full scholarship to support their studies based on merit and qualifications. Unfortunately their scholarship does not include support for data collection, but only covers tuition fees. Both Atcha and Kanin have already spend more than two years in the Ph.D. program to build up their knowledge of the literature and to develop their research proposal. They are now ready to collect and analyze data. After completing their dissertation, Atcha and Kanin intend to work as faculty members.

Both Atcha and Kanin will be co-advised by a strong team of international researchers. In Kanin's case, he will be co-advised by Prof. Olivia Mitchell (U Penn, and NBER) and by Dr. Kim Peijnenburg (HEC Paris). In Atcha's case, she will be co-advised by Dr. Ruben Cox, who works for the Authority for Financial Markets in the Netherlands (a regulatory agency similar to the SEC in the U.S.) and at Erasmus University Rotterdam.

If you require any more information about Atcha, Kanin and their research proposal, please do not hesitate to contact me in person.

Yours sincerely,

