

**Investors' Under-diversification:
A Field Experiment with Financial Brokerage Accounts**

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1. Introduction

Researchers have found that households are severely under-diversified in their portfolios of individual stocks (Blume and Friend (1975), Kelly (1995), Goetzmann and Kumar (2008)) and in retirement and pension accounts (Benartzi (2001), Benartzi and Thaler (2001), Agnew et al. (2003)). The failure to diversify is costly because under-diversified investors bear non-compensated idiosyncratic risk and hence achieve a lower risk return trade-off. Goetzmann and Kuman (2008) document that the economic costs of under-diversification are significant for most investors except a small subset of investors with superior private information. Even a small inefficiency in investing could lead to a large return loss if investors take a large amount of risk (Calvet, Campbell and Sodini (2007)).

The systematic under-performance of under-diversified investors is puzzling, because most investors could have simply invested in one of the many passive index funds and improved their performances. There are several potential explanations: (1) lack of financial sophistication: investors simply do not understand the benefits of diversification, the efficiency of market portfolio and the options to invest in index funds; (2) overconfidence: investors have mean-variance preference and understand return-risk tradeoff, but incorrectly believe they have “superior” stock picking abilities and choose not to invest in passive index funds with “average” returns; (3) preference for skewness (Mitton and Vorkink (2007)): investors have preference for positive skewness and intentionally choose to under-diversify in order to achieve a higher probability of extreme positive returns.

Until now researchers have not reached consensus about which explanation is more relevant. Past studies mostly exploit existing trading data. Differently, we plan to implement a randomized field experiment in a brokerage firm in China. We strive to answer the following questions: Which mechanism is more relevant for individual investors' under-diversification? If investors hold under-diversified portfolios, how can we switch them to hold more diversified portfolio? Would the switch improve the return-risk tradeoff of portfolios or improve investors' welfare afterwards? This study will better our understanding on individual investor's portfolio choice decision, especially the explanation of underdiversification, and suggest ways to help individual investors make better investment choice.

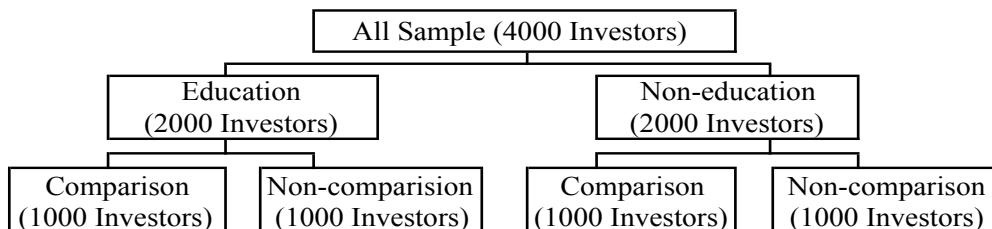
2. Methodology

To study investors' diversification behavior, we collaborate with a big Chinese financial brokerage firm, the Golden Sun Securities. The firm was established in 2002 and now covers more than 300,000 investors. We will randomly select around 4000 investors to participate in this project.

We use data from two sources in the analysis. First, the brokerage firm will provide individual trading data before and after the experiment. We use the data to define diversification measure, and quantify portfolio performance by comparing the Sharpe ratio of a household portfolio to the Sharpe ratio of a benchmark index. Second, we conduct baseline and follow-up online surveys for each investor. In the survey, we ask for individual characteristics such as age, gender, education, income, and elicit investor’s risk attitudes and time preference. We also ask questions to help identify the three potential channels: (1) understanding about diversification; (2) confidence about stock picking ability; (3) preference for skewness. We pay each investor 50 RMB to compensate for survey participation.

The experimental design is shown in Figure 1. The experiment has a two by two investor-level randomization. The first level of randomization is an education treatment: in the Education group, we offer investors information about index portfolio and benefits of diversification; in the Non-education group, no information is provided. In a crossed randomization, we randomize whether investors receive a personalized performance comparison between their own portfolios and more diversified portfolios. Specifically, in the Comparison group, we send individuals a message through the trading interface, which shows a comparison between their portfolio and a hypothetical portfolio that holds only index and risk-free assets. The hypothetical portfolio either has the same return or has the same variance as the investor’s portfolio. In the Non-comparison group, no message is sent. We stratify both randomizations based on individuals’ pre-experiment diversification measure.

Figure 1: Experimental Design



To measure the impact of sophistication on diversification, we first show the effectiveness of education on improving investors’ understanding about the benefits of diversification, and then compare the diversification index between the Education group and Non-education group. To study the channels of overconfidence and preference for skewness, we use two strategies. First, we compare the Comparison and Non-comparison groups. If there is more diversification in the Comparison group, overconfidence is an important explanation for insufficient diversification. Otherwise preference for skewness is the main channel. The second strategy is by testing whether there is a heterogeneous effect of the comparison treatment, by the pre-experiment measure of overconfidence and preference for skewness. To provide welfare implications, we evaluate the impact of different treatments on investors’ portfolio performance.

Reference:

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Calvet, Laurent E., John Y. Campbell, and Paolo Sodini, 2007, Down or Out: Assessing the Welfare Costs of Household Investment Mistakes, *Journal of Political Economy* 115, 707-747.

Goetzmann, William N., and Alok Kumar, 2008, Equity Portfolio Diversification, *Review of Finance* 12, 433-463.

Kelly, Morgan, 1995, All Their Eggs in One Basket: Portfolio Diversification of U.S. Households, *Journal of Economic Behavior and Organization* 27, 87–96.

Mitton, Todd, and Keith Vorkink, 2007, Equilibrium Underdiversification and the Preference for Skewness, *Review of Financial Studies* 20, 1255-1288.

Budget

		2014	2015	Total
Research Assistant	Approximately 100 hours/yr \$25/hr	2,575	2,652	5,227
Research Assistant	Fringe benefits (7.65%)	197	203	400
Service Personnel		2,150	423	2,573
Intervention Cost	Firm incentive, web design costs	5,900	0	5,900
Survey Cost	50 RMB per investor	2,900	0	2,900
Travel-International	Round-trip DTW-Beijing, and Beijing-Nanchang	3,000	0	3,000
				20,000

Budget Justification

A. PI

Jing Cai (PI) and Xing Huang (Co-PI) will oversee with work of the Research Assistant. Effort is negligible.

B. Research Assistant

We will hire a research assistant for approximately 100 hours per year in 2014 and 2015, with a salary at 25 \$/hour. The primary responsibilities of this research assistant will be to assist the PI by helping with econometric details, implementing computer software that will be publicly distributed, and helping clean the data and produce estimates.

C. Service Personnel (\$2,573)

We include a fee to cover computing, secretarial, and administrative assistance provided by the University of Michigan Population Studies Center in direct support of the research. The Service Personnel fee represents costs necessary to efficiently conduct a project and is identifiable as a project-specific direct cost.

D. Intervention costs:

In 2014, funds are requested for paying a Chinese financial brokerage firm for their cooperation on this project. The cooperation needed from them is to hire people to revise the trading platform according to our experimental design, and to provide individual trade data before and after the intervention. We will pay around \$5,900 for their cooperation.

E. Survey costs:

We will conduct a baseline and follow-up online survey for investors participated in the project. To give them incentive for survey participation, we pay each individual 50 RMB (\$ 0.8). We will include approximately 3,600 investors in the experiment, which costs \$2,900 in total.

F. Travel

The two PI will make a trip to China in 2014 to prepare and conduct the intervention in Jiangxi province of China (\$3,000). Funding is requested to cover round-trip airfare for each trip. Cost estimates include international airfare, and local in-country ground transportation from Beijing to field location.