Does Good Luck Make People Overconfident? Evidence from a Natural Experiment in China*

Huasheng Gao
Fanhai International School of Finance
Fudan University
huashenggao@fudan.edu.cn

Donghui Shi
Shanghai Stock Exchange
dhshi@sse.com.cn

Bin Zhao
New York University, Shanghai
bz20@nyu.edu

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Abstract

This paper examines the changes in trading behavior for retail investors who win an allotment for the IPO subscription. We find that retail investors who win such an allotment subsequently become more overconfident relative to retail investors who do not: the former group trades more frequently and lose more money. This effect is not explained by the wealth effect or house money effect. Overall, our evidence indicates that the experience of good luck makes people more overconfident about their prospects.

Keywords: Good Luck; Turnover rate; Trading; Overconfidence; IPO Subscription

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1. Introduction

Overconfidence is a widely documented cognitive bias that significantly influences an individual's decision making (see, for example, Thaler and Johnson, 1990). While most of these studies focus on the influence of overconfidence, little is known on the root causes of overconfidence. In this paper, we investigate whether the experience of good luck in the present makes people overconfident about their future prospects. We measure "good luck" by exploiting a natural experiment— households who win an allotment in IPO subscription. We use retail investors' stock trading behavior to infer their "overconfidence", following Barber and Odean (2001).

Borrowing the theoretical framework of Gervais and Odean (2001) on learning to be overconfident[1], we hypothesize that the trader believes in luck and can learn whether he is in a lucky stage at a given period based on his recent experience of "lucky events." People who recently experience "good luck" may think their subjective probability of being lucky too high and thus become overconfident about their prospects.

The unique feature of winning an IPO allotment allows us to estimate its effects in a difference-in-differences framework. Ideally, to study an experiment's effect, one would like to have an exogenous experiment in which individuals are randomly assigned to be affected by the experiment, which would allow us to compare treated and non-treated individuals' outcomes and to attribute any differences to the experiment. In China, winning the allotment in an IPO subscription is akin to such an experiment. For each IPO in the Shanghai Stock Exchange,

[1] In their model, a trader learns his ability by his past success or failure. When a trader is successful, he attributes too much of his success to his own ability and revise up his belief about his ability too much, which leads to overconfidence about this ability. This their model, traders learn their ability from the past experience and the bias (such as self-serving attribution bias) in the learning process leads to overconfidence about their true ability. The more overconfident an investor, the more he trades and the lower his expected profits from trading.

individual investors who applied for IPO allotment will be assigned an IPO application number for each 1,000 shares.[2] This IPO application number is randomly assigned by the China Securities Depository and Clearing Corporation (CSDC) and cannot be changed. The winning allotment numbers are drawn randomly from the pool while the entire process is taped and audited. Moreover, under the rule of CSRC for a capped 23X PE ratio in our sample period, China's IPO is greatly underpriced and households could make some considerable amount of money if they win the allotment. Thus, winning an IPO allotment is a good setting to measure how "being lucky" influences people's subsequent behavior.

We empirically test the effect of winning an IPO allocation on retail investors' stock trading behavior using a panel of over ten million person-period observations of Chinese individual investors during 2014–2016 and a difference-in-differences approach. We find that winning an IPO allocation (a proxy of good luck) leads to more frequent but less profitable trading (a reflection of overconfidence). On average, individuals who win the IPO allocation experience an increase in turnover rate by 33.1 percentage points and a decrease in their portfolio return by 1-2 percentage points in the three-month period following the IPO allocation, relative to individuals who fail to win the IPO allocation.

It is worth noting that our results are unlikely driven by the house money effect, which generally refers to the pattern that people tend to take on increased risk subsequent to a successful investment experience because they do not fully integrate the new money as their own but regard the new money as the house's money (Thaler and Johnson, 1990). We focus on the individual's overall portfolio trading, excluding the trading of new IPO shares. In other words, we focus on

[2] Investors with average stock portfolio worth at least 10,000 RMB in day t-20 to day t-2 relative to IPO offer day can apply for IPO allotment. Each 5,000 is qualified for one allotment ticket which corresponds to 1,000 IPO shares. The allotment application must be less than 0.1% of total IPO shares. Investors will learn their application results on day t+2.

how individuals trade their pre-existing money after winning the IPO allocation. In contrast, the house money effect should predict that individuals take more risk with the new money they earn from the IPO shares, but provide no prediction on how individuals deal with their pre-existing money. Second, given that high risk is usually associated with high return (at least for raw return), the house money effect would predict that individuals could have higher raw return subsequently. However, this is opposite to our findings.

It is also worth noting that our results are unlikely driven by wealth effect (i.e., the effect of winning IPO allocation on trading is because the individuals become rich). First, depending on the assumption of standard utility function, wealth could be positively or negatively correlated with risk preference. Thus, from an ex-ante perspective, it is unclear how the wealth gain from winning the IPO allocation would influence individuals' subsequent trading behavior. Second, we later re-estimate our results based on a subsample of rich individuals (for example, the ones with total portfolio value greater than 5 million RMB). Given that the average dollar gain of winning IPO allocation is around 30 thousand RMB, it should have no meaningful "wealth effect" on rich individuals. However, our results are largely the same when focusing on the subsample of extremely rich individuals. Third, we show that wealth is actually negatively associated with turnover rate, which implies that an increase in wealth would be associated with a decrease in turnover rate (opposite to our findings).

This paper provides at least two major contributions to the existing literature. First, our study is related to the literature on reinforcement learning, which posits that people' choice of actions depends on the payoffs they obtained from the same actions in the past (Erev and Roth 1998; Camerer and Ho 1999). Kaustia and Knupfer (2008) show that individuals' experience of high IPO return lead to more IPO subscription in the future. Choi et al. (2009) report that high

personally experienced returns in 401(k) accounts induce higher 401(k) savings rates. Greenwood and Nagel (2009) find that young mutual fund managers chose higher exposure to technology stocks in the late 1990s than older managers. Similarly, Vissing-Jorgensen (2003) shows that young retail investors with little investment experience had the highest stock return expectations during the stock-market boom in the late 1990s. Malmendier and Nagel (2011) show that individuals who have experienced low stock-market returns (the Great Depression period) are less willing to participate in the stock market. Malmendier and Nagel (2016) show that difference in life expectation strongly predict differences in subjective inflation expectations. Complementing to this literature, our study suggests that experience of "good luck" in the stock market makes people overconfident about their future prospects.

Second, there is a large literature focusing on how overconfidence influences people's decision making. Taking individual investors for example, overconfidence makes these investors trade more and lose more money (Barber and Odean, 2001). Taking corporate executives for examples, overconfident CEOs usually invest more, make more acquisitions (Malmendier and Tate 2005, 2008). Complementing this strand of literature, which usually take overconfidence as given, we investigate why individuals become overconfident in the first place? Does certain experience in the present increase the level of overconfidence in the future? We provide evidence that experience of good luck is an important factor contributing to people's cognitive bias of overconfidence.

The remainder of the paper is organized as follows: Section 2 reviews the background of China's IPO allotment; Section 3 develops our hypothesis; Section 4 describes our sample and key variable construction; Section 5 presents the empirical results; and Section 6 concludes.

2. Background on China's allocation of IPO Shares

IPO market is a hot investment opportunity in China A-share market. Since 2014 (when our sample period starts), China Securities and Regulation Committee (CSRC) has put a "window guidance" for IPO, and forced PE ratio of these IPO firms to be below 23 times.[3] However, since 23 times PE ratio is significantly below the market expected price, IPO stocks will normally increase 44% on the first day[4], and reach price limit of 10% for several trading days afterwards.

All investors with qualified holdings can apply for IPO allotment. Investors needs to have 10,000 RMB worth of stocks on average during day t-20 to t-2 period relative to IPO day. For each 5,000 RMB worth of stock, investor can apply for one allotment ticket on day t. One allotment ticket corresponds to 1,000 IPO shares. No investor can apply for more than 0.1% of total IPO volume for a single firm. And each investor may apply for a maximum of 0.1% allotment ticket. The tickets will be drawn randomly under audit on day t+1, and investors will learn their application results on day t+2. On average, there are 11 days between IPO allotment application day and IPO public trading day.

The average winning probability for IPO allotment application is 0.48% in our sample period from June 30, 2014 to September 1, 2016. Although the winning probability is quite low, investors who win an IPO allotment can get at least 44% first day return and further stock price run-up in

[3] China's IPO process has gone through several stages. Prior to 2001, in order to protect investors when the market and investors are relatively immature and market mechanism is relatively incomplete, CSRC adopted an approval method to control total IPO volume, with regulated IPO pricing method. IPO were priced at fixed price before 1993, companies do not have rights to determine issue price. During 1994-1998, IPO prices were fixed between 13-16 times PE ratio. From the end of 1998, IPO pricing started to be determined by the market. However, due to the increasing IPO price and PE ratio, many newly listed firms' prices drop after they went public, there were resentment towards high IPO price. PE multiple fixed pricing became the IPO pricing method since November 2001. The new securities law in 2004 canceled the requirement that IPO price must be approved by the regulator. IPO price were determined by the market since 2005.

[4] It is regulated that first day return cannot exceed 44%. As a result, all stocks price increase by 44% on the first day.

subsequent trading days. On average, such investors will reap around 15,655 RMB (around 2,300 USD) profit by winning one IPO allotment application.

3. Hypothesis Development

Our theoretical framework follows the model developed by Gervais and Odean (2001), who show that overconfidence is determined endogenously and changes dynamically based on a trader's past success or failure. When a trader is successful, he attributes too much of his success to his own ability and revise up his belief about his ability too much, which leads to overconfidence about this ability. This their model, traders learn their ability from their experience and the bias (such as self-serving attribution bias) in the learning process leads to overconfidence about their true ability. The more overconfident an investor, the more he trades and the lower his expected profits from trading.

Although traders donot learn "luck" in their model, one can easily extend their idea from "learning ability" to "learning luck." The outcomes of many risky decisions depend on both ability and luck. In general, economic theories assume that luck is a random, uncontrollable factor that should have little effect on future expectations. Although this is certainly correct scientifically, many people seem to think of luck in a manner in contrast with this view. In reality, it is common to see that some people "believe in luck,'' meaning that they think good luck consistently produces success in their daily lives. People sometimes say they have lucky days or that they think of themselves as lucky people in general. For example, Michael Jordan (a professional basketball player for the Chicago Bulls) changed the number on his uniform to "change his luck," following a series of disappointing performance.[5] These kinds of statements

[5] Jordan goes back to No. 23 (1995, May 11). *USA Today*, p.8C.

imply that luck is viewed as a personal quality that is at least somewhat stable over a short period of time.

Extending Gervais and Odean's (2001) framework of learning ability, the trader can learn whether he is in a lucky stage at a given period may depend on their recent experience of "lucky events." People who recently experience "good luck" may revise up their subjective probability of being lucky too much and thus become overconfident about their prospect. Supporting this conjecture, Darker and Freeman (1997) provide evidence that people react to lucky events by becoming more positive about the likelihood of future success, and such irrational beliefs about luck can serve as a source of positive expectations for the outcome of future events. This will lead to excessive (and inefficient) trading, similar in spirit to overconfidence about ability.

In summary, considering that we use event of winning IPO allotment as a measure of good luck and turnover rate as a proxy for traders' overconfidence, we predict that traders increases their trading following the winning of an IPO allotment.

4. Sample Formation and Variable Construction

All our data is obtained from Shanghai Stock Exchange, which record all individuals' trading activities on the stock exchange. Our data set covers three main files: trading, holding, and account type. In the trading file, we have account-trade level data that cover the common trade variables, with security code, encrypted account identifier, trade price, trade volume, trade direction, and the date and time of the trade. The holdings file is recorded daily to reflect each account's end-of-day holdings. The holdings variables include encrypted account identifier, date, security code, holding balance, and effective date. The account type file classifies each account under a specific type, including retail, mutual fund, qualified foreign institutional investor, social

security fund, insurance firm, brokerage asset management, broker self- account, hedge fund, and other institutions. In our study, we look at all individual investor accounts.

We look at the IPO event from June 30, 2014 to September 1, 2016. Hence our sample is from the February 2014 to September 2017. We first identify the individuals who win the IPO allocation (the treated group). We can track the stock trading behavior over three months prior to the IPO with the most recent one month data omitted and three months after the IPO, we also look at the next six months after the initial three month post IPO. For each three-month period, we calculate their turnover rate and performance of trading. As we explained in Section 2, the likelihood of winning the IPO allotment may be positively associated with investor's wealth. Thus, for each treated household, we match him to a control household who did not win the IPO allotment but has the closest portfolio value and stock trading turnover in the three-month period prior to the IPO subscription. Considering the trading of new IPO shares may bias our results and we are interested in investors' trading behavior in their existing portfolio, we remove the trading of the new IPO stock for both treated and control group. Finally, we have 5,665,994 person-period for the treated group and 5,665,994 person-period for the control group.

Following Barber and Odean (2001), our measure of turnover is the average of buy volume and sell volume divided by the average portfolio size. To gauge the effect of overconfident trading on return performance, we calculate an "own-benchmark" abnormal return for individual investors. The benchmark is the three month return of the beginning of period portfolio held by individual *i*, denoted R_i^b, which represents the return that the individual would have earned by holding its beginning of period portfolio for the three month. In gross own-benchmark abnormal return is the real return for each investor over the three-month period minus the benchmark return.

To remove those inactive accounts, we dropped accounts with zero trading in that year. We also require investors to have average portfolio size to be more than 10,000 RMB in month t-4 to month t-1 prior to IPO date, this criterion will also remove those accounts that participate in the IPO market only.

Table 1 provides summary statistics. On average, households in our sample have a turnover rate of around 380% of their entire portfolio, and a stock portfolio value of 374 thousand RMB. Their raw portfolio return is 6.49% and market-adjusted return is -1.77%, indicating that they greatly underperform the market. Their own-benchmark abnormal return is -5.30%, indicating that these households would be greatly better off if they had not made the trades.

5. Empirical Results

5.1 Univariate Tests

We examine the before-after effect of the change in trading behavior for the treatment group compared to the before-after effect in the control group. Table 2 reports the univariate test. In the three-month period before the treatment, the turnover rate is 365% for the treated group. The corresponding number is also 365% for the control group, which is unsurprising given that the control group is constructed by matching on turnover rate prior to the IPO allotment. However, in the three-month period following the IPO allotment, the turnover rate for the treated group increases to 411% (an increase of 46 percentage points), while the turnover rate for the control group only increases to 383% (an increase of 18 percentage points). These differences (46 percentage points vs. 18 percentages points) are significant at the 1% level.

Overall, the univariate test shows that treated group trade more for their portfolio after winning an IPO allotment, compared to the control group. This result provides suggestive

evidence that the experience of winning IPO allotment makes people more overconfident subsequently.

5.2 Baseline Regression

We implement a standard difference-in-differences test through the following regression:

$$Turnover = \alpha + \beta_1 Treat \times Post + \beta_2 Treat + \beta_3 Post + \beta_4 Ln\,(Portfolio\ wealth) + \beta_5 Market\ performance + \varepsilon. \quad (1)$$

The dependent variable is the turnover rate of an individual's portfolio. The indicator variable *Treat* takes the value of one for the treated group, and zero for the control group. The indicator variable *Post* takes the value of one for the three-month period after winning the IPO allotment, and zero for the three-month period prior to winning the IPO allotment. We control for the portfolio wealth (measured at the beginning of each three-month period) and the return of the stock market index. Given that our treatment is defined at the person level, we cluster standard errors by person.

The coefficient of interest in this model is the $\beta_1$coefficient, which captures the turnover differences in treated group before and after the event as opposed to similar before-after differences in control groups.

It is helpful to consider an example. Suppose we want to estimate the effect of winning an IPO allotment on a person's trading behavior. We can subtract the turnover rate before the event from the turnover rate after the event for persons that win the IPO allotment. However, economy-wide shocks may occur at the same time and affect people's trading behavior. To difference away such factors, we calculate the same difference in turnover rate for persons who donot win the IPO allotment. Finally, we calculate the difference between these two differences, which represents the incremental effect of winning an IPO allotment on the treated group compared to the control group.

Table 3 presents the regression results. The coefficient estimates on *Treat*×*Post* are positive and statistically significant in all columns. In column (1), we include *Treat*×*Post, Treat, Post* in the regression. We find that the coefficient on *Treat*×*Post* is positive and significant at the 1% level, suggesting that people trade more after they win the IPO allotment. We additionally control for *Ln (Portfolio wealth)* and the return of the stock market index in column (2), and the coefficient on *Treat*×*Post* is 0.331 and significant at the 1% level. The economic magnitude is sizable: turnover rate increase by 33 percentage points after winning the IPO allotment, relative to the sample median turnover rate of 188 percentage points (i.e., an increase of approximately 18%).

It is worth noting that the data from Shanghai Stock Exchange do not provide much demographic information, such as gender, age, education, profession, and so on. Given that our tests are in the difference-in-differences setting and examines the change in trading activities for treated households over six months around winning the IPO allotment as compared to the change for matched households in the control group, that demographic information is largely time-invariant and should not affect our results. Nonetheless, we additionally control for person fixed effect in the regression to control for all these time-invariant factors. The results are reported in column (3). After controlling for person fixed effect, the variable *Treat* is omitted because it is absorbed by the fixed effect. The significance and magnitude of *Treat*×*Post* are largely unchanged (0.332 and significant at the 1% level). Thus, our main results are largely the same after controlling for person time-invariant factors through person fixed effects.

With regards to control variables, we find that the coefficient on *Ln(Portfolio wealth)* is significantly negative, indicating that a larger portfolio value is associated with lower turnover rate. This result indicates that our findings of increased turnover following the IPO allotment are not

likely driven by wealth effect (i.e. an increase in wealth). We also find that people tend to trade more when the stock market is booming, which is consistent with Barber and Odean (2001),

Taken together, these results indicate that people tend to trade more aggressively after they win an IPO allotment. These findings are consistent with our hypothesis that people tend to become more overconfident after experiencing good luck.

5.3 Heterogeneous Treatment Effects

To provide further evidence that the effect of winning an IPO allotment on trading activities is indeed due to overconfidence, we implement triple-differences tests to explore any heterogeneity in the treatment effect. Evidence of heterogeneous treatment effects helps alleviate the concern that some omitted variables are driving our results, because such variables would have to be uncorrelated with all the control variables we include in the regression model and would also have to explain the cross-sectional variation in the treatment effect. As pointed out by Claessens and Laeven (2003) and Raddatz (2006), it is less likely to have an omitted variable correlated with the interaction term than with the linear term. We thus explore four possible sources of heterogeneity in the treatment effect.

First, Gervais and Odean (2001) predict that, with more trading experience, people could develop better self-assessment and are less likely to become overconfident. Thus, we expect the treatment effect to be stronger for individuals who are inexperienced in investing in the stock market. We measure an individual investor's experience by the number of years since they open their stock trading accounts. The *Low* indicator in Table 4 column (1) takes the value of one if the household's experience is below the sample median, and zero otherwise. We add the three-way interaction $Treat \times Post \times Low$, and estimate the following regression:

$$Turnover = \alpha + \beta_1 Treat \times Post \times Low + \beta_2 Treat \times Post + \beta_3 Treat \times Low + \beta_4 Post \times Low + \beta_5 Treat + \beta_6 Post + \beta_7 Low + \beta_8 Ln(Portfolio\ wealth) + \beta_9 Market\ performance + \varepsilon. \quad (2)$$

The coefficient on the *Treat*×*Post*×*Low* variable is positive and significant at the 1% level, indicating that the treatment effect is stronger for individuals who has less experience in trading in the stock market. In particular, the coefficient on *Treat*×*Post* is 0.144 and the coefficient on *Treat*×*Post*×*Low* is 0.208; both are significant at the 1% level. For inexperienced households, their turnover rate increases by 35.2 (=14.4+20.8) percentage points, while the turnover rate increases by 14.4 percentage points for experienced households.

Second, we examine the households' past record of winning an IPO allotment. If a household had never won an IPO allotment in the past (as opposed to the one who has won an IPO allotment for many times), he may be more likely to misinterpret this lucky event and become more overconfident. Thus, we expect the treatment effect to be stronger for households who have little records of winning an IPO allotment in the past. The *Low* indicator in column (2) takes the value of one if the number of times of the households winning an IPO allotment is below the sample median, and zero otherwise.

The coefficient on the *Treat*×*Post*×*Low* variable is positive and significant at the 1% level, while the coefficient on the *Treat*×*Post* indicator variable is an insignificant -0.004. This result indicates that the treatment effect is stronger for individuals who seldom won an IPO allotment in the past and is virtually absent for individuals who once won an IPO allotment many times.

Third, existing literature shows that investors tend to be more overconfident during the market booming period (Akerlof and Shiller, 2010;). We expect that the incremental effect of winning an IPO allotment on overconfidence is larger when the investors have a low level of

overconfidence to start with (i.e., the market bust period). In column (3), the *Low* indicator takes the value of one if the market index return is below the sample median, and zero otherwise. The coefficient on the *Treat*×*Post*×*Low* variable is positive and significant at the 1% level, indicating that the treatment effect is stronger for the market bust period (when the pre-existing level of overconfidence is likely low). In particular, the coefficient on *Treat*×*Post* is 0.194 and the coefficient on *Treat*×*Post*×*Low* is 0.215; both are significant at the 1% level. During the market bust period, households' turnover rate increases by 40.9 (=19.4+21.5) percentage points, while the turnover rate increases by only 21.6 percentage points during the market booming period.

Finally, considering that turnover rate is positively correlated with the level of overconfidence, we also expect that the incremental effect of winning an IPO allotment on overconfidence is larger when the investors' pre-treatment turnover rate is low (i.e., the investors have a low level of overconfidence to start with). In column (4), the *Low* indicator takes the value of one if the investor's turnover rate in the pre-treatment period is below the sample median, and zero otherwise. The coefficient on *Treat*×*Post* is 0.190 and the coefficient on *Treat*×*Post*×*Low* is 0.231; both are significant at the 1% level. For the households with a low pre-existing overconfidence level (i.e., low turnover rate in the pre-treatment period), households' turnover rate increases by 42.1 (=19.0+23.1) percentage points, while the turnover rate increases by only 19 percentage points for those with high pre-existing level of overconfidence level (i.e., high turnover rate in the pre-treatment period).

In summary, the cross-sectional variations in the treatment effects show that the effect of winning an IPO allotment on trading is indeed tied to households' experience and pre-existing overconfidence level. In particular, we find that the treatment effects are stronger when the households have little experience of trading in the stock market, when the households seldom won

an IPO allotment in the past, when the households are in the market bust period, and when the households have a low pre-existing turnover rate.

5.4 Portfolio Return

In this section, we examine portfolio return of these households. Examining their portfolio return could further help to distinguish whether increased turnover rate is due to increased overconfidence or due to some rational response made by the individuals. The changes in the trading behavior reflects any kind of rational response made by the individuals, it should predict that their stock performance should not become worse. One example of such rational response could be: winning an IPO allotment could affect a person's risk preference and make him more risk-seeking. Thus, high turnover rate could simply reflect a change in risk-taking preference. However, this type of explanation could predict higher raw return in the post-event period considering that high risk is positively associated with high raw return. Another example of rational response could be portfolio rebalancing: After winning the IPO allotment, the households rationally rebalance their existing portfolio, subsequently leading to a higher turnover rate. This explanation, however, does not predict a performance decline. In contrast, overconfidence implies that investors mistakenly over-estimate her prospect in the stock market, and thus predict that these trading could be associated with lower return.

We re-estimate Equation (1) by using the person's portfolio return as the dependent variable. In column (1) Table 5, we use the raw return as the dependent variable. The coefficient on *Treat*×*Post* is significantly negative. The coefficient on *Treat*×*Post* is -0.01 and is significant at the 1% level. This result indicates that individuals in the treated group experience a decrease in raw return by 1 percentage point over the three-month period following the winning of the IPO allotment (an annualized return of -4 percentage points).

In column (2), the dependent variable is the own-benchmark abnormal return, which represents the return that the household would have earned if it had merely held its beginning-of-period portfolio for the entire period. The coefficient on *Treat*×*Post* is -0.02 and is significant at the 1% level. This result indicates that households in the treated group experience a decrease their own-benchmark abnormal return by 2 percentage points over the three-month period following the winning of the IPO allotment.

In column (3), we examine the market-adjusted return as the dependent variable. The coefficient on *Treat*×*Post* is -0.012 and is significant at the 1% level: Households in the treated group experience a decrease their market-adjusted return by 1.2 percentage points over the three-month period following the winning of the IPO allotment.

In column (4), we examine the volatility of the households' portfolio. We measure the volatility based on the standard deviation of the daily return of the portfolio in the three-month period, and find that the treated group experience a significant increase in (excessive) risk-taking.

Lastly, following the IPO allotment, does the treated group input more money into the stock market (in addition to money invested in the IPO shares)? In column (5), the dependent variable is *Ln(Portfolio wealth)*, which is the market value of the household's portfolio except for the IPO shares. The coefficient on *Treat*×*Post* is 0.095 and is significant at the 1% level: the portfolio value of the treated group (in addition to the IPO shares) increases by approximately 10% $(= e^{0.095} - 1)$ after winning the IPO allotment. Despite the fact that the treated group's stock performance is declining, they input more money into the stock market. This result is broadly consistent with the view that winning an IPO allotment makes these householders more overconfident.

Overall, Table 5 shows that, after winning the IPO allotment, households earn significantly lower return compared to the households in the control group. This result is also consistent with the view that higher turnover rate after the IPO allotment reflect overconfidence rather than any rational response made by the household.

5.5 Net Wealth Gain of Winning an IPO Allotment

The IPO shares itself increase households' welfare, but the subsequent excessive trading decreases households' welfare. A natural question arises: what the net wealth gain of winning an IPO allotment is? Considering that the RMB-value loss associated with excessive trading should be larger for households with larger portfolio and that the gain from winning the IPO allotment is largely constant across portfolio wealth, we expect the net wealth effect to decrease with households' portfolio wealth.

To formally estimate the net wealth effect, we first divide our sample into 10 decimals based on households' wealth level. Then, for each group, we re-estimate the model reported in column (3) of Table 5 and obtain the coefficient β_1 on *Treat*×*Post*. Finally, the RMB-value net wealth is defined as the gain from winning the IPO allotment + portfolio wealth×β_1. The gain from winning the IPO allotment is defined as (shares obtain ×cumulative post-event stock return in 3 month). We report the net wealth effect in Table 6.

Consistent with our expectation, the net wealth gain of winning an IPO allotment is decreasing with the household's wealth. For households in the bottom decimal (lowest portfolio wealth), their net wealth effect is around 15 thousand RMB. Such a net wealth effect gradually decreases to around 5 thousand RMB for the 2nd top decimal wealthy group. It is worth noting that, for the ones in the top decimal (the ones with largest portfolio wealth), their net wealth effect is –

7.6 thousand RMB. Such a negative value is because the loss of excessive trading surpass the gain obtained from the IPO shares. Overall, winning the IPO allotment indeed benefits the winner; but the overconfidence caused by good luck greatly offset (or even reverse) the gain.

5.6 Additional Investigation and Robustness Check

5.6.1 Subsample Analysis of Rich Households

In this subsection, we focus on the subsample of rich households. Focusing on this subsample enables us to better distinguish our overconfidence explanation the wealth effect and/or house money explanation, because the average RMB-gain of winning the IPO allotment (around 30,000 RMB) is unlikely to create any meaningful wealth effect or house money effect for rich households.

In Table 7 column (1), we focus on the group of households whose portfolio wealth is in the top 10% of all households in our sample, and re-estimate Equation (1). The regression specification is the same as that in column (2) of Table 3. The coefficient on the *Treat*×*Post* indicator is still significantly positive. The coefficient on *Treat*×*Post* is 0.15 and significant at the 1% level, indicating that turnover rate increases by approximately 15 percentage points after winning the IPO allotment.

In Table 5 column (2), we re-estimate column (1) by focusing on the group of households whose portfolio wealth is at least 1.5 million RMB. We choose such a cutoff value so that the RMB value gain of each IPO allotment (on average 15 thousand RMB) is less than 1% of the households' portfolio wealth. Thus, the wealth effect or house money effect of winning an IPO allotment can be negligible. Such a restriction greatly reduces our sample to 430,434 observations, because only very a small number of households are such wealthy. The coefficient on *Treat*×*Post*

is 0.143 and significant at the 1% level, indicating that turnover rate increases by approximately 14 percentage points after winning the IPO allotment.

Overall, these results indicate that our findings hold even for a subsample of extremely rich households and thus indicate that our results are unlikely to be explained by the wealth effect and/or house money effect.

5.6.2 How Long does the Effect Last?

A related question is: How long the increased level of overconfidence last? We compute the turnover rate of our sample households over month [4,6], and month [7, 9] following the IPO allotment.

In columns (1) and (2) of Table 8, we examine the effect of winning an IPO allotment on turnover over three periods specified above. The coefficients on *Treat*×*Post* are decreasing in magnitude. For example, the coefficient on *Treat*×*Post* is 0.093 in column (1), indicating that the treatment effect is only 1/3 as large during the period of month 4-6 (0.093 vs. 0.331 reported in column (1) of Table 8). In column (2), where we examine the turnover rate during month 7-9, the coefficient on *Treat*×*Post* further shrinks to 0.035. The results indicate that the effect of winning an IPO allotment on turnover is decreasing over time and largely vanish at the end of month 9 following the IPO allotment.

Overall, we show that the effect of winning an IPO allotment on households' trading activities is diminishing over time. These results also indicate that experience of "good luck" has some relatively short-term impact on households' level of overconfidence. These findings are consistent with Gervais and Odean (2001) that overconfidence tends to be short-lived and traders develop a progressively more realistic self-assessment.

5.6.3 Placebo Test

In this section, we implement placebo tests to investigate the possibility that our results are purely driven by chance. In particular, we draw a random sample of 2,832,997 households (the same number of the actual households who win an IPO allotment) as the "pseudo treated group" from our sample pool, and then treat the rest of the pool as "pseudo control group." Based on these "pseudo" treated and control groups, we re-estimate column (2) Table 3 and save the coefficients on *Treat*×*Post*. We repeat this procedure 5,000 times.

Figure 1 plots the distribution of the coefficients on *Treat*×*Post*. The actual coefficient on *Treat*×*Post* of 0.331 (see column (2) of Table 3) is more than 88 times the standard deviation (0.0037) above the mean (0.0002) of the distribution and much larger than the maximum coefficient estimate (0.012). This result indicates that our results are indeed driven by winning an IPO allotment and are unlikely to be driven by chance.

6. Conclusions

Overconfidence is a cognitive bias that is confirmed empirically to predict a wide range of economic outcomes. In this paper, we ask: What makes people overconfident? Does the experience of good luck in the present make people overconfident about their future prospects? Existing literature provides little evidence on this question, possibly because it is empirically to measure "good luck." In this paper, we exploit a natural experiment in China's stock market to examine whether experiencing good luck makes people overconfident about their future prospects. We use the winning of an IPO allotment as a measure of "good luck". We find that households who win an IPO allotment subsequently trade more in the stock market and lose more money (a reflection of overconfidence). We also consider alternative explanations such as wealth effect and house

money effect; and these explanations are unlikely to hold. Overall, our results are consistent with the view that experience of good luck makes people overconfident about their future prospects.

Our study also has implication on how luck in perceived by human beings in the reality. Do people believe in luck, meaning they tend to view good luck as a stable (at least for a short period of time) and internal attribute which they possess? Or Do people do not believe in luck and instead maintain the rational view that it is external and unreliable (just as modelled in most of the economic and finance literature)? Do people (incorrectly) revise their subjective assessment of luck after experiencing some good luck? Contributing to these debates, our study provides suggestive evidence that people tend to believe in luck and become overconfident about their future prospects after experiencing lucky events in the present.

Appendix 1: Variable Definitions

Variable	Definition
Turnover	(Half of Buy Volume + Half of Sell Volume)/Average Portfolio Value
Portfolio value	Average value of total stock holding
Market index	Market return of the Composite in the Shanghai Stock Exchanges
Benchmark return	3-month Holding Return of Beginning of Period Portfolio
Abnormal return	Raw portfolio return – benchmark return

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Table 1: Summary Statistics

The sample consists of 11,382,612 person-period observations from 2014–2016. We obtain data from Shanghai Stock Exchange. Definitions of all variables are provided in Appendix 1. All continuous variables are winsorized at the 1st and 99th percentiles.

	Mean	StdDev	25th Percentile	Median	75th Percentile
Turnover	381.37%	497.91%	52.43%	188.20%	504.28%
Raw return	6.49%	32.23%	-8.65%	2.63%	20.40%
Own-benchmark abnormal return	-5.33%	40.83%	-21.92%	0.00%	12.79%
Market-adjusted return	-1.77%	25.23%	-15.14%	-1.80%	8.31%
Portfolio wealth (in thousand)	374	2825	68	150	339
Market return	9.52%	22.64%	-9.50%	5.05%	34.62%

Table 2: Univariate Tests

This table reports the univariate tests that examine the impacts of winning an IPO allotment on people's trading behavior. Treated group is the group of people who win an IPO allotment. For each individual in the treated group, we match him to a control individual who did not win an IPO allotment but has the closest portfolio value in the three-month period prior to the IPO subscription. Pre-event (Post-event) turnover is the turnover rate measured in the three-month period before (after) winning the IPO allotment. Variable definitions are provided in Appendix 1. All continuous variables are winsorized at the 1st and 99th percentiles. The superscript ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Treated group (1)	Control group (2)	Difference-in-differences test: (1)－(2)
Pre-event Turnover (a)	365%	365%	
Post-event Turnover (b)	411%	383%	
Difference= (b) － (a)	46%	18%	28%***

Table 3: The Effect of Winning IPO Allotment on Turnover

This table reports the difference-in-differences tests that examine the impacts of winning an IPO allotment on people's trading behavior. The indicator variable *Treat* takes the value of one if the person is in the treated group, and zero if the person is the in the control group. The indicator variable *Post* takes the value of one for the three-month period after winning the IPO allotment, and zero for the three-month period before winning the IPO allotment. Variable definitions are provided in Appendix 1. All continuous variables are winsorized at the 1st and 99th percentiles. T-statistics based on robust standard errors clustered by person are in parentheses. The superscript ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	Without Person FE		With Person FE
Treat ×Post	0.277***	0.331***	0.332***
	(74.97)	(89.70)	(90.63)
Treat	-0.000	-0.002	
	(-0.00)	(-0.43)	
Post	0.186***	0.232***	-0.078***
	(70.99)	(81.47)	(-29.69)
Ln(Portfolio wealth)		-0.569***	-0.576***
		(-407.32)	(-177.78)
Market return		0.448***	-1.267***
		(62.11)	(-206.46)
Constant	3.651***	10.392***	10.768***
	(1,320.27)	(595.49)	(277.52)
Person FE	No	No	Yes
Observations	11,331,988	11,331,988	11,331,988
Adj_R^2	0.10%	2.10%	2.30%

Table 4: Heterogeneous Treatment Effect

This table reports the difference-in-differences tests that examine the impacts of winning the IPO allotment on people's trading behavior. The indicator variable *Treat* takes the value of one if the person is in the treated group, and zero if the person is the in the control group. The indicator variable *Post* takes the value of one for the three-month period after winning the IPO allotment, and zero for the three-month period before winning the IPO allotment. In column (1), the indicator variable *Low* takes the value of one if the household's experience (measured as the number of years since he opened his stock trading account) is below the sample median, and zero otherwise. In column (2), the indicator variable *Low* takes the value of one if the number of times of the households winning an IPO allotment is below the sample median, and zero otherwise. In column (3), the indicator variable *Low* takes the value of one if the market index return is below the sample median, and zero otherwise. In column (4), the indicator variable *Low* takes the value of one if the household's turnover rate in the pre-treatment period is below the sample median, and zero otherwise. Variable definitions are provided in Appendix 1. All continuous variables are winsorized at the 1st and 99th percentiles. T-statistics based on robust standard errors clustered by person are in parentheses. The superscript ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	Investor experience	Past record of winning IPO allotment	Market condition	Pre-existing turnover rate
Treat ×Post ×Low	0.208***	0.378***	0.194***	0.231***
	(27.21)	(42.08)	(14.86)	(31.82)
Treat ×Post	0.144***	-0.004	0.215***	0.190***
	(28.14)	(-0.50)	(29.95)	(64.50)
Treat × Low	0.197***	-0.000	0.000	-0.000
	(24.17)	(-0.04)	(0.03)	(-0.000)
Low ×Post	-0.000	0.586***	2.251***	-1.371***
	(-0.08)	(86.67)	(242.30)	(-261.31)
Treat	-0.068***	-0.001	-0.002	-0.001
	(-12.15)	(-0.12)	(-0.34)	(-1.11)
Post	0.375***	-0.297***	-0.896***	0.744***
	(94.08)	(-49.75)	(-162.33)	(353.45)
Low	0.721***	0.680***	-0.813***	5.901***
	(124.80)	(87.04)	(-122.18)	(1374.23)
Ln(Portfolio wealth)	-0.524***	-0.525***	-0.557***	-0.296***
	(-346.21)	(-369.72)	(-403.56)	(-257.14)
Market return	0.965***	0.344***	0.761***	-0.604***
	(126.44)	(46.41)	(65.74)	(-93.56)
Constant	9.281***	9.280***	10.522***	4.353***
	(478.38)	(472.18)	(598.58)	(310.23)
Observations	9,560,868	11,331,988	11,331,988	11,331,988
Adj_R^2	0.030	0.026	0.035	0.299

Table 5: The Effect of Winning IPO Allotment on Performance

This table reports the difference-in-differences tests that examine the impacts of winning an IPO allotment on people's stock performance. The indicator variable *Treat* takes the value of one if the person is in the treated group, and zero if the person is the in the control group. The indicator variable *Post* takes the value of one for the three-month period after winning the IPO allotment, and zero for the three-month period before winning the IPO allotment. Variable definitions are provided in Appendix 1. All continuous variables are winsorized at the 1st and 99th percentiles. T-statistics based on robust standard errors clustered by person are in parentheses. The superscript ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) Raw return	(2) Own-benchmark abnormal return	(3) Market-adjusted abnormal return	(4) Volatility	(5) Ln(Portfolio wealth)
Treat ×Post	-0.010***	-0.020***	-0.012***	0.001***	0.095***
	(-32.93)	(-46.05)	(-37.84)	(42.21)	(157.21)
Treat	0.009***	0.008***	0.010***	-0.001***	-0.003***
	(42.71)	(32.24)	(49.12)	(-110.12)	(-2.95)
Post	-0.045***	-0.093***	-0.042***	0.003***	-0.067***
	(-209.12)	(-286.21)	(-200.36)	(295.72)	(-137.28)
Ln(Portfolio wealth)	0.005***	0.010***	0.006***	-0.001***	
	(84.07)	(113.11)	(96.91)	(-225.72)	
Market return	0.886***	0.716***	-0.079***	-0.019***	-0.033***
	(1,990.03)	(1,186.14)	(-177.68)	(-1,135.32)	(-21.32)
Constant	-0.051***	-0.186***	-0.063***	0.041***	11.985***
	(-66.62)	(-170.68)	(-83.45)	(728.87)	(16,296.09)
Observations	11,331,988	11,331,988	11,331,988	11,331,988	11,331,988
Adj_R^2	0.381	0.194	0.009	0.097	0.001

Table 6: Net Wealth Effect of Winning the IPO Allotment

This table reports the net wealth effect of winning the IPO allotment. We divide our full sample into decimals based on portfolio wealth. Based on each group, we re-estimate the model of column (4) of Table 4 and obtain the coefficient on *Treat*×*Post*. Gain from IPO is defined as IPO shares × (share price at the end of post-treatment period ─ IPO price). Wealth loss due to overconfidence is defined as portfolio wealth × the coefficient on *Treat*×*Post*. The net wealth effect is the sum of IPO gain and the wealth loss due to overconfidence.

Rank of the 10 portfolio wealth decimal	(1) Gain from IPO	(2) Loss due to overconfidence	(3) Net wealth effect (1)+(2)
1 (lowest portfolio wealth)	15381	-362	15020
2	15398	-932	14467
3	15421	-1605	13817
4	15439	-1820	13619
5	15461	-2860	12601
6	15495	-3461	12034
7	15553	-5194	10359
8	15642	-8064	7578
9	15818	-10550	5268
10 (highest portfolio wealth)	16933	-24574	-7640

Table 7: Subsample Analysis on Rich Individuals

This table reports the difference-in-differences tests that examine the impacts of winning the IPO allotment on people's trading behavior and portfolio return, based on a group of highly wealthy households. The indicator variable *Treat* takes the value of one if the person is in the treated group, and zero if the person is the in the control group. The indicator variable *Post* takes the value of one for the three-month period after winning the IPO allotment, and zero for the three-month period before winning the IPO allotment. In Panel A, we focus on the subsample of households whose portfolio wealth is in the top 10% of our full sample. In Panel B, we focus on the subsample of households whose portfolio wealth is at least 1.5 million RMB. Variable definitions are provided in Appendix 1. All continuous variables are winsorized at the 1st and 99th percentiles. T-statistics based on robust standard errors clustered by person are in parentheses. The superscript ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
	Top 10% Wealthy Household	Households with Portfolio Wealth Greater than 1.5 Million RMB
Treat ×Post	0.150***	0.143***
	(13.52)	(8.66)
Treat	-0.001	-0.000
	(-0.17)	(-0.02)
Post	0.523***	0.603***
	(63.72)	(49.92)
Ln(Wealth)	-0.525***	-0.587***
	(-104.22)	(-75.78)
Market return	0.860***	0.780***
	(47.51)	(30.16)
Constant	9.696***	10.597***
	(133.76)	(91.04)
Observations	1,133,198	430,434
Adj_R^2	0.013	0.018

Table 8: How Long Does the Effect Persist?

This table reports the difference-in-differences tests that examine the impacts of winning an IPO allotment on people's trading behavior over a longer period. The indicator variable *Treat* takes the value of one if the person is in the treated group, and zero if the person is the in the control group. In columns (1) and (2), the indicator variable *Post* takes the value of one for the three-month period (month 4-6, and month 7-9, respectively) after winning the IPO allotment, and zero for the three-month period (month -4 to -1) before winning the IPO allotment. T-statistics based on robust standard errors clustered by person are in parentheses. The superscript ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) Turnover (Month 4-6)	(2) Turnover (Month 7-9)
Treat×Post	0.093***	0.035***
	(23.74)	(8.93)
Other control	Yes	Yes

Figure 1: Placebo Test

This figure shows a histogram of the coefficients on *Treat*×*Post* from 5,000 bootstrap simulations of the model in column (2) of Table 3. For each iteration, we draw a random sample of 2,832,997 households (the same number of the actual households in our treatment group) as the "treatment group" from our sample pool, and then treat the rest of the pool as the control group. Based on these "pseudo" treated and control groups, we re-estimate column (3) Table 3 and save the coefficients on *Treat*×*Post*.