Insights about Mutual Funds' Stock-selecting ability under Strict Regulation in China

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ABSTRACT

This paper examines the stock-selecting ability of mutual funds by conducting an empirical study on China's IPO market from 2010 through 2015. With an underlying assumption that positive expectations about stocks drive funds' investment decisions, this study implements a two-stage testing methodology. Firstly, this study estimates funds' selection ability by controlling typically-used determinants of fund investment decisions. Then I evaluate the post-IPO performance of the selected stocks by using the Buy-and-Hold Abnormal Returns model and Fama-French Three-factor model. The findings demonstrate that mutual funds can differentiate stocks, especially in the downside.

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I. Introduction

Since the issuance of the first mutual fund on September 11, 2001, the mutual fund industry has developed rapidly and become an essential force in China's capital market. Nonetheless, many retail investors are uncertain about the reliability of funds. For them to make investment decisions, a question needs to be answered – that is whether mutual funds are able to select outperforming stocks to obtain excess returns.

To probe into this question, previous scholars have done many studies, but their conclusions are divergent. Some literature believes that fund managers can identify certain stocks, which in turn can outperform the market. For instance, Grinblatt and Titman (1989) examined stocks that were frequently traded by mutual funds and found that fund managers had stock picking capabilities for quarterly holdings. Later on, Daniel and Titman (1996) presented that the fund manager had significant stock picking ability before deducting management fees and transaction costs. Moreover, Chen, Jegadeesh, and Wermers (2000) found that funds tended to buy stocks with annual yields that are 2% higher than the stocks they sell, which leads them to gain profits in trading.

Other scholars held a contrary view. Jensen (1968) proposed that previous research failed to evaluate the performance of funds' portfolio correctly as they fail to measure different kinds of risk, which made their conclusions on stock picking ability invalid. Gruber (1996) found that between 1985 and 1994, mutual fund returns were 65 basis points lower than market index returns. Furthermore, Carhart's (1997) conclusion is even more pessimistic. He found that the more active fund manager involves in stock picking activity, the greater the gap between fund returns and market index returns.

While most of the studies mentioned above standing on the fund's perspective and using the fund's portfolio performance as the measurement of stock-picking ability, Feng and Johansson (2014) examine funds' stock picking ability from the stock perspective. They believe that the decision-making of IPO purchase under the lock-in deadline mainly comes from the internal evaluation of the newly listed company by fund managers. Using data from the China IPO market during 2005-2010, they conclude that mutual funds have the ability to pick stocks.

Inspired by Feng and Johansson's (2014) ideas, this study performs similar strategies on the IPO market from 2010 to 2015. I choose IPO market to study the funds' stock-picking ability for three main reasons. First of all, since there is a high degree of uncertainties and information asymmetry in IPO process, only the fund managers with the selection abil-

ity can survive in this market. Moreover, there is an embedded positive correlation between the funds' stock-picking ability and portfolio performance since fund managers have a strong incentive to choose out-performing stocks to gain a higher bonus. Last but not least, funds can hardly win by frequently arbitraging since institutional investors participating in China's IPO issuance market need to hold the position in the three-month lock-up period (Shao and Wu, 2009).

The period studied is 2010-2015, as it is meaningful to reevaluate the IPO market because the speculation in the market is restricted by the effect of the financial crisis, a gradual recovery and a significant change in regulation. Influenced by the remaining impact of economic depression, many IPO stocks broke their offering price (namely, "pofa") on the first day of trading during 2010-2012. According to the data from CSMAR, there are 25 pofa stocks in 2010, 72 pofa stocks in 2011, and 39 pofa stocks in 2012, which largely reduce the chance of speculation. In addition, it is also important to see the effects of regulation. China's financial market was turbulent in 2010-2015 with 3 IPO suspension, among which there was even the most extended suspension in the history of China market: from November 2012 to January 2014. As policies and regulations are getting stricter and more rigorous, fewer and fewer speculators are allowed on the market. Thus, investigating the funds' stock-picking ability during this special period, I could further test the model proposed by Feng and Johansson and enrich knowledge on stock selection ability of mutual funds in China's immature stock market under strict restriction.

As stated above, suffering from economic depression and the strict regulation, only mutual funds that are positive about the future performance of the newly listed companies would subscribe their IPO shares. Inferring from this assumption, the more mutual funds that participate in one stock's IPO subscription, the more positive view the funds held on the company. In other words, the number of funds participating in the subscription of new stock can imply funds' overall expectation about it.

By using a two-stage methodology, this study finds that most IPO firms outperformed the market during the selected period. Namely, mutual funds have the ability to evaluate stock performance especially those risky ones. To explain the research process and analyze the results in details, the rest of the paper proceeds as follows. In Section II, I introduce the institutional background. After that, the data sample and variables are described in Section III . Moreover, Section IV analyzes mutual funds' stock picking in the Chinese IPO market. Section V presents the empirical results on the relationship between mutual funds' stock selection in the IPO market and post-IPO stock performance, while Sec-

tion VI presents the analysis of the results under certain regulations and economic backgrounds. Finally, Section VII concludes the paper.

II. Institutional background

From 2010 to 2015, 1,133 new A-share companies have been listed During this period, there is a significant gap in the number of IPO each year, which is closely related to the suspension of IPO and the evolution of IPO policy. In the past decade, IPOs have experienced three suspensions, from September 2008 to July 2009, November 2012 to January 2014, July 2015 to November 2015. The second one is the longest, reaching 14 months.

After only 77 and 98 listings in 2008 and 2009 respectively, in 2010, A-share IPOs experienced a "blowout" with both the number of IPOs and the amount of financing reaching the highest annual level. On the one hand, the pace of approval has accelerated since the resumption of IPO. On the other hand, the launch of GEM (Growth Enterprise Market) in October 2009 has provided more possibilities for enterprises to enter the A-share market. In 2010, there were 321 companies listed on the Shenzhen Stock Exchange, accounting for 92% of the total IPO in that year. Among them, 117 companies are listed on the GEM.

However, the trend did not continue, the number of listed companies began to decline in 2011, and by 2012, the number and size of IPO companies fell to a three-year freezing point. The downturn of the stock market led to the slowdown of the pace of IPO and the sustained enthusiasm of enterprises for listing, which together led to the A-share spectacle of the 'barrier lake' of IPO. Since the suspension of IPO in October 2012 which lasted for 15 months, the market bottomed to 1949.46 in CSI300 Index (December 4, 2012), and then rebounded to 2444.80 in CSI300 Index (February 18, 2013), with the highest increase of 25.41%. Since the resumption of the IPO in January 2014, after CSI300 Index went down, it once bottomed to 1974, and then rose sharply, opening a rare bull market in the Chinese stock market. On July 4, 2015, the China Securities Regulatory Commission postponed the issuance of IPOs, and the CSI300 Index fell sharply, falling below 3000 points at one time. Then IPO suspended again in July 2015 and re-opened in November 2015. With the adjustment of IPO issuance, the reform of IPO issuance system has been in the process of promoting and improving. In June 2009, China Securities Regulatory Commission issued Guidance Opinions on Further Reform and Improvement of the IPO Issuance System. This newly issued regulation affected the quotation restraint mechanism of inquiry and purchase, diluted administrative guidance, and formed a further market-oriented pric-

ing mechanism.

Later, in October 2010, April 2012 and November 2013, the CSRC formulated and issued Opinions on Further Promoting/Deepening the Reform of the IPO Issuance System. After proposing that the scope and proportion of inquiries should be adjusted appropriately, and the regulation of issuance pricing should be strengthened, the CSRC finally proposed that the IPO issuance should be promoted. The mechanism of stock market issuance will further improve the marketization of IPO pricing. In the view of professionals, the implementation of the registration-based listing system (Zhu Ce Zhi) is the inherent requirement of A-share market's marketization legalization and internationalization reform. In November 2013, the Third Plenary Session of the Eighteenth Central Committee of the Communist Party of China first wrote the reform of registration-based listing system (Zhu Ce Zhi) into the document of the Party Central Committee. In December 2015, the National People's Congress authorized the State Council to reform the registration-based listing system. The period of validity of the authorization was determined to be two years, from March 1, 2016 to February 28, 2018.

In the recent two years, the CSRC has also promoted some work and achieved results. On the one hand, it has perfected and tightened the information disclosure system and cracked down on information fraud. On the other hand, it has implemented the policy of "strict supervision" to crack down on securities crimes, focusing on information fraud, insider trading and market manipulation.

In addition, in recent two years, the normalization of IPO has achieved remarkable results, not only alleviating the 'barrier lake' problem of IPO for many years, but also greatly improving the efficiency of IPO audit. The average queuing time of IPO has been shortened from three years in the past to one and a half years. In February 2018, the Standing Committee of the National People's Congress decided to extend the authorization period of the State Council for the registration system reform for two years to February 29, 2020.

III. Data Sample and Variables

A. Sample Selection

Suffering from the global financial crisis from 2007 to 2011, the Chinese financial market was in the state of stagnation. Nevertheless, benefited from the government's market-

saving behavior, the stock market started to rebound since 2009, which lead the mutual fund market to recover gradually. Moreover, starting from 2012 with the implementation of the newly revised Fund Law and the Administrative Measures for Securities Investment Fund Management Companies, the regulatory relaxation promoted a long-term prosperity in the asset management industry. Therefore, I set the time window from 2010 to 2015 in order to explore mutual funds' stock-picking ability in both recession and economic boom. To be more specific, my sample consists of all initial public offerings on the A-share market during the period 2010-2015.

All of the financials, pricing, and IPO allocation data are from the China Stock Market Accounting Research (CSMAR) Database. I choose CSMAR because it is the leading Chinese financial database, providing the most comprehensive and accurate information on listed Chinese companies.

After combining IPOs at Shanghai Stock Exchange and Shenzhen Stock Exchange, I get the full sample. As shown in Table III, there are 1133 IPOs during the period of 2010 to 2015. From this distribution, it is obvious that the amount of IPOs varies greatly from year to year. An important reason behind this variation is the government policy changes as the Chinese financial market is still in development. For instance, from Oct. 30th, 2009, the Growth Enterprise Market in Shenzhen was firstly been available for Chinese investors. In 2010, there were 347 IPOs taking place, among which 117 were listed on the Growth Enterprise Market in Shenzhen. In addition, between 2012 and 2014, the Chinese Securities Regulatory Commission (CSRC) halted IPO for 15 months to investigate in financial frauds and to reform the IPO approval process. Furthermore, in 2015, the IPO situation changed dramatically as the volatility of the stock market increased. The IPO amount in the first half year of 2015 reached 192, which composed 86% of the annual IPO amount. After the stock market crash in June, IPO was quickly suspended. Considering all the suspension between 2012-2015, the variation of numbers of IPOs is understandable. Moreover, since the policy and regulation changes are common and widely applicable in the Chinese market, all these periods are included in the sample and this study will try to evaluate mutual funds' IPO-stock-picking ability even when they encountered these special events.

Table IV presents numbers of IPOs for different industries during the period of 2010 to 2015. In this panel, the industries are classified according to the Listed Company Industry Classification Guidelines issued by CSRC. This table depicts that nearly 75% of IPOs are from the Industry class. To dig deeper, the top three subclasses in numbers of IPOs are Special Equipment Manufacturing, Raw Chemical Materials and Chemical Products,

and Electrical Machinery and Equipment Manufacturing. Since China is a leading developing country in manufactures, this distribution is in accordance with China's industrial structure. Namely, this distribution reflects the fact that the second industry is the pillar industry of the Chinese economy.

B. Variable Description and Descriptive Statistics

As there is no direct measurement for mutual funds' stock-picking ability, inferring from publicly available information is needed. Inspired by Feng and Johansson (2014), this study assumes that the mutual funds' subscription decision is based on the company's fundamentals, the underwriter's reputation, the CPA firm's credibility, and the fund's selectivity. Thus, in order to discuss mutual funds' selectivity, this study needs to analyze other variables first.

Table 2 presents the descriptive statistics of the variables I used in the analysis. To begin with, I propose to use Fund Subscription Ratio to reflect funds' investment decisions, which is defined by the following formula.

$$FundSubscriptionRatio = \frac{NumberofSharesPlacedtoFund}{NumberofSharesIssued}$$

Since my focus is on mutual funds' selectivity for IPO stocks, this study only interested in the IPOs that are invested by mutual funds. Thus, I removed 44 stocks with 0 Fund Subscription Ratio. In the current sample, at least 0.5% of a single IPO is subscribed by funds. On average, mutual funds subscribe 9% of shares offered at each IPO. Moreover, as depicted in Plot 1, the distribution of Fund Subscription Ratio is right skewed and 75% of the ratios are less than 11.8%.

In order to better understand the data sample, I created three subsamples depending on the Fund Subscription Ratio. Explicitly speaking, I divided the dataset into three parts by 33.3% and 66.7% quantile points and I labeled them as Low, Median and High respectively. The descriptive statistics for these three subsets can be found in Table V-VIII. An average of 3.7%, 7.2% and 15.1% of IPO shares are invested by mutual funds for the three groups respectively.

In order to explore mutual funds' selectivity, I need to control for all other IPO-specific and firm-specific factors. Researches show that auditors' reputation is a strong indicator in IPO process (Titman and Trueman, 1986; Beatty, 1989; Michaely and Shaw, 1995). As

suggested by Feng and Johansson (2014), the auditors' reputation could be classified into two groups– CPAs from the Big Four and CPAs from other firms. According to their research, if the auditor is from one of the big four international accounting firms (namely Deloitte, Ernst Young, KPMG, and PricewaterhouseCoopers), the fund subscription ratio will increase significantly (Feng and Johansson, 2014). Thus, I included a Big Four factor, which equals 1 when the IPO accountant is from the Big Four and equals 0 otherwise.

In addition to auditors' reputation, previous researches also demonstrated that underwriters' reputation has a significant influence on IPO performance (Carter and Manaster, 1990; Carter, Dark and Singh, 1998). Carter and Manaster's underwriter ranking system depends on the order of their names on the IPO tombstones. However, since this data is not publicly available for Chinese investors (Feng and Johansson, 2014), I decided to use a different way. I sorted underwriters based on their total IPOs underwrote during the period of 2010 to 2015 and found the top ten. If an IPO underwriter belongs the top ten underwriters, their Reputable Underwriter factor is 1. Otherwise, It is 0.

Besides the factors that influence the book building process, previous scholars also suggests that pricing related factors can impact fund investment decisions (Feng and Johansson, 2014). Therefore, this study also added offer price, IPO underpricing rate and PE ratio in the model. To calculate IPO underpricing rate, I measured the difference of the open price and closing price on the first trading day. In terms of the PE ratio, I used the issue price over the average of annual basic earnings during the two years or three years before IPO. Furthermore, since the IPO issue size varies greatly from firm to firm, I also included this factor for completeness.

In addition to the IPO-specific factors, firm-specific variables also need to be controlled, especially for financial fundamentals and ownership characteristics. In terms of the financial measures, this studyincluded sales growth ratio, ROE, leverage ratio and firm size. All of these factors are evaluated based on the mean value of the firm during the two years or three years before IPO. As for the ownership characteristics, following the research on corporate governance in China (Bai et al, 2004; Wei et al, 2005; Chen et al, 2006), the type of a firm's main shareholder and the ratio of the largest shareholder are very crucial. According to the CSMAR data manual, shareholders are classified into four groups, namely State-Owned Legal Person, Domestic Legal Person, Domestic Natural Person and State. In order to tell the effect of the government control power, I separated all the shareholders into two groups, state-related and private. If the firm is state-owned, it's Private factor will be 0. Otherwise, it will be 1. In terms of the Largest Ownership factor, I used the

shareholding percentage of the direct controlling shareholder as the proxy to estimate the decision-making efficiency of the shareholder who operates the company.

IV. Mutual fund classification on their stock-selecting ability

To begin the empirical study, I need to define the mutual funds' stock-selecting ability in advance. Following Feng and Johansson's model, this study regards all the firm-specific and IPO-specific variables as a proxy for fund managers' expectations. However, unlike Feng and Johansson's models, this study does not have any governance-specific variables because identify a reliable management team and a efficient company structure is also a part of fund managers' stock selection ability. Moreover, since 2010-2015 is a special period in Chinese capital market, this study adds 4 time dummies to control for the different regulations and market environment each year. Furthermore, as the compensation and reputation of fund managers are closely related to their fund performance, I assumed that they will try their best to construct their portfolios. Implying from this assumption, the fund subscription ratio of every IPO can reflect the expectation of mutual funds on the stock. Therefore, the model I formulated to measure the underlying expectation of mutual funds are as follows.

$$\begin{aligned} Fund\ Subscription\ Ratio = {} & \alpha + \beta_1 * IPO\ Value + \beta_2 * PE\ Ratio \\ & + \beta_3 * OfferPrice + \beta_4 * SalesGrowth + \beta_5 * ROE \\ & + \beta_6 * Leverage + \beta_7 * FirmSize + \beta_8 * ReputableUnderwriter \\ & + \beta_9 * IPOUnder - pricing + \beta_{10} * LargestOwnership \\ & + \beta_{11} * PrivateFirm + \beta_{12} * Big4 + \beta_{13} * \sum_{n=4} Year_j \end{aligned} \tag{1}$$

In this model, by controlling all known firm-related and IPO related financials, I applied Ordinary Least Square (OLS) to perform a linear regression. Specifically speaking, I used the proportion of IPO shares subscribed by funds to the total number issued as the proxy of mutual funds' investment decision. In addition, all the independent variables are specified in the previous section. The regression results are presented in Table 3. The results

demonstrate that most firm-specific variables, IPO-underpricing ratio and year dummies are significant at the 95% confidence level. Nonetheless, PE ratio, leverage ratio, reputable underwriter, largest ownership, private and Big4 are not very significant statistically. Conducting VIF test, I realized that the multicollinearity among those variables is very high according to the rule of thumb. This serious multicollinearity is understandable since IPO price is usually set at 23 times EPS in the market. For robustness, I also conduct two adjusted models—one without those parameters with high VIF and another one with heteroscedasticity corrected by Huber–White standard errors. Since the R squared drops significantly, I decide not to remove them in my final model. Moreover, since the correction of heteroscedasticity does not have a significant impact, I keep the model the same since heteroscedasticity is not serious. Thus, for completeness, I used model 1 to calculate residuals.

V. Post-IPO Performance

To analyze the stock's post-IPO performance, I used two different approaches:Buy-and-hold abnormal return (BHARs) and Fama-French's Three-factor Model. I define the event window first. As discussed before, most of the IPOs have abnormal return because of the IPO underpricing issue. In Feng and Johansson's approach, they exclude the first trading weeks' performance to "avoid extreme short-term movements in the secondary market". However, through IPO reform like price limitations and different patterns of post-IPO performance through the tested years, I believe a one-week reduction is too arbitrary. Therefore I include the abnormal return right after the IPO and use both one-year and two-year window to examine the effect. To simplify the process, I assume one year has 250 trading days. To compare with Feng and Johansson's approach, this study sets the intervals on both with and without first week trading performance, which is [+5, +255], [+5, +505] and [+0, +250], [+0, +500], respectively.

A. Buy-and-hold Abnormal Returns Model

As this study focuses on a relatively long-run effect, a simple cumulative abnormal return is not enough. Instead, I compared the stock return with the benchmark. Therefore, 1-year and 2-year BHARs for stock i are calculated by taking the difference between the compounded return on the stock and the compounded return on the benchmark.

$$1-year\ BHAR_i = \prod_{t=0}^{250}(1+r_{i,t}) - \prod_{t=0}^{250}(1+r_{m,t}) \tag{2}$$

$$1-year\ BHAR_i = \prod_{t=6}^{256}(1+r_{i,t}) - \prod_{t=6}^{256}(1+r_{m,t}) \tag{3}$$

$$2-year\ BHAR_i = \prod_{t=0}^{500}(1+r_{i,t}) - \prod_{t=0}^{500}(1+r_{m,t}) \tag{4}$$

$$2-year\ BHAR_i = \prod_{t=6}^{506}(1+r_{i,t}) - \prod_{t=6}^{506}(1+r_{m,t}) \tag{5}$$

Here, $r_{i,t}$ is the 1-day return including dividends for $stock_i$, and rm_t is the 1-day return on the benchmark. Moreover, min(250,stop) and min(500,stop) mean that the BHAR for $stock_i$ is calculated up to 250 and 500 trading days after the listing, respectively, or December 31, 2017, which is the last day of data available in this sample. For the benchmark, I used CSI300 index.

I constructed decision variable by calculating the results based on stock information from different residual groups. Afterwards, I ran a regression on the results with the residuals of their corresponding group to figure out the relationship between stock return and mutual fund's preference.

Table I 1- and 2-Year BHARs after IPO

	Full Sample	*Low Residual Funds*	*Median Residual Funds*	*High Residual Funds*
Panel A: 1-year Buy-and-Hold Abnormal Returns after IPOs				
(a.1) Return in Excess of CSI 300 Index	0.236	1.387**	0.893	0.995***
including first 5 trading days	(1.510)	(2.470)	(0.716)	(2.777)
(a.2) Return in Excess of CSI 300 Index	0.160	0.898**	0.737	0.918***
excluding first 5 trading days	(1.146)	(2.066)	(0.630)	(2.618)
Panel B: 2-year Buy-and-Hold Abnormal Returns after IPOs				
(b.1) Return in Excess of CSI 300 Index	1.605***	9.109***	-1.854	1.221*
including first 5 trading days	(3.994)	(5.237)	(-0.629)	(1.842)
(b.2) Return in Excess of CSI 300 Index	1.287***	7.011***	-1.905	1.056*
excluding first 5 trading days	(3.811)	(5.012)	(-0.736)	(1.745)

The results are presented in Table I above. As discussed above, residual is the difference between the real fund subscription ratio of an IPO and the predicted fund subscription ratio. Therefore, independent variables are negative for Low Residual Funds and positive for

High Residual Funds. Full Sample and Median Residual Funds, which have both positive and negative independent variables, are not meaningful in real life interpretation. Hence, it is understandable why their coefficients are in general not significant.

To investigate the meaningful relationships, this study only focuses on Low and High Residual Funds. For the low residual group, in one-year after IPO, 1 % less in the initial fund subscription ratio associates with 1.4% decreases the stock return. The decreasing scale is 0.9 % if I exclude the first-week trading performance. If I take a two-year window, these effects are much stronger: 1 % less in fund subscription ratio on average decreases the stock return by 9.1% . If I exclude the first-week trading performance, the decreasing ratio in the stock return will be 7.0%. In terms of the high residual group–namely, firms more preferred by mutual funds-1% more in fund subscription ratio correlates to 1.0% increases the stock return. If I exclude the first-week trading performance one year after IPO, the increase scale will be 0.9% . If I evaluate the stock performance two year after the IPO, 1% more in fund subscription ratio on average increases the stock return by 1.2% , 1.1% if I exclude the first-week trading performance. Therefore, I reckon that mutual funds have the stock-picking ability, and they are especially good at avoiding stocks that have lousy performance in the long run. More details about the results will be discussed in later VI.

B. Fama-French's Three-factor Model

I think that taking only one variable CSI300 index is not enough to compare the IPO stock return with the market as a whole. I also want to control IPO performance under more determinants, for example, the size of the firm and the reputation of its underwriter, inspired by Feng and Johansson's approach. Therefore, a modified Fama-French Three-Factor is applied to estimate the overall IPO stock performance from 2011 to 2017.

$$\begin{aligned} r_{i,t} = \alpha &+ \beta_1 * Market\ Risk\ Premium\ Factor_t + \beta_2 * Market\ Value\ Factor_t \\ &+ \beta_3 * Book - to - Market\ Factor_t + \beta_4 * Issue_{i,t} + \beta_5 * Residual * Issue_{i,t} \\ &+ \beta_6 * ReputableUnderwriter * Issue_{i,t} \end{aligned} \tag{6}$$

There are three market-related factors. Market Risk Premium Factor, according to CSMAR, is defined as the difference of the daily market return with cash dividend reinvested (Weighted Average of Total Market Value) and daily risk-free interest rate (PBOC bench-

mark interest rate of 3-month deposit). Market Value Factor is the difference of the daily returns of small-cap and large-cap portfolios which are divided on the basis of the FAMA 2*3 division methods. Book-to-Market Ratio Factor is the difference of the daily returns of high book-to-market ratio and low book-to-market ratio portfolios which are divided on the basis of the FAMA 2*3 division methods. All the daily returns of these portfolios are calculated by the weighted average of total market Value. In addition, Issue is a dummy variable that equals to 1 when the firm has IPO within the time arrange this study examined, 1-year and 2-year, respectively. Residual is the residuals from the model on Funds Subscription Ratio in Section IV. Reputable Underwriter is defined same as in Section III.B.

Table II 1- and 2-Year Fama-French's Three-factor Model

	1-Year	2-Year
Market Risk Premium Factor	0.863***	0.863***
	(550.018)	(549.923)
Market Value Factor	0.636***	0.636***
	(167.785)	(167.850)
Book-to-Market Factor	-0.384***	-0.385***
	(-108.229)	(-108.526)
Issue	0.0010***	0.0005***
	(12.490)	(8.040)
Residual * Issue	0.0006***	0.0004***
	(5.675)	(5.020)
Reputable Underwriter * Issue	-0.0005***	-0.0001
	(-4.182)	(-1.634)

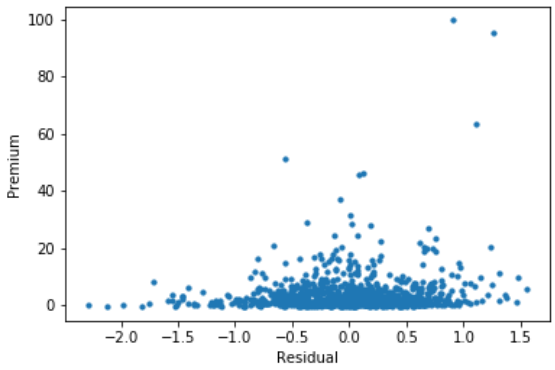
The results are presented in Table II above. Column 1 shows the results with the 1-year returns as the dependent variable, while Column 2 shows the results with 2-year returns as the dependent variable. The results for the two windows of return are quite similar. Market-related factors are strongly significant, in line with the Fama–French model I choose. The interaction term of Reputable Underwriter and Issue is negative, which is not consistent with my expectations in real life. But the most important thing is that interaction term of Residual and Issue is positive and significant for both 1 year after IPO and 2 years after IPO. From that I reach the same conclusion——mutual funds have the stock-picking ability in the IPO market.

VI. Results Analysis

A. On Stocks' level

Before analyzing the stock picking ability of mutual funds, it is important to address some unique characteristics on the IPO stock market itself. The first major difference of the IPO stock abnormal return for the year 2010-2015, compared with Feng and Johansson's result for the period of 2005-2010, is that almost all IPO stocks outperform the market in both one-year and two-year window. This result can be shown in Figure 1 below.

Figure 1. Stock Outperform the Market



As mentioned before, "pofa" (opening for trade below its IPO price) is a widespread phenomenon starting from the year 2011. Under that circumstance, it seems quite abnormal for us to find the overall IPO stock outperforming the market, even when I take the first week performance out of consideration.

This result can be explained first by the overall tendency of government regulation. A lot of companies were overvalued in previous years and there were also too many speculators in the market to gain profits from IPOs in general. To make the market more efficient and prevent the risk of bubble, regulators are being more and more cautious on IPO approval starting from year 2011—the year they have a big drop in IPO approval rate, from 84.4% to 78.6% according to QianZhan Research Institute. It is also said that the regulators care more about the stableness of a company's cash flow and capital structure; their ability on gaining sustainable revenue backed by a promising industry. Their selection bias overall improve the quality of IPO stocks compared to average market performance.

The second reason is that the strict regulation indirectly strengthen the market's confi-

dence about IPO stocks. Especially after the shutdown of IPO market in year 2013, investors tend to believe that those firms who can proceed IPO are with high potentials and very low risks to default. Therefore, even in 2015 when the market panic about the drastic drop, newly issued stocks are still more attractive to investors.

Another interesting phenomenon showed in the result is that for stocks that are not preferred by mutual funds, their performance are much worse in two-year window compared to one-year window.I can then conclude mutual funds have stock selection ability in the long run, especially on the down side. It is matched with the reality that fund managers put more emphasis on risk for IPO stocks as there is limited information available. In addition, this study argues that the "even worse" performance might be caused by the release of sell restriction on some original shareholders, as a lot of lock-up periods are one year. If there is something wrong with the stock or the firm doesn't have a promising future, investors in the market would expect the original shareholders to sell. Even though in theory this would not cause a big drop in market price but in real life China stock market is not efficient enough and people get panic. This effect is in line with my conclusion on mutual fund's stock picking ability as well.

B. On mutual funds' level

I discussed IPO restrictions on the firm side in the previous part, but it is also important to see from the investors' side so that I get a valid conclusion on mutual fund's stock picking ability. IPOs, because of its underpricing quality, have usually been seen as one of the most favorable ways for investors to speculate. This issue might not be obvious in the year 2011, because of "pofa", as discussed above. However, when IPOs restarted in the market after suspension, for example, in year 2014 and second half of the year 2015, it is normal to expect investors going into IPO market to generate profits.

The reason why I think mutual funds are still cautious about their choice is first because of more competitors in the market and therefore less profits. There are new rules made in 2015 on the frozen and withdraw of money—investor don't need to pay fully until it is sure that they have successfully purchased the stock and there is no frozen on their money as well. This policy makes the cost of going into IPO purchasing really low and brings more competitors into the market. It also reduces mutual funds' previous advantage, as now the size of funds doesn't give privilege in IPO purchasing. Therefore, a lot of "DaXin Fund", meaning that funds mainly focusing on IPO purchasing, changed their strategies

and transformed to mixed-type funds. Mixed-type here refers to more flexible combination of products in their portfolios, which leads to our second reason on their increasing cost of speculating.

The second reason is that mutual funds, if want to speculate on IPO market, would have to carry more risks. To purchase IPO, investors must have certain trading volume in their account, namely ("DiCang" in Chinese). For a lot of "DaXin" funds (funds mainly focusing on IPO purchasing), it is essential to manage the risk of the stocks in "DiCang" under certain level. However, it is hard to do when the overall stock market is going down. A common way that fund managers use to keep risk is to do hedge on Index futures market. Nevertheless, long existing negative basis is already indicating huge hedging pressure from all aspects of the market and makes it extremely expensive to perform hedging strategies. With all those increase of cost in risk management, I think that less mutual funds go into the IPO purchasing simply for speculation, which further justifies the conclusion that mutual funds have stock picking ability in the primary market.

VII. Conclusion

This paper focuses on evaluating mutual funds' stock-picking ability in China's IPO market during the period of 2010-2015. I choose this time window because I am interested in funds' performance during a challenging time, especially under strict regulations. Motivated by Feng and Johansson's idea, this study implemented a two-stage methodology. Firstly, I come up with a quantitative estimation for funds' stock-picking ability by controlling important stock-specific and IPO specific determinants. In this model, I regress funds' expectation on a single stock to those typically-used determinants to obtain the residuals, which is used as a proxy of the funds' selectivity in investment decisions.

After defining the funds' stock-picking ability, I utilize two different models to measure the post-IPO performance of the selected stocks. One of them is Buy-and-Hold Abnormal Return model, in which I used the performance of CSI 300 index as the benchmark. The other model is Fama-French Three-factor model, in which stock risk premium, market value and book-to-market value factors are considered as benchmarks. From these two models, this study finds that 1) most IPOs outperform the market in the 2-year time window, and 2)mutual funds have the ability to identify very risky stocks in 1- and 2-year horizon.

Probing into the results, I believe that various policy changes are the key drivers. First and foremost, regulators raise the thresholds for IPOs, which increases IPO firms' quality and the markets' confidence about these firms. Moreover, as the probability of pofa increases, IPO stocks is no longer a risk-free asset, which drives mutual funds to be more careful about the firms' financial fundamentals. Last but not least, regulators loose the lock-up periods for investing IPOs, which allows more competitors to compete with mutual funds. In this way, mutual funds need to be more prudent in building their portfolios.

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VIII. Appendix

Table III IPO Sample: Year Distribution of IPOs in A-share Market

IPO Year	IPO Numbers	Percentage
2010	347	30.63%
2011	282	24.89%
2012	154	13.59%
2013	2	0.18%
2014	125	11.03%
2015	223	19.68%

This table presents the yearly distribution of IPOs in China during the period of 2010-2015. Column 2 displays the number of IPOs in each year and Column 3 shows the proportion of the IPO numbers in that year to the total IPO numbers.

Table IV IPO Sample: Industry Distribution of IPOs in A-share Market

Main Industry	Sub-industry	IPO Numbers	Percentage
Industry	Special Equipment Manufacturing	106	9.36%
Industry	Raw Chemical Materials and Chemical Products	80	7.06%
Public Utility	Computer Application Service	56	4.94%
Industry	Electrical Machinery and Equipment Manufacturing	56	4.94%
Industry	Medicine Manufacturing	49	4.32%
Industry	Electronic Components and Appliance	47	4.15%
Industry	General Machinery Manufacturing	34	3.00%
Industry	Nonmetallic Mineral Products	30	2.65%
Industry	Manufacturing of computers, communication and other electronic equipment	29	2.56%
Industry	Electric Machines and Apparatuses Manufacture	28	2.47%
Industry	Metal Products	26	2.29%
Industry	Transportation Equipment Manufacture	26	2.29%
Public Utility	Software and information technology service	25	2.21%
Industry	Other Electronic Appliance Manufacturing	18	1.59%
Industry	Plastics Manufacturing	18	1.59%
Real Estate	Civil Engineering Construction	18	1.59%
Industry	Food Manufacturing	18	1.59%
Industry	Communications and Related Equipment Manufacturing	18	1.59%
Commercial	Retail Industry	18	1.59%
Industry	Smelting and Pressing of Nonferrous Metals	17	1.50%
Industry	Other manufacturing	14	1.24%
Industry	Instruments and Appearances, Culture and Office Machinery Manufacturing	14	1.24%

Industry	Automobile Manufacturing	13	1.15%
Industry	General Equipment Manufacturing	13	1.15%
Industry	Manufacturing of instrument and meter	13	1.15%
Industry	Food Processing	11	0.97%
Public Utility	Communication Service	10	0.88%
Industry	Textile	10	0.88%
Public Utility	Professional Technological Service	9	0.79%
Industry	Textile garments and costume	8	0.71%
Industry	Biological Products	8	0.71%
Industry	Culture and Education Goods, Sporting and Athletic Goods Manufacturing	8	0.71%
Industry	Furniture Manufacture	7	0.62%
Public Utility	Other Public Services	7	0.62%
Public Utility	Support Services for Mining	7	0.62%
Conglomerates	Graziery	7	0.62%
Public Utility	Specialty & Scientific Research Services	7	0.62%
Industry	Garment and other Fabric Products Manufacturing	7	0.62%
Public Utility	Business Service	6	0.53%
Industry	Power Transmission & Distribution Equipment and Controllers Manufacturing	6	0.53%
Industry	Consumer Electronics Manufacturing	6	0.53%
Public Utility	Radio, Film and Television	6	0.53%
Finance	Securities &Futures	6	0.53%
Public Utility	Internet and Related Services	5	0.44%
Industry	Paper-making and Paper Products	5	0.44%
Industry	Rubber and plastic product industry	5	0.44%
Industry	Computer and related Equipment Manufacturing	5	0.44%
Conglomerates	Agriculture	5	0.44%
Conglomerates	Decoration	5	0.44%
Industry	Chemical Fibre Manufacture	5	0.44%

Finance	Capital market service	5	0.44%
Industry	Manufacturing industry of wine, beverage and refined tea	4	0.35%
Public Utility	Warehousing	4	0.35%
Industry	Rubber Manufacturing	4	0.35%
Industry	Smelting and Pressing of Ferrous Metals	4	0.35%
Conglomerates	Building decoration and other construction	4	0.35%
Public Utility	Publishing Industry	4	0.35%
Public Utility	Ecological protection and environmental governance	4	0.35%
Industry	Metalworking Machinery Manufacturing	3	0.26%
Industry	Metal Structure Manufacturing	3	0.26%
Commercial	Wholesale	3	0.26%
Public Utility	Highway Transportation	3	0.26%
Industry	Communications Equipment Manufacturing	3	0.26%
Commercial	Wholesale of Medicine and Medical Appliance	3	0.26%
Industry	Nonferrous Metal Ore Mining and Dressing	3	0.26%
Public Utility	Tourism	3	0.26%
Industry	Wood Processing, Timber, Bamboo, Cane, Palm Fiber and Straw Products	3	0.26%
Industry	Special Chemical Products Manufacturing	3	0.26%
Public Utility	Information Services	3	0.26%
Industry	Chinese Herbal Medicine and Patent Medicine Processing Industry	3	0.26%
Industry	Electric Power, Thermal Production and Supply	3	0.26%
Industry	Beverage Manufacturing	3	0.26%
Public Utility	Public Facilities Management	3	0.26%
Public Utility	Support Services for Oil and Gas Extraction	2	0.18%
Public Utility	Other Communication Service	2	0.18%

Public Utility	Other Public Facilities Services	2	0.18%
Public Utility	Other Communication & Cultural Services	2	0.18%
Public Utility	Port	2	0.18%
Public Utility	Computer Software Development and Consultation	2	0.18%
Public Utility	Production and Supply of Tap Water	2	0.18%
Public Utility	Journalism and publishing	2	0.18%
Industry	Production of Leather, Fur, Down & Related Products	2	0.18%
Industry	Printing	2	0.18%
Public Utility	Air Transportation	2	0.18%
Real Estate	Real Estate	2	0.18%
Industry	Electronic Component Manufacturing	2	0.18%
Conglomerates	Farming, Forestry, Animal Husbandry, and Fishery Services	2	0.18%
Industry	Chemical Fertilizer Manufacturing	2	0.18%
Industry	Electrical Machinery Manufacturing	2	0.18%
Industry	Farm Products Processing	2	0.18%
Finance	Banking	2	0.18%
Industry	Machinery, Equipment and Instrument Manufacturing	2	0.18%
Industry	Manufacturing of cultural, educational, industrial art, sports and recreational articles	2	0.18%
Industry	Medical Machinery Manufacturing	2	0.18%
Conglomerates	Fishery	2	0.18%
Industry	Manufacturing of Railway, Ship, Aerospace and Other Transportation Equipments	2	0.18%
Conglomerates	Conglomerates	2	0.18%
Industry	Other Special Equipment Manufacturing	2	0.18%
Commercial	Wholesale of Energy, Material and Machine Electric Equipment	2	0.18%

Industry	Petroleum Refining and Coking	2	0.18%
Industry	Biological Medicines Manufacturing	1	0.09%
Commercial	Retail of Textile, Garments and Shoes and Hats	1	0.09%
Public Utility	Water Transportation	1	0.09%
Industry	Cement and Asbestine Cement Products	1	0.09%
Public Utility	Other Transportation	1	0.09%
Industry	Casting Manufacturing	1	0.09%
Industry	Broadcast and Television Equipment Manufacturing	1	0.09%
Public Utility	Production and Supply of Water	1	0.09%
Finance	Insurance	1	0.09%
Industry	Auxiliary activities of mining	1	0.09%
Public Utility	Telecommunication, broadcasting and TV and satellite transmission service	1	0.09%
Public Utility	Radio, television, film and television recording production	1	0.09%
Public Utility	Transport Supporting and Auxiliary Services	1	0.09%
Public Utility	Research and experimental development	1	0.09%
Industry	Chemical Pesticide Manufacturing	1	0.09%
Public Utility	Sanitation & Health Care Service	1	0.09%
Conglomerates	Animal Ranching and Farming	1	0.09%
Conglomerates	Forestry	1	0.09%
Public Utility	Other Computer Application Service	1	0.09%
Industry	Plastic Plate, Pipe, and Bar Manufacturing	1	0.09%
Industry	Coal Mining and Dressing	1	0.09%
Public Utility	Leasing Industry	1	0.09%
Industry	Plastic Films	1	0.09%
Industry	Production and Supply of Electricity, Steam & Hot Water	1	0.09%

Industry	Production and Supply of Gas	1	0.09%
Industry	Petroleum Processing, Coking and Nuclear Fuel Processing	1	0.09%
Industry	Other Nonmetallic Mineral Products Manufacturing	1	0.09%
Industry	Shipbuilding Industry	1	0.09%
Industry	Shoe-making	1	0.09%
Industry	Other Food Manufacturing	1	0.09%
Industry	Mining and Dressing of coal	1	0.09%
Industry	Metal Surface Treating and Heat Treating	1	0.09%
Industry	Special Instrument and Meter Manufacturing	1	0.09%
Industry	Manufacturing for Boiler and Prime Mover	1	0.09%
Public Utility	Advertising Services	1	0.09%
Industry	Leather, fur, feather and their products and shoe-making industry	1	0.09%
Industry	Leather and Hide Tanning and Products	1	0.09%
Industry	Information Technology	1	0.09%
Industry	Gas Production and Supply	1	0.09%
Industry	Foam Plastic, Artificial Leather, and Synthetic Leather Manufacture	1	0.09%
Industry	Ferrous Metal Ore Mining and Dressing	1	0.09%
Public Utility	Entertainment Industry	1	0.09%
Public Utility	Highway Transport	1	0.09%
Industry	Preparation Manufacturing for Chemical Medicine	1	0.09%
Industry	Consumer Chemical Products Manufacturing	1	0.09%
Commercial	Other Retail	1	0.09%

This table presents the industry distribution of IPOs in China from 2010 to 2015. Column 1 and 2 displays the industry types, which are classified according to the Listed Company Industry Classification Guidelines issued by CSRC. Column 3 and 4 show IPO amount each year, and the proportion of the IPO numbers in that year to the total IPO numbers.

Table V Whole Sample Descriptive Statistics

	mean	std	min	25%	50%	75%	max
Funds Subscription Ratio	0.09	0.057	0.005	0.05	0.074	0.118	0.42
IPO Value	20.268	0.752	18.699	19.77	20.18	20.668	24.951
PE Ratio	36.384	18.376	5.941	20.727	32.997	48.53	136.634
Offer Price	22.985	14.322	1.68	13.208	20	29	148
Sales Growth	2.038	14.208	-0.935	-0.355	0.169	1.308	313.741
ROE	0.246	0.12	-0.037	0.167	0.227	0.296	1.14
Leverage	0.453	0.17	0.043	0.329	0.453	0.576	1.004
Firm Size	20.316	1.127	18.232	19.59	20.112	20.784	29.586
Reputable Underwriter	0.591	0.492	0	0	1	1	1
IPO Under-pricing	0.348	0.322	-0.263	0.127	0.426	0.44	2.753
Largest Ownership	46.533	15.2	8.04	35.022	46.05	57.938	89.57
Private Firm	0.898	0.302	0	1	1	1	1
Big4	0.024	0.152	0	0	0	0	1

This table presents the descriptive statistics of the full sample. Fund Subscription Ratio measures the proportion of IPO shares subscribed by funds to total issued shares, including both online and offline subscription. IPO Value is the offering size, which is measured by number of shares issued times the offering price. Here, the unit of number of shares issued is 10,000. PE Ratio, Sales Growth, ROE and Leverage are defined as the average of those values in a certain time window before IPO. For Shanghai A and Shenzhen A shares, the time window is 3-year. For GEM shares, the time window is 2-year. In addition, firm size is measured by the pre-IPO average of the firm's total assets. As for Reputable Underwriter, it is 1 if the IPO underwriter is one of the top 10 popular underwriters. Otherwise, it is 0. Moreover, IPO Under-pricing is measured by the stock return on the first trading day. Largest Ownership is defined as the percentage of shares holding by the largest shareholder. Private Firm is a dummy variable, which equals to 1 if the firm's controller is not the state. In terms of Big4, it equals to 1 if the CPA's firm is the Big Four accounting firms (PWC, KPMG, Ernst Young, or DTT).

Table VI Low Fund-Subscription Ratio Group Descriptive Statistics

	mean	std	min	25%	50%	75%	max
Funds Subscription Ratio	0.043	0.01	0.005	0.04	0.045	0.05	0.058
IPO Value	20.121	0.735	18.699	19.586	20.021	20.532	24.951
PE Ratio	30.96	16.177	5.941	17.925	25.377	42.611	90
Offer Price	19.177	10.412	1.68	11.675	17	25.748	59.9
Sales Growth	1.544	6.995	-0.935	-0.358	0.151	1.264	97.929
ROE	0.227	0.108	-0.037	0.15	0.212	0.284	0.691
Leverage	0.456	0.161	0.055	0.345	0.453	0.573	1.004
Firm Size	20.433	1.041	18.526	19.821	20.236	20.888	29.586
Reputable Underwriter	0.571	0.496	0	0	1	1	1
IPO Under-pricing	0.371	0.282	-0.156	0.211	0.44	0.44	2.753
Largest Ownership	46.913	15.048	8.04	36.11	46.5	58.038	86.49
Private Firm	0.895	0.307	0	1	1	1	1
Big4	0.02	0.14	0	0	0	0	1

This table presents the descriptive statistics of the low Fund Subscription Ratio group. Namely the lowest 33.3% percentile of the whole sample. Fund Subscription Ratio measures the proportion of IPO shares subscribed by funds to total issued shares, including both online and offline subscription. IPO Value is the offering size, which is measured by number of shares issued times the offering price. Here, the unit of number of shares issued is 10,000. PE Ratio, Sales Growth, ROE and Leverage are defined as the average of those values in a certain time window before IPO. For Shanghai A and Shenzhen A shares, the time window is 3-year. For GEM shares, the time window is 2-year. In addition, firm size is measured by the pre-IPO average of the firm's total assets. As for Reputable Underwriter, it is 1 if the IPO underwriter is one of the top 10 popular underwriters. Otherwise, it is 0. Moreover, IPO Under-pricing is measured by the stock return on the first trading day. Largest Ownership is defined as the percentage of shares holding by the largest shareholder. Private Firm is a dummy variable, which equals to 1 if the firm's controller is not the state. In terms of Big4, it equals to 1 if the CPA's firm is the Big Four accounting firms (PWC, KPMG, Ernst Young, or DTT).

Table VII Median Fund-Subscription Ratio Group Descriptive Statistics

	mean	std	min	25%	50%	75%	max
Funds Subscription Ratio	0.074	0.011	0.058	0.066	0.074	0.08	0.1
IPO Value	20.299	0.765	18.716	19.784	20.194	20.712	23.801
PE Ratio	39.705	19.522	7.702	21.932	38.097	54.074	108.197
Offer Price	24.137	15.938	3.08	13.438	20.095	30.52	148
Sales Growth	1.334	5.622	-0.896	-0.347	0.104	1.114	76.072
ROE	0.245	0.115	0.061	0.172	0.231	0.298	1.081
Leverage	0.459	0.17	0.043	0.322	0.463	0.578	0.976
Firm Size	20.261	1.106	18.55	19.522	20.035	20.782	27.78
Reputable Underwriter	0.606	0.489	0	0	1	1	1
IPO Under-pricing	0.372	0.362	-0.232	0.128	0.407	0.44	2.35
Largest Ownership	46.224	15.406	13.57	34.99	45.295	58.122	89.19
Private Firm	0.894	0.309	0	1	1	1	1
Big4	0.023	0.15	0	0	0	0	1

This table presents the descriptive statistics of the median Fund Subscription Ratio group. Namely the median 33.3% to 66.7% percentile of the whole sample. Fund Subscription Ratio measures the proportion of IPO shares subscribed by funds to total issued shares, including both online and offline subscription. IPO Value is the offering size, which is measured by number of shares issued times the offering price. Here, the unit of number of shares issued is 10,000. PE Ratio, Sales Growth, ROE and Leverage are defined as the average of those values in a certain time window before IPO. For Shanghai A and Shenzhen A shares, the time window is 3-year. For GEM shares, the time window is 2-year. In addition, firm size is measured by the pre-IPO average of the firm's total assets. As for Reputable Underwriter, it is 1 if the IPO underwriter is one of the top 10 popular underwriters. Otherwise, it is 0. Moreover, IPO Under-pricing is measured by the stock return on the first trading day. Largest Ownership is defined as the percentage of shares holding by the largest shareholder. Private Firm is a dummy variable, which equals to 1 if the firm's controller is not the state. In terms of Big4, it equals to 1 if the CPA's firm is the Big Four accounting firms (PWC, KPMG, Ernst Young, or DTT).

Table VIII High Fund-Subscription Ratio Group Descriptive Statistics

	mean	std	min	25%	50%	75%	max
Funds Subscription Ratio	0.153	0.055	0.1	0.118	0.14	0.164	0.42
IPO Value	20.384	0.734	18.922	19.866	20.299	20.758	24.126
PE Ratio	38.524	18.1	9.284	25.914	34.812	47.579	136.634
Offer Price	25.656	15.219	3	16	22	31	110
Sales Growth	3.226	22.85	-0.861	-0.359	0.217	1.588	313.741
ROE	0.265	0.132	0.065	0.18	0.24	0.309	1.14
Leverage	0.444	0.18	0.049	0.321	0.45	0.572	0.962
Firm Size	20.253	1.219	18.232	19.495	20.024	20.666	26.454
Reputable Underwriter	0.597	0.491	0	0	1	1	1
IPO Under-pricing	0.303	0.315	-0.263	0.068	0.271	0.441	2.21
Largest Ownership	46.459	15.181	8.77	34.11	46.43	57.752	89.57
Private Firm	0.906	0.292	0	1	1	1	1
Big4	0.028	0.166	0	0	0	0	1

This table presents the descriptive statistics of the high Fund Subscription Ratio group. Namely the highest 33.3% percentile of the whole sample. Fund Subscription Ratio measures the proportion of IPO shares subscribed by funds to total issued shares, including both online and offline subscription. IPO Value is the offering size, which is measured by number of shares issued times the offering price. Here, the unit of number of shares issued is 10,000. PE Ratio, Sales Growth, ROE and Leverage are defined as the average of those values in a certain time window before IPO. For Shanghai A and Shenzhen A shares, the time window is 3-year. For GEM shares, the time window is 2-year. In addition, firm size is measured by the pre-IPO average of the firm's total assets. As for Reputable Underwriter, it is 1 if the IPO underwriter is one of the top 10 popular underwriters. Otherwise, it is 0. Moreover, IPO Under-pricing is measured by the stock return on the first trading day. Largest Ownership is defined as the percentage of shares holding by the largest shareholder. Private Firm is a dummy variable, which equals to 1 if the firm's controller is not the state. In terms of Big4, it equals to 1 if the CPA's firm is the Big Four accounting firms (PWC, KPMG, Ernst Young, or DTT).

Figure 2. Distributions of All Variables Before Normalization
As presented in this image, Firm Size, Fund Subscription Ratio, IPO Under-pricing, Offer Price, Pe Ratio and ROE are all left-skewed. Thus, this studyused natural log to normalize continuous data in the regression model presented in Table **??**.

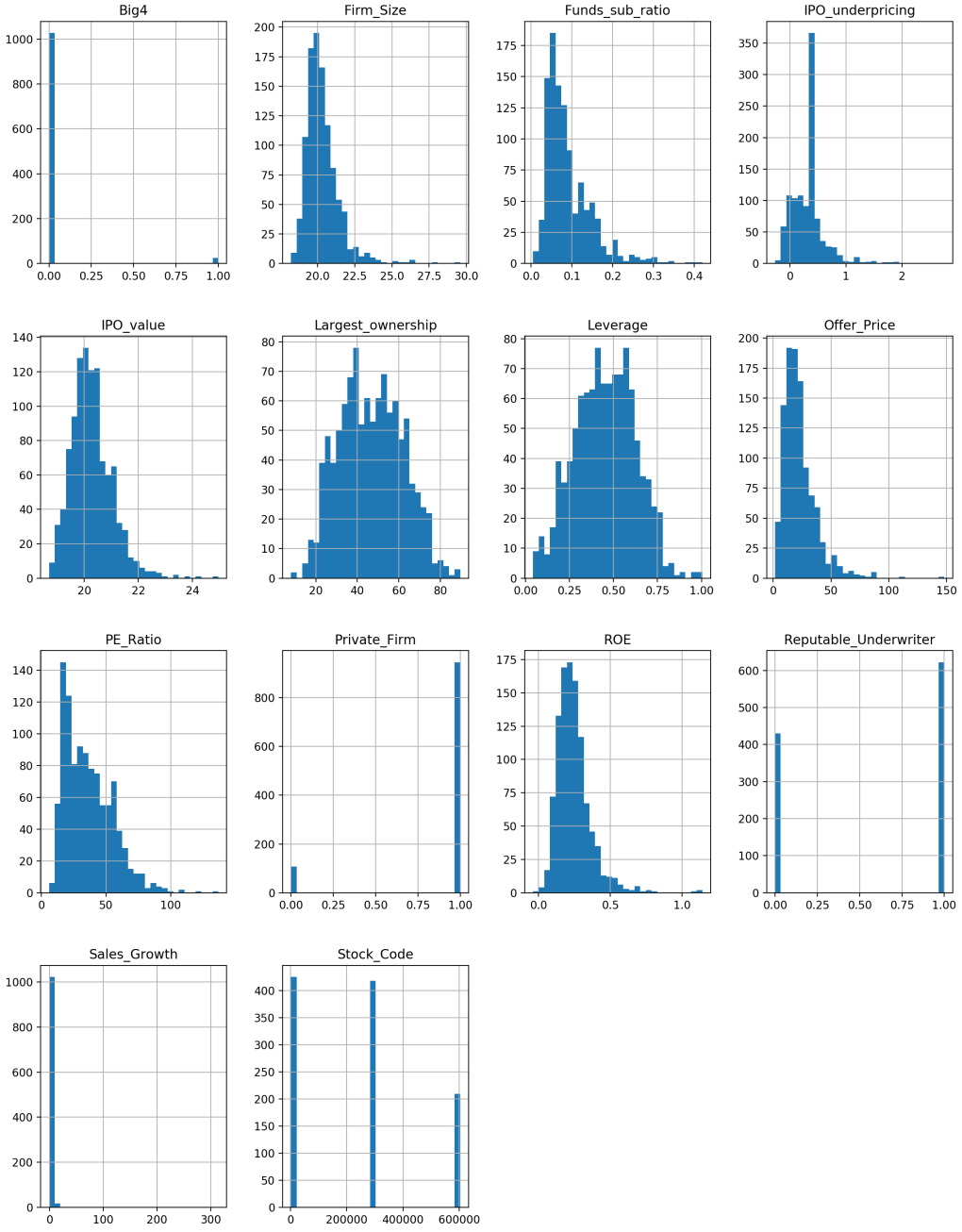

Table IX First Model OLS Regression Results

Dep. Variable:	Funds Subscription Ratio	**R-squared:**	0.222
Model:	OLS	**Adj. R-squared:**	0.210
Method:	Least Squares	**F-statistic:**	18.41
Date:	Fri, 07 Dec 2018	**Prob (F-statistic):**	2.93e-46
Time:	14:13:06	**Log-Likelihood:**	-792.04
No. Observations:	1052	**AIC:**	1618.
Df Residuals:	1035	**BIC:**	1702.
Df Model:	16		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	-3.2391	0.724	-4.477	0.000	-4.659	-1.819
IPO_value	0.2317	0.062	3.721	0.000	0.110	0.354
PE_Ratio	0.2364	0.221	1.071	0.285	-0.197	0.670
Offer_Price	0.1383	0.049	2.797	0.005	0.041	0.235
Sales_Growth	0.0461	0.020	2.354	0.019	0.008	0.085
ROE	-0.8928	0.275	-3.249	0.001	-1.432	-0.354
Leverage	0.0036	0.047	0.078	0.938	-0.088	0.095
Firm_Size	-0.1387	0.047	-2.937	0.003	-0.231	-0.046
Reputable_Underwriter	-0.0323	0.033	-0.992	0.321	-0.096	0.032
IPO_underpricing	0.4806	0.087	5.544	0.000	0.310	0.651
Largest_ownership	0.7868	4.663	0.169	0.866	-8.364	9.937
Private_Firm	-0.0705	0.061	-1.148	0.251	-0.191	0.050
Big4	0.0973	0.114	0.856	0.392	-0.126	0.320
IPO_year_2011	0.4398	0.047	9.272	0.000	0.347	0.533
IPO_year_2012	0.8675	0.065	13.442	0.000	0.741	0.994
IPO_year_2014	0.5248	0.077	6.836	0.000	0.374	0.675
IPO_year_2015	0.2073	0.071	2.914	0.004	0.068	0.347

Omnibus:	61.259	**Durbin-Watson:**	1.606
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	101.544
Skew:	-0.443	**Prob(JB):**	8.91e-23
Kurtosis:	4.237	**Cond. No.**	6.85e+03

In this model, this studytried to control for some important IPO-specific and firm-specific variables. Since the variance of all numerical values are very high, this studytook a logarithm of these values. Explicitly speaking, this studytook natural log on IPO_value, PE_ratio, Offer_Price, Saless_Growth, ROE, Leverage, Firm_Size, IPO_underpricing, Largest_ownership and Funds Subscription Ratio. In other words, this model values the impact of 1% change of those non-dummy variables on the change ratio of Funds Subscription Ratio.

The distribution of the Residuals are as follows.

Figure 3. Histogram of Residuals

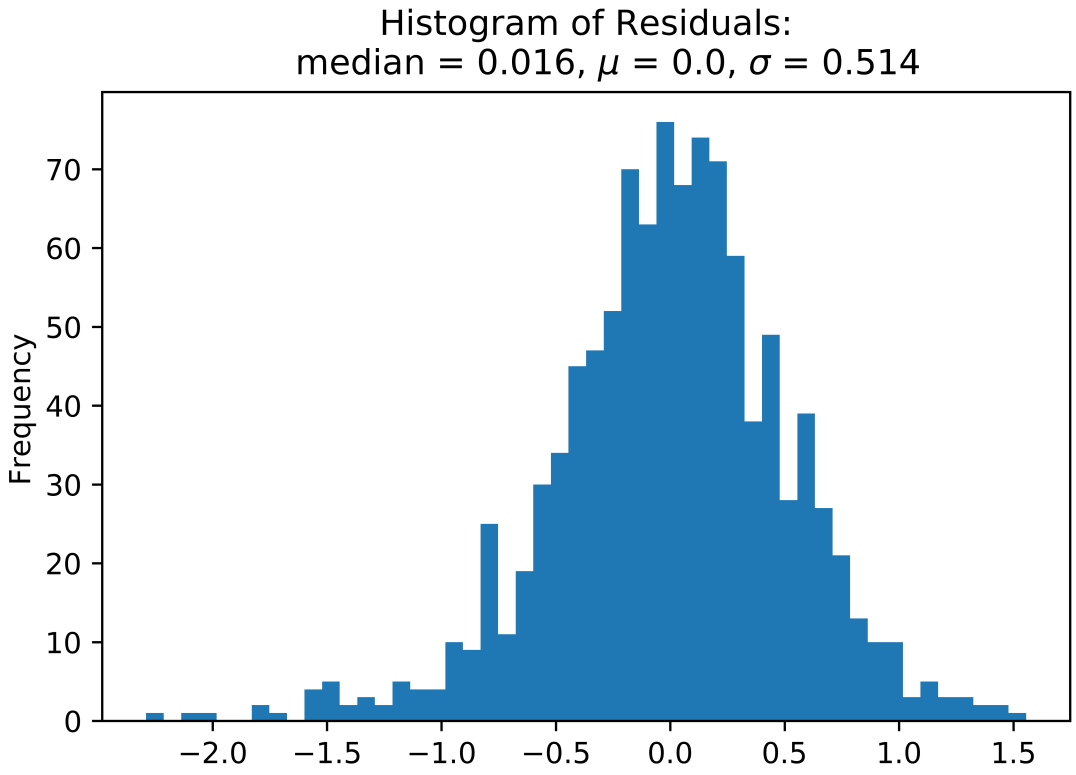

Table X-XVII presents the regression results for Buy-and-Hold Abnormal Returns(BHAR) Model including the initial 5 trading days. Here the residual is defined as the residual of the model 1. By classifying the residuals into three groups according to descending order, this studyget High, Median, Low groups.Table X-XIII display the results for 1-year window and Table XIV-XVII show the results of 2-year window. Here, this studydefine 1-year and 2-year to be 250 and 500 trading days respectively.

Table X Whole Sample 1-year BHAR Regression Results

Dep. Variable:	BHAR	**R-squared:**	0.002
Model:	OLS	**Adj. R-squared:**	0.001
Method:	Least Squares	**F-statistic:**	2.279
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	0.131
Time:	12:09:24	**Log-Likelihood:**	-2499.5
No. Observations:	1052	**AIC:**	5003.
Df Residuals:	1050	**BIC:**	5013.
Df Model:	1		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	1.5406	0.080	19.172	0.000	1.383	1.698
residual	0.2361	0.156	1.510	0.131	-0.071	0.543

Omnibus:	1300.077	**Durbin-Watson:**	1.878
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	219498.332
Skew:	6.222	**Prob(JB):**	0.00
Kurtosis:	72.661	**Cond. No.**	1.95

Table XI High Residual Firms 1-year BHAR Regression Results

Dep. Variable:	BHAR	**R-squared:**	0.022
Model:	OLS	**Adj. R-squared:**	0.019
Method:	Least Squares	**F-statistic:**	7.710
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	0.00579
Time:	12:09:28	**Log-Likelihood:**	-804.47
No. Observations:	350	**AIC:**	1613.
Df Residuals:	348	**BIC:**	1621.
Df Model:	1		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	2.0127	0.235	8.552	0.000	1.550	2.476
residual	0.9954	0.358	2.777	0.006	0.290	1.701

Omnibus:	425.088	**Durbin-Watson:**	1.911
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	38598.448
Skew:	5.450	**Prob(JB):**	0.00
Kurtosis:	53.279	**Cond. No.**	3.70

Table XII Median Residual Firms 1-year BHAR Regression Results

Dep. Variable:	BHAR	**R-squared:**	0.001
Model:	OLS	**Adj. R-squared:**	-0.001
Method:	Least Squares	**F-statistic:**	0.5125
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	0.475
Time:	12:09:30	**Log-Likelihood:**	-829.56
No. Observations:	352	**AIC:**	1663.
Df Residuals:	350	**BIC:**	1671.
Df Model:	1		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	1.7762	0.139	12.807	0.000	1.503	2.049
residual	0.8933	1.248	0.716	0.475	-1.561	3.348

Omnibus:	258.387	**Durbin-Watson:**	1.800
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	3139.270
Skew:	3.037	**Prob(JB):**	0.00
Kurtosis:	16.310	**Cond. No.**	9.14

Table XIII Low Residual Firms 1-year BHAR Regression Results

Dep. Variable:	BHAR	**R-squared:**	0.017
Model:	OLS	**Adj. R-squared:**	0.014
Method:	Least Squares	**F-statistic:**	6.099
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	0.0140
Time:	12:09:32	**Log-Likelihood:**	-853.37
No. Observations:	350	**AIC:**	1711.
Df Residuals:	348	**BIC:**	1718.
Df Model:	1		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	0.6266	0.332	1.887	0.060	-0.027	1.280
residual	1.3866	0.561	2.470	0.014	0.282	2.491

Omnibus:	585.517	**Durbin-Watson:**	1.995
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	223247.924
Skew:	9.262	**Prob(JB):**	0.00
Kurtosis:	125.333	**Cond. No.**	4.90

Table XIV Whole Sample 2-year BHAR Regression Results

Dep. Variable:	BHAR	**R-squared:**	0.015
Model:	OLS	**Adj. R-squared:**	0.014
Method:	Least Squares	**F-statistic:**	15.95
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	6.95e-05
Time:	12:12:40	**Log-Likelihood:**	-3492.1
No. Observations:	1052	**AIC:**	6988.
Df Residuals:	1050	**BIC:**	6998.
Df Model:	1		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	3.6613	0.206	17.735	0.000	3.256	4.066
residual	1.6050	0.402	3.994	0.000	0.816	2.394

Omnibus:	1406.964	**Durbin-Watson:**	1.961
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	280976.580
Skew:	7.171	**Prob(JB):**	0.00
Kurtosis:	81.768	**Cond. No.**	1.95

Table XV High Residual Firms 2-year BHAR Regression Results

Dep. Variable:	BHAR	**R-squared:**	0.010
Model:	OLS	**Adj. R-squared:**	0.007
Method:	Least Squares	**F-statistic:**	3.395
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	0.0663
Time:	12:12:44	**Log-Likelihood:**	-1019.6
No. Observations:	350	**AIC:**	2043.
Df Residuals:	348	**BIC:**	2051.
Df Model:	1		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	3.8260	0.435	8.793	0.000	2.970	4.682
residual	1.2213	0.663	1.842	0.066	-0.082	2.525

Omnibus:	400.381	**Durbin-Watson:**	1.857
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	27343.618
Skew:	5.019	**Prob(JB):**	0.00
Kurtosis:	45.122	**Cond. No.**	3.70

Table XVI Median Residual Firms 2-year BHAR Regression Results

Dep. Variable:	BHAR	**R-squared:**	0.001
Model:	OLS	**Adj. R-squared:**	-0.002
Method:	Least Squares	**F-statistic:**	0.3961
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	0.530
Time:	12:12:47	**Log-Likelihood:**	-1131.8
No. Observations:	352	**AIC:**	2268.
Df Residuals:	350	**BIC:**	2275.
Df Model:	1		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	3.7861	0.327	11.567	0.000	3.142	4.430
residual	-1.8536	2.945	-0.629	0.530	-7.646	3.939

Omnibus:	310.122	**Durbin-Watson:**	2.060
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	5738.785
Skew:	3.767	**Prob(JB):**	0.00
Kurtosis:	21.290	**Cond. No.**	9.14

Table XVII Low Residual Firms 2-year BHAR Regression Results

Dep. Variable:	BHAR	**R-squared:**	0.073
Model:	OLS	**Adj. R-squared:**	0.070
Method:	Least Squares	**F-statistic:**	27.43
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	2.83e-07
Time:	12:12:49	**Log-Likelihood:**	-1249.1
No. Observations:	350	**AIC:**	2502.
Df Residuals:	348	**BIC:**	2510.
Df Model:	1		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	-0.7412	1.029	-0.720	0.472	-2.765	1.282
residual	9.1085	1.739	5.237	0.000	5.688	12.529

Omnibus:	498.438	**Durbin-Watson:**	2.059
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	67502.931
Skew:	7.151	**Prob(JB):**	0.00
Kurtosis:	69.515	**Cond. No.**	4.90

Table XVIII-XXV presents the regression results for Buy-and-Hold Abnormal Returns(BHAR) Model excluding the initial 5 trading days. Here the residual is defined as the residual of the model 1. By classifying the residuals into three groups according to descending order, this studyget High, Median, Low groups.Table XVIII-XXI display the results for 1-year window and Table XXII-XXV show the results of 2-year window. Here, this studydefine 1-year and 2-year to be 250 and 500 trading days respectively.

Table XVIII Whole Sample 1-year BHAR Regression Results

Dep. Variable:	BHAR	**R-squared:**	0.001
Model:	OLS	**Adj. R-squared:**	0.000
Method:	Least Squares	**F-statistic:**	1.313
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	0.252
Time:	13:03:27	**Log-Likelihood:**	-2377.9
No. Observations:	1052	**AIC:**	4760.
Df Residuals:	1050	**BIC:**	4770.
Df Model:	1		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	1.3732	0.072	19.181	0.000	1.233	1.514
residual	0.1597	0.139	1.146	0.252	-0.114	0.433

Omnibus:	1219.511	**Durbin-Watson:**	1.875
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	137141.849
Skew:	5.694	**Prob(JB):**	0.00
Kurtosis:	57.763	**Cond. No.**	1.95

Table XIX High Residual Firms 1-year BHAR Regression Results

Dep. Variable:	BHAR	**R-squared:**	0.019
Model:	OLS	**Adj. R-squared:**	0.016
Method:	Least Squares	**F-statistic:**	6.852
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	0.00924
Time:	13:03:30	**Log-Likelihood:**	-796.70
No. Observations:	350	**AIC:**	1597.
Df Residuals:	348	**BIC:**	1605.
Df Model:	1		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	1.8190	0.230	7.903	0.000	1.366	2.272
residual	0.9178	0.351	2.618	0.009	0.228	1.607

Omnibus:	499.370	**Durbin-Watson:**	1.929
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	94385.412
Skew:	6.992	**Prob(JB):**	0.00
Kurtosis:	82.225	**Cond. No.**	3.70

Table XX Median Residual Firms 1-year BHAR Regression Results

Dep. Variable:	BHAR	**R-squared:**	0.001
Model:	OLS	**Adj. R-squared:**	-0.002
Method:	Least Squares	**F-statistic:**	0.3970
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	0.529
Time:	13:03:31	**Log-Likelihood:**	-806.60
No. Observations:	352	**AIC:**	1617.
Df Residuals:	350	**BIC:**	1625.
Df Model:	1		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	1.6055	0.130	12.357	0.000	1.350	1.861
residual	0.7366	1.169	0.630	0.529	-1.563	3.036

Omnibus:	299.242	**Durbin-Watson:**	1.824
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	5951.234
Skew:	3.524	**Prob(JB):**	0.00
Kurtosis:	21.871	**Cond. No.**	9.14

Table XXI Low Residual Firms 1-year BHAR Regression Results

Dep. Variable:	BHAR	**R-squared:**	0.012
Model:	OLS	**Adj. R-squared:**	0.009
Method:	Least Squares	**F-statistic:**	4.267
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	0.0396
Time:	13:03:32	**Log-Likelihood:**	-763.96
No. Observations:	350	**AIC:**	1532.
Df Residuals:	348	**BIC:**	1540.
Df Model:	1		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	0.7074	0.257	2.750	0.006	0.201	1.213
residual	0.8984	0.435	2.066	0.040	0.043	1.754

Omnibus:	501.678	**Durbin-Watson:**	1.968
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	91055.688
Skew:	7.079	**Prob(JB):**	0.00
Kurtosis:	80.739	**Cond. No.**	4.90

Table XXII Whole Sample 2-year BHAR Regression Results

Dep. Variable:	BHAR	**R-squared:**	0.014
Model:	OLS	**Adj. R-squared:**	0.013
Method:	Least Squares	**F-statistic:**	14.52
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	0.000147
Time:	13:07:02	**Log-Likelihood:**	-3309.5
No. Observations:	1052	**AIC:**	6623.
Df Residuals:	1050	**BIC:**	6633.
Df Model:	1		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	3.2807	0.174	18.904	0.000	2.940	3.621
residual	1.2873	0.338	3.811	0.000	0.624	1.950

Omnibus:	1269.296	**Durbin-Watson:**	1.954
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	146937.431
Skew:	6.124	**Prob(JB):**	0.00
Kurtosis:	59.588	**Cond. No.**	1.95

Table XXIII High Residual Firms 2-year BHAR Regression Results

Dep. Variable:	BHAR	**R-squared:**	0.009
Model:	OLS	**Adj. R-squared:**	0.006
Method:	Least Squares	**F-statistic:**	3.044
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	0.0819
Time:	13:07:05	**Log-Likelihood:**	-987.82
No. Observations:	350	**AIC:**	1980.
Df Residuals:	348	**BIC:**	1987.
Df Model:	1		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	3.4220	0.397	8.612	0.000	2.640	4.203
residual	1.0561	0.605	1.745	0.082	-0.134	2.247

Omnibus:	422.172	**Durbin-Watson:**	1.877
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	34917.014
Skew:	5.428	**Prob(JB):**	0.00
Kurtosis:	50.712	**Cond. No.**	3.70

Table XXIV Median Residual Firms 2-year BHAR Regression Results

Dep. Variable:	BHAR	**R-squared:**	0.002
Model:	OLS	**Adj. R-squared:**	-0.001
Method:	Least Squares	**F-statistic:**	0.5418
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	0.462
Time:	13:07:06	**Log-Likelihood:**	-1086.3
No. Observations:	352	**AIC:**	2177.
Df Residuals:	350	**BIC:**	2184.
Df Model:	1		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	3.4273	0.288	11.916	0.000	2.862	3.993
residual	-1.9048	2.588	-0.736	0.462	-6.994	3.185

Omnibus:	312.317	**Durbin-Watson:**	2.069
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	5915.993
Skew:	3.797	**Prob(JB):**	0.00
Kurtosis:	21.593	**Cond. No.**	9.14

Table XXV Low Residual Firms 2-year BHAR Regression Results

Dep. Variable:	BHAR	**R-squared:**	0.067
Model:	OLS	**Adj. R-squared:**	0.065
Method:	Least Squares	**F-statistic:**	25.12
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	8.58e-07
Time:	13:07:08	**Log-Likelihood:**	-1172.8
No. Observations:	350	**AIC:**	2350.
Df Residuals:	348	**BIC:**	2357.
Df Model:	1		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	-0.1001	0.827	-0.121	0.904	-1.727	1.527
residual	7.0105	1.399	5.012	0.000	4.260	9.761

Omnibus:	453.393	**Durbin-Watson:**	2.020
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	40169.999
Skew:	6.168	**Prob(JB):**	0.00
Kurtosis:	54.013	**Cond. No.**	4.90

Table XXVI and XXVII presents the results for Fama-French's Three-factor model during 1-year and 2-year window respectively. Market Risk Premium Factor is defined as the difference of the daily market return with cash dividend reinvested (Weighted Average of Total Market Value) and daily risk-free interest rate (PBOC benchmark interest rate of 3-month deposit). Market Value Factor is the difference of the daily returns of small-cap and large-cap portfolios which are divided on the basis of the FAMA 2*3 division methods. Book-to-Market Ratio Factor is the difference of the daily returns of high book-to-market ratio and low book-to-market ratio portfolios which are divided on the basis of the FAMA 2*3 division methods. All the daily returns of these portfolios are calculated by the weighted average of total market Value. Issueis a dummy variable that equals to 1 when the firm has IPO within the time arrange this studyexamined, 1-year and 2-year, respectively. Residual and Reputable Underwriter are defined in the model 1 on Funds Subscription Ratio.

Table XXVI 1-Year Fama-French's Three-factor Regression Model Results

Dep. Variable:	Stock Return	**R-squared:**	0.245
Model:	OLS	**Adj. R-squared:**	0.245
Method:	Least Squares	**F-statistic:**	7.169e+04
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	0.00
Time:	11:39:29	**Log-Likelihood:**	2.9111e+06
No. Observations:	1322868	**AIC:**	-5.822e+06
Df Residuals:	1322861	**BIC:**	-5.822e+06
Df Model:	6		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	0.0018	2.59e-05	70.303	0.000	0.002	0.002
Market Risk Premium Factor	0.8628	0.002	550.017	0.000	0.860	0.866
Market Value Factor	0.6360	0.004	167.786	0.000	0.629	0.643
Book-to-Market Ratio Factor	-0.3835	0.004	-108.231	0.000	-0.390	-0.377
Issue	0.0010	8.24e-05	12.490	0.000	0.001	0.001
Issue*Residual	0.0006	0.000	5.675	0.000	0.000	0.001
Issue*Reputable Underwriter	-0.0005	0.000	-4.182	0.000	-0.001	-0.000

Omnibus:	236088.958	**Durbin-Watson:**	1.976
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	1398041.795
Skew:	0.731	**Prob(JB):**	0.00
Kurtosis:	7.819	**Cond. No.**	170.

Table XXVII 2-Year Fama-French's Three-factor Regression Model Results

Dep. Variable:	Stock Return	**R-squared:**	0.245
Model:	OLS	**Adj. R-squared:**	0.245
Method:	Least Squares	**F-statistic:**	7.166e+04
Date:	Tue, 11 Dec 2018	**Prob (F-statistic):**	0.00
Time:	11:33:55	**Log-Likelihood:**	2.9111e+06
No. Observations:	1322868	**AIC:**	-5.822e+06
Df Residuals:	1322861	**BIC:**	-5.822e+06
Df Model:	6		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	0.0018	2.94e-05	61.398	0.000	0.002	0.002
Market Risk Premium Factor	0.8627	0.002	549.920	0.000	0.860	0.866
Market Value Factor	0.6363	0.004	167.850	0.000	0.629	0.644
Book-to-Market Ratio Factor	-0.3845	0.004	-108.527	0.000	-0.391	-0.378
Issue	0.0005	6.29e-05	8.040	0.000	0.000	0.001
Issue*Residual	0.0004	7.43e-05	5.020	0.000	0.000	0.001
Issue*Reputable Underwriter	-0.0001	7.66e-05	-1.634	0.102	-0.000	2.5e-05

Omnibus:	236972.351	**Durbin-Watson:**	1.976
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	1403551.384
Skew:	0.735	**Prob(JB):**	0.00
Kurtosis:	7.828	**Cond. No.**	184.