Institutional Net Buying and Small-cap Outperformance –Evidence from Chinese IPO Market

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Abstract

The first investigates the long-run stock performance of Chinese A-share IPOs going public between 1996 and 2000. I find that the sample, as a whole, does not significantly outperform (or underperform) the market, but small-cap IPOs evidently outperform the market benchmark (and/or their industry peers) over a three-year period or longer, based on both value-weighted (and/or equal-weighted) CARs (cumulative abnormal returns) and BAHRs (buy-and-hold returns). I further find that there is a positive relation between long-run returns and institutional ownership changes measured over the same period: IPOs involved with institutional net buying show significant contemporaneous outperformance in the stock market. This finding is particularly robust, if small-cap IPOs are concerned. IPOs involved with institutional net sell are likely to perform poorly in the stock market, but not strongly significant. So, I argue that institutional net buying could be one of the reasons to drive small-cap IPOs to outperform the benchmarks, primarily because these small-cap Chinese IPOs are so thinly-capitalized that the price pressure of institutional net buying may have a stronger effect on the contemporaneous stock returns. Another possible explanation is, small-cap stocks are more likely to get involved into a price manipulation, which may possibly push stock prices upwards.

Keywords: IPOs; outperformance; price impact; institutional net buying

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1 Introduction

Since the 1990's, plentiful studies have been made on the long-run performance of IPO firms both in developed markets and in emerging markets. Researchers (Ritter, 1991; Loughran and Ritter, 1995; Teoh et al., 1998), focusing on the US stock markets in the post-1970 period, argue that IPO firms often underperform the market in the long run, although substantially underpriced. International evidences have also been obtained from UK (Levis, 1993), Germany (Ljungqvist, 1997), Japan (Cai and Wei, 1997), Holland (Roosenboom, 2003) and many others. The global IPO long-run underperformance may indicate a possible informational inefficiency in capital allocation, or the existence of trading opportunities that produce superior abnormal returns.

However, recent studies suggest that long-run IPO underperformance is not as obvious as thought. Fama (1998) and Mitchell and Stafford (2000) argue that the choice of tests of long-horizon abnormal performance may draw different conclusion on the long-run performance of IPOs relative to the market benchmark, and buy-and-hold returns (BAHRs) method may magnify underperformance as a consequence of compounding single-period returns. Gompers and Lerner (2003) examine the US sample from 1935 to 1972, which displays some evidence of underperformance when event-time BAHRs are used; however, the underperformance disappears, when cumulative abnormal returns (CARs) are utilized. They also show that the underperformance of IPOs in the post-1970 sample may be a small sample effect or "Peso" problem. IPOs do not underperform aggregate benchmarks, in contrast to the post-1970 sample initially examined by Ritter (1991), implying that there may be no IPO underperformance ex-ante, but in the post-1970 period, we may have just drawn a small sample where too

many IPOs perform very poorly ex-post.

Furthermore, Ritter and Welch (2002) argue that there is a difference between equal-weighted computation and value-weighted computation. Kooli and Suret (2003) measure the long-run performance of 141 Canadian IPOs between 1986 and 2000, and find that results remain relatively similar irrespective of whether they use an event-time approach (BAHRs and CARs) or a calendar-time approach (alphas from the Fama-French three-factor pricing model). However, results do differ significantly whether they use equal-weighted or value-weighted portfolios. They find significant overperformance when equal-weighted portfolios are formed, while no significant outperformance is found when value-weighted portfolios are constructed.

Recent studies have also covered Chinese IPOs: Chan et al. (2004) investigate the Chinese A-share IPOs, and find that their sample slightly underperforms the size-matched and/or book/market (B/M)-matched portfolios. However, Chi and Padgett (2005) argue that the average market-adjusted cumulative return and buy-and-hold return over three years after listing are 10.3% and 10.7% (5% significance level) respectively. The two prior studies apparently are inconsistent with each other, because Chi and Padgett (2005) implicitly shows that Chinese IPO firms outperform the market benchmark.

We argue that both of the two prior Chinese studies use a relatively small sample of IPO firms, and, therefore, small sample biases may possibly affect the conclusions being drawn. So, first of all, this research is going to use a much larger of Chinese A-share sample, covering 741 IPO cases going public between 1996 and 2000, and investigate the long-term IPO stock performance. Secondly, we will adopt multiple choices of tests to investigate long-horizon abnormal performance and draw a reasonable conclusion.

More importantly, this research is aiming to identify one of the driving forces for the long-run abnormal performance of Chinese IPOs. We argue that IPO long-run performance may be driven by trading activities of institutions[2], for example registered traders like mutual funds, Social Pension, and many other unregistered traders, i.e. privately-held funds, investment companies, and securities companies (proprietary accounts) etc, which are exempt from many of the regulations governing mutual funds, such as periodic disclosures to the public. Even though trading volumes do not play a vital role in the classic asset pricing model, plenty of empirical studies reveal that institutional net trading volumes may have significant impacts on the stock returns on a quarterly basis, or on a yearly basis (Klemkosky, 1977; Nofsinger and Sias, 1999). The positive effect of institutional trades on stock returns may be more significant on small stocks (Lakonishok et al., 1992). At this stage, Chinese listed firms are usually thinly-capitalized and shares that can be traded on the stock exchanges are limited (only 1/3 of total shares are tradable on the exchanges); and speculative trading actions are especially active in the inefficient Chinese stock market (Mei et al., 2005). So, we expect that institutional trades in China may have a stronger impact on the stock performance, and it is particularly true for IPO firms, because IPOs are normally smaller in the size of tradable shares.

The remainder of the paper is organized as follows: Section 2 presents the literature review and an introduction of Chinese law and regulations. Section 3 introduces the hypotheses and variables. Section 4 describes the data, and discusses the findings. Section 5 comes to the conclusions.

2 Literature Review

[2] An institution, here in this paper, is referred to as an organisation which is in the business of holding assets.

2.1 Institutional Net Trading: US Evidences

Institutional ownership and trading become increasingly important in the US stock markets, since institutions owned 51% of US equities at the end of 2004, in comparison to approximately 7% in 1950 (US Federal Reserve Board, 2005). Since institutions have much larger holdings than most individuals and therefore have larger trades, the effect of institutional trades on price can be large indeed, if several large investors attempt to buy or sell a given stock at the same time, particularly when institutional investors herd (Lakonishok et al., 1992; Grinblatt et al., 1995; and Wermers, 1999). Even though Lakonishok et al. (1992) do not find a significant positive correlation between changes in institutional holdings and contemporaneous excess returns in larger stocks, they do observe inter-quarter positive feedback trading among smaller stocks. Wermers (1999) further provide evidences that stocks bought by herds have, on average, contemporaneous and future returns that are higher than stocks sold by herds. This return difference is especially pronounced among small stocks.

Prior studies have also documented a strong positive relation between quarterly and annual changes in institutional ownership and returns measured over the same period. An earlier study by Klemkosky (1977) discusses the institutional net trading volumes, also called as 'net trading imbalance', and shows that institutional net trading volumes had the expected impact on the abnormal stock returns during the trading quarter: net buying is associated with significantly positive abnormal returns and net selling with negative abnormal returns. Recently, Edelen and Warner (1999) find a positive daily relation between market returns and aggregate flow into equity funds. Nofsinger and Sias (1999) find the decile of New York Stock Exchange (NYSE) stocks that experience the largest annual increase in aggregate institutional ownership outperforms the decile that experiences the largest decrease by over 28% per year.

2.2 Theoretical Explanations

Prior literature has identified that the positive relation between changes in institutional ownership and contemporaneous returns is consistent with three hypotheses: (1) Price Pressure Hypothesis; (2) Informed Trading Hypothesis; and (3) Intra-period Positive Feedback Trading Hypothesis.

First of all, intuitively, the positive relation may be consistent with the price pressure caused by institutional trading. Sias et al. (2001) argue that the price impact of institutional trading is primarily responsible for the positive covariance between quarterly institutional ownership changes and quarterly returns. If institutions as a group are adding to their holdings of a certain stock, it is expected that their buying activity to push up the price of the stock. Of course, the demand for shares from one group of investors must be offset by the supply of shares from another group of investors. Hence, if we believe that, on average, buying by large institutions causes prices to increase, we are implicitly assuming that selling by individuals and smaller institutions does not have a countervailing effect (Sias et al., 2001).

Then, the informed trading hypothesis shows that if institutional investors are better informed, then the stocks purchased by institutions should outperform those sold. Some prior studies (e.g., Grinblatt and Titman, 1989, 1993; Daniel et al., 1997; Wermers, 1999; Nofsinger and Sias, 1999; Chen et al., 2001) reveal that measures of institutional demand are positively correlated with subsequent returns, suggesting that at least some of the correlation could be explained by institutional investors' ability to forecast returns.

Finally, a third explanation is related to the intra-period institutional positive feedback trading. If the price impact of institutional investors' buying (selling) is offset by the

price impact of non-institutional investors' selling (buying), changes in institutional ownership will still be correlated with same period returns when institutional investors (non-institutional investors) follow short-term positive (negative) feedback trading strategies. This explanation is consistent with theoretical models that suggest smart investors may rationally engage in positive feedback trading strategies (e.g., DeLong et al., 1990; Cutler et al., 1990; Hong and Stein, 1999). Moreover, recent empirical work suggests institutional investors tend to purchase (sell) stocks that performed well (poorly) in the recent past (e.g., Grinblatt et al., 1995; Wermers, 1999, 2000; Nofsinger and Sias, 1999; Cai et al., 2000). In addition, Odean (1998) reports that individual investors are more likely to sell past winners than losers (i.e., negative feedback trade).

2.3 Chinese Listed Firms and Ownership Structure

Since the 1990's, Chinese stock market has been growing rapidly and become important one of the most important market players in Asia, with 1,287 listed companies, a total market capitalization of Chinese RMB¥ 4,245 billion, and more than 70 million retail investors at the end of 2003 (CSRC[3], 2004). Table 1 presents the numbers and total capital raised from IPOs on Chinese A- or B-share markets respectively. B shares are originally designed for overseas investors and traded in either Hong Kong Dollars or US Dollars. Domestic investors can also access the B-share market since 2001. Table 1 shows that, in contrast to B-share, A-share offerings dominate the IPO market.

[Insert table one here]

However, China's economic reform of privatization is often called as 'one-third privatization' policy (Green, 2003), because Chinese SOEs initially only sell about one third of their equity to public investors, and allow the state, or administrative agencies

[3] China Securities Regulatory Commission, Chinese securities authority

of all levels, to retain control. The Shares held by the controlling shareholder are non-tradable (around 2/3 of total shares), and the rest, public float, is tradable on the stock exchanges.

According to HKEx (2004), the tradable shares listed on the domestic markets are mainly held by retail investors (an estimated percentage of 66.9%), even though institutional investors play an increasingly important role in shareholdings and trades (an estimated value of 33.1%) by 2003. Chinese Securities Investment Funds (SIFs) become an increasingly important institutional force of china, accounting for 9.9% of total tradable shares by 2003 (CSRC, 2004). QFIIs (Qualified Foreign Institutional Investors) and Social Pension Fund are introduced into the market since 2003, but the market percentages are very small (0.6% and 0.8% respectively) at the end of 2003 (CSRC, 2004). Insurance companies, commercial banks, and state-controlled enterprises and their listed subsidiaries are currently not allowed to buy stocks through their own investment accounts.

Other than the SIFs and Social Pension Fund, There are some financial institutions active in trading shares on the exchanges, for example, securities companies (stockbrokers) at their own proprietary accounts, private trust & investment companies and privately-offered funds, which add up to the major source of Chinese institutional investors. Since the shareholdings and trades of those institutions are exempt from many restrictive rules governing SIFs, Pension Funds or QFIIs, such as public disclosure requirements, the trading practices of those institutions are, therefore, hidden 'behind the curtain'. There is no statistical data measuring the aggregate size of tradable shares held by those institutions, but an estimated figure provided by HKEx (2004) is 21.8% at the end of 2003.

3 Hypotheses and Explanatory Variables

Prior studies based on the US markets, for example Klemkosky (1977), Edelen and Warner (1999) and Nofsinger and Sias (1999), document a strong positive relation between quarterly and annual changes in institutional ownership and returns measured over the same period. Further, institutional net trades may have a stronger impact on small stocks, primarily because price impacts caused by institutional net trades are expected to be more influential on small stocks (Lakonishok et al., 1992).

In this study, we hypothesize that the change in institutional ownership is positively associated with the long-term stock performance of Chinese IPOs, particularly for those small-cap IPOs, primarily because small-cap IPOs are more vulnerable to be affected by the price impact imposed by institutions. Basically, Chinese IPOs are generally small-sized: Firstly, an IPO firm usually sells a very small amount of shares to the public (Green, 2003), and shares held by original investors are not allowed to be traded on stock exchanges, so that tradable shares have been very limited. Secondly, large Chinese firms often choose to float in overseas markets, such as Hong Kong, and US markets, other than domestic markets. Before Bao Steel (600019) went public at the end of 2000, there were few large-cap IPOs being made on domestic markets.

So, we expect that small-cap Chinese IPOs are more likely to perform well (or badly) in the stock market, if the institutional ownership increases (or decreases) over the same period. First of all, we will investigate the relation between the size of the IPO firm and its aftermarket performance. Hence there is the follow hypothesis:

H1*: the long-term IPO abnormal performance is negatively associated with the size of the IPO firm.*

In this study, the size of the IPO is measured as the market capitalization of the IPO at the end of the IPO year (the calendar year in which the IPO was made).

Then, we have the second hypothesis below:

H2: *the long-term IPO abnormal performance is associated with the change in the institutional shareholdings measured over the same time.*

In this study, the change in institutional shareholding, or say the institutional net trade, is measured as the difference between end-period shareholding percentage and the beginning-period shareholding percentage.

The shares held by registered institutions, such as SIFs and Social Pension, for a given company can be easily obtained from well-established databases. So, the change in the percentage of institutional shareholdings by registered institutions in the stock *i* at the calendar year-end *T* (T = 1, 2, 3, 4, 5; Year 1 is the calendar year, in which the firm made the IPO) is computed as below:

$$\Delta FUND_{i,T} = FUND_{i,T} - FUND_{i,1} \quad (1)$$

$FUND_{i,T}$: the proportion of the ownership held by registered institutions in the stock *i* at calendar year-end *T* (T = 1, 2, 3, 4, 5). In this study, we use the data at calendar year-ends, because the data are only available on a yearly basis. According the CSRC's regulations on information disclosures, the data should be disclosed in corporate annual reports, and quarterly reports are not released until 2002.

This measurement of institutional ownership changes is straightforward but imprecise, primarily because institutional ownership held by unregistered institutions, such as stockbrokers, investment companies, and privately-offered funds, is excluded from

calculation. As addressed earlier, a precise measurement of the shareholdings by unregistered institutions is impracticable, since the data are not publicly available. A second problem is, the use of outside accounts, or so-called nominal accounts, is not prohibited in China. Unregistered institutions may use outside accounts to cover up their real identity, and it makes impossible to precisely measure those institutional ownership[4].

In this study, we use a second institutional ownership measure, called 'SPA' (Shares Per Account), to proxy for the ownership held by both registered institutions and unregistered institutions. The SPA is calculated as the total tradable shares divided by the number of accounts holding the tradable shares. Obviously, the SPA is not a straight measurement of institutional ownership, but it measures the level of ownership concentration in tradable shares. A high SPA indicates that the shares are likely to be held by a small number of large blockholders, such as institutional investors. Shares held by controlling shareholders and other original shareholders are categorized as non-tradable shares, so that these non-tradable shareholdings would not affect the value of the SPA. Of course, the presence of some wealthy individual investors, may have an impact on the SPA; but as to the entire market as a whole, the effect caused by those limited wealthy individuals would be small.

So, there is a likely positive relation between the SPA and the percentage of institutional ownership. If the SPA of a stock is very high, we assume that institutions hold a large percentage of the shares. When the SPA goes lower, institutions supposedly sell the stocks to non-institutional investors. As a rule of thumb, the SPA is roughly proportional

[4] The use of outside accounts is often associated with illegal trading activities, like stock manipulation and/or illegal insiders' trading (Aggarwal and Wu, 2003). For example, as the CSRC Litigation Releases shows, stock manipulators widely use a large quantity of outside accounts to facilitate their manipulative schemes. Outside accounts do not expose ultimate account holders to the public, and may lower the risk of bringing up a CSRC's investigation.

to the percentage of institutional shareholdings in the total tradable shares, and the change in the SPA primarily results from the change in institutional shareholdings, if the size of total tradable shares is held constant over time.

We, then, use the percentage change of the SPA between two year-ends as the proxy for the change of institutional shareholdings over the same period. The percentage change of the SPA, represented as $\Delta SPA_{i,T}$, for a given stock *i* at the calendar year-end *T* (T=1, 2, 3, 4, 5) is measured as below:

$$\Delta SPA_{i,T} = \left(\frac{SPA_{i,T} - SPA_{i,1}}{SPA_{i,1}} \right) \qquad (2)$$

$SPA_{i,T}$: tradable shares per account of stock *i* at calendar year-end *T* (T=1, 2, 3, 4, 5).

It should be noted that the Equation (2) is valid, only when the size of total tradable shares remains constant over the period. In fact, the amount of total tradable shares may be very changeable particularly for fast-growing companies, due to stock splits, stock dividends, and rights issues etc. Even if the trade of a stock is suspended, the amount of the SPA is still supposed to rise, when the size of the total tradable shares goes up, for example stock dividends. So, in this sense, the variation in the aggregate tradable shares over time should be controlled:

$$\Delta SPA_{i,T} = \left(\frac{SPA_{i,T}}{SPA_{i,1}} \right) - \left(\frac{TS_{i,T}}{TS_{i,1}} \right) \qquad (3)$$

$TS_{i,T}$: the size of total tradable shares of stock *i* at calendar year-end *T* (T=1, 2, 3, 4, 5).

Even though it is not a precise measurement, $\Delta SPA_{i,T}$ is believed to provide a reasonable estimation of institutional net trading, which can not be measured exactly.

The advantage to use $\Delta SPA_{i,T}$ as a proxy for institutional ownership changes is, the widely used outside accounts by unregistered institutions in China make it difficult to measure institutional ownership and its variation over time, but outside accounts would not critically affect $\Delta SPA_{i,T}$, because $\Delta SPA_{i,T}$ measures the change in the shareholding concentration and it does not take into consideration which accounts are being used, either the proprietary accounts or outside accounts.

4 Empirical Tests

4.1 Data Collection and Performance Measurement

This research will investigate the long-run stock performance of Chinese A-share IPOs going public from December 1996 to December 2000, and a total of 741 IPO firms are identified during that period. We ignore the IPO cases going public prior to 1996, because we will need to construct a group of matched publicly traded firms for each sample IPO firm as a way of benchmarking. Another reason is, the information on the SPA is not available until 1996, so our research sample needs to be limited to the IPO firms that went public since then. The data used in this study are generously provided by MinFa Securities Co., Ltd (Shanghai). The information on stock performance and institutional trading by funds can be collected from well-established databases, such as CSMAR® System and Sinofin Database, and the information on the SPA is published on company's annual reports.

The two performance measures, CARs (cumulative abnormal returns) and BAHRs (buy and hold returns), are used to evaluate aftermarket abnormal performance of Chinese IPOs, since both of them are widely used in prior literature to identify long-term abnormal performance, but neither of them is always preferred (Gompers and Lerner,

2001). So, the yearly benchmark-adjusted cumulative abnormal returns (CARs) and buy-and-hold returns (BAHRs) for an IPO firm *i* in event year *t* (t = 1, 2, 3, 4, 5) are calculated as yearly raw return on a stock minus the yearly benchmark return for the corresponding trading period:

$$CAR_t = \sum_{s=1}^{t}\left\{\sum_{i=1}^{741}\left[w_{i,s} \times (R_{i,s} - R_{m,s})\right]\right\} \tag{4}$$

$$BAHR_t = \sum_{i=1}^{741}\left\{w_{i,s} \times \left[\prod_{s=1}^{t}(1+R_{i,s}) - \prod_{s=1}^{t}(1+R_{m,s})\right]\right\} \tag{5}$$

Where $w_{i,s}$ denotes a weight and $R_{i,s}$ represents the raw return of stock *i* in year *s* (s = 1, 2, 3, 4, 5), and $R_{m,s}$ is the contemporaneous benchmark return in year *s* (s = 1, 2, 3, 4, 5). In addition, the buy-and-hold returns and Cumulative abnormal returns are both inclusive of dividends and other distributions.

The aftermarket period includes the following 5 years where years are defined as successive 252-trading-day periods relative to the IPO date. Thus, the event year 1 consists of event days 1-252, and the event year 2 consists of event days 253-504. For IPOs that are de-listed before their 5-year anniversary, the aftermarket period is truncated, and the 5-year return ends with its last listing.

In the classic study, Ritter (1991) use matching firms for a benchmark, which denote already-listed firms matched by industry. In this study, industry-matched benchmark is also used: The matched firms are selected by matching a group of publicly-traded firms to the IPO firms within the same 2-digit CSRC's SIC Code (Standard Industry Classification, 2001). The CSRC's SIC (2001) is currently the only official system, which is widely used and covers all the listed firms in mainland China. Table 2 presents

the Chinese SIC (2001) and our sample distribution by industry sectors. According to the SIC (2001), there are 13 specific industry sectors in total (from sector A to M), and sector C (Manufacturing) is further divided into 10 sub-sectors, as it is an extraordinarily large sector and covers too many companies (around 2/3 of total). Thus, sample IPOs are divided into these 22 industry (sub-)sectors, and matched publicly traded firms are those which come from the same industry sectors (or sub-sectors).

[Insert table two here]

The matching firms approach is the basic way of benchmarking in this study, but we adopt another benchmark to see if different findings arise from the second benchmark to be utilized. The second way of benchmarking used in this study is the value-weighted A-share composite index by calculating the weighted average of Shanghai A-share Index and Shenzhen A-share Index.

4.2 Aftermarket Performance

Table 3 presents the event-time CAR (Cumulative Abnormal Returns) series for the five years following the IPO.

[Insert table three here]

Panel A reports equal-weighted (EW) and value-weighted (VW) CARs after industry adjustment (a group of industry-matched firms): it is clear that EW-CARs are slightly higher than zero over the five years after the IPO. For example, they reach 2.34% (t-statistic= 1.39) over 2 years, 1.30% (t-statistic= 0.63) over 3 years, 1.14% (t-statistic= 0.48) over 4 years and 2.98% (t-statistic= 1.12) over 5 years. However, VW-CARs seem to be quite low in the subsequent five years after the IPO. For example, they reach -1.15% (t-statistic= -0.68) over 2 years, -6.12% (t-statistic= -2.96) over 3 years, -6.50%

(t-statistic= -2.73) over 4 years and -5.26% (t-statistic= -1.97) over 5 years. Panel B reports equal-weighted and value-weighted CARs after market adjustment (A-share market index return). The data follow a somewhat same pattern: EW-CARs are relatively higher than VW-CARs over two years or longer after the IPO. For example, EW-CARs reach 3.24% (t-statistic= 1.83) over 2 years, 5.53% (t-statistic= 2.55) over 3 years, 3.59% (t-statistic= 1.44) over 4 years and 5.37% (t-statistic= 1.92) over 5 years. However, VW-CARs reach 0.63% (t-statistic= 0.36) over 2 years, -2.68% (t-statistic= -1.24) over 3 years, -6.50% (t-statistic= -2.73) over 4 years and -5.26% (t-statistic= -1.97) over 5 years.

Table 4 further presents the event-time BAHR (Buy And Hold Returns) series for the five years following the IPO. Panel A and Panel B report equal-weighted (EW) and value-weighted (VW) BAHRs after industry and market adjustments respectively. The data in table 4 follow an exactly same pattern: EW-BAHRs show positive figures over a two-year period or longer; however, VW-BAHRs show negative figures contemporaneously.

[Insert table four here]

As a whole, table 3 and 4 provide mixed findings on long-run returns of Chinese IPOs, and seemingly the choice of performance measures may draw different conclusion on long-run performance relative to market benchmarks, for example, BAHRs show poorer aftermarket performance than CARs do, due to a consequence of compounding single-period returns. Many prior studies on IPO long-run performance use the BAHRs as the main performance measure, and have identified the existence of IPO underperformance. This finding is consistent with prior literature, like Fama (1998) and Mitchell and Stafford (2000), arguing that BAHRs may magnify underperformance.

Most importantly, the findings in table 3 and 4 show that EW-figures are evidently higher than contemporaneous VW-figures are, in terms of industry-adjusted (and/or market-adjusted) CARs (and/or BAHRs). This finding is consistent with prior literature, for example Ritter and Welch (2002) and Kooli and Suret, (2003), showing significantly different results whether equal-weighted (EW) or value-weighted (VW) portfolios are adopted. The finding may imply that small-cap IPOs may perform better than larger-cap IPOs in the stock market, primarily because IPOs with a high weight (i.e. larger-cap firms) contribute more to the value-weighted average than IPOs with a low weight (i.e. small-cap firms) do.

So, in order to further examine long-run returns of Chinese IPOs, we segregate our sample IPOs into 6 categories by the size of the firm's market capitalization at the end of the IPO year. Following Ritter (1991), we compute wealth relatives as an additional performance measure, defined as:

$$Wealth\ \ relatives = \frac{1 + average\ \ total\ \ return\ \ on\ \ IPOs}{1 + average\ \ total\ \ return\ \ on\ \ matching\ \ \ firms} \qquad (6)$$

As explained by Ritter (1991), a wealth relative of greater than 1.00 can be interpreted as IPOs outperforming a portfolio of matching firms; a wealth relative of less than 1.00 indicates that IPOs underperformed.

Table five presents aftermarket performance of Chinese IPOs categorized by firm size (market capitalization at the end of the IPO year). In Panel A and Panel B, we compute the wealth relatives by using 3-year total returns and 5-year total returns respectively.

[Insert table five here]

Ritter (1991) presents evidence that IPOs with a small issue size report a low wealth

relative, which means that small IPOs have the worse aftermarket performance than large IPOs do. The evidence is mildly supportive of the overreaction hypothesis that small IPOs perform abnormally well on the first trading day so as to underperform in the aftermarket period. However, Table five in this research shows a different finding: according to the two panels (A and B), the smallest IPOs evidently report a much higher wealth relative (1.141 and 1.071 respectively) than the remaining IPOs do. It clearly indicates that small-cap IPOs are likely to outperform their industry peers, while there is no significant evidence that the remaining IPOs are outperforming (and/or underperforming) their industry peers.

Table 5 presents an interesting finding that small-cap IPOs are likely to outperform their industry-matched firms. This finding is not consistent with Ritter (1991), which argues small-cap IPOs are likely to more underperform the market benchmarks. In order to secure a finding of outperformance for small-cap IPOs, we calculate the event-time equal-weighted and value-weighted CARs (and BAHRs) after both industry adjustment and market adjustment of Chinese small-cap IPOs. We further categorize sample IPOs into 4 size-quartile portfolios by its market capitalization at the end of the IPO year: the IPOs in the smallest size-quartile portfolio are defined as ‘small-cap IPOs’ and the IPOs in the remaining three size-quartile portfolios are ‘larger-cap IPOs’.

In Figure 1, we have plotted the event-time EW-CAR and VW-CAR series after the two benchmark adjustments (industry matching firms and value-weighted A-share market index) of small-cap IPOs and larger-cap IPOs. Panel A shows that small-cap IPOs significantly outperform their industry matching firms and/or A-share market index over three years or longer, in term of both EW-CARs and EW-CARs. Small-cap IPOs underperform the benchmarks by around -6% over 1 year, but soon get better relative to market benchmarks: they outperform the benchmarks by more than 10% over 3 years

and more than 20% over 5 years. In Panel B, we present the same performance measures of larger-cap IPOs (the remaining three size-quartile portfolios). However, larger-cap IPOs do not show a significant outperformance (and/or underperformance) in the aftermarket period: larger-cap IPOs seem to slightly outperform the benchmarks by around 2% over the first 2 years, but perform poorly subsequently, for example they seem to slightly underperform the benchmarks by around -10% over 5 years.

[Insert figure one here]

Figure 2 has presented the event-time EW-BAHR and VW-BAHR series after the two benchmark adjustments (industry matching firms and value-weighted A-share market index) of small-cap IPOs and larger-cap IPOs. Figure 2 follows the exactly same pattern: small-cap IPOs in Panel A significantly outperform the benchmarks by 10% over 3 years and more than 20% over 5 years; larger-cap IPOs in Panel B seem to slightly outperform the market over the first 2 years, but they are likely to underperform the benchmarks over 3 years or longer.

[Insert figure two here]

Figure 1 and 2 confirm the interesting finding that small-cap IPOs perform abnormally well in the aftermarket period, in comparison to larger-cap IPOs. This finding is not consistent with any prior IPO studies based on western markets. In this research, we hypothesize that net trading activities by institutional investors may have an effective impact on IPO long-run performance, primarily due to large price pressure. It is particularly true for those small-cap IPOs, because small stocks are more vulnerable to be affected by price impacts associated with institutional trading (Lakonishok et al., 1992). In the following section, we will investigate the likely relation between institutional net trading and long-run returns of Chinese IPOs.

4.3 Institutional Net Trading and Contemporaneous IPO Performance

In this section, we focus on institutional net trade, which is measured as the difference between beginning-period institutional ownership and end-period institutional ownership. Of course, institutions may change their holdings within the period, and this trading action is also likely to affect the IPO long-run performance. However, it is important to recognize that the effects of these within-period institutional trading activities would be offset with each other, and only the net trades by institutions are likely to affect the stock returns. So, the institutional net trade is the difference between institutional selling and institutional buying, which equals to the difference between beginning-period institutional ownership and end-period institutional ownership.

Firstly, in table 6, we present the average institutional ownership changes (or say institutional net trades) from calendar year-end 1 to calendar year-end *T* (T = 2, 3, 4, 5) of the sample IPOs in 4 different size-quartiles.

[Insert table six here]

Panel A describes the changes in institutional shareholdings over time by registered institutions only, like funds and Social Pension. In Panel A, it clearly shows that, for small-cap IPOs, there is a significant increase in ownership held by registered institution: From year-end 1 to year-end 3, the proportion of institutional ownership goes up by 0.32% (t statistic = 1.79), and it increases by 1.03% (t statistic = 3.08) from year-end 1 to year-end 5. However, larger-cap IPOs do not report a significant increase in institutional ownership in the post-IPO period.

Panel B further describes the changes in the SPA (shares per account) over time, which proxy for the changes in the aggregate ownership by both registered institutions and

unregistered institutions. If $\Delta SPA_{i,T}$ is higher than zero, it can be interpreted as an increase in the SPA (and/or an increase in aggregate ownership held by both registered institutions and unregistered institutions); if less than zero, it indicates that aggregate institutional shareholdings go decrease. Panel B shows a similar finding as Panel A does: For small-cap IPOs, there is a significant rise (0.376, t statistic = 2.81) in the SPA from calendar year-end 1 to year-end 3, and the figure is 0.468 (t statistic = 1.87) from year-end 1 to year-end 5. For larger-cap IPOs, the SPA seems to increase too, but not statistically significant.

Table 6 presents evidence that small-cap IPOs report a significant increase in institutional ownership from calendar year-end 1 up to year-end 5, whilst larger-cap IPOs do not seem to have it. In other words, small-cap IPOs are more involved into institutional buying activities in the post-IPO period. We expect that these institutional buying activities are likely to affect long-run returns of small-cap IPOs.

Then, we will investigate the effect of institutional net trading on IPO long-run performance. Once again, we segregate our sample IPOs into 4 size-quartile portfolios, and each of the four portfolios is further divided into three sub-groups by institutional net trading: (1) IPOs involved with institutional net selling (i.e. beginning-period institutional ownership is higher than end-period institutional ownership), (2) IPOs involved with no institutional net trading (i.e. beginning-period institutional ownership is equal to end-period institutional ownership), (3) IPOs involved with institutional net buying (i.e. beginning-period institutional ownership is lower than end-period institutional ownership).

Table 7 reports calendar-time industry-adjusted CARs and institutional net trading by 4 size-quartile portfolios. In Panel A, we present the median CARs starting from calendar

year-end 1 to year-end 3: For each of the 4 size-quartile portfolios, IPOs involved with institutional net buying report evidently better performance than IPOs with no net trading; IPOs involved with institutional net selling seem to report poorer performance than IPOs with no net trading, but the evidence is weak and statistically insignificant. As far as the smallest size-quartile portfolio is concerned, institutional net buying drives the IPOs significantly outperform their industry peers by 58.12% (z statistic = 2.09); however, institutional net selling drives the IPOs perform badly (-19.45%, z statistic = 0.00) in comparison to the IPOs without being involved into institutional net trading (13.84%, z statistic = 4.96).

Panel B presents the median CARs starting from calendar year-end 1 to year-end 5. Panel B shows a same tendency as Panel A does: IPOs involved with institutional net buying report significantly better performance than IPOs with no net trading. For the smallest size-quartile portfolio, institutional net buying drives the IPOs significantly outperform their industry peers by 106.21% (z statistic = 2.76), in comparison to the IPOs without being involved into institutional net trading (15.10%, z statistic = 4.75).

[Insert table seven here]

Table 7 is partly supportive of price pressure hypothesis that institutional net trading is likely to affect contemporaneous returns measured over the same period (Sias et al. 2001). It provides strong evidence on the price impact of institutional net buying on long-run returns of Chinese IPOs, but no significant evidence on the price impact of institutional net selling. Moreover, table 7 also confirms the small-cap hypothesis that the price impact is more likely to affect those small-cap stocks (Lakonishok et al., 1992). It is clearly shown in Panel A that institutional net buying push the smallest-cap IPOs to outperform by 58.12% (z statistic = 2.09), and the remaining three larger-cap IPOs by

42.01% (z statistic = 2.78), 17.65% (z statistic = 1.91) and 7.12% (z statistic = 1.21) respectively. In Panel B, institutional net buying drives the smallest-cap IPOs upwards by 106.21% (z statistic = 2.76), and the remaining three larger-cap IPOs by 42.50% (z statistic = 1.43), 13.94% (z statistic = 0.69) and 18.22% (z statistic = 1.20) respectively.

So, we think that there is a likely relation between institutional net buying and abnormally high returns of Chinese IPOs measured over the same period. We believe that institutional net buying is one of the reasons to drive up the long-run performance of those small-cap IPOs.

However, one may argue that, as shown in table 7, small-cap IPOs without any net institutional trading do outperform their industry peers by 13.84% (z statistic = 4.96) and 15.10% (z statistic = 4.75) respectively over the 2 years or longer. This abnormal performance associated with those small-cap IPOs could not be interpreted as the consequence of institutional net buying by registered institutions.

It should be pointed out that, in Panel A and B, the variable of institutional ownership '$FUND_{i,T}$' consists of the ownership by registered institutions only, exclusive of any ownership held by unregistered institutions. So, this measurement of institutional ownership '$FUND_{i,T}$' has substantially underestimated the actual amount of institutional shareholdings owned by both of the two types of institutional investors, since HKEx (2004) estimates that trade volumes by unregistered institutions account for more than 60% of total institutional trading volumes each year. We argue that the outperformance of small-cap IPOs without any net trades by registered institutions may be interpreted as the consequence of institutional net trading by unregistered institutions.

Then, we introduce the variable '$\Delta SPA_{i,T}$' to proxy for the changes in institutional ownership by both registered institutions and unregistered institutions over the period, and investigate how the institutional ownership changes affect long-run returns of Chinese IPOs. We also segregate our sample IPOs into 4 size-quartile portfolios, and each of the four portfolios is further divided into two sub-groups by institutional net trading: (1) IPOs reporting a decrease in the SPA from calendar year-end 1 to year-end 3 (or year-end 5), (2) IPOs reporting an increase in the SPA from calendar year-end 1 to year-end 3 (or year-end 5).

Panel C presents the median CARs starting from calendar year-end 1 to year-end 3: For each of the 4 size-quartile portfolios, IPOs with an increase in the SPA over the 2 years, implying a rise in aggregate ownership by two types of institutions, report evidently better performance than IPOs without. Take the smallest size-quartile portfolio for example. IPOs with an increase in the SPA significantly outperform their industry peers by 19.15% (z statistic = 4.54); however, IPOs with a decrease in the SPA outperform by 8.69% only (z statistic = 1.80). Panel D presents the median CARs starting from calendar year-end 1 to year-end 5, and it shows a same tendency as Panel A does: For the smallest size-quartile portfolio, IPOs with an increase in the SPA significantly outperform their industry peers by 47.64% (z statistic = 5.64), in comparison to IPOs with a decrease in the SPA (6.66%, z statistic = 1.52).

The finding in Panel C and D is obvious: for each of the 4 size-quartile portfolios, the IPOs with an increase in the SPA perform much better in the stock market than those with a decrease in the SPA. As far as the smallest size-quartile portfolio is concerned, IPOs with an increase in the SPA significantly outperform their industry peers; while IPOs with a decrease in the SPA slightly outperform, but not statistically significant. So,

Panel C and D show that the changes in the SPA, or say the changes in aggregate ownership by two types of institutions, are likely to affect the long-run returns measured over the same period.

Table 7 provides robust evidence that institutional net trading is likely to affect long-run returns of Chinese IPOs, and institutional net buying could be one of the reasons to drive small-cap IPOs to outperform their industry peers. In order to double check our findings in table 7, we further presents calendar-time industry-adjusted BAHRs and institutional net trading by 4 size-quartile portfolios (in table 8). Table 8 indicates an exactly the same pattern as shown in table 7.

[Insert table eight here]

5 Conclusion and Limitation

5.1 Conclusion

In this research, we examine a larger Chinese IPO sample (741 firms) going public between 1996 and 2000, and find that the choice of performance measures may draw different conclusion on long-run performance relative to market benchmarks. Chinese IPOs, as a whole, do not significantly outperform (or underperform) the market, but we find strong evidence that small-cap IPOs extraordinarily outperform the market benchmark (and/or their industry peers) over a three-year period or longer, based on both value-weighted (and/or equal-weighted) CARs and BAHRs.

Then, we argue that institutional net buying could be one of the reasons to drive up the long-run performance of those small-cap IPOs. First of all, we find that small-cap IPOs, on average, report a significant increase in institutional ownership in the post-IPO period. More importantly, we find that IPOs involved with institutional net buying

perform abnormally well in the stock market, in comparison to those without. The finding is particularly robust, if small-cap IPOs are concerned. Small-cap IPOs involved with institutional net buying significantly outperform their industry peers over the same period, however those without institutional net buying do not significantly outperform. So, in this sense, we argue that institutional net buying may drive up the aftermarket performance of small-cap IPOs measured over the same period.

5.2 Limitation

Due to data unavailability, we cannot precisely measure institutional ownership. We calculate institutional ownership in two ways: (1) the proportion of the ownership held by registered institutions, like funds and Social Pension. This calculation is straightforward but imprecise, because ownership held unregistered institutions, such as privately-offered funds, private investment companies and stockbrokers (proprietary accounts) are excluded from calculation. (2) A proxy (SPA, tradable shares per account) for institutional ownership by both registered institutions and unregistered institutions, which is computed as total tradable shares divided by investment accounts holding tradable shares, due to unavailable data of ownership held by unregistered institutions. Moreover, outside accounts are widely used in China so that it is difficult to measure the shares held by unregistered institutions precisely. However, the SPA provides a reasonable estimation of institutional shareholdings by the two types of institutions, because the SPA is roughly proportional to the percentage of institutional shareholdings in the total tradable shares. If a stock reports a high SPA, we assume that the institutional ownership in this stock is very large.

Secondly, prior literature indicates three hypotheses, which may explanation the positive relation between institutional ownership changes and contemporaneous returns: (1)

Price Pressure Hypothesis; (2) Informed Trading Hypothesis; and (3) Intra-period Positive Feedback Trading Hypothesis. However, in this study, we cannot distinguish among these hypotheses. We conjecture that the positive relation might be mainly interpreted as price pressure imposed by institutional trading, since we find that the positive relation is more significant, if the IPOs are small-cap. Apparently, small-cap stocks are more vulnerable to be affected by block trades.

Moreover, there might be a fourth explanation for the positive relation between small-cap outperformance and institutional ownership changes. Small-cap stocks are more likely to get involved into a price manipulation, which may possibly push stock prices upwards (Aggarwal and Wu, 2003). As identified in the CSRC Litigation Releases in recent years, there are more than 40 manipulation cases in China exposed to light. Among them, most stocks involved are small-cap IPO firms and manipulated mainly by unregistered institutions, for example stockbrokers and investment companies. Those manipulated stocks extraordinarily outperform the market benchmarks. We conjecture that stock manipulation may be another explanation to small-cap outperformance in China, since Chinese anti-manipulation laws and enforcements were not established, until the promulgation of Security Law in 1999. However, due to the nature of the market-based price manipulation, it is difficult to obtain direct evidence for this. We would like to leave it for any future research.

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Table 1: The number of IPOs and total capital raised on Chinese market (unit: million RMB Yuan)

	Shares	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Number Of IPOs	**A**	10	4	21	119	110	24	189	206	115	98	154	88	97	82	98
	B	0	0	9	19	30	12	15	16	5	2	6	0	0	1	2
Total Capital Raised	**A**	459	500	5,000	19,483	4,962	2,268	22,445	65,506	40,909	49,788	81,237	53,429	51,696	45,351	35,342
	B	0	0	4,409	3,813	3,827	3,335	4,718	8,076	2,555	379	1,399	0	0	356	2,624

Source: National Bureau of Statistics of China (NBSC), 1990-2004

Table 2: Sample's distribution by industry sector

SIC (2001)	Sample	A-share Firms*	%
A Agriculture, forestry, & fishing	**21**	**30**	**70.00%**
B Mining	**12**	**20**	**60.00%**
C Manufacturing	**445**	**742**	**59.97%**
- C0 Foods and beverages	*(38)*	*(58)*	*(65.52%)*
- C1 Textiles, suits and leathers	*(35)*	*(56)*	*(62.50%)*
- C2 Wood products and furniture	*(1)*	*(2)*	*(50.00%)*
- C3 Papers, stationery, sporting, musical instruments	*(16)*	*(24)*	*(66.67%)*
- C4 Petroleum refining, chemicals, and allied products	*(96)*	*(136)*	*(70.59%)*
- C5 Electronic, electric components and home appliances	*(20)*	*(39)*	*(51.28%)*
- C6 Mineral products and metal products	*(75)*	*(117)*	*(64.10%)*
- C7 Equipments and machineries	*(110)*	*(194)*	*(56.70%)*
- C8 Drugs and Biologic products	*(42)*	*(82)*	*(51.22%)*
- C9 Miscellaneous products	*(12)*	*(34)*	*(35.29%)*
D Water, electricity, and gas	**31**	**52**	**59.62%**
E Construction	**12**	**25**	**48.00%**
F Transport & public utilities	**34**	**55**	**61.82%**
G Information technology	**44**	**79**	**55.70%**
H Wholesale and retail trade	**52**	**96**	**54.17%**
I Finance and insurance	**3**	**10**	**30.00%**
J Real estate	**12**	**45**	**26.67%**
K Service	**28**	**41**	**68.29%**
L Publishing, media, and allied services	**4**	**11**	**36.36%**
M Miscellaneous products and services	**43**	**81**	**53.09%**
TOTAL	741	1,287	57.58%

Source: Standard Industry Classification of China (ed. 2001)

Note: * ending at 31 December 2003

Table 3: Aftermarket Performance - Cumulative Abnormal Returns (CARs)

Panel A: Industry-adjusted CARs

Event Year	CAR (EW)	t-statistic	CAR (VW)	t-statistic
1	-0.47%	-0.39	1.24%	1.04
2	2.34%	1.39	-1.15%	-0.68
3	1.30%	0.63	-6.12%**	-2.96
4	1.14%	0.48	-6.50%*	-2.73
5	2.98%	1.12	-5.26%	-1.97

Panel B: Market-adjusted CARs

Event Year	CAR (EW)	t-statistic	CAR (VW)	t-statistic
1	-0.22%	-0.18	1.35%	1.08
2	3.24%	1.83	0.63%	0.36
3	5.53%*	2.55	-2.68%	-1.24
4	3.59%	1.44	-7.65%**	-3.06
5	5.37%	1.92	-8.59%**	-3.08

*** significant at 1%, ** significant at 5%, and * significant at 10%.

Note:

1. CARs are equal-weighted (EW) and value-weighted (VW).

2. Industry-adjusted benchmark is a group of selected publicly traded firms by matching the firms within the same industry sector according to the CSRC SIC (2001).

3. Market-adjusted benchmark is a value-weighted market index, which is composed of Shanghai A-share Index and Shenzhen A-share Index.

4. t-statistic: $t(CAR_s) = CAR_s * \sqrt{\frac{n_s}{s * \text{var} + 2 * (s-1) * \text{cov}}}$ where event year s = 1, 2, 3, 4, 5; and n is the number of firms trading in each event year. Var is the average of the cross-sectional variances over the 5 event years, and cov is the first-order autocovariance of the AR_s series (AR_s is the abnormal return in an event year s).

Table 4: Aftermarket Performance - Buy and Hold Returns (BAHRs)

Panel A: Industry-adjusted BAHRs

Event Year	BAHR (EW)	t-statistic	BAHR (VW)	t-statistic
1	-0.47%	-0.39	1.24%	1.04
2	1.64%	0.97	-2.61%	-1.55
3	-1.48%	-0.72	-8.98%**	-4.35
4	-5.66%*	-2.37	-15.07%***	-6.32
5	-0.66%	-0.25	-13.17%**	-4.94

Panel B: Market-adjusted BAHRs

Event Year	BAHR (EW)	t-statistic	BAHR (VW)	t-statistic
1	-0.22%	1.08	1.35%	1.08
2	2.54%	1.44	-0.73%	-0.41
3	4.41%	2.04	-4.18%	-1.93
4	2.26%	0.90	-10.87%**	-4.35
5	5.17%	1.85	-12.91%***	-4.62

*** significant at 1%, ** significant at 5%, and * significant at 10%.

Table 5: Aftermarket Performance categorized by Firm Size

Panel A: 3-year Holding Period Total Return (Exclusive of the Initial Return)

Firm Size (Chinese ¥)	No. of IPOs	Average 3-year Holding Return		Wealth Relative
		IPOs	matching firms	
10,000,000 – 24,999,999	87	28.53%	12.61%	1.141
25,000,000 – 49,999,999	220	17.46%	16.24%	1.010
50,000,000 – 74,999,999	164	9.91%	15.40%	0.952
75,000,000 – 99,999,999	103	-5.26%	1.16%	0.937
100,000,000 – 149,999,999	115	-6.90%	-4.11%	0.971
150,000,000 – 792,000,000	52	-12.54%	-2.20%	0.894
All	741	8.04%	9.08%	0.990

Panel B: 5-year Holding Period Total Return (Exclusive of the Initial Return)

Firm Size (Chinese ¥)	No. of IPOs	Average 5-year Holding Return		Wealth Relative
		IPOs	matching firms	
10,000,000 – 24,999,999	87	44.59%	34.98%	1.071
25,000,000 – 49,999,999	220	15.84%	12.90%	1.026
50,000,000 – 74,999,999	164	-8.14%	-5.25%	0.969
75,000,000 – 99,999,999	103	-14.19%	-12.13%	0.977
100,000,000 – 149,999,999	115	-9.44%	-13.43%	1.046
150,000,000 – 792,000,000	52	-9.71%	-11.74%	1.023
All	741	4.02%	2.18%	1.018

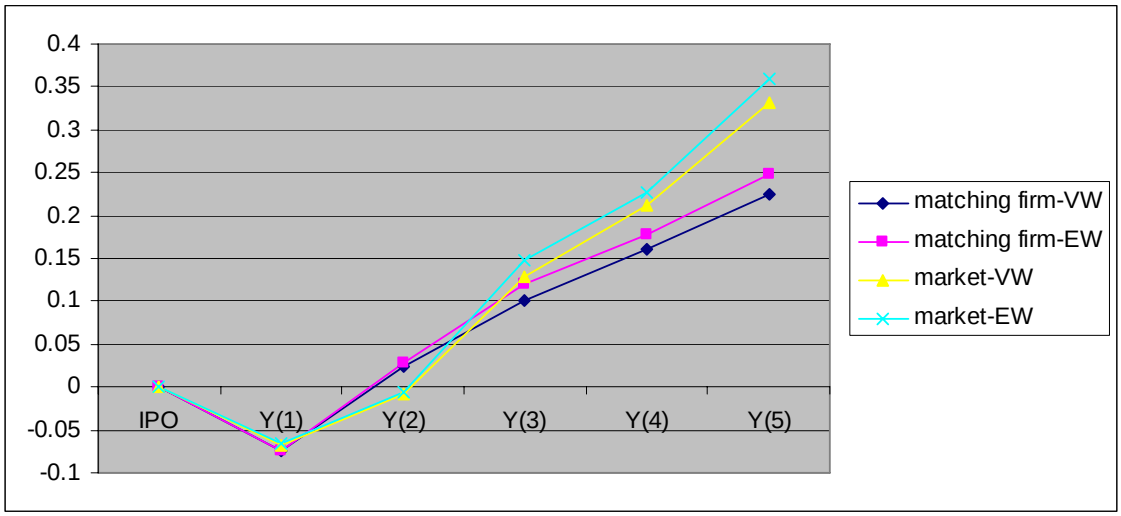
Note:
1. Firm size is the market capitalization of the firm at the end of the IPO year.

2. Holding period returns are the averages of holding period total returns, exclusive of initial returns.

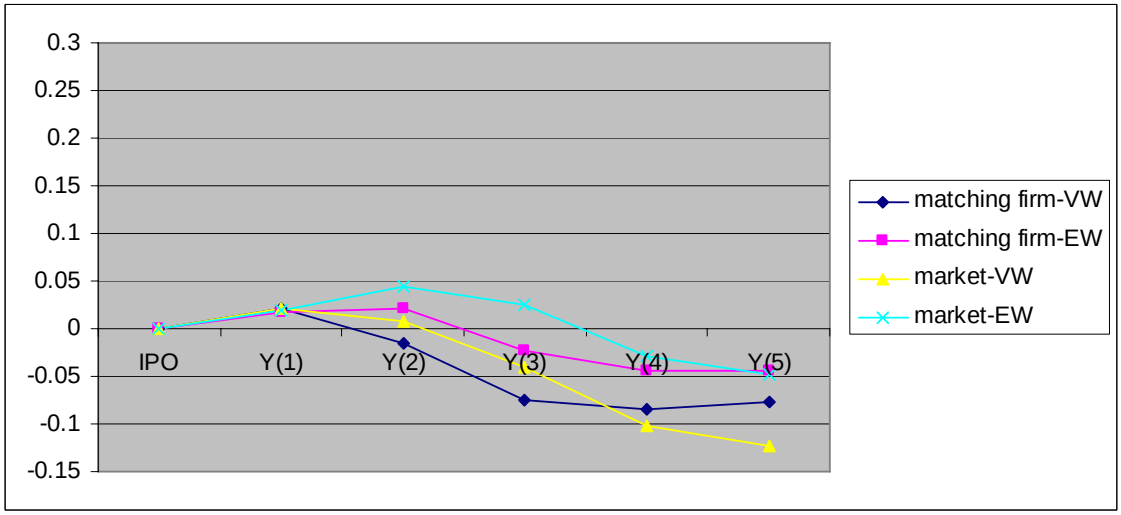
3. The wealth relative is the ratio of one plus the mean IPO holding period return (not in percent) divided by one plus the mean matching firm holding period return (not in percent). For the smallest float size category, 1.2853/1.1261 = 1.141 (Ritter, 1991).

Figure 1: Event-time CAR Series with Different Adjustments (Equal-weighted and Value-weighted)

Panel A: Small-Cap IPOs (The smallest Quartile IPO portfolios)



Panel B: Larger-Cap IPOs (The remaining three Quartile IPO portfolios)



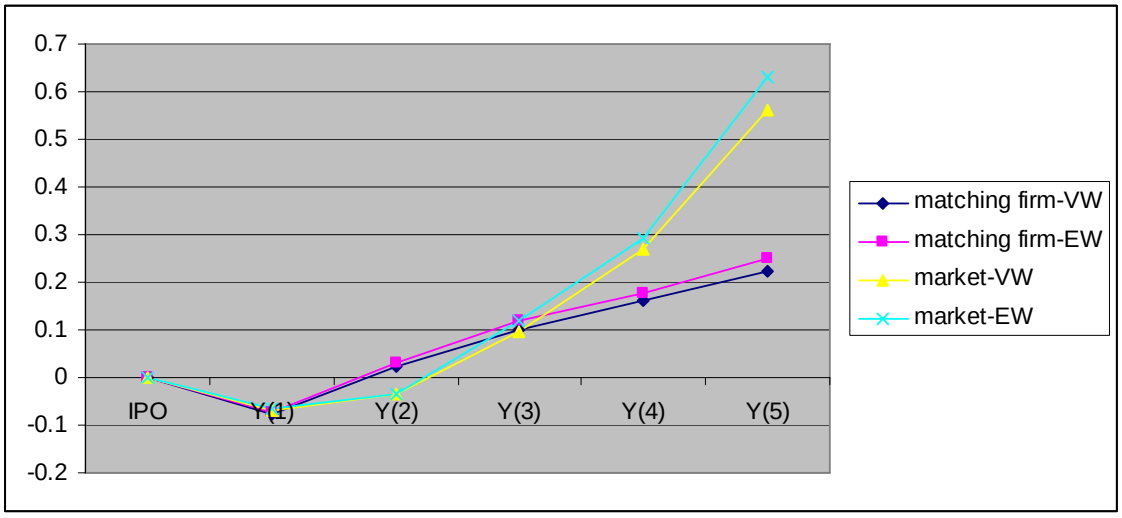
Note:
1. CARs are equal-weighted (EW) and value-weighted (VW).

2. CARs are adjusted by two benchmarks (industry matched firms and market index).

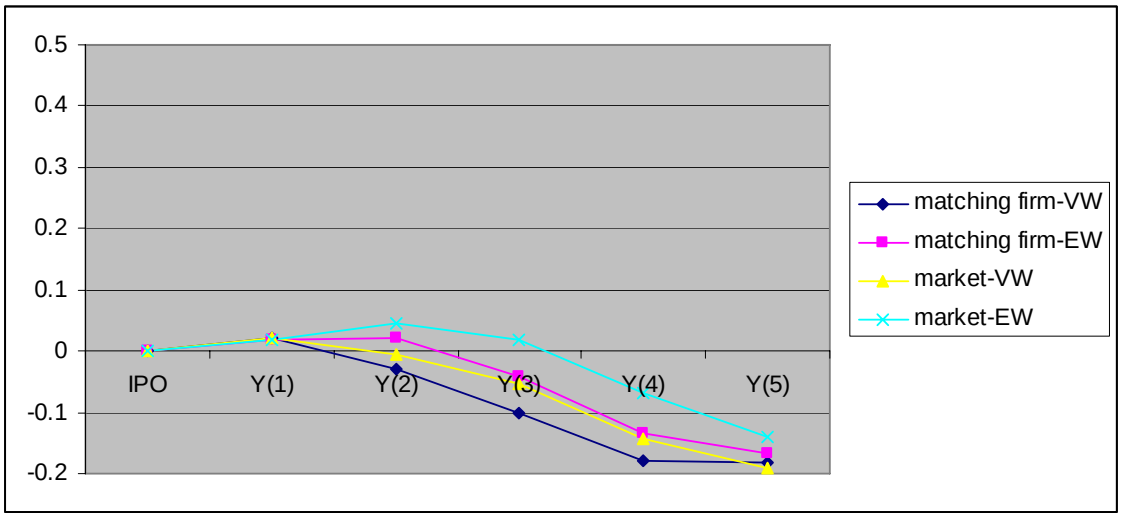
3. IPOs are segregated into four quartile portfolios by the magnitude of size (the market capitalization of the firm at the end of the IPO year).

Figure 2: Event-time BAHR Series with Different Adjustments (Equal-weighted and Value-weighted)

Panel A: Small-Cap IPOs (The smallest Quartile IPO portfolios)



Panel B: Larger-Cap IPOs (The remaining three Quartile IPO portfolios)



Note:
1. BAHRs are equal-weighted (EW) and value-weighted (VW).

2. BAHRs are adjusted by two benchmarks (industry matched firms and market index).

3. IPOs are segregated into four quartile portfolios by the magnitude of size (the market capitalization of the firm at the end of the IPO year).

Table 6: Average Institutional Ownership Changes from the First Calendar Year-end up to the Fifth Calendar Year-end

Panel A: ΔFUND

Firm Size	Year-end 1 To Year-end 2	Year-end 1 To Year-end 3	Year-end 1 To Year-end 4	Year-end 1 To Year-end 5
1st Quartile Portfolio (Small-cap IPOs)	0.08% (0.40)	0.32%* (1.79)	0.88%*** (2.73)	1.03%*** (3.08)
2nd Quartile Portfolio	0.36%* (1.84)	0.58%* (1.74)	0.41% (0.94)	0.33% (0.43)
3rd Quartile Portfolio	0.32% (0.65)	0.24% (0.45)	-0.34% (-0.65)	0.68% (1.04)
4th Quartile Portfolio (Large-cap IPOs)	-0.81% (-1.50)	-0.46% (-0.66)	-0.67% (-0.93)	-0.03% (-0.03)
All	0.02% (1.12)	0.16% (0.71)	0.07% (0.29)	0.50%* (1.86)

Panel B: ΔSPA

Firm Size	Year-end 1 To Year-end 2	Year-end 1 To Year-end 3	Year-end 1 To Year-end 4	Year-end 1 To Year-end 5
1st Quartile Portfolio (Small-cap IPOs)	0.364** (2.28)	0.376*** (2.81)	0.451** (2.26)	0.469* (1.87)
2nd Quartile Portfolio	0.503 (1.62)	0.287 (1.30)	0.138 (0.70)	0.074 (0.30)
3rd Quartile Portfolio	0.456** (2.29)	0.419 (1.29)	0.043 (0.29)	-0.075 (-0.57)
4th Quartile Portfolio (Large-cap IPOs)	0.041 (0.59)	0.250 (1.68)	0.382* (1.97)	0.359 (1.54)
All	0.331*** (3.58)	0.333*** (3.80)	0.278*** (2.77)	0.205* (1.89)

*** significant at 1%, ** significant at 5%, and * significant at 10%.

Note:

1. $\Delta FUND_{i,T} = FUND_{i,T} - FUND_{i,1}$ where $FUND_{i,T}$ is the proportion of institutional ownership held by mutual funds, Social Pension in the stock *i* at the calendar year-end *T* (T = 1, 2, 3, 4, and 5; year 1 is the calendar year, in which the firm went public).

2. $\Delta SPA_{i,T} = \left(\frac{SPA_{i,T}}{SPA_{i,1}}\right) - \left(\frac{TS_{i,T}}{TS_{i,1}}\right)$ where $SPA_{i,T}$ is the SPA (shares per account) of stock *i* at calendar year-end *T* (T = 1, 2, 3, 4, 5; year 1 is the calendar year, in which the firm went public); $TS_{i,T}$ is the size of total tradable shares of stock *i* at calendar year-end *T* (T = 1, 2, 3, 4, 5).

3. Firm size (Grouping variable) is the market capitalization of the IPO firm at the end of the IPO year.

Table 7: Calendar-time Cumulative Abnormal Returns (From Year-end 1 up to Year-end 5) and Institutional Net Trading by Size Quartiles

Panel A: Median Industry-adjusted CAR returns (Starting From Calendar Year-end 1 to Year-end 3)				
	$FUND_{i,3} - FUND_{i,1} < 0$	$FUND_{i,3} - FUND_{i,1} = 0$	$FUND_{i,3} - FUND_{i,1} > 0$	All
1st Quartile Portfolio (Small-cap IPOs)	-19.45% (0.00)	13.84%*** (4.96)	58.12%** (2.09)	14.86%*** (5.28)
2nd Quartile Portfolio	-48.27% (0.80)	-6.31% (1.36)	42.01%*** (2.78)	-4.16% (0.56)
3rd Quartile Portfolio	-15.44%** (2.04)	-13.52%*** (3.19)	17.65%* (1.91)	-11.55%*** (2.69)
4th Quartile Portfolio (Large-cap IPOs)	-18.95%*** (4.53)	-20.52%*** (5.10)	7.12% (1.21)	-16.74%*** (5.75)
All	-19.15%*** (5.13)	-5.77%* (1.91)	16.56%*** (4.02)	
Panel B: Median Industry-adjusted CAR returns (Starting From Calendar Year-end 1 to Year-end 5)				
	$FUND_{i,5} - FUND_{i,1} < 0$	$FUND_{i,5} - FUND_{i,1} = 0$	$FUND_{i,5} - FUND_{i,1} > 0$	All
1st Quartile Portfolio (Small-cap IPOs)	N/A	15.10%*** (4.75)	106.21%*** (2.76)	16.87%*** (5.43)
2nd Quartile Portfolio	-44.70% (0.80)	-9.02% (1.02)	42.50% (1.43)	-8.91% (0.76)
3rd Quartile Portfolio	-33.94%*** (2.70)	-22.42%*** (3.67)	13.94% (0.69)	-21.64%*** (3.84)
4th Quartile Portfolio (Large-cap IPOs)	-22.11%** (2.47)	-20.73%*** (3.52)	18.22% (1.20)	-17.55%*** (2.93)
All	-24.88%*** (3.68)	-6.69% (1.34)	22.24%*** (3.07)	

*** significant at 1%, ** significant at 5%, and * significant at 10% (Figures in parenthesis are Wilcoxon Signed Rank z-statistics).

Note:

1. $FUND_{i,T}$ is the proportion of institutional ownership held by mutual funds, Social Pension in the stock *i* at the calendar year-end *T* (T =1, 2, 3, 4, and 5).
2. Firm size (Grouping variable) is the market capitalization of the IPO firm at the end of the IPO year.
3. CARs are adjusted by two benchmarks (industry matched firms and market index).

Table 7: Calendar-time Cumulative Abnormal Returns (From Year-end 1 up to Year-end 5) and Institutional Net Trading by Size Quartiles (continued)

Panel C: Median Industry-adjusted CAR returns (Starting From Calendar Year-end 1 to Year-end 3)			
	$\Delta SPA_{i3} < 0$	$\Delta SPA_{i3} > 0$	All
1st Quartile Portfolio (Small-cap IPOs)	8.69%* (1.80)	19.15%*** (4.54)	14.86%*** (5.28)
2nd Quartile Portfolio	-8.25%** (2.31)	6.51%* (1.78)	-4.16% (0.56)
3rd Quartile Portfolio	-17.22%*** (4.13)	-7.78% (0.18)	-11.55%*** (2.69)
4th Quartile Portfolio (Large-cap IPOs)	-23.54%*** (6.91)	-8.90% (0.49)	-16.74%*** (5.75)
All	-11.81%*** (5.65)	5.34%*** (3.21)	
Panel D: Median Industry-adjusted CAR returns (Starting From Calendar Year-end 1 to Year-end 5)			
	$\Delta SPA_{i5} < 0$	$\Delta SPA_{i5} > 0$	All
1st Quartile Portfolio (Small-cap IPOs)	6.66% (1.52)	47.64%*** (5.64)	16.87%*** (5.43)
2nd Quartile Portfolio	-15.57%*** (3.01)	12.78%** (2.15)	-8.91% (0.76)
3rd Quartile Portfolio	-27.51%*** (3.48)	2.48%* (1.95)	-21.64%*** (3.84)
4th Quartile Portfolio (Large-cap IPOs)	-34.46%*** (6.81)	23.80%** (2.38)	-17.55%*** (2.93)
All	-18.06%*** (6.36)	13.08%*** (5.08)	

*** significant at 1%, ** significant at 5%, and * significant at 10% (Figures in parenthesis are Wilcoxon Signed Rank z-statistics).

Note:

1. $\Delta SPA_{i,T} = \left(\frac{SPA_{i,T}}{SPA_{i,1}}\right) - \left(\frac{TS_{i,T}}{TS_{i,1}}\right)$ where $SPA_{i,T}$ is the SPA (shares per account) of stock *i* at calendar year-end *T* (T = 1, 2, 3, 4, 5); $TS_{i,T}$ is the size of total tradable shares of stock *i* at calendar year-end *T* (T = 1, 2, 3, 4, 5).

2. Firm size (Grouping variable) is the market capitalization of the IPO firm at the end of the IPO year.

3. CARs are adjusted by two benchmarks (industry matched firms and market index).

Table 8: Calendar-time Holding Returns (From Year-end 1 up to Year-end 5) and Institutional Net Trading by Size Quartiles

Panel A: Median Industry-adjusted holding returns (Starting From Calendar Year-end 1 to Year-end 3)				
	$FUND_{i,3} - FUND_{i,1} < 0$	$FUND_{i,3} - FUND_{i,1} = 0$	$FUND_{i,3} - FUND_{i,1} > 0$	All
1st Quartile Portfolio (Small-cap IPOs)	-14.92% (0.00)	13.56%*** (3.92)	49.06%** (2.09)	13.77%*** (4.27)
2nd Quartile Portfolio	-69.48% (0.80)	-10.43%** (2.29)	38.37%*** (2.78)	-8.66% (1.44)
3rd Quartile Portfolio	-10.51%* (1.79)	-15.40%*** (4.31)	11.59%* (1.79)	-12.37%*** (3.67)
4th Quartile Portfolio (Large-cap IPOs)	-15.93%*** (4.80)	-19.53%*** (5.56)	4.24% (0.69)	-15.58%*** (6.32)
All	-14.91%*** (5.24)	-8.50%*** (3.61)	14.68%*** (3.51)	
Panel B: Median Industry-adjusted holding returns (Starting From Calendar Year-end 1 to Year-end 5)				
	$FUND_{i,5} - FUND_{i,1} < 0$	$FUND_{i,5} - FUND_{i,1} = 0$	$FUND_{i,5} - FUND_{i,1} > 0$	All
1st Quartile Portfolio (Small-cap IPOs)	N/A	10.77%*** (2.72)	99.26%** (2.25)	11.72%*** (3.34)
2nd Quartile Portfolio	-32.85% (0.26)	-18.29%*** (4.32)	51.51% (0.92)	-18.79%*** (4.00)
3rd Quartile Portfolio	-24.60%*** (3.44)	-25.27%*** (6.26)	-2.07% (0.05)	-23.03%*** (6.29)
4th Quartile Portfolio (Large-cap IPOs)	-14.92%*** (3.30)	-18.00%*** (4.77)	5.20% (0.81)	-14.53%*** (4.28)
All	-16.46%*** (4.62)	-14.72%*** (5.46)	13.67%** (2.01)	

*** significant at 1%, ** significant at 5%, and * significant at 10% (Figures in parenthesis are Wilcoxon Signed Rank z-statistics).

Note:

1. $FUND_{i,T}$ is the proportion of institutional ownership held by mutual funds, Social Pension in the stock *i* at the calendar year-end *T* (T =1, 2, 3, 4, and 5).
2. Firm size (Grouping variable) is the market capitalization of the IPO firm at the end of the IPO year.
3. BAHRs are adjusted by two benchmarks (industry matched firms and market index).

Table 8: Calendar-time Holding Returns and Institutional Net Trading by Size Quartiles (continued)

Panel C: Median Industry-adjusted holding returns (Starting From Calendar Year-end 1 to Year-end 3)			
	$\Delta SPA_{i3} < 0$	$\Delta SPA_{i3} > 0$	All
1st Quartile Portfolio (Small-cap IPOs)	6.21%* (1.97)	16.51%*** (3.97)	13.77%*** (4.27)
2nd Quartile Portfolio	-12.12%*** (2.90)	1.57% (1.05)	-8.66% (1.44)
3rd Quartile Portfolio	-18.34%*** (4.83)	-8.51% (0.59)	-12.37%*** (3.67)
4th Quartile Portfolio (Large-cap IPOs)	-21.56%*** (7.22)	-8.09% (1.14)	-15.58%*** (6.32)
All	-13.98%*** (6.76)	1.61%** (1.99)	
Panel D: Median Industry-adjusted holding returns (Starting From Calendar Year-end 1 to Year-end 5)			
	$\Delta SPA_{i5} < 0$	$\Delta SPA_{i5} > 0$	All
1st Quartile Portfolio (Small-cap IPOs)	-3.17% (0.23)	53.50%*** (4.50)	11.72%*** (3.34)
2nd Quartile Portfolio	-26.06%*** (5.09)	-7.14% (0.14)	-18.79%*** (4.00)
3rd Quartile Portfolio	-29.55%*** (5.53)	-13.29%*** (2.27)	-23.03%*** (6.29)
4th Quartile Portfolio (Large-cap IPOs)	-26.93%*** (7.07)	8.05%* (1.93)	-14.53%*** (4.28)
All	-23.58%*** (9.06)	1.27%** (2.46)	

*** significant at 1%, ** significant at 5%, and * significant at 10% (Figures in parenthesis are Wilcoxon Signed Rank z-statistics).

Note:

1. $\Delta SPA_{i,T} = \left(\frac{SPA_{i,T}}{SPA_{i,1}}\right) - \left(\frac{TS_{i,T}}{TS_{i,1}}\right)$ where $SPA_{i,T}$ is the SPA (shares per account) of stock *i* at calendar year-end *T* (T = 1, 2, 3, 4, 5); $TS_{i,T}$ is the size of total tradable shares of stock *i* at calendar year-end *T* (T = 1, 2, 3, 4, 5).

2. Firm size (Grouping variable) is the market capitalization of the IPO firm at the end of the IPO year.

3. BAHRs are adjusted by two benchmarks (industry matched firms and market index).