"Cold" IPOs or hidden gems?

On the medium-run performance of IPOs

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Abstract

Over a third of Initial Public Offerings (IPOs) listing on NYSE, AMEX and NASDAQ from 1981 through 2008 accepted offer prices on or below the minimum of their initial price range. This is a striking number of issuers accepting large discounts, and has been given no attention in the extant IPO literature. I argue that issuers are only willing to accept such discounts if the expected returns on funds raised are exceptional, and make up for the foregone assets-in-place. If the low demand for allocations in these "cold" IPOs are a result of investors bounded rationality, then abnormal returns will be observed as the market corrects. Using a sample of more than 5000 IPOs, I document significant and robust abnormal returns up towards 5% (excluding Initial Day Returns) during the first months of trading. These abnormal returns are greater and more persistent if general market conditions are strong, supporting a bounded rationality explanation.

Keywords: IPOs, Book-building, Medium-run IPO returns, Long-run IPO returns, Bounded Rationality, Lockups

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1 Introduction

Why would more then a third of all first time issuers the last three decades be willing to sell their stock at a major discount? In a sample of over 5000 Initial Public Offerings from 1981 through 2008 more than a third issue their stock at offer prices on or below the minimum of their filing range. This indicates that a significant number of issuers accept issuing stocks at a prices which are equivalent to their ex ante worst case scenario or below. This has thus far been given little or now attention in the extant IPO literature. By contrast the equally large fraction of "hot" IPOs issuing at offer prices on or above the issuers best case offer price has left behind a vast number of theories and studies.

"Hot" IPOs typically attract a lot of the attention, which benefits the issuer, underwriter and their regular investors (Cook, Kieschnick, and Ness, 2006; Derrien, 2005; Ljungqvist, Nanda, and Singh, 2006). Issuers are able to sell stock at high prices (Purnanandam and Swaminathan, 2004), institutional investors are able to flip[1] their allocation in high demand IPOs for profit (Krigman, Shaw, and Womack, 1999; Houge, Loughran, Suchanek, and Yan, 2001; Boehmer, Boehmer, and Fishe, 2006; Derrien, 2005; Cornelli, Goldreich, and Ljungqvist, 2006), and bankers secure future business from both their issuer and regular investors (Loughran and Ritter, 2002, 2004; Fjesme, 2011; Fjesme, Michaely, and Norli, 2010).

"Cold" IPOs on the other hand typically suffer from low demand potentially caused by investors bounded rationality (Miller, 1977; Barber and Odean, 2007; Odean, 1999). If individual investors have bounded rationality or financial constraints in selecting their portfolio, they are likely to overlook or pass on IPOs that don't attract their attention. Institutional investor on the other hand may, due to their size and organization, alleviate this problem to some extent, and earn abnormal returns on overlooked IPOs. In this study I show that these abnormal return materialize, are large, and both economically and statistically significant over the last three decades[2]. The effect is also more pronounced under good market conditions, supporting this line of argument.

[1] Flipping refers to the practice of selling an IPO allocation the first day of trading to capture the initial return on the offering.

[2] All results hold both in event and calendar time.

A straightforward interpretation of the Myers and Majluf (1984) framework shows that only those issuers with high NPV prospects would be willing to fund their projects through heavily discounted issues. Rearranging equation (1) in Myers and Majluf (1984) gives us that

$$\frac{b}{E} \geq \frac{(a+S) - P'}{P'} \tag{1}$$

In other words, the NPV (b) on the funds raised in the issue (E) must be greater then the foregone assets in place ($a+S$). An issue with low demand for allocations will need to reduces the offer price to attract investors, which will often require the number of shares issued to be increased. Hence reducing the the fraction of the company retained by current shareholders, and potentially ex ante set the value of their shares (P') below the value of the assets in place ($P' < (a+S)$). A rational issuer will only be willing to allow this transfer of assets in place to new investors if the NPV (b) of the project to be funded is sufficiently large. More to the point the future NPV more than makes up for the foregone assets in place[3].

Alternatively "cold" IPOs could be lemons, but both lockup agreements and underwriter certification (Beatty and Ritter, 1986; Carter and Manaster, 1990) argue against such an explanation for the majority of low demand issues. Particularly if those investors willing to invest are informed, and able to properly identify IPOs truly sold at a discount, they should be able to earn abnormal returns as information asymmetries subside.

Boehmer, Boehmer, and Fishe (2006) finds that the institutional investors receive a larger proportion of the allocations in "cold" IPOs, and typically also in those IPOs with better ex post long-run performance. Which is corroborated by several studies documenting that institutional investors flipping predicts future underperformance (Krigman, Shaw, and Womack, 1999; Houge, Loughran, Suchanek, and Yan, 2001; Boehmer, Boehmer, and Fishe, 2006; Derrien, 2005; Cornelli, Goldreich, and Ljungqvist, 2006).

Furthermore, Aggarwal (2003) finds evidence that institutional investors typically flip more than retail investors. This is likely a consequence of institutional investors being well positioned to flip "hot" IPOs as it is well-documented that they receive favourable allocations with regards

[3]Equation (1) is the incentive constraint $(a+S) \leq \frac{P'}{P'+E}[a+S+E+b]$ in Myers and Majluf (1984)

to initial day returns[4] (Hanley and Wilhelm, 1995; Cornelli and Goldreich, 2001, 2003; Aggarwal, Prabhala, and Puri, 2002; Ljungqvist and Wilhelm, 2002; Dorn, 2009). On the other hand if they are also superior in evaluating low demand IPOs, they may be able to earn abnormal returns as the market corrects in the months after listing.

Both Aggarwal (2003) and Boehmer, Boehmer, and Fishe (2006) document that book-building price revisions are positively correlated with institutional investors flipping activity. The book-building price update is a well suited ex ante proxy for investors demand for allocations, being that one of the most robust empirical findings in the IPO literature is the positive correlation between the book-building price update and initial day returns, starting with Hanley (1993).

Due to book-building being a discretionary auction underwriters can—through promising favorable allocations—incentivize investors to reveal their positive private signals (Beneveniste and Spindt, 1989), particularly as investors can be assured to recoup the cost of getting informed (Sherman, 2005). Bakke, Leite, and Thorburn (2015) shows that the partial adjustment to private information is greater in bull markets as the incentive to reveal private information is greater since underpricing is more likely due to higher demand for alloctions. However, they also show that those IPOs suffering from low demand do not show this partial adjustment, supporting the findings of Cornelli, Goldreich, and Ljungqvist (2006).

Using a sample of over 5000 IPOs over the period 1981 – 2008 I document significant and robust abnormal returns up towards 5% (excluding initial day and first month returns) in the first months after listing for "cold" IPOs. These positive abnormal returns are strong and persistent both in the event and calendar time analysis, and therefore not likely a result of pseudo market timing (Schultz, 2003). In comparison, "hot" IPOs, with high demand for allocations, underperform in the same period, but the evidence is not as strong and only found in the event time analysis giving support to a pseudo market timing story.

All of the above effects are more prominent, and slower to subside, when the book-building period coincides with an up-market, when investor face a larger menu of positive returns, supporting a bounded rationality explanation. I also find that positive first month buy-and-hold abnormal

[4] Initial day returns are the return on allocation in the offering at first day close ($IR1 = p_1/p_{Offer} - 1$).

returns[5] seem to indicate a future winner, more so than the initial day returns.

Brav and Gompers (1997), Brav, Geczy, and Gompers (2000), Eckbo, Masulis, and Norli (2000) and Eckbo and Norli (2004) show using large-sample evidence that the long-run underperformance reported by Ritter (1991) and Loughran and Ritter (1995)[6] can be explained by the general findings of Fama and French (1992), and tends to be mostly related to small growth stock. None of my findings contradict these findings, and as the length of the holding periods increase my findings are similar to these. That said for short holding periods abnormal returns are found, which is consistent with a bounded rationality explanation.

The rest of the paper is organized as follows. The sample and data is described in Section 2. The univariate analysis is presented in Section 3, while sections 4 and 5 present the Cross-Sectional and Calendar Time Analysis respectively. Section 6 Concludes.

2 Sample description

2.1 Selection of IPOs

The sample used below consists of 5092 book-built U.S. IPOs from the Global New Issues databases in Thompson Financial's SDC. I identify 8498 U.S. IPOs in the period 1970-2008 listing on the NYSE, AMEX or Nasdaq. Since I study only those issues using a book-building process as their allocation and price setting mechanism, I want to purge fixed price offerings. I therefore restrict the sample to 6301 cases with a positive pricing range, i.e. with a positive spread between the high and low filing price. SDC, however, does not report the filing range prior to 1981. As a result, this restriction effectively eliminates all IPOs in the 1970s.

In line with extant IPO literature I purge all "Penny Stocks", Unit offerings, Real Estate Investment Trusts (REITs), American Depository Receipts (ADRs), and closed-end funds from the sample. I require firms to have a filing midpoint of at least \$5 per share[7], to be listed in CRSP, and to be traded by the 42nd trading day after the public listing on NYSE, AMEX or Nasdaq.

[5] These does not include the initial day return.

[6] There are also some earlier studies like Ibbotson (1975) and Ibbotson and Jaffe (1975) documenting this.

[7] The \$5 requirement is fairly standard in the literature, and is used to purge "pennystocks". See any of Jay Ritter's IPO papers as a reference.

I further require the IPO firm to have a lead underwriter rank in the Ritter underwriter ranking dataset[8]. All stock price data is from CRSP. If there is no trade on a given day, I use the midpoint of the bid-ask spread.

To control for lockup agreements I use the lockup data found in the SDC database to define dummies for the firms under lockup agreements[9]. The definition of the dummies for the lockup state, duration and expirations and will be explained in more detail when relevant to the analysis.

My final dataset consists of 5092 IPOs for 1981-2008, all of which have a complete set of control variables. However, lockup data was not available on SDC prior to 1988. For all analysis which includes lockup information only the data from 1988 through 2008 is used, which consists of 4616 observations. For a thorough analysis of the short-run aspects of the sample see Bakke, Leite, and Thorburn (2015).

Subsections 2.2 and 2.3 explain the different aspects of the portfolio construction for the event- and calendar time analysis.

2.2 Event Time Buy-and-Hold Returns and Portfolio Construction

In the crossectional analysis below, the primary measure for medium-run performance is Buy-and-Hold Returns (BHR).

$$BHR = \left[\prod_{t=1}^{T} \frac{p_t + d_t}{p_{t-1}}\right] \times 100 \tag{2}$$

Where p_t and d_t represents the price and dividend (or coupon) at time t, and p_{t-1} represents the price in the previous period.

The basic strategy used throughout the event time analysis is the Buy-and-Hold Abnormal Return of each IPO. This refers to a stocks BHR in reference to another asset's BHR, as a benchmark.

$$BHAR_{IPO} = BHR_{IPO} - BHR_{Benchmark} \tag{3}$$

[8]This database is available from Jay Ritter's webpage at University of Florida.

[9]Field and Hanka (2001) finds that the SDC lockup data in the period 1988 through 1992 has a 3 percent error rate for the length of the lockup period.

When using a risk-free asset[10] as the benchmark I refer to the BHAR as Excess Buy-and-Hold Returns (xBHR). Since the sample spans over 28 years not using excess returns could add a lot of noise, as the risk-free rate varies significantly over time. When a index, stock or portfolios thereof is used as a benchmark the effect of the risk-free rate cancels out automatically.

The BHARs can be interpreted as Zero investment strategies. In those cases where the investor believes that the IPO will outperform the benchmark, the investor goes long in the IPOed stock and short in the reference asset. Conversely, if the investor believes the IPO will underperform, he does the opposite.

In line with Brav and Gompers (1997) I argue that a large number of matched industry indices such as the Fama-French Industry Indices (Fama and French, 1997) work well as a benchmark, as firms within the same industry are likely to have similar risk and equity betas. Much of the extant literature uses firms matched on size and book-to-market ratio as argued by Barber and Lyon (1997) or portfolios thereof as argued by Kothari and Warner (1997). Their arguments go against using "a broad index" as a benchmark. However in their context this is typically a market-wide index such as the S&P500.

Hong, Torous, and Valkanov (2007) show that industries tend to lead the stock market as investors in one market are slow to observe information originating in another. I therefore argue that industry indices are more likely to match the returns of individual firm matching. Using a large number of matched industry indices should therefore benchmark the business risk fairly close to what a match to a single firm would, but with reduced noise compared to single firm matching.

There is a potential size effect when matching on industry indices as the IPO firm may be smaller and potentially also have lower leverage then the industry average. The appropriate CRSP Cap Decile index is therefore added in the multivariate analysis to alleviate this concern.

All IPOs in the sample are matched by SIC industry classification to their respective Fama-French 49 Industry Index[11] (Fama and French, 1997), as well as the 10 CRSP Cap decile indices by the last quarterly breakpoints pre-IPO. These two benchmark make out the primary benchmarking in the cross sectional analysis.

[10] I use the CRSP daily US treasury data as proxy for the risk-free rate.
[11] These indices are available at Ken French's website at Darthmouth.

Each IPO is also matched to firms in CRSP[12] which are the closest in terms of size and book-to-market, within the same Fama-French 49 Industry classification. I require all matched firms to be within 30 percent of the IPO firm's size on the listing date, and within 30 percent of book-to-market at listing compared to the matched firms in COMPUSTAT maximum 90 days prior to listing. Alternatively, matched by both IPO and matched firm on COMPUSTAT within 90 days of listing.

The closest match is used as the single firm matching (referred to as $Size\&BM$ henceforth), and the 10 closest matches are used to create an equally weighted benchmark portfolio (referred to as the *Industry Average* from here on). I require at least 10 matches within the matching requirements for a Industry Average portfolio to be constructed. These two benchmarks are constructed to be inline with Barber and Lyon (1997) and Kothari and Warner (1997) respectively, and all analysis below is unaffected by the choice of the three alternative benchmarking methods outlined above.

In unreported results I show that the combination of the matched Fama-French 49 Industry and CRSP Decile Indices is superior to using either size and book-to-market matched–or portfolios thereof–as benchmarks in a multivariate Buy-and-Hold Returns setting. This combination does produce betas insignificantly different from one for the Industry indices for all monthly increments[13] in holding period for the first three years after listing, and no abnormal returns for the full sample. The Industry Averages match well for the first year after listing, while the Size&BM matched portfolios are noisy and over-adjust. The choice of using the Fama-French indices and CRSP Decile portfolios is also favoured due to replicability, in addition to be good benchmarks well beyond the first year.

I construct all BHR portfolios starting one-month after listing, in line with Houge, Loughran, Suchanek, and Yan (2001). Underwriters tend to trade actively in the newly-issued stock in order to provide price stabilization, sometimes covering a short position resulting from an overallotment of shares (a greenshoe option). Most such market interventions take place in the weeks immediately following the offering[15], and thus using a 21st day return as a measure for initial returns has been

[12]That is firms on NYSE, AMEX or Nasdaq.

[13]Months of trading in the event time analysis this refers to 21 trading days[14] and the returns thereof. Monthly returns are only applicable to the calendar time analysis.

[15]See, e.g., Ruud (1993) and Hanley, Kumar, and Seguin (1993).

argued (Lowry, Officer, and Schwert, 2008) for short-run studies.

While returns in the first weeks of trading may be affected by underwriter trades, the returns from the first month of trading are likely to accurately capture the ex post demand for the firm's shares. The first month does generally produce abnormal returns[16].

As a robustness check, however, the event time analysis is also run with portfolios starting the first day of trading. This does alter levels of the Buy-and-Hold Abnormal Returns (BHAR) slightly (the results get stronger), but not the trajectory. Using portfolios constructed on the 21st trade day also presents an opportunity to do a broadened analysis of additional criteria for aftermarket performance.

2.3 Calender Time Portfolio Construction

Monthly calendar time portfolios are constructed by rebalancing the portfolio at the end of each calendar month such that every new IPO listed is included and IPOs that have been included for a specific number of month since their listing are removed. Following Mitchell and Stafford (2000) all monthly portfolios with less than 10 portfolio companies are removed. This prohibits a small number of companies to distort the result. It also implicitly gives us a test for investor attention as more IPOs would likely put restriction on the attention given to each IPO.

Four categories of portfolios are formed based on the allocation demand[17], and tested against the Fama-French-Carhart-Pastor-Stambaugh[18] model in monthly increments of portfolio inclusion. This is further done with all three benchmark portfolios: Fama-French 49 Industries, Size & BM and Industry Average.

3 Univariate Analysis

The univariate analysis is based on a basic implementable strategy. An investor observes the result of the book-building process. Using the publicly available information from the book-building

[16]The average BHAR is about 3 percent on average (with t-stat of 9.33) against matched Fama-French 49 industries in my sample.

[17]All, Low Demand State (LDS), "Medium" (within range) Demand State (MDS) and High Demand State IPOs. These will be described below.

[18]Fama and French (1993); Carhart (1997); Pastor and Stambaugh (2003)

process the investor forms portfolios. For each portfolio he can either go long (buy) the stock and short (sell) the benchmark, or vice versa. In my analysis I use the Fama-French 49 industry indices, a industry, size and book-to-market matched firm ($Size\&BM$) or a portfolio the 10 closest matches thereof ($Industry\ Average$) as the benchmark.

In the analysis below I refer to a strategy of long stock/short index as the Buy-and-Hold Abnormal Returns (BHAR). These portfolios can be seen as Zero Investment Portfolios, and are formed after one month of trading (the 21st trade day after listing). Every month beyond the first indicates longer holding periods for the initial zero investment portfolio.

3.1 Demand State and Private Information Portfolios

Throughout the paper IPOs are sorted into three different portfolios by demand for allocations. IPOs with a final offer price at the top of or above the initial SEC filing range are allocate into the High Demand State (HDS) portfolio. IPOs on bottom of or below the range are allocated to the Low Demand State (LDS) portfolio. The remainder is allocated to the within range portfolio (referred to as the Medium Demand State or MDS).

As a proxy for private information I utilize the same price update based proxy as used in Bakke, Leite, and Thorburn (2015)[19], which is sorted into positive, neutral, or negative private information portfolios.

The distribution of IPOs into the different portfolios is approximately 38.5, 24 and 37.5 percent for the high, medium and low demand state portfolios respectively, and 44, 5.5 and 50.5 percent for the positive, neutral and negative private information portfolios respectively[20].

When splitting the mean BHARs by allocation demand a very clear patter emerges in figure 1. The two "cold" IPO categories (LDS or Negative Private information) both outperform the "hot" IPOs (HDS or Positive Private information) and the full sample of IPO. The neutral portfolio of IPOs, where the offer price was set within the initial filing range track the average of the sample fairly well.

[19]This is the book-building price update orthogonalized on the S&P500 return during the 45 trading day prior to issue. This is done by defining *private* equal to the error term of the regression $price\ update = \beta * S\&P500 + e$. Any *private* smaller then 1 percent is set to zero, which conservatively matches the neutral price update thresholds.

[20]Full tables are given in tables 14 and 15 in the appendix C

The overall negative trend for the long-run BHARs in figure 1, which represent columns 2 and 5 of table 1, clearly shows the "cold" IPO categories only have positive returns that are statistically different from zero in the first 4 to 6 month holding periods.

By contrast the "hot" IPOs attribute mostly to the negative trend, and as we can see from columns 4 and 7 these are the only statistically significant negative returns in the first year after listing. These results are qualitatively the same if the $Size\&BM$ or $Industry\ Average$ benchmarks are used instead[21].

An overall explanation for this type of negative long run trends in event time is pseudo market timing as suggested by Schultz (2003), where issuers sell when prices are high – rather then trying to time the market. Bakke, Leite, and Thorburn (2015) finds that demand for allocations follows the general market conditions which would suggest that the negative trends as explained by Schultz (2003) should be more prominent in "hot" markets. However, it is important to note that these negative trends are not present in the multivariate event time or calendar time analysis where other controls are included.

There is no question that high demand state IPOs are attractive allocations to receive. However, there are no guarantee for investors to receive such allocations, while low demand states inherently does not have such restrictions.

Figure 2 shows the demand state portfolios from figure 1, but includes the initial day return and the first month BHAR as well.

An interesting observation is the similarities between the low demand and medium demand portfolios in figure 2. With the exception of the first 6 months of trading these two portfolios seem to have very similar benchmarked returns. However, in the first 6 months or so the low demand state portfolios seem to be catching up with the medium demand portfolio. This supports a hypothesis of abnormal returns for "Cold" IPOs in this period.

It is however worth noting that the high demand IPOs hardly outperform even the risk-free rate on average, as shown in figure 7 (in appendix A), but the pattern from figure 1 and 2 still emerges.

[21] All results using the alternative benchmarks can be found in tables 12 and 13 in appendix A.

3.2 Bounded Rationality and Market Condition Portfolios

In a typical up-market investors face an abundance of investment opportunities, and will likely both try to invest in what they perceive as the most promising investments as well as more broadly participating in the market as most investments are highly like to yield good returns.

If investors have bounded rationality as suggested by Barber and Odean (2007), a reasonable proxy for the severity of this would be the general market conditions or returns.

In down-markets however investors first of all find that their portfolios are bleeding and that new funding is scarce. Secondly, investor are likely to weigh their options more carefully, and the number of potential investments are likely reduced as well. Hence, abnormal returns should be reduced and subside quicker in down-markets, while abnormal returns should be more persistent in up-markets – where investors are not able to exploit these returns as other more attention grabbing investments take precedence.

When sorting the sample of IPOs by the return of the S&P500 in the 45 trading days prior listing[22], as presented in figure 3 and table 2, we find that issues during good market conditions will result in negative BHARs for all benchmarks in line with Schultz (2003). For the Fama-French industry indices we also find that negative market conditions result in positive abnormal returns, but in light of the correlation between the general market condition and allocation demand, as well as it only exists for one of the three benchmarks, its hardly conclusive.

About one quarter of the IPOs in my sample are issued under negative market conditions, and as a result the positive market condition portfolio is fairly close to the total average. However, we do see a strong spike in positive abnormal returns for the first months of trading for IPOs issued in a market downturns. In other words, it is too early to conclude that the observed abnormal returns in the previous section is a general up-market phenomenon.

A more interesting question is whether the market conditions impact the private signal. In the multivariate analysis in Section 4 I will try to answer this question.

[22]The return on the S&P500 index in the 45 trading days prior to issue is used to match the median number trading days of the book-building periods i my sample.

3.3 Initial Returns

Since my analysis is based on holding periods starting at the 21st trading day, an investor would have access to more information than just the publicly available results of the book-building process. Both the initial day returns which represent the abnormal returns on allocations, and the first month abnormal returns, would be available to the investor. It would be natural to also access this information in the analysis. Specifically, it would be interesting to see if these additional pieces of information predict medium-run performance.

Krigman, Shaw, and Womack (1999) find that "extra hot" IPOs, with Initial Day Returns of 60 percent or more, typically underperform in the long-run. As is is well documented, starting with Hanley (1993), that demand for allocation is typically highly correlated with initial day returns, we should expect High Demand State IPOs to underperform.

If the findings of Jegadeesh and Titman (1993) and Rouwenhorst (1998) that past losers continue being losers, and winners tend to continue being winners we should potentially find a positive correlation between first month positive abnormal returns and medium-run performance.

The two initial returns are compared in figure 4 and table 3, where it is evident that positive initial returns predict abnormal returns. At the same time the benchmark used impacts whether abnormal returns are present. The Fama-French indices and the *Industry Average* both indicate that the first month returns are strong indicators of future returns.

The first month "winners", those IPOs outperforming their industry index, seem to also outperform their industry for the first five months. Beyond the 5th month they do not statistically differ from zero for the remainder of the first year. Conversely, those IPOs with poor performance in the first month of trading are not underperforming in the first 5 months of trading, but underperform significantly from about 6 month and beyond. This would indicate support for an explanation along the lines of Jegadeesh and Titman (1993) and Rouwenhorst (1998), where past losers continue being losers, and winners tend to continue being winners. With regards to the initial day returns only the Fama-French 49 matched BHARs produce statistically significant BHARs.

The univariate analysis is implementable as a trading strategy, however it does not control for any other factors, or jointly for all factors analyzed above. In the next section I will discuss the

result of the multivariate event-time analysis, where joint tests are performed.

4 Event Time Analysis

To analyze the effects of the demand for allocation, market condition and initial return effects I run regressions for Buy-and-Hold Returns with monthly increments in the holding period.

My sample spans over 28 year and thus it is reasonable to expect large variations in the risk-free rate over the sample period. All regressions therefore use excess Buy-and-Hold Returns[23] ($xBHR$) for both the IPO stock medium-run performance, as well as the Fama-French 49 industry ($xBHRFF49$) and the CRSP 10 Cap-based indices($xBHRCAP$).

The Fama-French indices are matched on daily data for each IPO by SIC code, and the Cap indices are based on the firms market capitalization the first day of trading (first day close $\times$ share outstanding) relative to the last published quarterly cap breakpoint before the listing. The basic regression equation for all analysis below is

$$\begin{aligned} xBHR &= \alpha + \sum_i \beta_i \, x_i + \sum_j \lambda_j d_j + \rho \; Rank \\ &+ \beta_{Industry} \, xBHRFF49 + \beta_{Size} \, xBHRCAP + year \; dummies + \epsilon \end{aligned} \tag{4}$$

Where x_i represents the variables of interest, d_j represents lockup dummies, $Rank$ is the Carter and Manaster (1990) underwriter rank[24], and xBHRFF49 and xBHRCAP are the Fama-French 49 Industry indices and CRSP cap decile indices respectively.

This regression is run in monthly increments, where each row in the table represents a one month increment in the duration of the holding period. Each holding period runs from the 21st trade day to the month (after listing) that the row represents. Months are, as above, defined as 21 trading days.

All regressions are run with listing year dummies. None of the results below depend on including listing year dummies, but the results become cleaner, as the noise of any "vintage" (listing year)

[23] Buy-and-Hold Returns above the risk-free rate.
[24] The underwriter ranking is from Jay Ritter's website.

fixed effects are removed. The listing year dummies also account for fixed effects of boom or bust years.

The three major pieces of information that may affect a firm's future performance is the demand for allocations, market conditions and the ex post initial returns of the offering. The premise of this paper is that the information conveyed in the publicly available information set from the book-building process of an IPO predicts medium-run performance, if the average investor is inattentive with regards to IPOs that are not attention grabbing.

With regards to the demand for allocation, we can assume that investors will need to rely on their own independent analysis of the firm prior to deciding to submit their bid in the book-building process. No market prices are available as there would be in a seasoned equity offering (SEO), and as such requires investors to bear the cost of getting informed (Sherman, 2005). High demand for allocations in an offering is therefore an indication that the firm in question is regarded as an attractive investment by a large number of investors. This drives up the both the offer price and potentially the number of shares issued or sold in the offering. A larger number of shares issued can potentially result in over-supply of stock in the market. Combined with an increased price, the long-run effect of this combination depends greatly on the quality of the issuing firm.

Those IPOs, which are only able to attract the minimum of investors necessary to execute the issue, are on the other hand most likely only willing to sell their stocks at a discount when the expected return on the funds received outweigh the cost of discounts needed to raise the external capital (Myers and Majluf, 1984).

If investors face bounded rationality constraints in an up-market, where there are an abundance of investment opportunities, this could result in less effort put into each investment. If most investments likely result in positive returns, and some in sensational returns, investing more broadly would be the optimal strategy. However, in a down-markets investors are probably more concerned with conserving the capital of their invested portfolio, than participating broadly. If so, they will take great care in picking their investments. To address this I will split the private signal proxies by the market condition, in line with Bakke, Leite, and Thorburn (2015).

I will also control for momentum by including the initial day and first month abnormal return,

where I expect to find short-run returns to be negatively correlated with the long-run performance (Houge, Loughran, Suchanek, and Yan, 2001), and first month "winners" to predict future "winners" (Jegadeesh and Titman, 1993; Rouwenhorst, 1998).

Lockup agreements are present in about three-quarters of the IPOs in my sample. These are agreements between the underwriter and the insiders of the IPO firm to prohibit the insiders from selling stock for a initial period after listing. The most common duration for these type of agreements are either 6 or 12 months (180 or 360 days respectively). The terms of the lockup agreement are specified in the IPO prospectus, and the main reasoning behind lockup agreements is to reassure the market that management will exert effort after the listing and that insider are not attempting to cash out in advance of imminent bad news.

To control for lockups I similarly compare the quarter of firms in the sample not featuring lockup agreements to those that do, and additionally I compare the performance of IPOs with long (more than 6 months) versus short (expiration within 6 month) lockup periods.

Michaely and Shaw (1994) and Carter, Dark, and Singh (1998) show that there is less severe long-run underperformance when the IPO is handled by more prestigious underwriters. I control for underwriter rank and find support for such a hypothesis. However, this seems to be more prevalent for longer holding periods.

4.1 Multivariate event-time tests

The question now becomes if the effects analyzed above are still present if tested jointly. Below I will first present the evidence for the demand for allocations, and then analyze the test for the difference in the general market conditions during the book-building period.

4.1.1 Demand for allocations and Medium-run performance

Tables 4 and 5 presents the results for excess BHR regressions in monthly increasing holding periods, for the binary and continuous variables respectively. Each row represents increasing holding periods. What is of interest here is the statistical significant of the first and second columns in table 4 and the first column of table 5. Its clear that there are significant abnormal returns in the first 6 months

after listing.

In table 4 we observe that these abnormal returns are relatively symmetrical between the "hot" and "cold" IPOs. However, the Low Demand State IPOs Peak at 5 months after listing, while the High Demand State IPOs trough after 6 months.

For the continuous measure of demand for allocation *Private* we see similar results in table 5, where the results are highly statistically significant at the 0.1 percent level for all holding periods up to and including the 5th month after listing. These abnormal return only subside for holding periods beyond 7 months after listing.

From this we can draw the preliminary conclusion that it is likely that the demand for allocation can forecast abnormal returns in the first year after listing. However this does not provide an explanation beyond the empirical findings. I will now test how difference in the general marked condition during the book-building period affects these results.

4.1.2 Testing for differences in Investor Attention

The bounded rationality hypothesis, would imply that investors are unable to evaluate all investment opportunities when the market in general is "hot". This is tested indirectly by splitting[25] demand state variable by the S&P500 return during the book building period. If investors are constrained by bounded rationality we should find that the abnormal returns are more persistent in up- vs. down-market. Not splitting the variable by the sign of the market return will only change the magnitude of coefficient, but wouldn't change the overall findings qualitatively, as shown above.

Tables 6 and 7 presents the results for excess BHR regressions in monthly increasing holding periods, for the binary and continuous variables respectively.

The overall results both for the binary and continuous measures of allocation demand show that there are abnormal returns in the first 6 months after listing, and these effects are more pronounced in better overall market conditions. Those IPOs that performed well in the initial month also typically show abnormal returns throughout the first year, similarly IPO underpricing

[25]By splitting I refer to creating two variable where one is equal to private for positive S&P500 return and zero otherwise. The other would similarly be equal to private when the S&P500 return is negative and zero otherwise. When splitting the private we need to allow for an additional intercept, and hence the positive S&P500 return dummy must be included.

– that is initial day returns – gives a boost to the abnormal returns in these initial months.

As reported in the first sets of columns in table 6, the abnormal returns are as high as 4 to 5.25 percentage and statistically significant at the 1 percent level. This indicates high abnormal return during the first months of list as the market corrects.

Comparing the binary measure of allocation demand in table 6 with the continuous measure in table 7, we see that the dummies under good market conditions are – with opposite signs – fairly symmetrical and statistically significant for up to 7 months. In down-markets the continuous measure is statistically significant for half as long compared to up-markets, which can be interpreted as the abnormal returns subsiding quicker when markets are bad. This is what we would expect if investors have bounded rationality. When the overall market conditions are bad there is also no statistical significance in the binary measure, and their coefficients are also not symmetric any longer.

With regards to lockups is seems that IPOs with longer lockups have more severe underperformance. In unreported results I find that IPOs with lockups underperform for about 18 months after listing before the effect subsides.

The pre-issue S&P500 return produces significant betas from the 5th through the 9th month after listing. This can be interpreted in two ways. Either that higher (lower) return pre-issue is a result of a exuberant (depressed) market, and this result in prolonging the abnormal returns. Alternatively, the more of an up-market (down-market) the more likely the IPO was done at the "top" ("bottom") of the market and the observed abnormal return is reflection of the market turning. This in line with the findings of Santos (2010), which finds that long-run underperformance is a phenomenon mainly found in IPOs listing in hot IPO markets, but not in cold markets, and would also fit well with the pseudo market timing hypothesis of Schultz (2003).

Similarly to Michaely and Shaw (1994) and Carter, Dark, and Singh (1998) the underwriter rank is positively correlated with abnormal returns. These coefficient (although not reported here) become larger and more statistically significant beyond the first year as holding periods become longer.

Also note that the Fama-French industry benchmark is not statistically different from one[26] – indicating that they are a suitable benchmark. The size index will also become small and statistically insignificant beyond the first year. In robustness checks I find that using the Industry Average benchmark also produces a beta statistically insignificant from one for the first 9 months after listing, while the beta for the Size&BM is is surprisingly low around 0.20. However the Fama-French Industry indices remain statistically insignificant from one for 36 months or more[27] after listing.

With regards to whether or not there are abnormal returns on average for the full sample of IPOs I find that this most likely is not the case when most reasonable factors are accounted for. In any respect the evidence provided in this section clearly points to abnormal returns existing for IPOs in the medium-run after listing.

In this section I have shown that there are abnormal returns related to the information revealed in the book-building process (tables 4 and 5). These findings could have several explanations.

Firstly, it could be a purely behavioural explanation as set forth by Daniel, Hirshleifer, and Subrahmanyam (1998), Barberis, Shleifer, and Vishny (1998) and Hong and Stein (1999).

Alternatively, the abnormal performance could also represent a verifiable information being dissipated into the market over the first 6 months. Examples could be earnings reports (or surprises) or other news, below I will address earnings surprises.

The evidence presented here suggest that investors are constrained by bounded rationality. In tables 6 and 7 I find evidence that the abnormal returns found in this study are mostly attributed to IPO issued in up-markets compared to those issue done during down-markets. However 75 percent of the IPOs in the sample are issued in during favourable market conditions.

4.2 Earnings Announcement Surprises

Quarterly Earnings announcement surprises could explain the abnormal returns found in the analysis above. If newly listed companies that issued through a "cold" ("hot") IPO typically also report higher (lower) earnings then expected in the first quarterly earnings announcement(s), this could

[26]Tables 6 – 5 all report t-stats for significance from zero. However, a t-stat of 11–12 for coefficients in the 1–1.2 range indicate standard errors of in the range of 0.8 – 0.11 and hence implying statistical insignificance from a coefficient of 1.

[27]My sample was setup to run for a maximum of 36 months.

explain the abnormal returns. Investors would update their beliefs about the firm, which in turn would result in a jump in the stock price.

To test for earnings announcement surprises I use the earnings estimates from I/B/E/S and classified an positive earnings surprise as those cases where the actual earnings reported where above the analyst consensus.

The alpha for each IPO was estimated using a Fama-French-Carhart model (Fama and French, 1993; Carhart, 1997)[28] on daily data for the 2nd through 6th month of trading. Both *pure alphas* which do not control for the event window(s) around the earnings announcement(s) and *controlled alphas* where the effect of the earnings announcements are controlled for are estimated. These alphas are then scaled by 104 trading days to give the 5 month average alphas by sorting group. Table 8 summarized the results by demand state and positive/negative earnings announcement surprise.

Not surprising we observe in the second column of the first panel of table 8 that for the sample over all positive earnings earnings surprises do result in positive abnormal returns, and vice versa. However, in these abnormal returns for the full sample disappear in the forth column, when earnings surprises are controlled for[29]. For those IPOs that present negative earnings surprises on the other hand we observe, comparing columns 3 and 6, negative abnormal returns beyond those explained by the earnings announcement(s).

Turning to the averages sorted by demand states we observe the anticipated pattern emerging, with demand states being negatively correlated with alphas. All three categories present pure alphas with statistically significant coefficients.

More importantly, we observe in column 4 that when the earnings surprises are controlled only the high and low demand states have statistically significant alphas. This is a key finding as the demand state is publicly available information, whilst the earnings surprise is unknown ex ante, and hence not a tradable criteria.

Finally, and also consistent with expectations, only positive earnings surprises result in positive alphas for the IPOs within or below their filing range. However, for the high demand state or "hot"

[28]The Pastor and Stambaugh (2003) liquidity measure is not available at daily frequency.

[29]The earnings events are controlled for by having dummy variables for the event window +/- 2 days of the earnings announcement.

IPO these alphas are highly negative regardless of having positive or negative earnings surprises. Both pure and controlled alphas are statistically significant and negative, but a negative surprise results on average in an almost twice as large negative abnormal return. We also see that those IPOs that are not in I/B/E/S have positive abnormal returns for "cold" IPOs in column 7, which are highly statistically significant.

The evidence presented in this section points to the abnormal returns mainly being attributed to positive earnings announcements in the case of "cold" IPOs. Compared to those IPOs that were priced within the initial filing range the "cold" IPOs overall still present abnormal returns when earnings announcement are accounted for ex post (column 4). "Hot" IPOs on the other hand are highly sensitive to negative earnings announcement surprises, which are penalized hard by the market.

4.3 Robustness checks

4.3.1 Fama-French-Carhart estimations and bootstrapped mean alphas

As a robustness check I use the estimates for the *pure alpha* in the previous section to conduct to robustness checks.

In table 9 I present regressions of the alphas for the IPOs, the three benchmarks as well as long/short portfolios of the IPOs and the three benchmarks used in this paper on private and public information proxies. I find large significant loading on the private information proxy in panel A for the IPOs, as well as smaller but statistically significant loading on the matched Fama-French industries, but no loading on the two other benchmarks. Furthermore, I find that the public information proxy (pre-issue S&P500) also has significant loading in panel B.

Using such a short time series and daily data can potentially result is several biases in the estimates, the most important being no loading on the factors and excessive zero returns. No loading results in larger alphas, while an excessive number of zero returns will result in alphas being biased towards the risk free rate. As such the differences between the portfolios are more important than the levels observed.

4.3.2 Bootstrapped mean alphas

My second robustness check follows the methodology developed by Blake, Timmermann, Tonks, and Wermers (2010) and Kosowski, Timmermann, Wermers, and White (2006), where I estimate the conditional and unconditional bootstrapped distributions for the average alphas conditional on their demand for allocation.

This is done by estimating each IPOs time series with a true zero alpha and the estimated betas, with error terms randomly drawn with replacement from 1000 bootstraps per IPO. These bootstrapped alphas are then averaged both for the full sample of IPOs (unconditional) and each of the three demand states (conditional) to create distributions of average alphas. Each of these distribution hence contain 1000 averages.

Due to the short time series I also do the same procedure with the median for comparison. Figure 5 shows the results for the IPOs and the Fama-French 49 industry, size and book-to-market matched firms. The alphas are shown as the gross mean, that is the daily alpha multiplied by 84 trading days. This is purely a scaling and does not affect the results.

Looking at the mean alphas of the IPO portfolios in figure 5 we see that both the high and low demand portfolios are highly significant, and the pattern confirms the analysis above. Also the average of all the IPOs in the sample is almost perfectly centred on zero.

Comparing the means to the medians the low demand portfolio is still clearly significant, while the high demand portfolio is not. The difference between the mean and median alphas for the low demand state portfolio is also minimal, at roughly 4 percent. For comparison the Size & BM and Industry average portfolios can be found in figure 8 in appendix B[30]. Overall the robustness checks support the analysis and main findings of this paper.

This concludes the event time analysis. In the next section the calendar time analysis will be presented.

[30]I have also done this for the Fama-French Industry Indices, but these yield average alphas bell curves indistinguishably different from zero, and are therefore not reported.

5 Calendar Time Analysis

To give a preliminary accessment of the abnormal returns in calendar time over the the 28 years of data I construct three investment vehicles. The first vehicle, dubbed LDS, invests 100 dollars on the 21st day of trading in all IPOs which had a final offer price on or below the low point of the initial filing range. Simultaneously it shorts the matching Fama-French 49 Industry index with 100 dollars. Each of these long/short pairs are closed on the 105th trading day[31]. The second vehicle, dubbed MDS, invests a 100 dollars in all IPOs with an offer price within the initial filing range (not including the high and low prices). It also shorts the matched Fama-French 49 industry index. The final vehicle, dubbed HDS, invests in all IPOs priced on or above the top of their initial filing range. This is again financed by shorting the corresponding Fama-French 49 industry index.

Figure 6 shows the accrued earnings for the three investment vehicles described above, if started in June 1981 and run through December 2008. These include both the realized returns and the margins (from ongoing investments). For reference I report the excess S&P500[32] as well as the total volume of IPOs in the three portfolios. The S&P500 is a market proxy, and the total volume of IPOs in play (invested in the portfolios) give an indicator of the "hotness" of the IPO market itself.

There are several points to be taken away from this picture. First and foremost "Cold" (low demand) IPOs have an incredible positive abnormal return over the this 28 year period of around 110x the amount of the bets. This return is not by any standard trivial. Furthermore, we see a negative abnormal return overall for the "Hot" (high demand) IPOs, but the pattern is less persistent. It should be noted that the dot com bubble does add significant noise to the trajectory, but the pattern is somewhat inconsistent prior to the bubble as well. As expected the within range IPOs do not display any consistent pattern.

If we compare the three investment vehicles to the two market condition proxies this lends support to the hypothesis and findings presented earlier in this paper. We see that the major hike

[31]The Event Time Analysis above shows abnormal returns in the first 5 months of trading. Any analysis in this section requiring a static holding period will focus on a holding period starting on the 21st and ending on the 105th trading day.

[32]The S&P500 return less the risk-free rate.

in the LDS vehicle coincides with both strong IPO markets and general market conditions. In cooler periods all vehicles' returns are more or less flat. This should indicate that investors face bounded rationality constraints when the menu of investments available is great and opportunities are flush. When opportunities are scarce and investors face potential losses these abnormal returns are virtually non-existent. Overall, the preliminary calendar time evidence supports a bounded rationality hypothesis.

5.1 Calender Time Portfolios

Although figure 6 may look impressive, it is highly stylized and created in hindsight. Below I will present more rigorous analysis to try to convince the reader of the existence of such (sensational) abnormal returns. In order to analyze this in calendar time, portfolios are constructed such that at the end of each calendar month new IPOs are taken into the portfolio and taken out after a certain number of months after listing. Following Mitchell and Stafford (2000) all monthly portfolios with less than 10 portfolio companies are removed. This prohibits months with a small number of companies to drive the result, as well as an indirect test of the attention hypothesis.

Four categories of portfolios are formed: All, Low Demand State (LDS), "Medium" (within range) Demand State (MDS) and High Demand State (HDS) IPOs[33]. Matching portfolios are also formed for all three benchmarks: Fama-French 49 Industries, Size & BM and Industry Average (used in the Cross Sectional Analysis). These monthly portfolios are then run using a standard Fama-French-Carhart-Pastor-Stambaugh model (Fama and French, 1993; Carhart, 1997; Pastor and Stambaugh, 2003). The results for the full sample and the "cold" IPO (LDS) are reported in table 10, while the results for "hot" (HDS) and within range (MDS) IPOs are reported in table 11.

Even though the full sample of IPOs (Panel A in table 10) present positive and statistically significant alpha's for holding periods of 1 through 4 months, it is clear that these only can be attributed to the "cold" IPOs (Panel B in table 10) when comparing the four panels of tables 10 and 11. It is also worth noting that there are no economically or statistically significant abnormal returns beyond a 6 month holding period (although not reported here), which is in line with the

[33]These are described in section 3.1.

findings of Brav and Gompers (1997), Brav, Geczy, and Gompers (2000), Eckbo, Masulis, and Norli (2000) and Eckbo and Norli (2004).

In panel B of table 10, which reports the monthly alphas for the "cold" IPOs, we see that abnormal returns are much higher for the shorter holding periods. This indicates that in periods of high IPO activity abnormal returns are greater, on average. Shorter periods results in fewer portfolio months due to the requirement of a minimum of 10 IPOs in the portfolio at any time.

The findings here strongly support a bounded rationality hypothesis, as the abnormal returns are stronger in more intense or "hot" market conditions. Longer holding periods (such as 3-6 months) will cover more IPOs, however the increase in number of months does not make up for the decrease in abnormal returns.

Even a 1 percent monthly alpha on the 5 month holding period portfolios, statistically significant at 1 percent, makes a strong argument in support of the existence of abnormal returns on average in the first month following a "Cold" IPO. However, the calendar time analysis doesn't give support to any negative abnormal returns from "hot" IPOs which is in line with other calendar time studies of IPOs.

We can therefore conclude that there exists large abnormal returns in the first 6 months after listing for "cold" IPOs. The evidence found in the event time analysis is corroborated by the calendar time evidence. The calendar time evidence also suggests that "hotter" IPO markets result in higher abnormal return, supporting a bounded rationality hypothesis. This concludes the calendar time analysis.

6 Conclusion

My results show significant medium-run abnormal returns for "Cold" IPOs, and these returns are larger and take longer to subside when markets are generally good. This fits well with the arguments presented by Miller (1977), Odean (1999) and Barber and Odean (2007) with regards to investors bounded rationality.

My results are robust both with regards to Calender Time multi-factor asset pricing models such as a Fama-French-Carhart-Pastor-Stambaugh model and Event Time cross-sectional analysis.

Although I find significant abnormal returns in reasonable subsamples of IPOs based on revealed information, there is no support for persistent long-run underperformance of IPOs in my sample. The general finding of the extant multi-factor asset pricing literature of no long-run abnormal returns, such as Brav and Gompers (1997), Brav, Geczy, and Gompers (2000), Eckbo, Masulis, and Norli (2000), and Eckbo and Norli (2004), hold for the full sample of IPOs over longer horizons such as three years.

The main finding in this paper is that "cold" IPOs, those that set the final offer price on or below their minimum price in the initial filing range, significantly outperform their benchmark in the medium-run. This is a novel and interesting contribution to the IPO literature, as these IPOs seem to both have been overlooked by investor and researchers alike.

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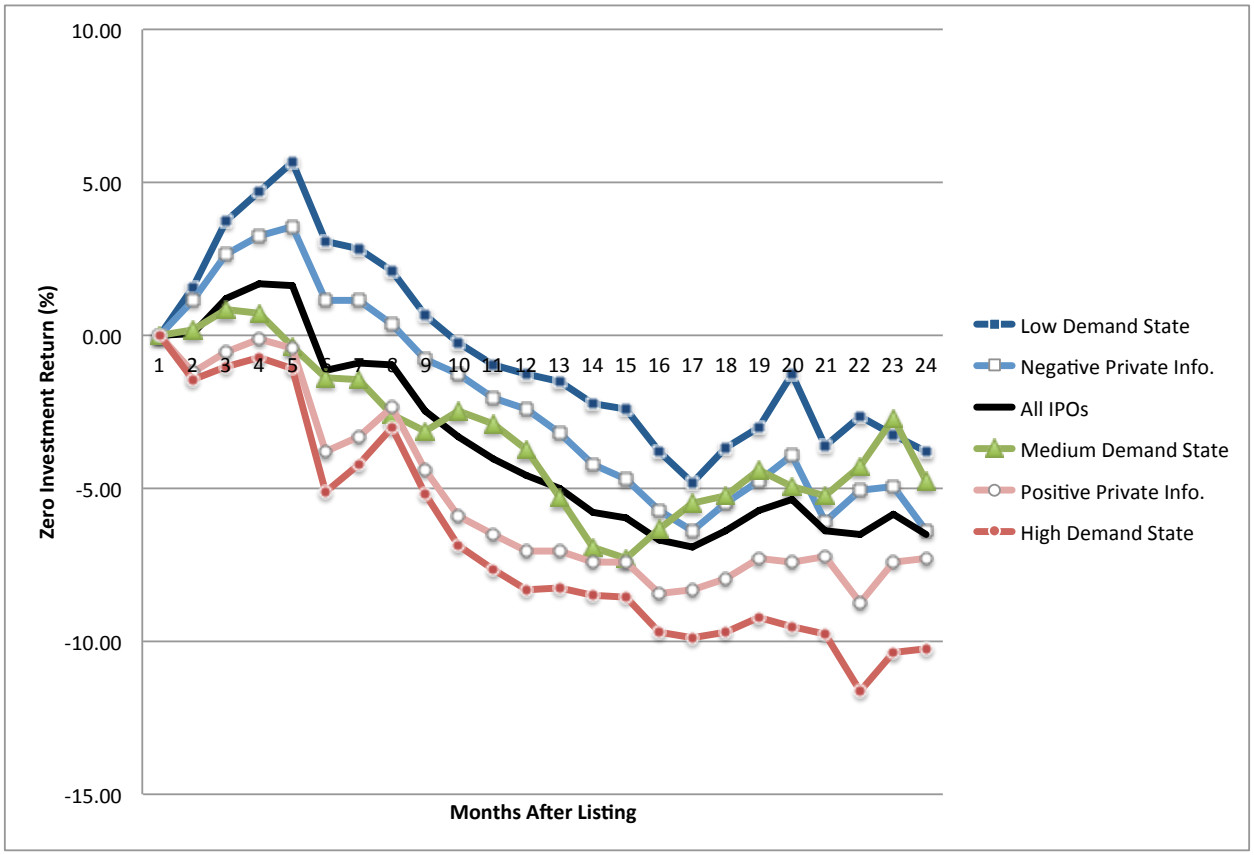


Figure 1: **Average buy-and-hold return by allocation demand:** The above portfolios of $\overline{BHAR}$, with the Fama-French 49 Industry Indices as benchmark, are sorted by the IPOs demand for allocation. High, Medium and Low Demands States are portfolios containing those IPOs where the offer price is on the maximum of or above the initial filing range, and on the minimum of or below the initial filing range. The portfolios for the private information (adjusted price update) are strictly positive or negative, and hence the neutral updates are excluded.

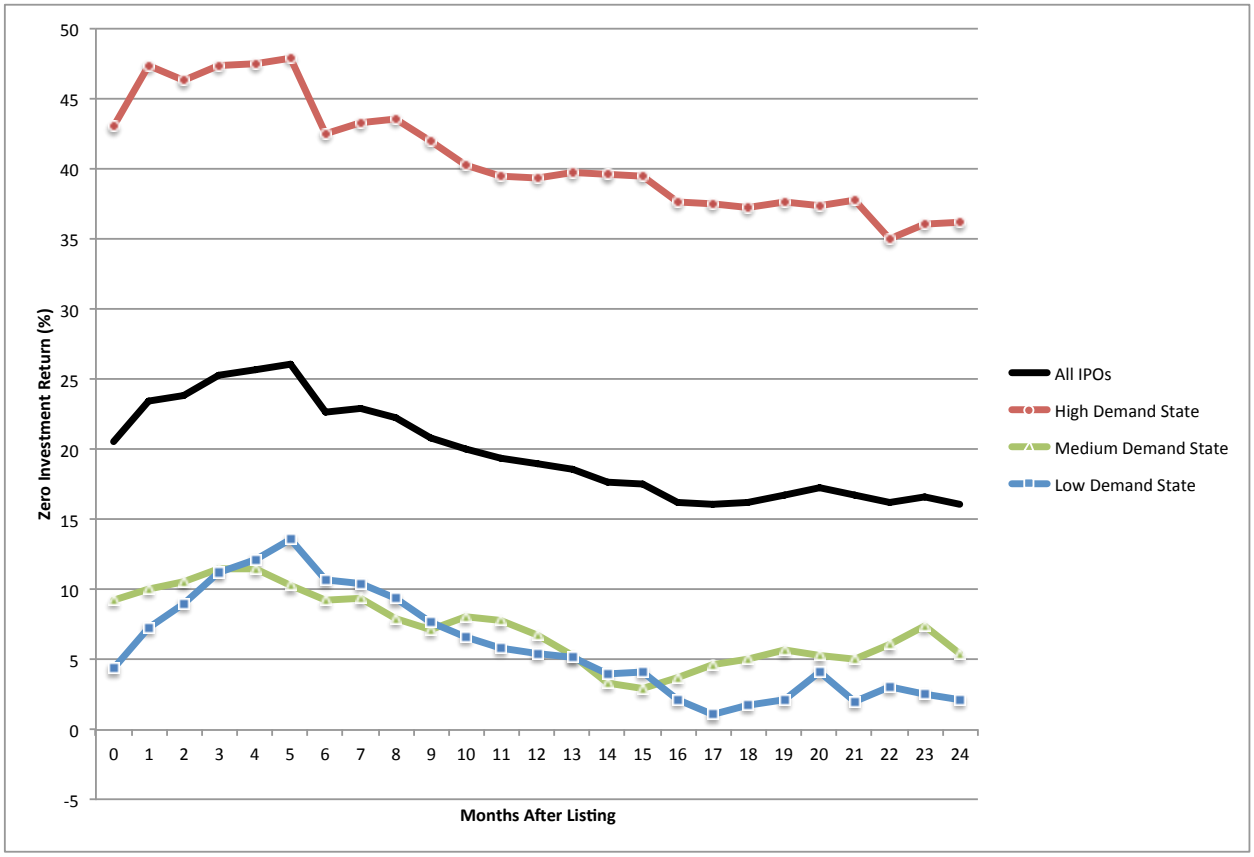


Figure 2: **Average buy-and-hold abnormal return including initial returns by allocation demand:** The above portfolios of $\overline{BHAR}$, with the Fama-French 49 Industry Indices as benchmark, starting the first day of trading and includes the initial day return. They are sorted by the IPOs demand for allocation. High and Low Demands states (HDS and LDS respectively) are portfolios containing those IPOs where the offer price is on the maximum of or above the initial filing range, and on the minimum of or below the initial filing range.

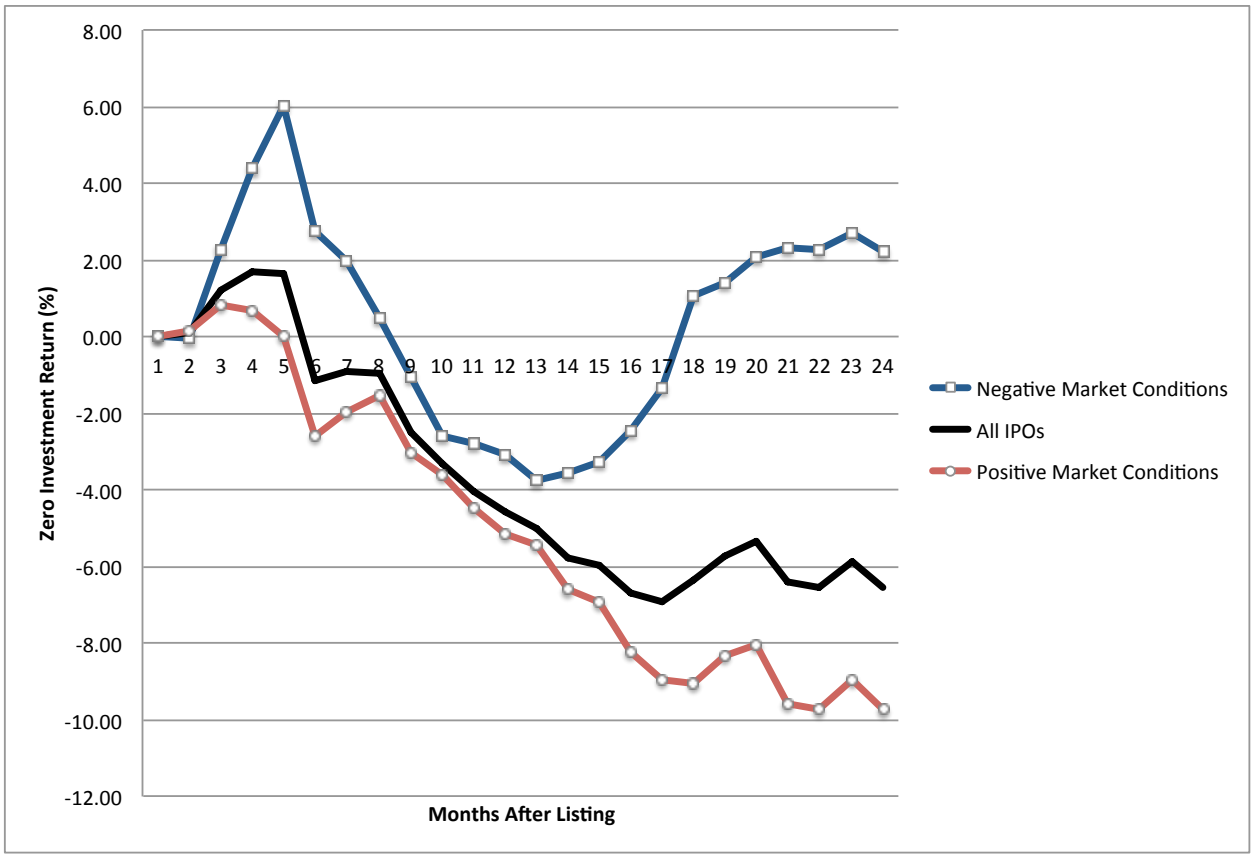


Figure 3: **Average buy-and-hold return by market condition during book-building** The above portfolios of $\overline{BHAR}$, with the Fama-French 49 Industry Indices as benchmark, are sorted by the S&P 500 return in the 45 trading day pre-issue.

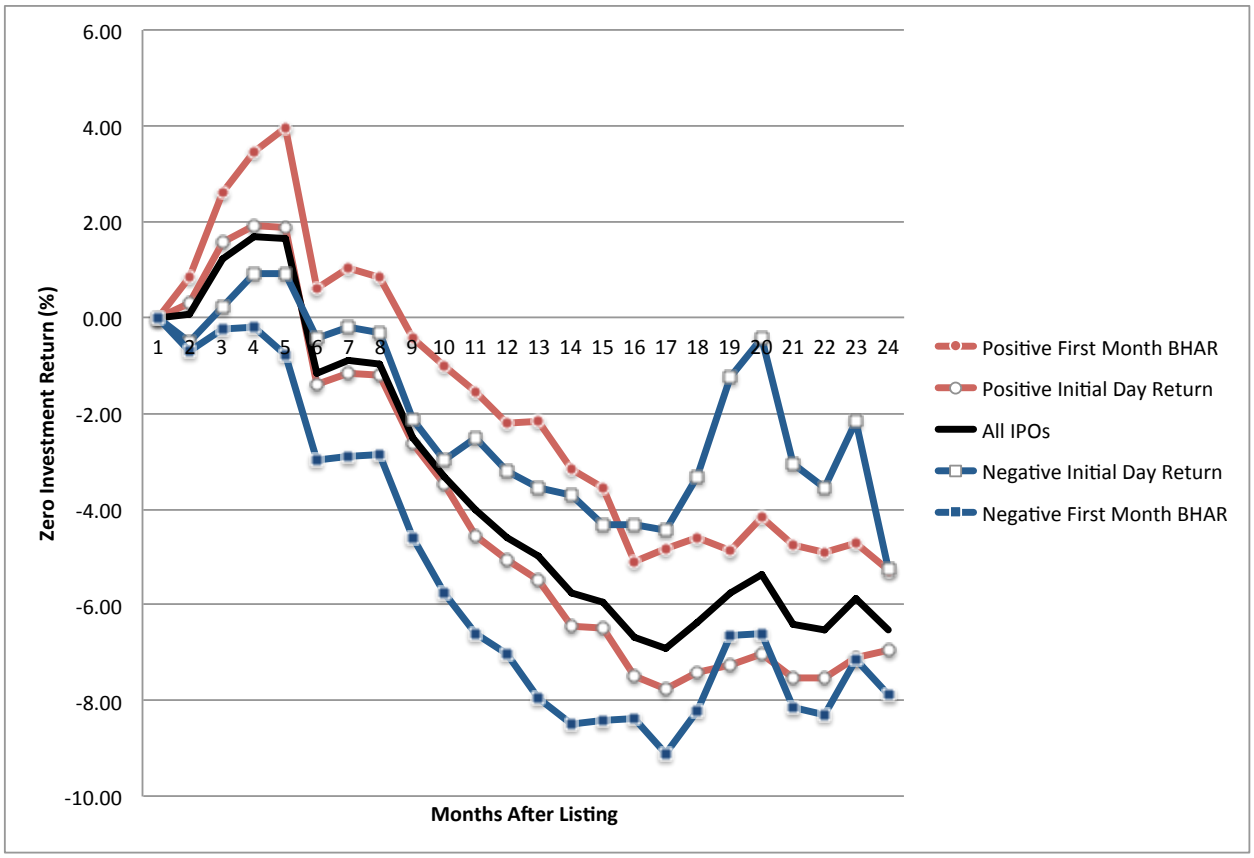


Figure 4: **Average Buy-and-Hold Return by Initial Returns:** The above portfolios of $\overline{BHAR}$, with the Fama-French 49 Industry Indices as benchmark, are sorted by the IPOs initial day and first month buy-and-hold abnormal return.

IPOs

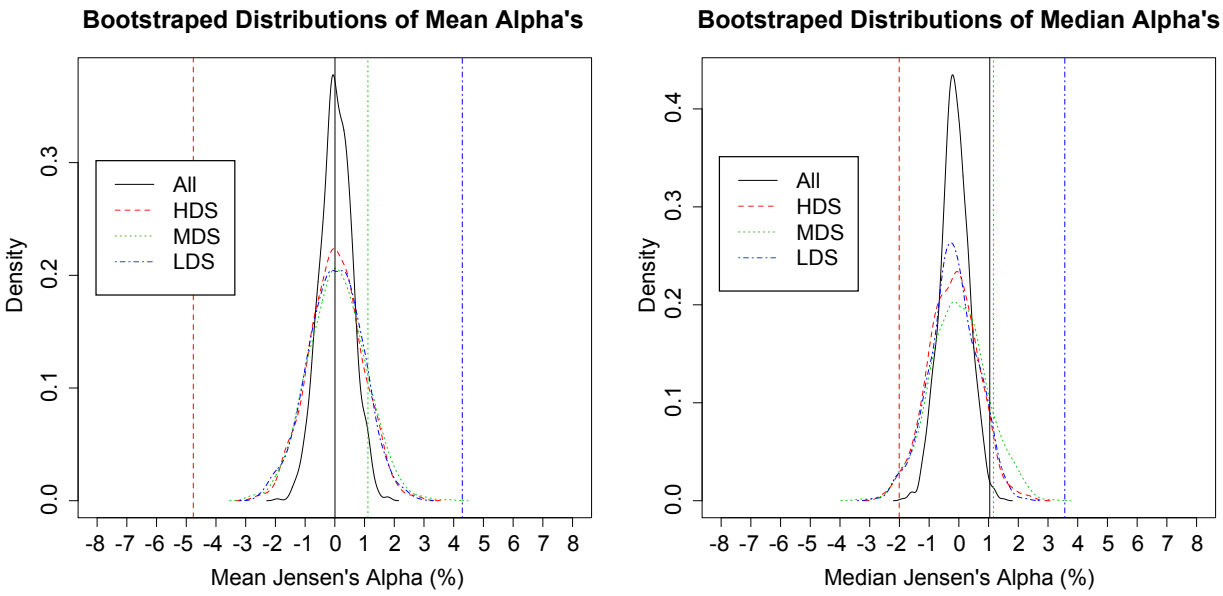


Figure 5: **Alphas with bootstrapped distributions by allocation demand**
High, Medium and Low Demand States (HDS, MDS and LDS respectively) defined as above. The above alphas are from Fama-French-Carhart 4 factor models on time series of each IPOs daily data from 2nd through 5th months of trading. The bell curves are their conditional and unconditional bootstrapped distributions following Blake, Timmermann, Tonks, and Wermers (2010) and Kosowski, Timmermann, Wermers, and White (2006).

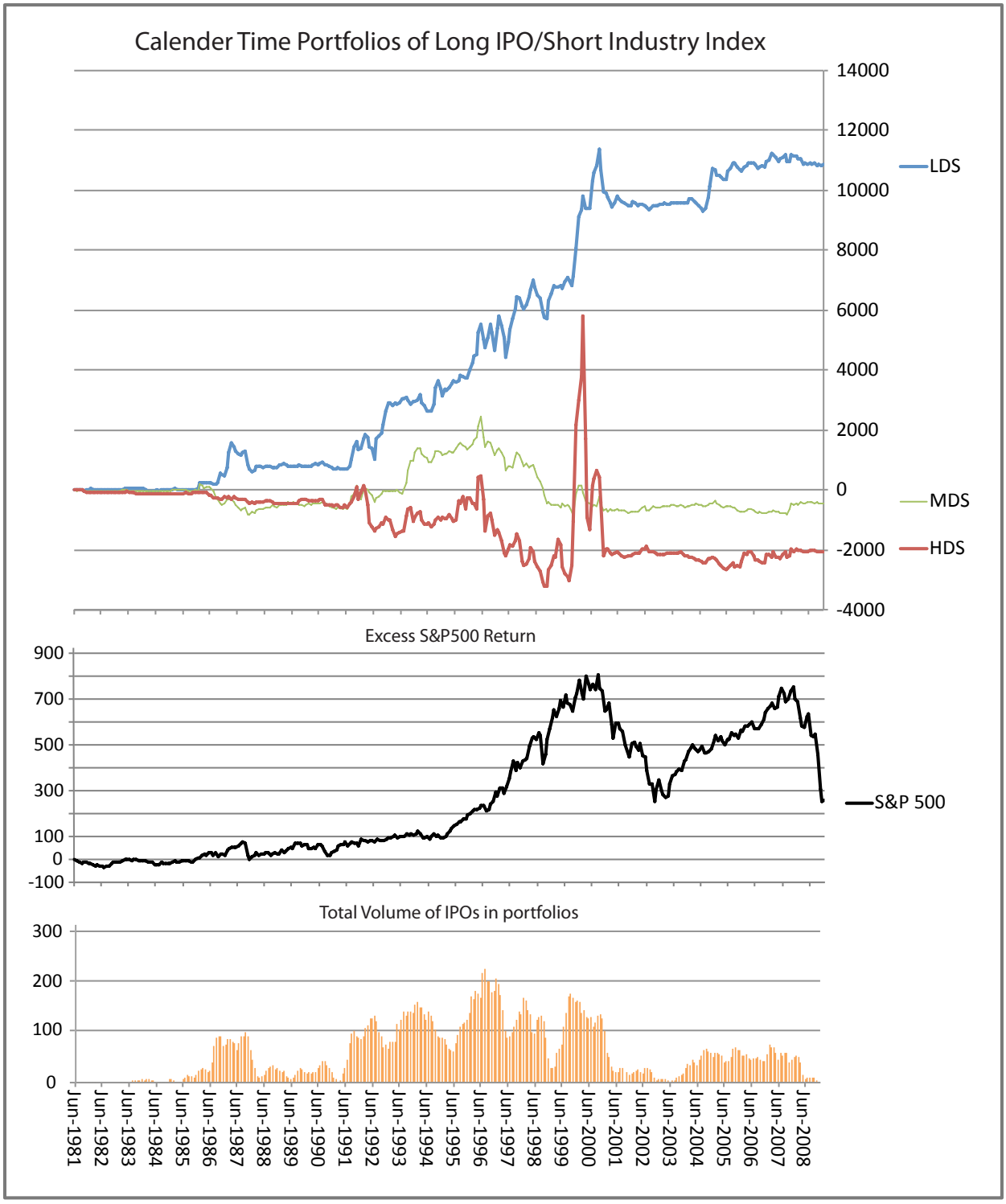


Figure 6: **Calender time portfolios by allocation demand:** The three portfolios represents buying the IPOed stock, and shorting the corresponding Fama-French 49 industry index, on the 21st trading day holding it until the 5th month of trading (84th trading day). The portfolios are split into High, Medium, and Low Demand States (HDS/MDS/LDS) as defined by the final offer price relativt to the initial filing range. As a reference a corresponding rebased S&P500 index is shown below, as well as the total volume of IPOs in the three portfolios.

Table 1: **Univariate BHAR (Demand State) by Months of Seasoning**

This table contains the average Buy-and-Hold Abnormal Returns (BHAR), by holding period, where the Fama-French 49 Industry Indices are used as benchmarks. The portfolios start one month (the 21st day of trading) after listing, and the month column represents a holding period from the beginning of the first month after listing to that month after listing. This corresponds to a Zero Investment Strategy of Long Stock/Short benchmark. The portfolios are sorted by the demand for allocations. A Low Demand State is defined as an offering where the offer price is set on or below the initial filing range minimum. The High Demand State is conversely defined as an offer price set on or above the initial filing range maximum. Private information is defined as the error term of the book-building percent price update regressed on the S&P500 return in the 45 trading day prior to issue. Numbers are in percent of the zero investment size (% of long/short position), t-stats and p-values are for a test of BHAR = 0, with significance levels represented by $+ = 10\%$, $* = 5\%$, $** = 1\%$, $*** = 0.1\%$.

	$\overline{BHAR}$ with Fama-French 49 Industry indices as Benchmark							N
Month	All IPOs	Low Demand State	Medium Demand State	High Demand State	Negative Private Info.	No Private Info.	Positive Private Info.	All
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5092
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
2	0.08	1.59***	0.16	-1.44**	1.13**	0.70	-1.22*	5092
	(0.28)	(0.44)	(0.49)	(0.50)	(0.36)	(0.94)	(0.46)	
3	1.21**	3.73***	0.83	-1.00	2.67***	1.59	-0.53	5091
	(0.43)	(0.68)	(0.75)	(0.76)	(0.55)	(1.39)	(0.72)	
4	1.67**	4.68***	0.73	-0.70	3.25***	1.45	-0.14	5090
	(0.54)	(0.84)	(0.88)	(1.00)	(0.68)	(1.72)	(0.93)	
5	1.63*	5.66***	-0.37	-1.07	3.58***	-0.19	-0.39	5090
	(0.64)	(1.07)	(0.92)	(1.16)	(0.86)	(1.82)	(1.06)	
6	-1.16	3.05**	-1.41	-5.09***	1.15	-1.42	-3.80**	5088
	(0.70)	(1.10)	(1.04)	(1.30)	(0.88)	(2.15)	(1.20)	
7	-0.91	2.84*	-1.47	-4.21**	1.14	-0.84	-3.30*	5081
	(0.79)	(1.23)	(1.17)	(1.49)	(1.00)	(2.64)	(1.36)	
8	-0.98	2.09	-2.58*	-3.00	0.35	-2.45	-2.34	5074
	(0.90)	(1.31)	(1.20)	(1.81)	(1.06)	(2.49)	(1.63)	
9	-2.50**	0.68	-3.16*	-5.18**	-0.79	-2.88	-4.43**	5056
	(0.84)	(1.33)	(1.27)	(1.56)	(1.08)	(2.83)	(1.41)	
10	-3.34***	-0.23	-2.49	-6.87***	-1.26	-2.02	-5.92***	5045
	(0.87)	(1.38)	(1.54)	(1.55)	(1.16)	(3.27)	(1.41)	
11	-4.03***	-0.97	-2.89	-7.68***	-2.08	-2.19	-6.52***	5033
	(0.91)	(1.47)	(1.55)	(1.60)	(1.22)	(3.35)	(1.47)	
12	-4.58***	-1.27	-3.77*	-8.29***	-2.42	-4.74	-7.07***	5017
	(0.99)	(1.57)	(1.61)	(1.81)	(1.30)	(3.27)	(1.65)	

Table 2: **Univariate BHAR (S&P500 return) by months of seasoning**

This table contains the average Buy-and-Hold Abnormal Returns (BHAR), by holding period, for all three benchmarks. The portfolios start one month (the 21st day of trading) after listing, and the month column represents a holding period from the beginning of the first month after listing to that month after listing. This corresponds to a Zero Investment Strategy of Long Stock/Short Benchmark. The portfolios are split by the positive/negative return of the S&P 500 in the 45 trading days prior to the issue. The number of IPOs per portfolio/holding period is the same as tables 1, 12 and 13. Numbers are in percent of the zero investment size (% of long/short position), t-stats and p-values are for a test of BHAR = 0, with significance levels represented by $+ = 10\%$, $* = 5\%$, $** = 1\%$, $*** = 0.1\%$.

	$\overline{BHAR}$ by benchmark					
	Fama-French 49		Industry Average		Industry, Size & BM	
Month	SP500 > 0	SP500 ≤ 0	SP500 > 0	SP500 ≤ 0	SP500 > 0	SP500 ≤ 0
1	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
2	0.13	-0.05	0.18	-0.17	-0.01	0.32
	(0.31)	(0.60)	(0.34)	(0.64)	(0.43)	(0.73)
3	0.83	2.26*	0.47	2.19	0.50	2.04
	(0.46)	(0.99)	(0.50)	(1.12)	(0.61)	(1.26)
4	0.66	4.41***	0.69	2.99*	0.49	2.93
	(0.60)	(1.20)	(0.65)	(1.34)	(0.79)	(1.71)
5	0.02	6.02***	0.47	3.73*	0.35	4.05
	(0.71)	(1.40)	(0.78)	(1.60)	(0.93)	(2.30)
6	-2.59**	2.73	-2.85**	0.59	-1.95	3.36
	(0.78)	(1.51)	(0.84)	(1.78)	(1.00)	(1.95)
7	-1.97*	1.96	-2.73**	0.02	-1.72	3.70
	(0.88)	(1.71)	(0.96)	(2.02)	(1.16)	(2.07)
8	-1.53	0.50	-2.05	-2.17	-1.15	1.72
	(1.09)	(1.61)	(1.18)	(1.93)	(1.38)	(2.20)
9	-3.03**	-1.05	-3.51**	-4.03*	-2.28	0.86
	(1.00)	(1.55)	(1.10)	(1.82)	(1.34)	(2.17)
10	-3.62**	-2.58	-4.95***	-4.97**	-3.22*	0.86
	(1.06)	(1.52)	(1.16)	(1.76)	(1.47)	(2.22)
11	-4.47***	-2.81	-6.14***	-5.93**	-3.08*	1.27
	(1.09)	(1.63)	(1.22)	(1.90)	(1.51)	(2.32)
12	-5.13***	-3.09	-6.60***	-6.80**	-2.84	2.50
	(1.19)	(1.78)	(1.35)	(2.05)	(1.67)	(2.34)

Table 3: **Univariate BHAR (Initial return) by months of seasoning**

This table contains the average Buy-and-Hold Abnormal Returns (BHAR), by holding period, where the Fama-French 49 Industry Indices are used as benchmarks. The portfolios start one month (the 21st day of trading) after listing, and the month column represents a holding period from the beginning of the first month after listing to that month after listing. This corresponds to a Zero Investment Strategy of Long Stock/Short Fama-French 49 Industry Index. The portfolio presented in this table split the IPOs by positive/negative initial day return ($IR1$) and the first month BHAR ($BHAR1$). The number of IPOs per portfolio/holding period is the same as tables 1, 12 and 13. Numbers are in percent of the zero investment size (% of long/short position), t-stats and p-values are for a test of BHAR = 0, with significance levels represented by $+ = 10\%$, $* = 5\%$, $** = 1\%$, $*** = 0.1\%$.

	$\overline{BHAR}$ by benchmark											
	FF49				Industry Average				Industry, Size & BM			
Month	IR1 > 0	IR1 ≤ 0	BHAR1 > 0	BHAR1 ≤ 0	IR1 > 0	IR1 ≤ 0	BHAR1 > 0	BHAR1 ≤ 0	IR1 > 0	IR1 ≤ 0	BHAR1 > 0	BHAR1 ≤ 0
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
2	0.29	-0.52	0.83*	-0.70	0.12	-0.02	0.73	-0.59	0.15	-0.13	0.28	-0.14
	(0.33)	(0.50)	(0.40)	(0.38)	(0.55)	(0.55)	(0.44)	(0.44)	(0.44)	(0.68)	(0.53)	(0.51)
3	1.56**	0.21	2.61***	-0.22	1.14	0.29	2.22**	-0.44	0.96	0.78	1.24	0.57
	(0.51)	(0.77)	(0.64)	(0.57)	(0.82)	(0.82)	(0.70)	(0.70)	(0.67)	(1.00)	(0.81)	(0.77)
4	1.93**	0.91	3.47***	-0.19	1.40	1.01	2.97**	-0.46	0.93	1.77	1.60	0.67
	(0.65)	(0.94)	(0.82)	(0.70)	(1.04)	(1.04)	(0.90)	(0.90)	(0.89)	(1.26)	(1.11)	(0.96)
5	1.88*	0.91	3.96***	-0.77	1.50	0.81	3.38**	-0.83	1.06	2.19	1.99	0.68
	(0.77)	(1.13)	(0.94)	(0.87)	(1.30)	(1.30)	(1.03)	(1.03)	(1.12)	(1.48)	(1.38)	(1.20)
6	-1.40	-0.44	0.60	-2.97**	-2.40*	-0.60	-0.48	-3.49**	-0.90	0.59	-0.05	-1.01
	(0.83)	(1.26)	(0.99)	(0.98)	(1.44)	(1.44)	(1.10)	(1.10)	(1.05)	(1.72)	(1.31)	(1.23)
7	-1.15	-0.21	1.02	-2.90*	-2.26*	-1.25	-0.40	-3.70**	-0.57	0.64	0.33	-0.87
	(0.94)	(1.45)	(1.14)	(1.09)	(1.69)	(1.69)	(1.27)	(1.27)	(1.18)	(2.02)	(1.48)	(1.40)
8	-1.20	-0.34	0.85	-2.87*	-2.21	-1.71	-0.75	-3.49*	-0.33	-0.52	-0.65	-0.11
	(1.10)	(1.53)	(1.19)	(1.37)	(1.79)	(1.79)	(1.32)	(1.32)	(1.37)	(2.22)	(1.59)	(1.72)
9	-2.62*	-2.14	-0.45	-4.61***	-3.74**	-3.38	-2.24	-5.12***	-1.28	-1.92	-2.03	-0.83
	(1.01)	(1.47)	(1.19)	(1.19)	(1.74)	(1.74)	(1.30)	(1.30)	(1.34)	(2.17)	(1.65)	(1.58)
10	-3.46**	-2.98	-1.01	-5.75***	-5.08***	-4.58*	-3.08*	-6.93***	-2.27	-1.72	-2.44	-1.81
	(1.04)	(1.55)	(1.25)	(1.21)	(1.80)	(1.80)	(1.37)	(1.37)	(1.47)	(2.15)	(1.79)	(1.68)
11	-4.54***	-2.51	-1.55	-6.59***	-6.63***	-4.48*	-3.97**	-8.31***	-2.12	-1.30	-1.57	-2.27
	(1.08)	(1.68)	(1.31)	(1.26)	(1.92)	(1.92)	(1.46)	(1.46)	(1.51)	(2.29)	(1.81)	(1.78)
12	-5.05***	-3.21	-2.21	-7.04***	-7.08***	-5.39*	-4.38**	-9.05***	-1.30	-1.73	-1.08	-1.76
	(1.19)	(1.76)	(1.41)	(1.40)	(2.03)	(2.03)	(1.59)	(1.59)	(1.61)	(2.60)	(1.95)	(1.93)

Table 4: **Buy-and-hold regressions by months of seasoning**

Each row in this table represents a regression for variables of a holding period from the 21st trading day until the month of the first column. The dependent variable is the excess buy-and-hold return ($xBHR$) for all regressions, and the independent variables are given in the header. Low and High Demand State (LDS/HDS) are dummies defined as a final offer price on or below the filing range minimum, and on or above the filing range maximum respectively. $S\&P500$ is the return in the 45 trading days pre-issue. $IR1$ and $BHAR1$ are dummies for positive initial day or first month buy-and-hold return. *Has Lockup* is a dummy for those IPOs which included lockup provisions (regardless of length and expiration). In addition there are dummies for lockups longer then 6 months split by expiration. *Rank* is the Carter and Manaster (1990) underwriter rank. $Excess\ BHRFF49$ and $BHRCAP$ are the excess buy-and-hold returns for the matched Fama-French 49 industry and CRSP Cap decile indices respectfully. *Year Dummies* are listing year dummies. Returns in this table are in percent. The White (1980) t-statistics are given i parentheses, and significance levels are represented by $+ = 10\%$, $* = 5\%$, $** = 1\%$, $*** = 0.1\%$.

Dependent variable: *Excess BHR*															
							Expires > 6 months								
Month	*Low Demand State*	*High Demand State*	*S&P500* (Pre-Issue)	Positive *IR1 Dummy*	Positive *BHAR1 Dummy*	*Has Lockup*	*Lockup*	*Lockup Expired*	*Rank*	*Excess BHRFF49*	*Excess BHRCAP*	*Constant*	*Year Dummies*	N	adj. R^2
(1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	Yes	4616	.
	(.)	(.)	(.)	(.)	(.)	(.)	(.)		(.)	(.)	(.)	(.)			
(2)	1.60*	-1.92*	-2.86	1.95**	1.02+	-1.01	-1.86+		0.17	0.69***	1.22***	-1.80	Yes	4616	0.195
	(2.20)	(-2.57)	(-0.33)	(2.77)	(1.72)	(-1.23)	(-1.79)		(1.56)	(8.63)	(11.34)	(-0.92)			
(3)	2.55*	-3.40**	-10.32	3.87***	2.05*	-2.07	-2.69		0.34*	1.01***	0.92***	-4.32	Yes	4615	0.190
	(2.25)	(-2.90)	(-0.64)	(3.63)	(2.33)	(-1.60)	(-1.64)		(2.22)	(10.55)	(8.19)	(-1.60)			
(4)	2.81*	-3.98**	-17.27	3.33*	3.55**	-3.82*	-1.63		0.46*	1.12***	0.83***	-5.21	Yes	4614	0.192
	(2.07)	(-2.86)	(-0.98)	(2.45)	(3.05)	(-2.30)	(-0.71)		(2.48)	(10.66)	(5.78)	(-1.50)			
(5)	4.53**	-3.31*	-40.72+	4.00*	3.93**	-5.49**	-2.83		0.56*	1.17***	0.76***	-4.10	Yes	4614	0.209
	(2.85)	(-2.15)	(-1.94)	(2.33)	(2.83)	(-2.77)	(-1.01)		(2.43)	(11.67)	(5.35)	(-0.99)			
(6)	2.77+	-4.49**	-52.11*	2.76	3.13*	-5.91**	-3.55		0.54*	1.12***	0.79***	-4.39	Yes	4612	0.199
	(1.66)	(-2.58)	(-2.15)	(1.50)	(2.02)	(-2.78)	(-1.16)		(2.15)	(10.66)	(6.40)	(-1.02)			
(7)	2.07	-3.53+	-45.75	2.24	3.74*	-6.50**	-3.08		0.65*	1.10***	1.01***	-6.97	Yes	4605	0.188
	(1.10)	(-1.70)	(-1.52)	(1.06)	(2.14)	(-2.67)	(-0.82)		(2.17)	(12.83)	(7.30)	(-1.40)			
(8)	2.08	-1.95	-32.06	1.82	3.67+	-8.05**	-3.60	-22.35+	0.64+	1.25***	1.14***	-8.81	Yes	4598	0.194
	(1.04)	(-0.90)	(-1.13)	(0.80)	(1.85)	(-2.94)	(-1.02)	(-1.73)	(1.74)	(12.07)	(5.20)	(-1.54)			
(9)	2.21	-2.47	-43.73+	2.78	4.15*	-8.64***	-4.43	-21.00+	0.82*	1.18***	0.81***	-6.89	Yes	4581	0.191
	(1.07)	(-1.17)	(-1.71)	(1.28)	(2.29)	(-3.47)	(-1.39)	(-1.75)	(2.48)	(11.98)	(5.74)	(-1.14)			
(10)	0.72	-4.77*	-32.02	2.95	4.94**	-8.76***	-8.74*	-2.11	0.67+	1.08***	0.69***	-5.19	Yes	4570	0.175
	(0.31)	(-2.04)	(-1.24)	(1.33)	(2.60)	(-3.49)	(-2.45)	(-0.31)	(1.86)	(12.83)	(5.31)	(-0.79)			
(11)	-0.28	-4.69+	-24.63	0.92	5.35**	-7.14**	-10.60**	-0.49	0.75+	1.05***	0.54***	-3.88	Yes	4559	0.170
	(-0.12)	(-1.95)	(-0.90)	(0.38)	(2.69)	(-2.70)	(-2.89)	(-0.07)	(1.91)	(12.45)	(4.69)	(-0.53)			
(12)	0.46	-3.54	-20.63	1.77	5.16*	-5.57+	-10.50**	-2.06	1.18***	0.99***	0.65***	-9.60	Yes	4543	0.160
	(0.18)	(-1.38)	(-0.73)	(0.71)	(2.39)	(-1.93)	(-2.68)	(-0.29)	(3.32)	(13.25)	(5.96)	(-1.22)			

Table 5: **Buy-and-hold regressions by months of seasoning**

Each row in this table represents a regression for variables of a holding period from the 21st trading day until the month of the first column. The dependent variable is the excess buy-and-hold return ($xBHR$) for all regressions, and the independent variables are given in the header. *Private* is the private information proxy, which is the error term of regressing the S&P500 on the book-building price update. $S\&P500$ is the return in the 45 trading days pre-issue. $IR1$ and $BHAR1$ are dummies for positive initial day or first month buy-and-hold return. *Has Lockup* is a dummy for those IPOs which included lockup provisions (regardless of length and expiration). In addition there are dummies for lockups longer then 6 months split by expiration. *Rank* is the Carter and Manaster (1990) underwriter rank. *Excess BHRFF49* and *BHRCAP* are the excess buy-and-hold returns for the matched Fama-French 49 industry and CRSP Cap decile indices respectfully. *Year Dummies* are listing year dummies. Returns in this table are in percent. The White (1980) t-statistics are given i parentheses, and significance levels are represented by $+ = 10\%$, $* = 5\%$, $** = 1\%$, $*** = 0.1\%$.

Dependent variable: *Excess BHR*														
						Expires > 6 Months								
Month	*Private*	*S&P500* (Pre-issue)	*Positive IR1 Dummy*	*Positive BHAR1 Dummy*	*Has Lockup*	*Lockup*	*Lockup Expired*	*Rank*	*Excess BHRFF49*	*Excess BHRCAP*	*Constant*	*Year Dummies*	N	adj. R^2
(1)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	Yes	4616	.
	(.)	(.)	(.)	(.)	(.)	(.)		(.)	(.)	(.)	(.)			
(2)	-7.07***	-6.94	1.77*	0.93	-1.17	-1.76+		0.17	0.68***	1.22***	-1.53	Yes	4616	0.196
	(-4.24)	(-0.82)	(2.54)	(1.57)	(-1.44)	(-1.71)		(1.58)	(8.51)	(11.40)	(-0.80)			
(3)	-9.80***	-17.34	3.23**	1.93*	-2.23+	-2.48		0.33*	1.01***	0.93***	-3.56	Yes	4615	0.190
	(-4.05)	(-1.11)	(3.08)	(2.19)	(-1.73)	(-1.51)		(2.16)	(10.47)	(8.42)	(-1.35)			
(4)	-12.53***	-25.36	2.82*	3.38**	-4.08*	-1.41		0.45*	1.12***	0.83***	-4.64	Yes	4614	0.193
	(-4.01)	(-1.44)	(2.12)	(2.92)	(-2.47)	(-0.61)		(2.46)	(10.63)	(5.84)	(-1.35)			
(5)	-12.35***	-50.04*	3.07+	3.82**	-5.67**	-2.63		0.55*	1.17***	0.76***	-2.40	Yes	4614	0.209
	(-3.30)	(-2.40)	(1.87)	(2.75)	(-2.90)	(-0.94)		(2.42)	(11.64)	(5.40)	(-0.59)			
(6)	-10.84**	-60.57*	1.81	2.99+	-6.05**	-3.25		0.53*	1.12***	0.80***	-3.44	Yes	4612	0.199
	(-2.75)	(-2.54)	(1.03)	(1.95)	(-2.89)	(-1.07)		(2.09)	(10.64)	(6.50)	(-0.81)			
(7)	-9.57*	-52.38+	1.70	3.61*	-6.67**	-2.87		0.64*	1.10***	1.01***	-6.48	Yes	4605	0.188
	(-2.11)	(-1.77)	(0.83)	(2.08)	(-2.79)	(-0.76)		(2.15)	(12.82)	(7.29)	(-1.32)			
(8)	-5.28	-36.91	1.17	3.63+	-8.09**	-3.44	-23.15+	0.63+	1.25***	1.14***	-7.88	Yes	4598	0.194
	(-0.94)	(-1.32)	(0.54)	(1.85)	(-3.03)	(-0.97)	(-1.76)	(1.73)	(12.08)	(5.14)	(-1.41)			
(9)	-4.68	-49.52*	1.80	4.12*	-8.61***	-4.21	-21.67+	0.80*	1.18***	0.82***	-5.65	Yes	4581	0.191
	(-0.86)	(-1.98)	(0.87)	(2.29)	(-3.52)	(-1.32)	(-1.81)	(2.45)	(11.99)	(5.64)	(-0.96)			
(10)	-5.06	-39.10	1.75	4.86*	-8.69***	-8.40*	-1.72	0.64+	1.07***	0.71***	-4.65	Yes	4570	0.174
	(-0.84)	(-1.55)	(0.83)	(2.57)	(-3.55)	(-2.36)	(-0.25)	(1.78)	(12.78)	(5.24)	(-0.73)			
(11)	-6.13	-30.13	0.28	5.21**	-7.20**	-10.30**	-0.16	0.72+	1.05***	0.55***	-4.25	Yes	4559	0.170
	(-1.12)	(-1.13)	(0.12)	(2.64)	(-2.76)	(-2.81)	(-0.02)	(1.86)	(12.40)	(4.76)	(-0.59)			
(12)	-3.78	-25.60	0.91	5.10*	-5.52+	-10.25**	-1.78	1.15**	0.99***	0.66***	-9.33	Yes	4543	0.160
	(-0.66)	(-0.92)	(0.38)	(2.37)	(-1.95)	(-2.62)	(-0.25)	(3.25)	(13.24)	(6.04)	(-1.21)			

Table 6: **Buy-and-hold regressions by months of seasoning**

Each row in this table represents a regression for variables of a holding period from the 21st trading day until the month of the first column. The dependent variable is the excess buy-and-hold return ($xBHR$) for all regressions, and the independent variables are given in the header. Low and High Demand State (LDS/HDS) are dummies defined as a final offer price on or below the filing range minimum, and on or above the filing range maximum respectively. These are split by positive/negative $S\&P500$, the return in the 45 trading days pre-issue. $IR1$ and $BHAR1$ are dummies for positive initial day or first month buy-and-hold return. *Has Lockup* is a dummy for those IPOs which included lockup provisions (regardless of length and expiration). In addition there are dummies for lockups longer then 6 months split by expiration. *Rank* is the Carter and Manaster (1990) underwriter rank. *Excess* $BHRFF49$ and $BHRCAP$ are the excess buy-and-hold returns for the matched Fama-French 49 industry and CRSP Cap decile indices respectfully. *Year Dummies* are listing year dummies. Returns in this table are in percent. The White (1980) t-statistics are given i parentheses, and significance levels are represented by $+ = 10\%$, $* = 5\%$, $** = 1\%$, $* ** = 0.1\%$.

Dependent variable: *Excess BHR*																	
Month	*High Demand State*		*Low Demand State*		*S&P500*	*Positive IR1 Dummy*	*Positive BHAR1 Dummy*	*Has Lockup*	Expires > 6 Months		*Rank*	*Excess BHRFF49*	*Excess BHRCAP*	*Constant*	*Year Dummies*	N	adj. R^2
	(S&P500 > 0)	(S&P500 ≤ 0)	(S&P500 > 0)	(S&P500 ≤ 0)	(Pre-issue)				*Lockup*	*Lockup Expired*							
(1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	Yes	4616	.
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)		(.)	(.)	(.)	(.)			
(2)	-1.84*	-2.10	1.78*	1.20	-5.21	1.93**	1.02+	-1.01	-1.85+		0.17	0.69***	1.22***	-1.74	Yes	4616	0.194
	(-2.34)	(-1.49)	(2.18)	(1.09)	(-0.53)	(2.75)	(1.72)	(-1.23)	(-1.78)		(1.58)	(8.65)	(11.27)	(-0.89)			
(3)	-3.51**	-2.94	2.70*	2.27	-10.19	3.86***	2.05*	-2.07	-2.69		0.34*	1.01***	0.93***	-4.32	Yes	4615	0.190
	(-2.96)	(-1.25)	(2.20)	(1.24)	(-0.56)	(3.62)	(2.33)	(-1.60)	(-1.64)		(2.22)	(10.52)	(8.14)	(-1.59)			
(4)	-4.00**	-3.71	3.25*	1.89	-20.59	3.29*	3.54**	-3.82*	-1.63		0.46*	1.12***	0.83***	-5.12	Yes	4614	0.192
	(-2.71)	(-1.32)	(2.21)	(0.86)	(-0.99)	(2.42)	(3.05)	(-2.30)	(-0.71)		(2.49)	(10.68)	(5.82)	(-1.46)			
(5)	-3.61*	-1.97	5.24**	3.13	-43.19+	3.95*	3.91**	-5.49**	-2.85		0.56*	1.17***	0.76***	-4.02	Yes	4614	0.209
	(-2.17)	(-0.63)	(2.94)	(1.24)	(-1.88)	(2.31)	(2.82)	(-2.76)	(-1.01)		(2.45)	(11.69)	(5.36)	(-0.96)			
(6)	-4.16*	-5.22	3.64*	0.82	-63.27*	2.68	3.12*	-5.92**	-3.52		0.55*	1.12***	0.79***	-4.09	Yes	4612	0.199
	(-2.25)	(-1.54)	(1.99)	(0.30)	(-2.44)	(1.46)	(2.02)	(-2.78)	(-1.15)		(2.18)	(10.61)	(6.37)	(-0.94)			
(7)	-2.68	-5.95	3.15	-0.51	-64.87*	2.14	3.75*	-6.52**	-3.01		0.66*	1.10***	1.01***	-6.49	Yes	4605	0.188
	(-1.23)	(-1.54)	(1.53)	(-0.16)	(-2.03)	(1.02)	(2.15)	(-2.68)	(-0.80)		(2.20)	(12.82)	(7.28)	(-1.30)			
(8)	-0.35	-6.72+	3.70	-1.88	-64.56*	1.66	3.69+	-8.09**	-3.45	-23.08+	0.66+	1.25***	1.14***	-8.02	Yes	4598	0.195
	(-0.14)	(-1.76)	(1.64)	(-0.60)	(-2.14)	(0.73)	(1.86)	(-2.96)	(-0.97)	(-1.80)	(1.79)	(12.08)	(5.20)	(-1.41)			
(9)	-1.64	-4.52	3.99+	-1.90	-68.41*	2.60	4.15*	-8.66***	-4.35	-21.23+	0.84*	1.18***	0.81***	-6.25	Yes	4581	0.191
	(-0.71)	(-1.18)	(1.67)	(-0.63)	(-2.32)	(1.21)	(2.30)	(-3.47)	(-1.35)	(-1.77)	(2.54)	(11.99)	(5.74)	(-1.04)			
(10)	-4.56+	-4.85	2.09	-2.29	-45.81	2.83	4.93**	-8.76***	-8.79*	-1.92	0.69+	1.08***	0.69***	-4.85	Yes	4570	0.175
	(-1.77)	(-1.29)	(0.80)	(-0.73)	(-1.49)	(1.28)	(2.60)	(-3.48)	(-2.45)	(-0.28)	(1.90)	(12.82)	(5.31)	(-0.74)			
(11)	-4.41+	-5.04	1.00	-3.13	-38.56	0.81	5.35**	-7.14**	-10.63**	-0.30	0.76+	1.06***	0.54***	-3.55	Yes	4559	0.170
	(-1.69)	(-1.27)	(0.36)	(-0.94)	(-1.20)	(0.33)	(2.69)	(-2.70)	(-2.89)	(-0.04)	(1.94)	(12.44)	(4.73)	(-0.49)			
(12)	-3.46	-3.38	1.38	-1.58	-29.22	1.68	5.16*	-5.57+	-10.53**	-1.93	1.19***	0.99***	0.65***	-9.40	Yes	4543	0.160
	(-1.22)	(-0.80)	(0.48)	(-0.43)	(-0.86)	(0.67)	(2.39)	(-1.93)	(-2.68)	(-0.27)	(3.34)	(13.26)	(5.97)	(-1.20)			

Table 7: **Buy-and-hold regressions by months of seasoning**

Each row in this table represents a regression for variables of a holding period from the 21st trading day until the month of the first column. The dependent variable is the excess buy-and-hold return ($xBHR$) for all regressions, and the independent variables are given in the header. *Private* is the private information proxy, which is the error term of regressing the S&P500 on the book-building price update. *Private* is split by positive/negative $S\&P500$, the return in the 45 trading days pre-issue. $IR1$ and $BHAR1$ are dummies for positive initial day or first month buy-and-hold return. *Has Lockup* is a dummy for those IPOs which included lockup provisions (regardless of length and expiration). In addition there are dummies for lockups longer then 6 months split by expiration. *Rank* is the Carter and Manaster (1990) underwriter rank. *Excess BHRFF49* and $BHRCAP$ are the excess buy-and-hold returns for the matched Fama-French 49 industry and CRSP Cap decile indices respectfully. *Year Dummies* are listing year dummies. Returns in this table are in percent. The White (1980) t-statistics are given i parentheses, and significance levels are represented by $+ = 10\%$, $* = 5\%$, $** = 1\%$, $*** = 0.1\%$.

	Dependent variable: *Excess BHR*															
Month	*Private*		*Positive S&P500 Dummy*	*S&P500* (Pre-issue)	*Positive IR1 Dummy*	*Positive BHAR1 Dummy*	*Has Lockup*	Expires > 6 Months *Lockup*	*Lockup Expired*	*Rank*	*Excess BHRFF49*	*Excess BHRCAP*	*Constant*	*Year Dummies*	N	adj. R^2
	(S&P500 > 0)	(S&P500 ≤ 0)														
(1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	Yes	4616	.
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)		(.)	(.)	(.)	(.)			
(2)	-6.62***	-8.38*	1.67+	-18.47+	1.73*	0.94	-1.18	-1.72+		0.18	0.69***	1.22***	-2.39	Yes	4616	0.196
	(-3.53)	(-2.57)	(1.75)	(-1.71)	(2.48)	(1.59)	(-1.45)	(-1.67)		(1.62)	(8.54)	(11.20)	(-1.21)			
(3)	-9.65***	-10.19*	0.94	-23.88	3.20**	1.94*	-2.24+	-2.46		0.33*	1.01***	0.93***	-4.04	Yes	4615	0.189
	(-3.67)	(-1.97)	(0.63)	(-1.21)	(3.06)	(2.20)	(-1.73)	(-1.50)		(2.17)	(10.50)	(8.35)	(-1.49)			
(4)	-12.74***	-11.87*	0.56	-29.35	2.79*	3.38**	-4.08*	-1.40		0.46*	1.12***	0.83***	-4.92	Yes	4614	0.192
	(-3.53)	(-2.12)	(0.29)	(-1.27)	(2.09)	(2.93)	(-2.47)	(-0.61)		(2.47)	(10.64)	(5.87)	(-1.42)			
(5)	-13.33**	-9.46	0.50	-53.94*	3.03+	3.81**	-5.67**	-2.63		0.56*	1.17***	0.76***	-2.64	Yes	4614	0.208
	(-3.18)	(-1.27)	(0.23)	(-2.06)	(1.84)	(2.76)	(-2.89)	(-0.93)		(2.43)	(11.67)	(5.44)	(-0.63)			
(6)	-11.48*	-8.91	1.81	-73.63*	1.72	3.00*	-6.05**	-3.23		0.54*	1.12***	0.80***	-4.34	Yes	4612	0.198
	(-2.54)	(-1.12)	(0.79)	(-2.48)	(0.98)	(1.96)	(-2.89)	(-1.06)		(2.12)	(10.58)	(6.46)	(-0.99)			
(7)	-10.31*	-7.30	3.44	-76.79*	1.55	3.63*	-6.67**	-2.80		0.65*	1.10***	1.01***	-8.20	Yes	4605	0.188
	(-2.03)	(-0.83)	(1.32)	(-2.09)	(0.76)	(2.10)	(-2.79)	(-0.75)		(2.19)	(12.79)	(7.31)	(-1.62)			
(8)	-6.16	-2.62	5.56*	-76.15*	0.94	3.67+	-8.09**	-3.35	-22.77+	0.66+	1.25***	1.14***	-10.67+	Yes	4598	0.194
	(-0.91)	(-0.31)	(1.97)	(-2.20)	(0.43)	(1.88)	(-3.03)	(-0.94)	(-1.68)	(1.79)	(12.09)	(5.15)	(-1.81)			
(9)	-7.10	2.61	4.39	-80.79*	1.55	4.15*	-8.61***	-4.16	-21.41+	0.82*	1.18***	0.82***	-7.86	Yes	4581	0.191
	(-1.10)	(0.31)	(1.54)	(-2.38)	(0.76)	(2.31)	(-3.52)	(-1.30)	(-1.77)	(2.51)	(12.00)	(5.64)	(-1.28)			
(10)	-8.53	5.44	2.78	-59.59+	1.53	4.87**	-8.68***	-8.49*	-1.44	0.66+	1.08***	0.71***	-6.11	Yes	4570	0.174
	(-1.17)	(0.65)	(0.94)	(-1.68)	(0.73)	(2.58)	(-3.54)	(-2.37)	(-0.21)	(1.84)	(12.79)	(5.29)	(-0.91)			
(11)	-9.34	3.54	2.06	-45.46	0.11	5.22**	-7.18**	-10.38**	0.06	0.74+	1.05***	0.55***	-5.34	Yes	4559	0.170
	(-1.43)	(0.44)	(0.68)	(-1.23)	(0.05)	(2.64)	(-2.76)	(-2.82)	(0.01)	(1.91)	(12.40)	(4.80)	(-0.72)			
(12)	-7.03	6.05	1.05	-33.73	0.77	5.09*	-5.51+	-10.32**	-1.62	1.17**	0.99***	0.67***	-9.91	Yes	4543	0.160
	(-1.03)	(0.66)	(0.32)	(-0.86)	(0.32)	(2.37)	(-1.94)	(-2.63)	(-0.23)	(3.29)	(13.27)	(6.07)	(-1.25)			

Table 8: **Average Estimated Alphas by IBES Earnings Surprise**

This table presents the averages of the alpha's for a Fama-French-Carhart model run on daily returns for each IPO during the 2nd through 6th month of trading. All averages are presented as the daily alpha times 104 trading days, and hence the average alpha for the holding period. *Pure Alphas* are the average estimated alphas with out controlling for the event window around the earnings announcements. *Controlled Alphas* are the average estimated alphas but controlled for a 5-day event windows around the earnings announcement(s). The t-statistics for t-tests of significance from zero are represented by $+ = 10\%$, $* = 5\%$, $** = 1\%$, $*** = 0.1\%$.

	Pure Alpha's			Controlled Alpha's			
		Surprise(s)			Surprise(s)		
	All EA's	Positive	Negative	All EA's	Positive	Negative	Non-IBES
All IPOs							
Mean	-0.0047	0.0213*	-0.0580*	-0.0164	0.0010	-0.0583*	0.0105
Median	0.0084	0.0372	-0.0457	-0.0005	0.0211	-0.0384	0.0123
N	2857	1756	808	2857	1756	808	2169
HDS IPOs							
Mean	-0.0694*	-0.0454*	-0.1168*	-0.0806*	-0.0656*	-0.1192*	-0.0315*
Median	-0.0395	-0.0047	-0.0851	-0.0528	-0.0436	-0.0868	-0.0062
N	1293	825	369	1293	825	369	655
MDS IPOs							
Mean	0.0313*	0.0806*	-0.0502	0.0241	0.0666*	-0.0522	0.0022
Median	0.0365	0.0885	-0.0240	0.0320	0.0681	-0.0175	0.0002
N	561	339	145	561	339	145	623
LDS IPOs							
Mean	0.0585*	0.0803*	0.0120	0.0437*	0.0564*	0.0150	0.0471***
Median	0.0584	0.0856	-0.0006	0.0470	0.0705	0.0132	0.0433
N	1003	592	294	1003	592	294	891

Table 9: **Fama-French 4 factor Alphas**

This table shows regressions on the alphas of a Fama-French-Carhart 4 factor model, on each IPO, benchmarks, or long IPO/short benchmark portfolios for daily data for the 2nd through 5th months of trading. All variable are defined as in the regression results above (tables 5 and 7). *Panel A* shows the alphas regressed on the private signal proxy (adjusted price update). *Panel B* shows the alphas regressed on the private as well as public signal proxy. *Panel A* shows the alphas regressed on the *Private* proxy split by positive/negative *S&P*500. The White (1980) t-statistics are given i parentheses, and significance levels are represented by $+ = 10\%$, $* = 5\%$, $** = 1\%$, $*** = 0.1\%$.

Dependant Variable: estimated Alpha from a Fama-French-Carhart 4 factor model							
		Benchmarks			Long IPO - Short Benchmark Portfolio		
	IPOs	Fama-French 49 Industry Indices	Industry Average	Industry, Size & BM Matched	Fama-French 49 Industry Indices	Industry Average	Industry, Size & BM Matched
				Panel A			
Private	-0.179***	-0.013**	-0.009	-0.036	-0.165***	-0.167***	-0.137***
	(-7.02)	(-3.02)	(-0.91)	(-1.34)	(-6.47)	(-5.38)	(-3.45)
Constant	0.180***	0.013**	0.022*	0.070*	0.167***	0.175***	0.125**
	(7.09)	(2.91)	(2.14)	(2.56)	(6.56)	(5.65)	(3.12)
N	5089	5089	5067	5074	5089	5067	5074
Adj. R2	0.015	0.002	0.000	0.000	0.013	0.010	0.003
				Panel B			
Private	-0.171***	-0.013**	-0.007	-0.036	-0.158***	-0.159***	-0.127**
	(-6.66)	(-2.96)	(-0.71)	(-1.32)	(-6.12)	(-5.07)	(-3.16)
*S&P*500	-0.408***	-0.016	-0.081*	-0.006	-0.392***	-0.411***	-0.488**
	(-4.03)	(-0.78)	(-2.05)	(-0.06)	(-3.88)	(-3.44)	(-3.13)
Constant	0.010+	0.000	0.015***	0.034***	0.010+	0.018**	-0.001
	(1.84)	(-0.16)	(6.77)	(5.44)	(1.86)	(2.76)	(-0.14)
N	5088	5088	5067	5074	5088	5067	5074
Adj. R2	0.017	0.002	0.001	0.000	0.014	0.011	0.005

Table 10: Calendar Time Alpha's by Months of Inclusion

This table presents the calendar time portfolio alphas by months of inclusion post listing using a monthly Fama-French-Carhart-Pastor-Stambaugh model. See section 2.3 and 5 for details. Panel A presents calender time portfolios where all IPOs are included. Panel B include only Low Demand State IPOs. Newey-West t-stats are given in parenthesis, with significance levels represented by $+ = 10\%$, $* = 5\%$, $** = 1\%$, $*** = 0.1\%$. The number of included months is given below the t-stats.

Months	*FF49*			*Industry, Size & BM*			*Industry Average*		
Included	*Zero*	*IPOs*	*FF49*	*Zero*	*IPOs*	*ISBM*	*Zero*	*IPOs*	*IA*
				Panel A: All IPOs					
1	1.768***	1.868***	0.100	1.609*	1.807**	0.198	1.868**	2.133**	0.265
	(3.35)	(3.43)	(1.12)	(2.58)	(3.27)	(0.65)	(2.99)	(3.32)	(1.43)
	175	175	175	173	173	173	159	159	159
2	1.241***	1.267***	0.0257	1.055**	1.272***	0.217	1.054**	1.416***	0.362+
	(4.16)	(3.99)	(0.35)	(2.90)	(3.94)	(0.95)	(2.76)	(3.91)	(1.96)
	226	226	226	226	226	226	212	212	212
3	0.881***	0.908**	0.0270	0.807*	0.923**	0.116	0.528	0.850**	0.322+
	(3.52)	(3.31)	(0.37)	(2.13)	(3.32)	(0.52)	(1.48)	(2.81)	(1.96)
	251	251	251	249	249	249	243	243	243
4	0.624*	0.635*	0.0115	0.575+	0.667*	0.0919	0.378	0.678*	0.299+
	(2.38)	(2.27)	(0.18)	(1.82)	(2.35)	(0.46)	(1.25)	(2.20)	(1.96)
	261	261	261	259	259	259	255	255	255
5	0.330	0.387	0.0570	0.175	0.402+	0.227	-0.0592	0.350	0.409*
	(1.49)	(1.63)	(0.89)	(0.57)	(1.67)	(1.16)	(-0.21)	(1.38)	(2.45)
	272	272	272	269	269	269	264	264	264
6	0.0633	0.139	0.0757	-0.0462	0.134	0.180	-0.274	0.122	0.396*
	(0.31)	(0.64)	(1.37)	(-0.15)	(0.61)	(0.82)	(-1.01)	(0.50)	(2.52)
	271	271	271	271	271	271	270	270	270
				Panel B: LDS IPOs					
1	5.210***	5.248***	0.0381	5.764***	5.474***	-0.290	5.016***	5.423***	0.407
	(4.69)	(4.80)	(0.24)	(4.45)	(4.81)	(-0.51)	(3.84)	(4.25)	(1.26)
	77	77	77	74	74	74	62	62	62
2	2.550***	2.623***	0.0727	2.819***	2.674***	-0.145	2.875***	3.223***	0.348
	(3.93)	(4.01)	(0.64)	(3.69)	(4.00)	(-0.38)	(3.57)	(4.18)	(1.42)
	147	147	147	143	143	143	128	128	128
3	1.863***	1.874***	0.0107	2.304***	1.960***	-0.344	2.013**	2.420***	0.407+
	(4.22)	(4.07)	(0.11)	(3.93)	(4.13)	(-1.11)	(3.29)	(4.13)	(1.87)
	184	184	184	182	182	182	169	169	169
4	1.348***	1.386***	0.0378	1.444**	1.408***	-0.0361	1.250**	1.691***	0.441*
	(3.36)	(3.44)	(0.52)	(2.83)	(3.47)	(-0.12)	(2.62)	(3.70)	(2.19)
	206	206	206	205	205	205	192	192	192
5	1.001**	1.070***	0.0691	1.016*	1.099***	0.0823	0.853*	1.331***	0.478+
	(3.27)	(3.35)	(1.03)	(2.52)	(3.40)	(0.28)	(1.98)	(3.38)	(1.90)
	225	225	225	223	223	223	207	207	207
6	0.479+	0.563*	0.0840	0.625+	0.563*	-0.0614	0.164	0.663*	0.499*
	(1.94)	(2.36)	(1.30)	(1.67)	(2.29)	(-0.21)	(0.47)	(2.29)	(2.11)
	241	241	241	240	240	240	226	226	226

Table 11: Calendar Time Alpha's by Months of Inclusion (2)

This table presents the calendar time portfolio alphas by months of inclusion post listing using a monthly Fama-French-Carhart-Pastor-Stambaugh model. See section 2.3 and 5 for details. Panel A presents calendar time portfolios where Within Range (MDS) IPOs are included, and Panel B only How Demand State IPOs. Newey-West t-stats are given in parenthesis, with significance levels represented by + = 10%, ∗ = 5%, ∗∗ = 1%, ∗ ∗ ∗ = 0.1%. The number of included months is given below the t-stats.

Months	*FF49*			*Industry, Size & BM*			*Industry Average*		
Included	*Zero*	*IPOs*	*FF49*	*Zero*	*IPOs*	*ISBM*	*Zero*	*IPOs*	*IA*
				Panel A: MDS IPOs					
1	2.634*	2.738*	0.103	3.229*	3.383**	0.154	2.914+	3.500+	0.586
	(2.51)	(2.47)	(0.62)	(2.48)	(3.33)	(0.20)	(1.88)	(2.04)	(1.20)
	33	33	33	32	32	32	23	23	23
2	0.918	1.023+	0.106	0.786	1.055+	0.269	1.050+	1.367+	0.316
	(1.60)	(1.74)	(0.81)	(1.22)	(1.77)	(0.69)	(1.67)	(1.99)	(1.49)
	96	96	96	96	96	96	79	79	79
3	0.888+	0.985*	0.0973	0.689	0.942+	0.253	0.922	1.156*	0.234
	(1.85)	(2.01)	(1.09)	(0.96)	(1.89)	(0.48)	(1.65)	(2.19)	(1.01)
	144	144	144	142	142	142	120	120	120
4	0.783*	0.786+	0.00291	0.694	0.790+	0.0961	1.024*	1.133*	0.109
	(2.12)	(1.96)	(0.03)	(1.26)	(1.96)	(0.26)	(2.30)	(2.59)	(0.52)
	176	176	176	174	174	174	158	158	158
5	0.424	0.471	0.0468	0.192	0.504	0.312	0.241	0.758+	0.517*
	(1.26)	(1.35)	(0.61)	(0.44)	(1.41)	(0.88)	(0.58)	(1.88)	(2.13)
	207	207	207	206	206	206	193	193	193
6	0.150	0.216	0.0657	0.129	0.253	0.124	-0.0273	0.481	0.508*
	(0.46)	(0.64)	(0.99)	(0.30)	(0.74)	(0.40)	(-0.07)	(1.28)	(2.33)
	224	224	224	222	222	222	212	212	212
				Panel B: HDS IPOs					
1	1.478	2.017*	0.539**	0.852	2.205*	1.353*	1.883	2.760*	0.877***
	(1.64)	(2.05)	(2.68)	(0.62)	(2.24)	(2.22)	(1.47)	(2.36)	(3.61)
	74	74	74	72	72	72	61	61	61
2	0.449	0.658	0.209+	0.620	0.645	0.0251	0.447	1.029+	0.582**
	(0.82)	(1.12)	(1.68)	(0.90)	(1.09)	(0.10)	(0.70)	(1.74)	(2.77)
	129	129	129	129	129	129	109	109	109
3	0.676	0.865+	0.189+	0.251	0.887+	0.636+	0.126	0.450	0.324+
	(1.64)	(1.90)	(1.77)	(0.40)	(1.93)	(1.91)	(0.26)	(0.88)	(1.85)
	168	168	168	168	168	168	152	152	152
4	0.804+	0.945*	0.141	0.439	0.977*	0.538+	0.525	0.865+	0.341+
	(1.85)	(2.00)	(1.25)	(0.79)	(2.06)	(1.90)	(1.05)	(1.70)	(1.87)
	198	198	198	197	197	197	181	181	181
5	0.597	0.780+	0.183*	0.481	0.805+	0.324	0.329	0.665	0.336*
	(1.41)	(1.70)	(1.97)	(0.82)	(1.74)	(1.16)	(0.74)	(1.57)	(1.99)
	213	213	213	213	213	213	201	201	201
6	0.104	0.252	0.148+	-0.0634	0.271	0.334	-0.242	0.0979	0.340*
	(0.33)	(0.74)	(1.78)	(-0.15)	(0.78)	(1.31)	(-0.61)	(0.26)	(2.03)
	223	223	223	223	223	223	211	211	211

A Univariate Robustness

Table 12: **Univariate BHAR (Demand State) by Months of Seasoning**

This table contains the average Buy-and-Hold Abnormal Returns (BHAR), by holding period, where the industry average (10 closest matches on size and book-to-market within maximum 30 percent of the IPO) used as benchmarks. The portfolios start one month (the 21st day of trading) after listing, and the month column represents a holding period from the beginning of the first month after listing to that month after listing. This corresponds to a Zero Investment Strategy of Long Stock/Short benchmark. The portfolios are sorted by the demand for allocations. A Low Demand State is defined as an offering where the offer price is set on or below the initial filing range minimum. The High Demand State is conversely defined as an offer price set on or above the initial filing range maximum. Private information is defined as the error term of the book-building percent price update regressed on the S&P500 return in the 45 trading day prior to issue. Numbers are in percent of the zero investment size (% of long/short position), t-stats and p-values are for a test of BHAR = 0, with significance levels represented by $+ = 10\%$, $* = 5\%$, $** = 1\%$, $*** = 0.1\%$.

	$\overline{BHAR}$ with Industry Averages as Benchmarks							N
Month	All IPOs	Low Demand State	Medium Demand State	High Demand State	Negative Private Info.	No Private Info.	Positive Private Info.	All
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4388
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
2	0.09	1.67**	0.63	-1.77**	1.38***	0.72	-1.49**	4388
	(0.30)	(0.49)	(0.52)	(0.54)	(0.40)	(1.00)	(0.51)	
3	0.92	3.69***	0.87	-1.70	2.74***	0.83	-1.17	4388
	(0.47)	(0.74)	(0.79)	(0.84)	(0.59)	(1.51)	(0.80)	
4	1.30*	4.30***	0.75	-1.24	3.14***	0.48	-0.72	4388
	(0.59)	(0.94)	(0.92)	(1.09)	(0.75)	(1.82)	(1.02)	
5	1.33	5.20***	-0.26	-1.40	3.57***	-0.81	-0.98	4388
	(0.71)	(1.23)	(0.97)	(1.27)	(0.97)	(1.99)	(1.16)	
6	-1.95*	2.20	-1.78	-6.02***	0.66	-2.88	-4.83***	4386
	(0.78)	(1.25)	(1.10)	(1.45)	(0.99)	(2.21)	(1.33)	
7	-2.01*	1.64	-1.64	-5.73**	0.47	-3.00	-4.74**	4379
	(0.88)	(1.42)	(1.25)	(1.66)	(1.13)	(2.82)	(1.50)	
8	-2.08*	0.55	-2.67	-4.24*	-0.48	-5.20	-3.53	4372
	(1.01)	(1.51)	(1.33)	(1.99)	(1.21)	(2.75)	(1.79)	
9	-3.65***	-0.92	-3.15*	-6.57***	-1.64	-5.48	-5.73***	4358
	(0.94)	(1.51)	(1.42)	(1.73)	(1.22)	(3.11)	(1.57)	
10	-4.95***	-2.09	-2.47	-9.23***	-2.24	-4.04	-8.20***	4348
	(0.97)	(1.55)	(1.72)	(1.71)	(1.31)	(3.63)	(1.56)	
11	-6.08***	-3.55*	-3.66*	-9.99***	-3.81**	-5.26	-8.81***	4338
	(1.03)	(1.65)	(1.75)	(1.81)	(1.37)	(3.80)	(1.65)	
12	-6.65***	-4.01*	-4.77*	-10.34***	-4.20**	-7.32	-9.40***	4323
	(1.13)	(1.78)	(1.83)	(2.07)	(1.47)	(3.85)	(1.88)	

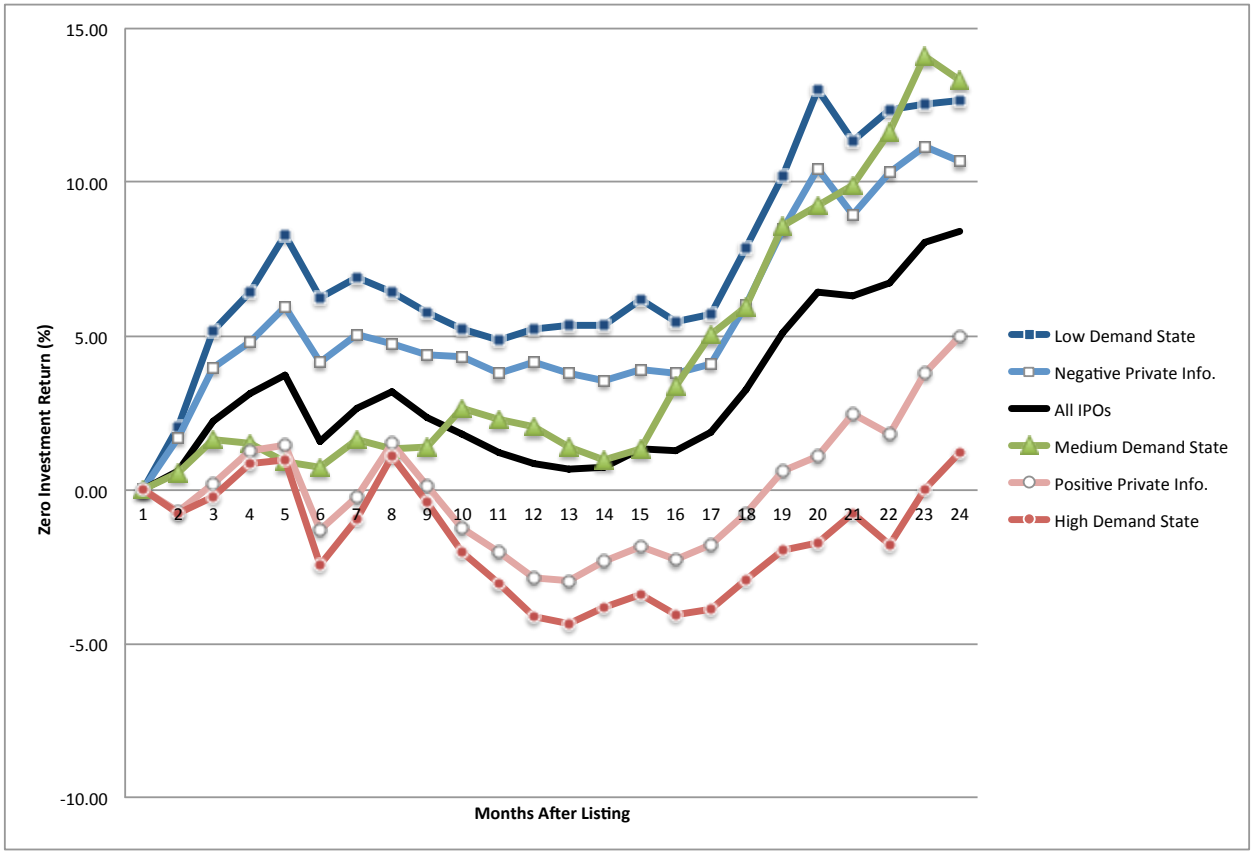


Figure 7: **Excess buy-and-hold return by allocation demand:** The above portfolios of $\overline{xBHR}$ are sorted by the IPOs demand for allocation. High and Low Demands states (HDS and LDS respectively) are portfolios containing those IPOs where the offer price is on the maximum of or above the initial filing range, and on the minimum of or below the initial filing range. The portfolios for the private information (adjusted price update) are strictly positive or negative, and hence the neutral updates are excluded.

Table 13: **Univariate BHAR (Demand State) by Months of Seasoning**

This table contains the average Buy-and-Hold Abnormal Returns (BHAR), by holding period, where firms matched on Fama-French 49 Industry classification, size and book-to-market are used as benchmarks. The portfolios start one month (the 21st day of trading) after listing, and the month column represents a holding period from the beginning of the first month after listing to that month after listing. This corresponds to a Zero Investment Strategy of Long Stock/Short benchmark. The portfolios are sorted by the demand for allocations. A Low Demand State is defined as an offering where the offer price is set on or below the initial filing range minimum. The High Demand State is conversely defined as an offer price set on or above the initial filing range maximum. Private information is defined as the error term of the book-building percent price update regressed on the S&P500 return in the 45 trading day prior to issue. Numbers are in percent of the zero investment size (% of long/short position), t-stats and p-values are for a test of BHAR = 0, with significance levels represented by $+ = 10\%$, $* = 5\%$, $** = 1\%$, $*** = 0.1\%$.

	$\overline{BHAR}$ with Industry, Size & Book-to-Market Matched Firm as Benchmark							N
Month	All IPOs	Low Demand State	Medium Demand State	High Demand State	Negative Private Info.	No Private Info.	Positive Private Info.	All
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4978
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
2	0.08	1.24*	0.71	-1.43*	1.16*	1.20	-1.31*	4978
	(0.37)	(0.59)	(0.69)	(0.63)	(0.50)	(1.25)	(0.59)	
3	0.91	3.66***	2.21*	-2.50*	3.07***	2.03	-1.70	4975
	(0.56)	(0.90)	(0.98)	(0.97)	(0.73)	(1.97)	(0.91)	
4	1.14	4.20**	1.67	-2.10	3.15**	1.37	-1.19	4973
	(0.74)	(1.27)	(1.24)	(1.23)	(1.03)	(2.27)	(1.15)	
5	1.34	4.51*	1.41	-1.72	3.31*	0.85	-0.85	4971
	(0.92)	(1.78)	(1.37)	(1.40)	(1.41)	(2.55)	(1.28)	
6	-0.52	2.58	1.44	-4.69**	1.53	1.57	-3.15*	4966
	(0.90)	(1.54)	(1.47)	(1.53)	(1.24)	(2.98)	(1.42)	
7	-0.26	2.81	1.62	-4.35*	1.98	3.41	-3.31	4956
	(1.02)	(1.68)	(1.59)	(1.81)	(1.35)	(3.35)	(1.66)	
8	-0.38	1.42	1.57	-3.29	0.99	3.12	-2.40	4943
	(1.17)	(1.86)	(1.66)	(2.19)	(1.49)	(3.42)	(1.99)	
9	-1.44	0.63	2.06	-5.53**	0.64	3.01	-4.39*	4923
	(1.14)	(1.90)	(1.72)	(2.03)	(1.52)	(3.71)	(1.86)	
10	-2.13	0.78	3.29	-8.19***	1.12	3.73	-6.60**	4907
	(1.23)	(1.95)	(1.99)	(2.21)	(1.60)	(4.32)	(2.02)	
11	-1.91	0.80	3.29	-7.65**	0.83	3.53	-5.75**	4888
	(1.27)	(2.01)	(2.13)	(2.27)	(1.67)	(4.48)	(2.08)	
12	-1.41	1.72	3.31	-7.26**	1.81	1.13	-5.43*	4868
	(1.37)	(2.15)	(2.26)	(2.50)	(1.78)	(4.89)	(2.28)	

B Event Time Robustness

C Additional Tables

Table 14: **IPO survivorship (by demand state)**

This table shows the number and percentage of IPOs overall, and split by demand state, for each holding-period.

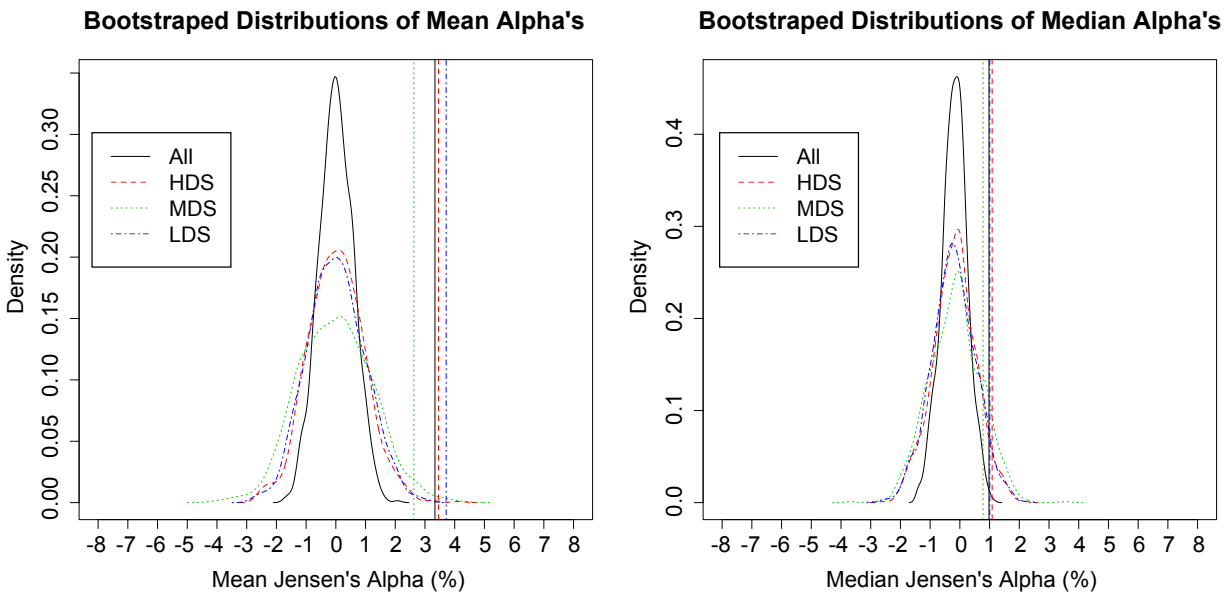
Month	All	HDS	MDS	LDS	All	HDS	MDS	LDS
1	5092	1973	1200	1919	100.00%	38.7%	23.6%	37.7%
2	5092	1973	1200	1919	100.00%	38.7%	23.6%	37.7%
3	5091	1973	1200	1918	99.98%	38.8%	23.6%	37.7%
4	5090	1972	1200	1918	99.96%	38.7%	23.6%	37.7%
5	5090	1972	1200	1918	99.96%	38.7%	23.6%	37.7%
6	5088	1972	1199	1917	99.92%	38.8%	23.6%	37.7%
7	5081	1969	1197	1915	99.78%	38.8%	23.6%	37.7%
8	5074	1966	1196	1912	99.65%	38.7%	23.6%	37.7%
9	5056	1963	1188	1905	99.29%	38.8%	23.5%	37.7%
10	5045	1958	1186	1901	99.08%	38.8%	23.5%	37.7%
11	5033	1954	1183	1896	98.84%	38.8%	23.5%	37.7%
12	5017	1947	1182	1888	98.53%	38.8%	23.6%	37.6%
13	4994	1936	1177	1881	98.08%	38.8%	23.6%	37.7%
14	4954	1922	1170	1862	97.29%	38.8%	23.6%	37.6%
15	4906	1904	1161	1841	96.35%	38.8%	23.7%	37.5%
16	4862	1885	1155	1822	95.48%	38.8%	23.8%	37.5%
17	4834	1868	1152	1814	94.93%	38.6%	23.8%	37.5%
18	4790	1853	1143	1794	94.07%	38.7%	23.9%	37.5%
19	4742	1842	1133	1767	93.13%	38.8%	23.9%	37.3%
20	4691	1819	1124	1748	92.12%	38.8%	24.0%	37.3%
21	4637	1802	1107	1728	91.06%	38.9%	23.9%	37.3%
22	4590	1780	1098	1712	90.14%	38.8%	23.9%	37.3%
23	4545	1760	1086	1699	89.26%	38.7%	23.9%	37.4%
24	4489	1732	1080	1677	88.16%	38.6%	24.1%	37.4%
25	4442	1713	1069	1660	87.23%	38.6%	24.1%	37.4%
26	4380	1693	1058	1629	86.02%	38.7%	24.2%	37.2%
27	4323	1665	1046	1612	84.90%	38.5%	24.2%	37.3%
28	4265	1649	1030	1586	83.76%	38.7%	24.2%	37.2%
29	4220	1632	1022	1566	82.88%	38.7%	24.2%	37.1%
30	4166	1605	1011	1550	81.81%	38.5%	24.3%	37.2%
31	4113	1590	1000	1523	80.77%	38.7%	24.3%	37.0%
32	4060	1571	994	1495	79.73%	38.7%	24.5%	36.8%
33	4005	1543	987	1475	78.65%	38.5%	24.6%	36.8%
34	3956	1526	978	1452	77.69%	38.6%	24.7%	36.7%
35	3910	1510	968	1432	76.79%	38.6%	24.8%	36.6%
36	3850	1487	950	1413	75.61%	38.6%	24.7%	36.7%

Table 15: **IPO survivorship (by private information)**

This table shows the number and percentage of IPOs overall, and split by private information, for each holding-period.

		Private				Private		
Month	All	Positive	Neutral	Negative	All	Positive	Neutral	Negative
1	5092	2223	286	2583	100.00%	43.7%	5.6%	50.7%
2	5092	2223	286	2583	100.00%	43.7%	5.6%	50.7%
3	5091	2223	286	2582	99.98%	43.7%	5.6%	50.7%
4	5090	2222	286	2582	99.96%	43.7%	5.6%	50.7%
5	5090	2222	286	2582	99.96%	43.7%	5.6%	50.7%
6	5088	2222	286	2580	99.92%	43.7%	5.6%	50.7%
7	5081	2218	286	2577	99.78%	43.7%	5.6%	50.7%
8	5074	2214	286	2574	99.65%	43.6%	5.6%	50.7%
9	5056	2210	281	2565	99.29%	43.7%	5.6%	50.7%
10	5045	2205	281	2559	99.08%	43.7%	5.6%	50.7%
11	5033	2199	280	2554	98.84%	43.7%	5.6%	50.7%
12	5017	2192	280	2545	98.53%	43.7%	5.6%	50.7%
13	4994	2179	279	2536	98.08%	43.6%	5.6%	50.8%
14	4954	2163	277	2514	97.29%	43.7%	5.6%	50.7%
15	4906	2141	275	2490	96.35%	43.6%	5.6%	50.8%
16	4862	2121	275	2466	95.48%	43.6%	5.7%	50.7%
17	4834	2104	273	2457	94.93%	43.5%	5.6%	50.8%
18	4790	2085	271	2434	94.07%	43.5%	5.7%	50.8%
19	4742	2071	269	2402	93.13%	43.7%	5.7%	50.7%
20	4691	2048	264	2379	92.12%	43.7%	5.6%	50.7%
21	4637	2030	260	2347	91.06%	43.8%	5.6%	50.6%
22	4590	2007	257	2326	90.14%	43.7%	5.6%	50.7%
23	4545	1983	253	2309	89.26%	43.6%	5.6%	50.8%
24	4489	1952	253	2284	88.16%	43.5%	5.6%	50.9%
25	4442	1931	248	2263	87.23%	43.5%	5.6%	50.9%
26	4380	1908	246	2226	86.02%	43.6%	5.6%	50.8%
27	4323	1878	243	2202	84.90%	43.4%	5.6%	50.9%
28	4265	1862	238	2165	83.76%	43.7%	5.6%	50.8%
29	4220	1844	238	2138	82.88%	43.7%	5.6%	50.7%
30	4166	1814	237	2115	81.81%	43.5%	5.7%	50.8%
31	4113	1794	237	2082	80.77%	43.6%	5.8%	50.6%
32	4060	1772	236	2052	79.73%	43.6%	5.8%	50.5%
33	4005	1744	234	2027	78.65%	43.5%	5.8%	50.6%
34	3956	1725	233	1998	77.69%	43.6%	5.9%	50.5%
35	3910	1706	231	1973	76.79%	43.6%	5.9%	50.5%
36	3850	1679	226	1945	75.61%	43.6%	5.9%	50.5%

(a) Industry, Size & Book-to-Market matched



(b) Industry averages

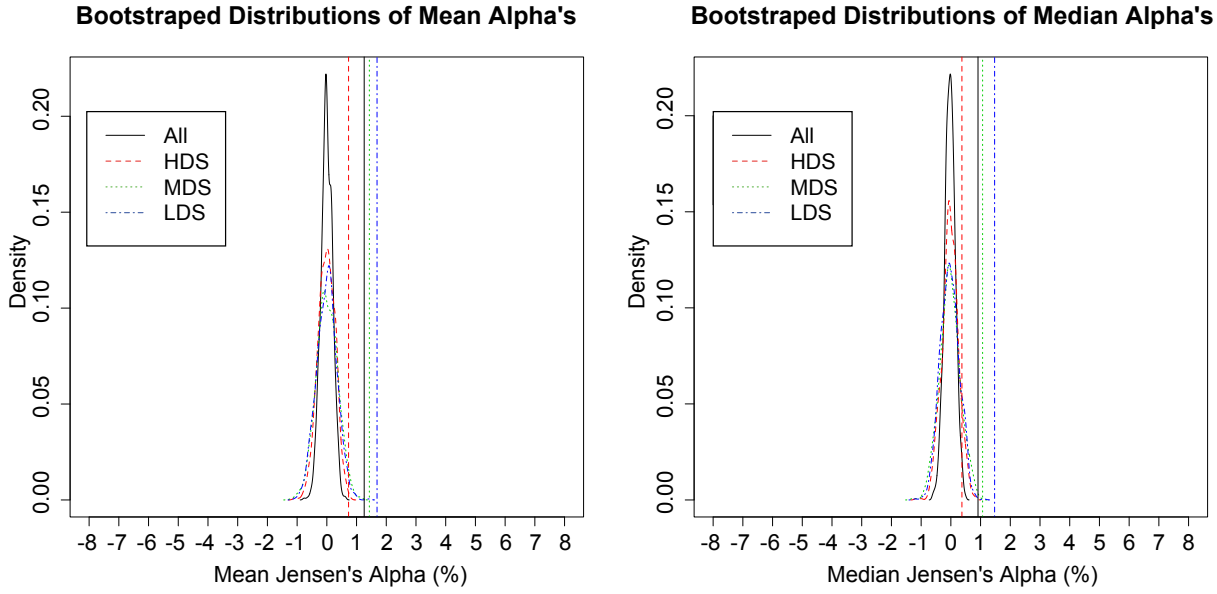


Figure 8: **Alphas with bootstrapped distributions by allocation demand**
High, Medium and Low Demand States (HDS, MDS and LDS respectively) defined as above. The above alphas are from Fama-French-Carhart 4 factor models on time series of each IPOs daily data from 2nd through 5th months of trading. The bell curves are their conditional and unconditional bootstrapped distributions following Blake, Timmermann, Tonks, and Wermers (2010) and Kosowski, Timmermann, Wermers, and White (2006).