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Initial Public Offering Allocations, Price Support, and Secondary Investors

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INITIAL PUBLIC OFFERING ALLOCATIONS, PRICE SUPPORT, AND SECONDARY INVESTORS

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Abstract

Tying Initial Public Offering (IPO) allocations to after-listing purchases of other IPO shares, as a form of price support, has generated much theoretical interest and media attention. Price support is price manipulation and can reduce secondary investor return. Obtaining data to investigate price support has in the past proven to be difficult. We document that price support is harming secondary investor return using new data from the Oslo Stock Exchange. We also show that investors who engage in price support are allocated more future oversubscribed allocations while harmed secondary investors significantly reduce their future participation in the secondary market.

JEL classification: G24; G28

Keywords: IPO allocations; Laddering; Price stabilization; Price support; Equity offerings

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I. Introduction

Lead investment banks can secure after-listing price support for IPOs they underwrite by allocating shares to institutional investors whose secondary market trading they can influence. Investment banks can gain such influence from their power to exclude institutional investors from future IPOs. Chen and Wilhelm (2008) explain theoretically that price support can be beneficial for issuers because it allows for an optimal response to new information and smooths the transition to secondary trading. Price support is price manipulation and may have a negative impact on non-IPO investors who buy shares in the secondary market immediately after the listing. The main objective of this paper is to understand whether price support harms secondary investors who buy shares immediately after the listing. Our main result is that when increasing price support with one standard deviation, secondary investor holding period excess returns (HPERs) are reduced by 7.5% in the first three months after the listing, holding all else constant. Secondary investors who buy after IPOs with price support reduce their future participation in the secondary market with 14% compared to investors who buy after IPOs with no price support. The investors who provide immediate post-IPO price support receive more than three times larger allocations than non-price support investors in future oversubscribed IPO allocations from the same lead investment bank. Price support is mainly provided by large international institutions. Most secondary investors who are hurt by the price support are retail and small domestic non-financial institutions (such as privately held companies).

Our main contribution is that we show that price support harms secondary investors and keeps these investors away from the secondary IPO market in the future. We argue that regulators should require more information be provided to markets regarding price support trades

by investors to avoid possible harm to naïve secondary investors. Currently investment banks are not required to disclose price support made by investors. Obtaining data that allows us to distinguish primary from secondary investors and secondary trading by allocated investors has proved to be difficult in the past. Using data from the Oslo Stock Exchange (OSE), we are able to observe both the allocation of IPO shares to investors and the trading of allocated and non-allocated investors after the IPOs. The OSE data consist of 187,570 investor-IPO pairs as well as stock trading commissions and after-listing trading from 1993 to 2007. Stock ownership by investor ID is observed for all of the studied companies throughout the listing process.

Price support can take several forms, which can be legal (like IPO price stabilization) or illegal (like IPO laddering).[1] We expect laddering and price stabilization to have the same effect on secondary investor returns, as both mechanisms keep secondary prices artificially high in the period immediately after the listing. For this reason we do not distinguish between laddering and

[1] Chapter 3 in the Norwegian Securities Trading Act implements the European Union (EU) Commission Regulation on the stabilisation of financial instruments under Norwegian law. Section 3.12 of the Act sets out the conditions under which price stabilisation can be carried out, without coming into conflict with the rules prohibiting market price manipulation. Price stabilisation is legal to prevent or retard a fall in the share price immediately after a share issue. Stabilisation must not occur above the offering price (laddering). The rules governing price stabilization in the U.S. new issues market are the same. Rule 101 of Regulation M under the Securities and Exchange Act of 1934 prohibits price stabilization above the offering price (laddering) in the U.S. as price manipulation. Rule 104 of the same Act, however, allows price stabilization for the purpose of preventing or retarding a decline in the market price of a security if it falls below the offering price in the IPO.

price stabilization, which we call “price support” in the rest of the paper. Wilhelm (1999), Hao (2007), and Chen and Wilhelm (2008) study IPO price support theoretically. Wilhelm (1999) describes the benefits and the economic consequences of IPO price support. Wilhelm explains that price support in the immediate period after the listing can be beneficial by giving investors time to analyse if negative volume shocks in the IPO shares are driven by perceived overvaluation or other reasons such as diversification needs. Price support can then help avoid negative spirals in price due to negative volume shocks driven by other reasons than perceived overvaluation. Wilhelm further explains that any secondary investor unaware of the IPO price support might buy shares after the listing assuming that shares are priced correctly. Secondary investors buying under this assumption will be hurt when secondary prices fall to their apparent equilibrium levels. The secondary investors who lose money on price support are likely to be naïve (presumably retail) investors.

Hao (2007) discusses the factors that affect incentives to engage in IPO price support and the effects of IPO price support on issuing firms. Hao (2007) shows that underwriters mainly use price support to boost the after-listing market price. Investor price support reduces the possibility of price decreases after the listing and thereby the underwriters' expected cost of investment bank price support (especially if used without over-allotment options). Hao argues that excessive buying ensures that prices will be higher than they otherwise would have been after the listing (until price support investors sell and the effect of price support on prices disappears). Hao (2007) also shows that price support is likely to boost immediate prices and contribute to underperformance after the listing. Thus, price support hurts investors who buy shares on the secondary market.

Chen and Wilhelm (2008) explain that there is often a very high share turnover (and price volatility) due to information asymmetry in the immediate period after a new listing. Due to the high turnover it may be optimal for banks to intervene in prices and help smooth the transition for issuers. Chen and Wilhelm argue that investment banks may then collaborate with institutional IPO investors in supporting the price transition to normal secondary market trading. Some institutional IPO investors are allocated shares at the IPO offer price both before and after secondary trading has started. It is assumed that allocations (plus secondary market purchases) exceed optimal holdings and that the lead investment bank can control the offloading of excessive shares in the secondary market by over allocated investors. Controlling additional purchases and the sale of shares by specific investors allows the lead investment bank to respond optimally, on behalf of the issuer, to the arrival of informed secondary market investors.

Several empirical papers investigate the existence of IPO price support. Ellis (2006) investigates trading volume in IPO shares after the listing of 311 Nasdaq IPOs from 1996 to 1997. She shows that during this period, investors with buy orders filed through the lead underwriter accounted for 22% of the trading volume after IPOs. This finding is consistent with price support claims, since price support investors are likely to buy shares through the lead underwriter in order to make their price support trades visible for the lead underwriter. Griffin, Harris and Topaloglu (2007) provide indirect evidence of IPO price support by investigating through which brokerage houses after-listing buy orders are placed.[2] By using IPO allocation and

[2] In addition to the previously mentioned reasons for IPO price support, Griffin et al. (2007) argue that investment banks may use investor price support to improve their reputation. Reduced after-listing price uncertainty can be good for investment banks because IPOs that fall in price may cause reputational damage among future issuers and investors. Griffin et al. also argue that

aftermarket trading data, we are able to provide direct evidence of IPO price support and of its consequences for investors. This is the first paper, as far as we know, to investigates the consequences of price support empirically.

The rest of the paper is organized as follows. Section II describes the hypotheses. Section III describes the institutional setup. Section IV describes the data set. Section V describes the empirical results, and Section VI concludes the paper.

II. Hypothesis Development

A main empirical prediction from Chen and Wilhelm (2008) is that secondary market prices should decline from their initial levels in IPOs with more price support. Chen and Wilhelm argue that prices are likely to initially rise from the offer price immediately after the listing (as newly arriving informed investors compete to avoid being crowded out) and then decline (as the optimal secondary market share distribution is achieved). Chen and Wilhelm argue that this process is likely to take a few weeks or months. Hao (2007) similarly argues that price support leads to lower returns in the longer period after the listing as price support boosts immediate prices above their equilibrium levels. Wilhelm (1999) argues that any secondary investor unaware of IPO price support might buy shares immediately after the listing assuming that shares are priced correctly. Secondary investors buying under this assumption (presumably naïve investors or retail investors) will be hurt if secondary prices fall to their apparent

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price support generates revenues for lead investment banks through trading commissions because price support investors are likely to execute their trades through the lead investment bank.

equilibrium levels. If secondary investors are hurt by the price support, we should find a negative relation between total levels of price support and secondary investor return. Griffin, Harris and Topaloglu (2007) explain that lead banks are likely to use a group of large institutional investors for price support (to economize on monitoring costs). Chen and Wilhelm (2008) also argue that investment banks are likely to use a select group of institutional investors for price support. The biggest institutional investors in Norway (besides government related investors) are international institutions. We therefore expect a negative relation between price support by large international institutions and secondary investor returns. We formalize this hypothesis in H1.

H1: There is a negative relation between total levels of price support by international institutions and secondary investor holding period excess returns (HPERs).

Second, we investigate if price support investors are rewarded with future oversubscribed IPO allocations for this service. Chen and Wilhelm (2008) argue that institutional investors are willing to provide price support in return for future opportunities to obtain allocations at discounted prices. Chen and Wilhelm refer to this process as informal penalty bids. If banks are able to use institutional investors in this way, there should be a positive relation between past IPO price support and allocations in future oversubscribed IPOs. Because it is difficult to obtain data on IPO allocations, there is no direct evidence tying allocations to after-listing trading.[3] Using detailed IPO allocation and aftermarket trading data from the Oslo Stock Exchange, we

[3] IPO order books do, however, typically have some investors that are marked with, for example, "will buy 2x" or "will buy 3x" that are references to the multiples of IPO shares that will be purchased after the listings; see Hao (2007).

can estimate the relation between past price support and allocation in future oversubscribed IPOs. Such a relation would support Chen and Wilhelm in that lead banks get institutional investors to engage in price support by tying purchases to future oversubscribed allocations. We formalize this hypothesis in H2.

> *H2: There is a positive relation between oversubscribed IPO allocations and past investor price support by international institutional investors.*

Hao (2007) predicts theoretically that price support will increase initial returns after the listing which in turn will increase the information momentum and demand for shares by secondary investors. Barber and Odean (2008) find that retail investors buy disproportionately more shares in companies that get more attention from high one-day returns or high trading volumes. Kumar and Lee (2006) similarly show that retail investors spend less time on investment analysis and engage in more attention based trading. Kumar and Lee also find that retail trading is correlated across retail investors (in the sense that when one group of retail investors buy shares a different set of retail investors also buy shares). Based on Hao, Kumar and Lee, and Barber and Odean we therefore expect a positive relation between the number of shares purchased by price support and secondary investors immediately after the listing.

However, we also expect that the secondary investors will not repeat this strategy when they realize that there has been price support in the IPO. Rational investors who lose money buying immediately after new listings should not repeat this strategy in the future, when they realize that IPO price support inflates artificially short-term post-IPO prices. Investigating future IPO secondary market participation by such investors allows us to understand the implications of

price support on the secondary market. We investigate the consequences of price support by measuring if secondary investors initially buy more share due to price support and then if they continue to buy (or drop out) from the secondary market in the future. We formalize this hypothesis in H3.

H3: Price support is positively related with secondary buying in current IPOs and negatively related with secondary buying in future IPOs.

III. Institutional Setup

The Oslo Stock Exchange (OSE) requires that companies have sufficient levels of equity to survive for 12 months without positive cash flow after a listing. The OSE also requires that public companies must have a minimum number of owners (500 for the main list).[4] Most companies need to issue new equity to meet these requirements before they list publicly. All companies are assisted by an investment bank in their IPO listing process. Issuers meet with several investment banks in sales presentations before a specific lead manager is chosen. The investment banking industry in Norway is highly competitive with 32 different lead managers in the 188 companies in the sample. Most IPOs also include several co-managers that consist of both international (including the largest U.S. banks) and domestic investment banks. Given high competition in the industry, the reputation of the banks is likely to be an important factor in the

[4] The listing process information is obtained from the seminar "The road to the listing" November 3, 2009 by Deloitte Public Accountants and the Oslo Stock Exchange and from meetings with former investment bankers in Norway.

selection process for the issuer (Abrahamson, Jenkinson, and Jones, 2011). Many IPOs on the OSE include major financial centres such as New York and London in their IPO roadshows.

Bookbuilding is used to price and allocate shares on the OSE. For instance in one of the listing prospectuses the final offer price is described as being determined by bids among investors that apply for shares valued at more than 1 million NOK (179,200 USD) in the bookbuilding procedure. The final offer price will be based on the demand for shares at different price levels. The pricing range NOK 18.90 (3.4 USD) to NOK 23.50 (4.2 USD) will be used as an indicative interval. Applications will be accepted from February 8 to February 27, 2002 (indicating a three week roadshow). The investment bank makes a list of its proposed IPO allocations after applications are received. The proposed allocation list is given to the board of the issuing company for approval. Anecdotal evidence suggests that the allocation list is typically approved without adjustments.

A key institutional difference between IPOs in Norway and IPOs in the United States is that for some IPOs on the OSE the lead investment bank sells and distributes shares at the offering price before the actual listing on the exchange. The delay between allocation and listing appears random and does not happen in all IPOs. When there is a delay, the IPO offering price does not change in the period between allocation and listing.

IV. Data Description

A. IPO Sample and Investor Identification

There were 266 new listings on the OSE in the period 1993 to 2007 that included equity offerings to new shareholders. We observe allocation data in 188 of these companies. For the remaining 78 companies we are unable to observe allocation data because these companies list in the database after IPO shares are distributed. Table 1 reports the capital raised from the 188 IPOs in the sample per year. Table 2 describes the main characteristics for these 188 companies. The average capital raised per IPO, the average equal weighted first day return (underpricing), and the average equal weighted allocation to institutional investors is $89 million, 10%, and 79%, respectively.

The Oslo Stock Exchange requires all shareholders to register in the Norwegian Central Depository (the VPS) before a listing. The VPS database is comprehensive because it is not possible to list on the OSE without first listing in the VPS. This database includes month-end ownership by all shareholders in all companies that are publicly listed or are considering a listing in the future. The VPS database is unique because it allows for calculation of IPO allocations. We use the fact that shares can be transferred before the listing to calculate actual IPO allocations and secondary trading. There are three dates that are important in the listing process: when the companies list their ownership records in the VPS, when the companies transfer the IPO shares, and when official secondary trading starts (the listing date on the OSE). These three dates influence at what level of detail we can observe IPO allocations and secondary trading. We observe share holdings at the end of each calendar month so when the listing in VPS date, share

allocation date, and OSE listing date are in separate calendar months we can differentiate between pre IPO, allocated, and secondary investor shares.

We are able to observe exact IPO allocations and secondary trading in 35 companies with 26,858 IPO allocations (and 13,131 secondary investors). Figure 1A shows the timeline in the listing for these companies. In total, 25 of these 35 companies transfer the IPO shares in the calendar month just before the listing month. The remaining ten companies transfer the shares in an earlier month. For these ten companies we can control that allocated shares are not traded in the month before the listing by comparing holdings between months in the VPS data. In these 35 companies we can completely discriminate between allocated and secondary investors. We observe company ownership after the IPO shares are transferred, but before secondary trading at the OSE has started. We define IPO allocations from the VPS database as the difference in company ownership from the end of the month before the allocation dates to the month of the allocation dates (when shares are transferred). The IPO listing prospectuses made in connection with the listings include future allocation/share transfer dates. We also observe that shares are transferred in the specified months in the VPS data. We only investigate IPO allocations to new shareholders. Allocations to existing shareholders (if any) are dropped.[5]

[5] Shares sold over the counter (OTC trading) in the period between the allocation day and the end of the allocation month cannot be detected in the data. Therefore, investors who buy shares in the OTC market between the allocation day and the end of the allocation month will be treated as allocated investors. However, OTC trading is expected to be a very small phenomenon in this period. It is unlikely that many of the investors to whom IPO shares are allocated will sell these shares before the listing and potentially lose out on the expected underpricing.

Appendix Table A1 shows the timeline provided in one of the listing prospectuses in the sample. From Table A1 it can be seen that the lead manager in the IPO accepts applications for shares in the period November 26 to December 10, 1993. Investors are notified about their allotment on December 17, 1993 and shares must be paid in full by December 23, 1993. Shares are expected to be in the investor accounts by December 30. (From the database we also observe that shares were actually transferred in December). From the OSE listing statistics we observe that the actual listing date was January 10, 1994. In this IPO the shares were allocated to the IPO investors before the actual listing (as evidenced by the listing prospectus and the Norwegian database). In this case, we observe investors' holdings at the end of November 1993, the end of December 1993, the end of January 1994, and at the end of February 1994. We identify IPO investors as those who hold shares at the end of December 1993 (and did not hold shares in November 1993). We identify secondary investors as those who hold shares at the end of January 1994 (and separately at the end of February 1994) and did not hold shares in November or December 1993.

From the VPS data we are also able to observe the ownership before and after the IPO of 153 other companies (160,712 IPO-investor pairs) for which the shares are transferred during the month of listing. In these companies IPO allocations are obtained as the investors who hold shares at the end of the listing month minus pre-IPO investors. The ownership in these IPOs could be contaminated by some after-listing trading. Secondary investors are then defined as the new investors that buy in the company until the end of the month after the listing. Figure 1B shows the timeline in the listing for these 153 companies. Whenever possible, we report results for the entire sample of 188 IPOs, as well as for the smaller sample of 35 IPOs for which we can exactly identify IPO investors and secondary investors.

B. Definition of Variables

Appendix Table A2 provides a definition of all variables. *Price support* is defined as the number of additional shares purchased by the allocated international institutions immediately after the listing as a fraction of the shares issued in the IPO. We include *Price support* until the month after the listing as both Griffin et al. (2007) and Chen and Wilhelm (2008) argue that price support may go on for some time after the listing. The results remain unchanged when we only include *Price support* if it occurs within the listing month (and are therefore not reported). The results are also the same if we include all institutional investors or all domestic financial institutions as price support (rather than only international institutions) and are therefore not reported. Price support by the underwriter will be part of share purchases by domestic financial institutions.

Past price support is the cumulative number of times an investor has a positive value of *Price support* divided by the cumulative number of times the investor has participated in IPOs by the same lead investment bank. This variable measures how frequently an investor has potentially engaged in price support, relative to his/her total participations in IPOs by the same bank. *IPO allocation* is defined as the number of shares allocated to an investor divided by the total number of shares issued in the IPO as a percentage.[6]

HPER is the excess holding period return in the issuing company over the return of a matched company on market value and book-to-market ratio. *HPER* is used to measure the

[6] The number of shares sold in the IPO is the number of actual shares sold to new shareholders from the VPS database. In listing prospectuses the number of shares sold is often disclosed as a range. The actual number of shares sold is observable in the VPS database.

return of the company after the listing. Barber and Lyon (1997) show that calculating abnormal returns using a matched firm technique gives well specified test statistics in virtually all sampling situations. We therefore follow Barber and Lyon and calculate holding period excess returns (HPERs) by matching IPOs to public non-IPO companies with market values ranging from 70% to 130% of the IPO firms. We then select the firm with the closest book-to-market ratio as the matching firm for our HPER calculations. To judge the robustness of our results, we use the return on two alternative benchmarks: (1) the main market index (the OBX) and (2) the closest of 50 (10 * 5) portfolios on *MV* and *BV/MV*. The results remain unchanged when we use these alternative benchmarks and are therefore not reported. We measure the *HPER* from the first day closing price to the first 1, 2, 3, 6, and 12 month closing price. The results are the same if we calculate the HPERs from the first week or the first three week closing prices and are therefore not reported.

C. Summary Statistics

Investors are classified into 72 different investor codes in the VPS database. We further group these 72 investor codes into government investors, domestic retail, international retail, domestic financial institution, domestic non-financial institution, and international institutional investor. Panel A in Table 3 shows the total number and the total value of IPO allocations between these six investor groups in all the 188 companies in the sample. The share distribution is about the same when the 35 companies with exact data are investigated separately (not reported). IPO allocated investors buy 2,201.6 million shares for a total value of $16,784.2 million USD (at offering prices). Domestic and international retail investors receive in total

about 13% of the total IPO shares. (Retail investors receive about 20% of the equal weighted shares across the 188 IPOs). Government investors, domestic financial institutions, and domestic non-financial institutions receive 6.4%, 17.1%, and 14.6% of the total IPO shares, respectively. The remaining 49% of the IPO shares are given to large international institutional investors. We measure the size of the investors by their portfolio of Norwegian publicly traded shares. The average *Portfolio* of the IPO allocated international institutional investors is $68.2 million. The IPO share distribution is about the same in value terms.

Panel B of Table 3 shows the distribution of secondary purchases made by allocated investors within the first month after the listing. These allocated investors buy in total 13.6% of the issued shares in the month after the listing (298.8 million shares purchased / 2,201.6 million shares issued = 13.6%). Government investors, domestic retail, international retail, and domestic non-financial institutions buy in total 23% of the secondary shares in total. Domestic financial institutions also buy 23% of secondary shares. *Price support* by the underwriter will be included in these 23% (as most of the underwriters are classified as domestic financial institutions).[7] The remaining 54% of the secondary purchases made by allocated investors are made by large international institutions. Most of the IPO allocations and secondary purchases are therefore made by large international institutional investors. Domestic financial and international institutions are the most active of the allocated investors on the secondary market. Moreover, price support investors in these two categories of investors are bigger on average (in terms of

[7] Most underwriters are likely to retain some shares in the IPO. This is consistent with Chiang, Lowry, and Qian (2014) who find that most underwriters have a positive inventory in the IPO stock at the time of the IPO.

their portfolio sizes) than investors in the same categories who receive shares in the IPO. Potential price support investors are bigger than investors who do not provide price support.

Panel C of Table 3 describes the secondary investors that buy shares within the first month after the new listings. These investors are not allocated IPO shares. These are the secondary investors who are potentially hurt from price support. Secondary investors buy 18.9% of the issued shares (415.2 million shares purchased / 2,201.6 million shares issued = 18.9%). We find that 13.6% and 18.9% of the IPO issued shares are purchased by allocated and non-allocated *Secondary* investors in the month after the listing, respectively. This is higher than Aggarwal (2003) who find that 15% of IPO issued shares are on average sold within the first two days of trading. We observe trading over a much longer time interval than Aggarwal so it is expected that we will find more trading. In total 55% of the secondary shares are bought by retail and small domestic non-financial institutions. Most of the secondary purchases (by non-allocated investors) are made by retail investors and small domestic non-financial companies. This is not surprising, as these two categories of investors are the most likely to be discriminated against in the IPO allocation process. The non-allocated domestic financial investors and the international institutions that buy shares in the secondary market are also significantly smaller (based on their *Portfolio*) than the same investors who are allocated shares in the IPO. The average *Portfolio* of a non-allocated international institution who buy shares in the secondary market is only 16% of the value of an IPO allocated international institution who buy shares in the secondary market ($31.3 / $194.2). *Price support* investors are much larger than *Secondary* investors.

D. Share Ownership after the Listing

Figure 2 shows share holdings in the six months after the listing for shares in companies with an IPO on the OSE in the period 1993 to February 2007. The sample is reduced from 188 to 182 companies to observe six months of post-listing holdings (as the sample ends in September 2007). Figure 2 is very consistent with the predictions in the related literature. *Pre IPO* investors own shares before the IPO. These investors own in total 65% of outstanding shares immediately after the time of allocation (T = Allocation). The remaining 35% of outstanding shares are issued in the IPOs. One month after the listing *Pre IPO* investors still own 65% of all shares (T = 1). There is a small reduction in the holing percentage of *Pre IPO* in the six months after the listing that comes from shares not tied or shares granted early release from a lock-up contract. *Allocated* are the investors who buy shares in the IPO. *Allocated* investors own 35% of total outstanding shares at the allocation. *Allocated* investors have reduced their ownership to 26.7% of total shares by T = 1 (one month after the listing). *Allocated* share ownership is very stable from T = 1 to T = 6. A large fraction of the IPO allocated shares are sold immediately while the remaining shares are held for more than six months after the listing. We interpret this to be consistent with Chen and Wilhelm (2008) who explain that share ownership will reach a steady state within a few months after the listing date. We also interpret this to explain the need for price support due to the large fraction of IPO allocated shares that are just immediately offloaded.

Price support is the additional shares purchased by the allocated international institutions immediately after the listing. Chen and Wilhelm (2008) and Griffin et al. (2007) argue that *Price support* may go on for a few weeks or months. Chen and Wilhelm also explain that investment banks are likely to be able to control the offloading of the excessive shares purchased by the *Price support* investors. Figure 2 is consistent with Chen and Wilhelm in the sense that we

observe that *Price support* investors buy an additional 2.4% of total shares (or about 7% of issued shares) in the period between allocation and T = 1. *Price support* shares are then slowly offloaded until T = 6 where only a small fraction are left.

Secondary are the non-allocated investors who buy shares in the immediate secondary market after the listing. *Secondary* are the same unique investors over time (as we do not include investors who buy later into this group). *Secondary* are the investors who are likely to lose money from *Price support.* (These investors are mainly retail and small domestic non-financial institutions). *Secondary* investors buy 6.1% of total shares (or 17.4% of the IPO issued shares) in the immediate term after the listing (T = 1). From Figure 2 we can also see that *Secondary* investors keep most of the shares and at T = 6 they still own 4.8% of total shares (or 14% of issued shares). This is consistent with Odean (1998) who finds that the average share holding period for investors using discount brokers is about 15 months. Retail investors and domestic companies are arguably more likely to use discount brokers than professional investors. *Secondary* investors will buy shares immediately after the listing and then hold most of these shares through the first six months of the listing (which means that these investors will lose money if the share price falls after the listing). Figure 2 shows that from T = 2 and onwards the share ownership is more stable. There is a small reduction in all groups after T = 2 where *New* investors buy shares. *New* are the secondary investors who buy shares later after the listing.

V. Empirical Results

A. Secondary Investor Holding Period Excess Returns

Hypothesis H1 predicts a negative relation between *Price support* and *HPER*s. We follow Barber and Lyon (1997), Kothari and Warner (1997), and Boehmer, Boehmer, and Fishe (2006) and investigate IPO holding period excess returns (HPERs) to measure the relation between price support and secondary investor returns. In Table 4 we regress the *1, 2, 3, 6,* and *12 month HPER* on *Price support* and various controls and year fixed effects in standard OLS regressions using equation (1).

$$\begin{aligned} HPER_j = a_0 \; + \; & a_1 \text{Price support}_j \; + \; a_2 \text{Market value}_j + \; a_3 BV/MV_j + \; a_4 VC_j \\ + \; & a_5 \text{First day return}_j + a_6 \text{Top-tier dummy}_j + a_7 Tech_j + a_8 \text{Offer size}_j \\ + \; & a_9 \text{Bubble dummy} + \; a_{10} \text{Post bubble dummy} \quad + \; a_{11} \text{Time gap}_j \\ + \; & \sum_{t=1}^{15} d_j \text{Year fixed effects} + e_j \end{aligned} \tag{1}$$

HPER is the holding period return of the issuing company in excess of a matching company on *MV* and *BV/MV* in %. We find the same results using alternative benchmarks such as the main market index (the OBX) or the closest of 50 (10 * 5) portfolios on MV and BV/MV (and these results are therefore not reported). *Price support* is defined as the total level of the issue that is purchased by IPO allocated international institutions immediately after the listing in decimal points.[8] We use the combined set of control variables developed by Liu and Ritter

[8] We find the same results if we include *Price support* by all institutional investors or domestic financial institutions (rather than only international institutions). In the main analysis we estimate

(2011) and Boehmer et al. (2006) when they investigate IPO first day returns and IPO long run returns, respectively. We additionally include the variable *Time gap* to control for that the results are not driven by the time difference between the IPO allocation and the listing.[9]

From column 1 of Table 4 we can see there is an indication of a negative relation between the *1 month HPER* and *Price support* for all 188 companies. The coefficient on the *1 month HPER* on *Price support* is 1.7, but only significant at the 10% level in a one-sided t-test. In columns 2, 3, and 4 we regress the *2, 3, and 6 month HPERs* on *Price support*, respectively. The slope coefficients of the *2, 3, and 6 month HPERs* on *Price support* are -10.1, -20.0, and -32.6, respectively. All coefficients are significant at the 1% level in a standard t-test. The interpretation is that increasing *Price support* with one standard deviation (0.27) will decrease the *2, 3, and 6 month HPERs* by 2.7%, 5.4% and 8.8%, respectively (holding all else constant). In column 5 we regress the *12 month HPER* on *Price support*. The coefficient of the *6 and the 12 month HPERS* are very similar. We interpret this to mean that secondary investors are mainly hurt by price support in the immediate term after the listing. However, there is a long term effect on prices that lasts for more than one year after the listing. Secondary investors who are not allocated in the IPO buy shares immediately after IPOs for a total value of $3,384.1 million. Secondary investors lose $17 million (0.5%), $91 million (2.7%), $183 million (5.4%), and $298 million (8.8%) in total over the first one, two, three, and six months after the listing from price

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Price support until the end of the month after the listing as both Griffin et al. (2007) and Chen and Wilhelm (2008) argue that price support may go on for weeks or months after the listing. We find the same results for *Price support* only within the listing month.

[9] The correlations between *Price support* and *Time gap* are very low at 0.04 and -0.06 in the 188 company and the 35 company samples, respectively.

support, respectively (when assuming 27% price support and that all secondary investors hold all shares for the entire period).

In columns 6 to 10 of Table 4 we separately investigate the 35 companies with exact data. From column 6 it can be seen that there is a negative relation between the *1 month HPER* and *Price support* when only investigating the 35 companies with exact data. The slope coefficient of the *1 month HPER* on *Price support* is -8.5 (column 6). The interpretation is that increasing *Price support* with one standard deviation (0.27) will decrease the *1 month HPER* by about 2.3% (-8.5 * 0.27). From column 7, 8 and, 9 it can be seen that the *2, 3,* and *6 month HPERs* are also negatively related to *Price support* with slope coefficient of -11.5, -27.8 and -38.6, respectively. The interpretation is that increasing *Price support* with one standard deviation will reduce the *2, 3,* and *6 month HPERs* by 3.1%, 7.5% and 10.4%, respectively. (A price fall of 3.1% in two months is similar to the example used in Wilhelm (1999) where the Landstar IPO fell with 3.8% in the first five weeks after the listing). The coefficients on the *Price support* variable in columns 6 to 9 are all highly significant statistically, with t-statistics of -3 or better. Also here we find a similar effect of *Price support* on the *6 month HPER* and *the 12 month HPER*s (column 9 and 10). We interpret this to mean that there is a negative impact of *Price support* on *HPERs* in the immediate period after the listing that also last for the longer term. Secondary investors who buy immediately after the listing (and hold the shares) will lose money in the early months after the listing when there is more price support. These results are in line with hypothesis H1: There is a negative relation between total levels of price support and secondary investor holding period excess returns (*HPERs*). None of the control variables are consistently related to the *HPERs.*

B. Fama and French (1993) Three Factor Regressions

Table 5 shows the results when we investigate post-IPO returns using the Fama and French (1993) three factor regressions of monthly excess returns. The portfolio *Price support* invests a rolling portfolio in all IPOs with price support. We assume that IPOs are bought at the first day closing price and sold after six months. The portfolio *No Price support* invests a rolling portfolio in all IPOs with no price support. We regress portfolio monthly excess returns over the risk free rate (3 month NIBOR) on the excess return on the market portfolio (the OBX), the performance of small stocks relative to large stocks, and the performance of value stocks relative to growth stocks as explained by Fama and French (1993). All 188 IPOs in the period 1993 to 2007 are included in the regressions. The portfolio investing in IPOs with *Price support* generates a significant negative alpha. The portfolio investing in IPOs with no price support does not give a significant alpha. In panel A, B, and C the *Price support* portfolio invests in IPOs with more than 6.7%, 8.5%, and 9.5% *Price support* (equivalent to the top 33%, the top 25%, and the top 20% of IPOs with price support, respectively). The portfolios investing in IPOs in the top 33%, 25%, and 20% of IPOs with price support have monthly alphas of -1.87%, -1.90%, and -2.14%, respectively. The three factor regressions give the same results as the HPER regressions. Increased *Price support* reduces post IPO returns also using the Fama and French 3-factor model.

C. Price Support and IPO Allocations

Hypothesis H2 predicts a positive relation between past investor price support and future oversubscribed IPO allocations. *Past price support* is the cumulative number of times an

allocated international institutional investor has purchased more shares immediately after the listing divided by the cumulative number of times the investor has participated in IPOs by the same bank. *Oversubscription* takes the value of one if the IPO is more than two, three, or four times oversubscribed in columns 1, 2 and 3, respectively.[10] Oversubscribed more than two, three, and four times is equivalent to about the top 33%, the top 25%, and the top 20% of IPOs. We use the entire 188 IPO sample to investigate the relation between past price support and future IPO share holdings as there are large time gaps between the IPOs in the 35 company sample. Column 1 in Table 6 shows that there is a strong positive relation between Ln(*IPO allocation*) and *Past price support* for international institutions. There is also a significantly stronger relation between Ln(*IPO allocation*) and *Past price support*Oversubscription*. International institutions that provide price support in IPOs by one bank own more shares (and more oversubscribed shares) immediately following future IPOs by the same bank. The relation between *Past price support* and *IPO allocation* is evidence supporting our hypothesis that banks use IPO allocations as rewards for past price support. The results are economically significant, with a coefficient of Ln(*IPO allocation*) on *Past price support* and *Past price support*Oversubscription* of 1.54 and 1.58, respectively. The interpretation is that increasing *Past price support* from zero to one will lead to a 312% increase in oversubscribed IPO shares held immediately following the listing,

[10] Investment banks sometimes voluntarily report oversubscription levels in the newspapers in the period after the listings. Oversubscription levels are only reported for about half of the issues. We assume that all IPOs where oversubscription is not reported had an oversubscription equal to one. We can then see if price support becomes more important in more oversubscribed issues.

holding all other explanatory variables constant.[11] For example: an investor who always provides price support will hold 312% more of the oversubscribed issue immediately after the listing than an investor who never provides price support.

In columns 2 and 3 *Oversubscription* takes the value of one for IPOs that are more than three and more than four times oversubscribed, respectively. The coefficients of Ln(*IPO allocation*) *Past price support*Oversubscription* are 3.52 and 3.55 in IPOs that are more than three and more than four times oversubscribed, respectively. Holding all other variables constant the interpretation is that increasing *Past price support* from zero to one will lead to a 352% and a 355% increase in oversubscribed IPO shares held immediately following the listing. The effect of *Past price support* on allocations is larger for IPOs that are more oversubscribed. We conclude that, consistent with hypothesis H2, there is a positive relation between oversubscribed IPO allocations and past investor price support for investor-investment bank pairs.

There is also a positive relation between Ln(*IPO allocation*) and *Commission* and *Past pair*. This indicates that investors are also able to obtain IPO allocations based on past stock trading commission and having a past relation with the lead underwriter. These findings are consistent with the IPO allocation views presented by Ritter (2003).

[11] We do not expect any problems with multicolinearity even if the interaction term *Oversubscription* is included in the regressions because the Variance Inflation Factors (VIFs) are below 2 for all specifications. VIFs greater than 5 (or sometimes 10) are usually seen as indications of multicolinearity.

D. Price Support and Secondary Investors

Hypothesis H3 predicts a positive relation between *Price support* and first day returns and shares purchased by secondary investors immediately after the listing. Column 1 in Table 7 shows the results when we regress *First day return %* on *Price support*. *First day return %* is the percentage price change from the IPO offer price to the first day closing price in percent. *Price support* is defined as the number of additional shares purchased by the allocated international institutions immediately after the listing as a fraction of the shares issued in the IPO. The coefficient of *Price support* on *First day return %* is 8.4 and significant at the 1% level in a standard t-test. The interpretation is that increasing *Price support* with one standard deviation will increase *First day return %* by 2.3% (0.27 * 8.4). We conclude that there is a positive relation between *Price support* and *First day return %*.

Hypothesis H3 also predicts a positive relation between *Price support* and secondary investor buying. Column 2 of Table 7 shows the results when we regress Ln(*Secondary value*) on *Price support*. *Secondary value* is the number of shares purchased by non-allocated secondary investors immediately after the listing in millions of USD per IPO. The coefficient of *Price support* on Ln(*Secondary Value*) is 0.72 (column 2 of Table 7). The interpretation is that when *Price support* is increased with one standard deviation secondary investors will increase the amount of money invested in the secondary market immediately after the IPO by 19.4% (0.27 * 0.72 * 100). Secondary investors buy shares for an average value of $18 million per IPO. Increasing *Price support* with one standard deviation (0.27) will increase the amount invested by about $3.5 million per IPO (0.194 * $18). We control for the same variables as before (*Market value, BV/MV, VC, First day return, Top-tier dummy, Tech, Offer size, Bubble dummy, Post bubble dummy, Time gap,* and year fixed effects). In column 3 and 4 of Table 7 we show the

exact same results with Ln(*Secondary shares*) and Ln(*Secondary fraction*) as the dependent variables. *Secondary shares* and *Secondary fraction are* defined as the shares purchased by non-allocated investors immediately after the listing in number of shares and as the fraction of outstanding shares, respectively. Consistent with Hao (2007), Kumar and Lee (2006), and Barber and Odean (2008) we conclude that secondary investors are buying more shares when price support investors are buying more shares.

We also want to investigate if the secondary investors keep more of their shares in the period after the listing when there is more *Price support*. In column 5 of Table 7 we regress *Secondary change* on *Price support* and the same control variables as before. *Secondary change* is the change in total share ownership (as a percentage of outstanding shares) by secondary investors in the period from one month after the listing to six months after the listing. The samples size is then reduced from 188 companies to 182 companies to observe six months of post-listing holdings. The coefficient of *Price support* on *Secondary change* is 2.1 (column 5). The interpretation is that when *Price support* is increased with one standard deviation secondary investors retain 0.6% more of the outstanding shares, holding all else constant (0.27 * 2.1). Secondary investors buy in total 6.1% of outstanding shares in the 188 companies (and reduce this to 4.8% in six months). Companies with *Price support* will therefore have economically and statistically significantly higher ownership retention by secondary investors. We conclude that secondary investors hold on to their shares for longer time periods when there is more *Price support*. This finding is consistent with the disposition effect documented by Odean (1998), who shows that investors are more likely to hold on to shares that fall in value than shares that increase in value. We conclude that at least first time secondary IPO investors are not able to minimize the effect of *Price support*.

H3 also predicts that secondary investors who buy shares after IPOs with price support will stop buying shares after future IPOs. If secondary investors are rational, we expect that they will not continue to buy shares immediately after IPOs when they realize that there has been price support. In Table 8 we therefore regress *Future participation* on *Price support dummy* in a Poisson count model.[12] *Future participation* is the number of times (within two years of the listing) the secondary investor buys shares immediately after future IPOs if the investor is not allocated IPO shares. *Price support dummy* takes the value of one (zero otherwise) for IPOs with a positive value for *Price support*. We control for the same variables as before (*Market value, BV/MV, VC, First day return, Top-tier dummy, Tech, Offer size, Bubble dummy, Post bubble dummy, Time gap,* and year fixed effects). We also control for the market value of the portfolio of the investor at the end of the year before the IPO (*Portfolio*). From column 1 of Table 8 we show that the coefficient of *Price support dummy* on *Future participation* is –0.15. There is a negative relation between *Price support dummy* and *Future participation.*[13] For ease of interpretation we compute the incident rate ratios in column 2 of Table 8. Incidence rate ratios are obtained by exponentiating the Poisson regression coefficients.[14] From column 2 of Table 8 we show that the incident rate ratio of *Price support dummy* on *Future participation* is 0.86 (and significant at the one percent level). The interpretation is that increasing *Price support dummy* from zero to one will reduce *Future participation* by 14% (1 - 0.86). For example: an investor

[12] We find the same results if we use an alternative model such as a Tobit model or an OLS model (and these results are therefore not reported).

[13] We find the same results when *Price support dummy* takes the value of one (zero otherwise) for IPOs with *Price support* above the median level or in the top 1/5, 1/4, 1/3, or 1/2 of IPOs.

[14] See Hilbe (2007) for a detailed review on the interpretation of Poisson regression coefficients.

who buys shares on the secondary market in an IPO with price support will reduce participation in the secondary market by 14% over the next two years. We also want to measure if the reduction in *Future participation* is driven by a negative *HPER* (and not by the *Price support*). In column 3 of Table 8 we also include *Loss dummy* in the regression. *Loss dummy* takes the value of one (zero otherwise) if the investor has a negative *1 month HPER*.[15] From column 3 (and 4) of Table 8 we show that the coefficient (and the incident rate ratio) of *Price support dummy* and *Loss dummy* on *Future participation* are about the same. The interpretation is that increasing *Loss dummy* from zero to one will reduce *Future participation* by 17% (1 - 0.83). We interpret this finding to mean that including *Price support* in the secondary market is as bad for *Future participation* as is investors losing money. The data set ends in September 2007 so *Future participation* is biased downwards in the later part of the sample. In columns 5 to 8 we show a slightly stronger relation between *Future participation* and *Price support dummy* and *Loss dummy* for IPOs before 2005. We conclude that secondary IPO investors are able to reduce the effects of *Price support* by dropping out of the market in the future. Overall, these results are consistent with our hypothesis H3: Price support is positively related with secondary buying in current IPOs and negatively related with secondary buying in future IPOs.

[15] We find the same results when we define *Loss dummy* as IPOs with a negative *2, 3, and 6 month HPER.*

VI. Conclusion

In this paper we show that secondary investors are hurt by IPO price support. More than half of the secondary shares are purchased by retail or small domestic non-financial institutions (such as privately held companies). These smaller investors lose money on their investment when there is more *Price support*. Secondary investors also reduce their participation in the secondary market after buying shares in IPOs with price support.

Most of the price support is provided by large international institutions. When these large international institutions buy more shares after the listing, they are also allocated more shares in future oversubscribed IPOs. We control for the stock trading commissions generated by the investors, portfolio value, investor type, past trading characteristics, past investor allocations by the same banks, and company-specific variables. The evidence is consistent with IPO price support. There is also a relation between past investor-investment bank pairs indicating that some investors may be favoured with allocations because over time they participate with the same investment banks.

The main practical implication of these findings is that secondary investors are currently hurt by price support. These investors will also reduce their participation in the secondary market in the future. It is likely that price support provides an important function in a positive manner as explained in Chen and Wilhelm (2008) as we find that investment banks actively use price support as a dependency for IPO allocations. Our results, however, show that a segment of the market (that is likely to be more naïve) seems to misunderstand these more complex price support practices. Regulators can avoid misleading investors by requiring more detailed reporting of price support activities.

Theoretical implications of these findings is that although most theoretical papers explain IPO allocations from pricing information or from a buy-and-hold perspective, IPO allocation practices should also be explained from a price support perspective. Our findings are consistent with Fulghieri and Spiegel (1993), Loughran and Ritter (2002), Hao (2007) and Chen and Wilhelm (2008) in that IPO allocations are tied to secondary purchases. Our findings are also consistent with Hao (2007) who predicts a price fall in the period after the listing due to the price support and Wilhelm (1999) who predicts that naïve (presumably retail) investors might be losers in the secondary market when there is price support.

In this article we contribute to the existing literature by showing that price support hurts small investors and that these investors reduce their participation in the market in the future. Our finding indicates that regulators should require more information be provided to market participants regarding price support conducted by IPO allocated investors.

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Figure 1: This figure describes the timeline in the listing process. *Listing in the VPS* is when the companies list ownership records in the ownership database. *Share transfer in the IPO* is when the companies distribute the allocated shares in the VPS ownership database. *Listing on the OSE* is when the company is listed publicly. Figure 1A show the listing process for the 35 companies where we obtain exact IPO allocations. For these 35 companies we can distinguish between equity capital events and therefore observe exact IPO allocations. Figure 1B show the listing process for the remaining 153 companies. IPO allocations in these companies include between one and 30 days of after-listing trading.

Figure 1A.

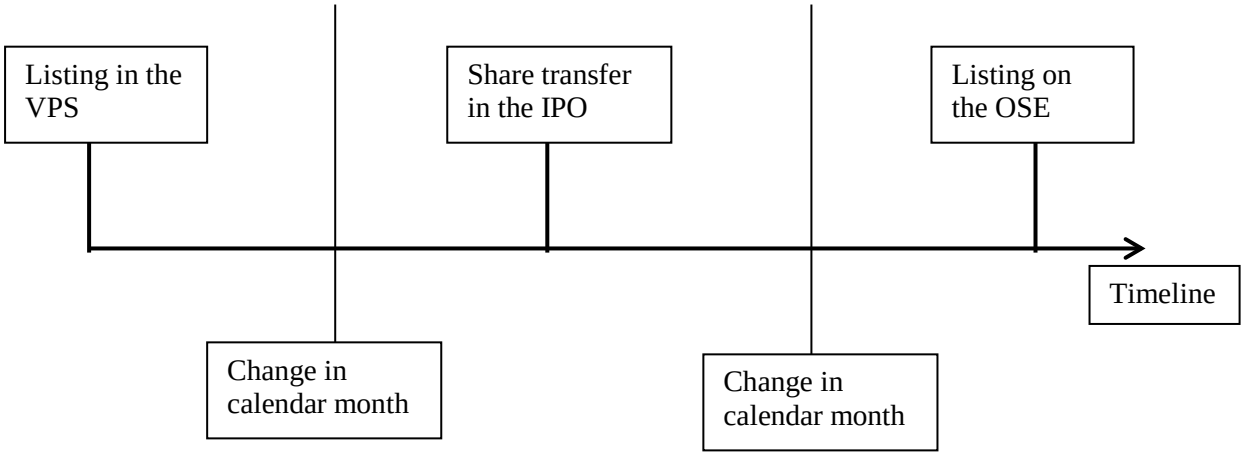


Figure 1B.

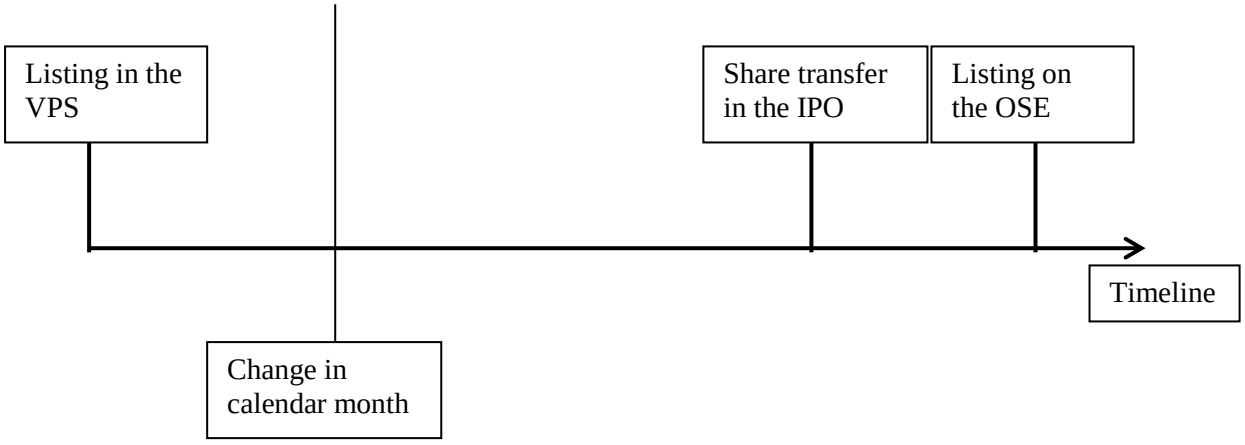
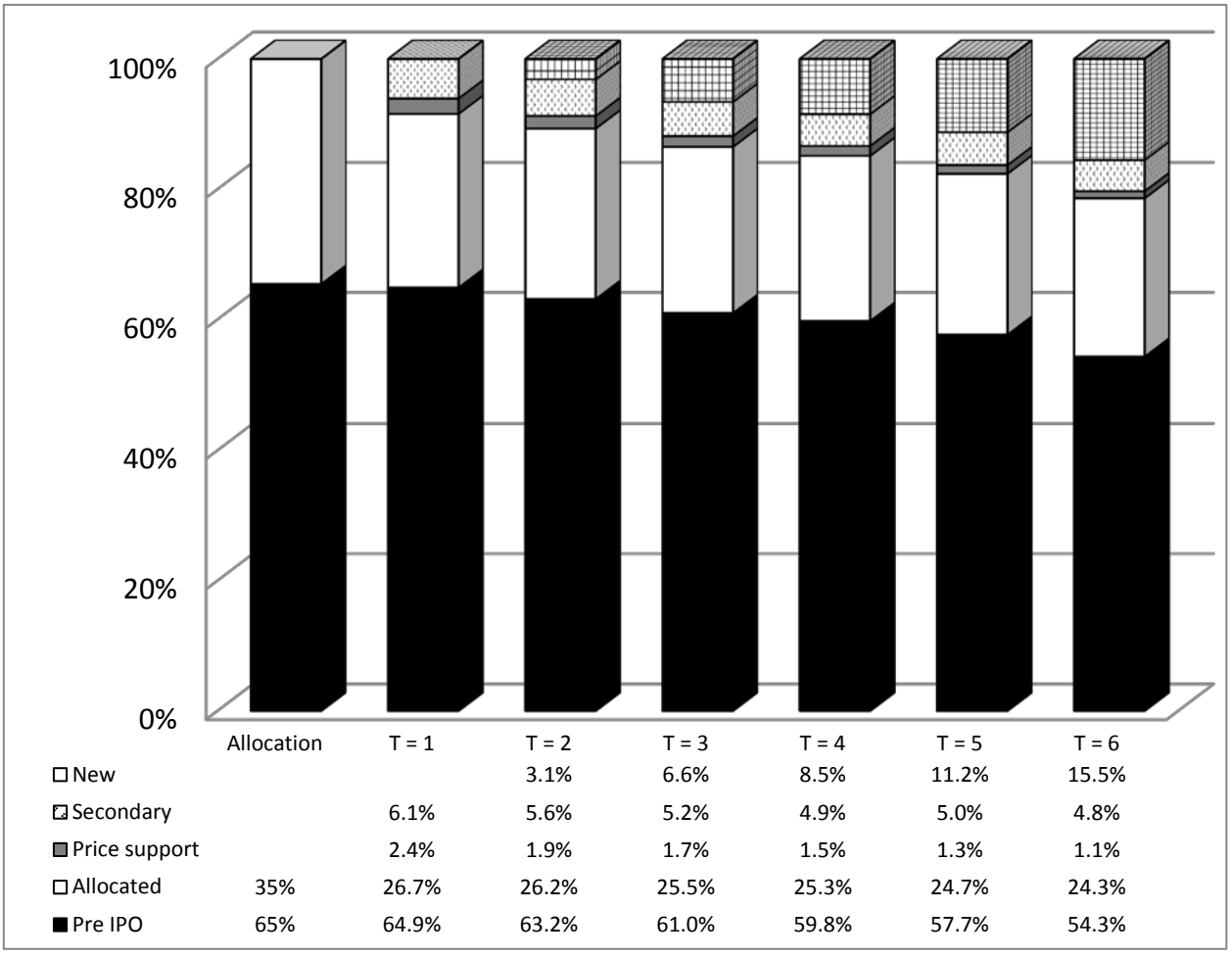


Figure 2: This figure show the share ownership evolvement in the six months after the listing for all shares in companies with an IPO on the Oslo Stock Exchange in the period 1993 to February 2007. The sample is reduced from 188 to 182 companies to observe six months of post-listing holdings. *Pre IPO* are the non-allocated investors who own shares before the IPO. *Allocated* are the investors that buy shares in the IPO. *Price support* are the additional shares purchase by the international institutional investors who are both allocated shares in the IPO and buy more shares immediately after the listing. *Secondary* are the non-allocated investors who buy shares immediately after the listing. *New* are the secondary investors who buy shares after the end of the month after the listing. T = 1 to T = 6 are the share ownership at one to six months after the listing month.



	Allocation	T = 1	T = 2	T = 3	T = 4	T = 5	T = 6
New			3.1%	6.6%	8.5%	11.2%	15.5%
Secondary		6.1%	5.6%	5.2%	4.9%	5.0%	4.8%
Price support		2.4%	1.9%	1.7%	1.5%	1.3%	1.1%
Allocated	35%	26.7%	26.2%	25.5%	25.3%	24.7%	24.3%
Pre IPO	65%	64.9%	63.2%	61.0%	59.8%	57.7%	54.3%

Table 1

IPOs per Year

This table reports the number of IPOs on the Oslo Stock Exchange (OSE) in the period 1993 to 2007. *Offer size M.USD* is the number of issued shares from the VPS database times the IPO offer price (accumulated in million USD per year). *Offer size %* is the number of shares sold in the issue as a fraction of the number of shares outstanding in the company (as an average for all IPOs per year). USD values are calculated from a USD/NOK exchange rate of 0.1792.

Year	IPOs	Offer size M.USD	Offer size %
1993	10	$425.5	33.2%
1994	12	$507.3	37.7%
1995	14	$638.7	48.5%
1996	12	$410.5	30.7%
1997	29	$1,049.8	28.3%
1998	12	$286.7	49.6%
1999	3	$40.6	16.8%
2000	14	$1,399.5	24.3%
2001	5	$112.5	13.4%
2002	2	$103.7	30.9%
2003	1	$48.0	46.3%
2004	14	$3,117.9	29.4%
2005	34	$3,518.5	41.7%
2006	19	$3,308.1	30.4%
2007	7	$1,816.8	52.1%
Total	188	$16,784.2	35.0%

Table 2

Summary Statistics of Firms Going Public on the Oslo Stock Exchange

Panel A reports company statistics for the sample of 188 companies on the OSE in the period 1993 to 2007. Panel B reports statistics for the allocated IPO investors in these 188 companies. Panel C reports statistics for the non-allocated IPO investors who buy shares in the immediate secondary market after the listing of these 188 companies. All variables are defined in table A1. USD values are calculated from a constant USD/NOK exchange rate of 0.1792.

Panel A: Company variables	N	Mean	Std.Dev.
Capital raised in the IPO	188	$89.28	$249.25
First day return	188	9.99%	25.26%
Institutional allocation %	188	79.37%	17.29%
1 month HPER	188	-1.45%	14.88%
2 months HPER	188	-0.92%	22.07%
3 months HPER	188	-0.01%	31.65%
6 months HPER	188	2.11%	52.72%
Price support	188	0.057	0.271
Market value	188	$298.435	$841.209
BV/MV	188	0.590	0.745
Offer price	188	$8.935	$6.805
VC	188	0.149	0.357
Tech	188	0.176	0.381
Top-tier dummy	188	0.537	0.500
Time gap	188	0.681	1.082
Offer size	188	0.350	0.271
Secondary shares	188	2.208	4.710
Secondary value	188	$18.000	$58.524
Secondary fraction	188	0.068	0.084
Panel B: Allocated IPO investors			
IPO allocation	187,570	0.108%	0.920%
Price support	187,570	0.0020	0.0404
Price support*Oversubscription	187,570	0.0003	0.0152
Oversubscription	187,570	0.741	0.438
Commission	187,570	$0.010	$0.133
Portfolio	187,570	$0.005	$0.099
Past pair	187,570	0.020	0.079
Past buy-hold	187,570	0.049	0.219
Held cold	187,570	0.020	0.138
Panel C: Secondary investors			
Loss dummy	38,313	0.621	0.485
Portfolio	38,313	$0.003	$0.056
Future participation	38,313	0.327	1.076
Price support dummy	38,313	0.814	0.389

Table 3 IPO Allocated, Price Support, and Secondary Investors: This table shows the number and value of shares purchased by IPO allocated investors, price support investors, and secondary investors (across investor groups) in panel A, B, and C, respectively. Column 2 shows the number of investors. Column 3 (and 4) and 5 (and 6) show total number of shares purchased (and as a %) and the total value of the shares purchased in million USD (and as a %) in total per investor group, respectively. Share value is calculated using offering prices in Panel A and first day closing prices in Panels B and C, respectively. Column 7 (and 8) shows the average *Portfolio* value and standard deviations in million USD for the investors in each group at 31.12.xx in the year before the IPO.

1	2	3	4	5	6	7	8
Panel A: IPO allocated investors	N. Investors	IPO shares		IPO value		Investor portfolio value	
		Total	%	Total	%	Mean	St.Dev
Government	296	140.5	6.4%	$1,075.1	6.4%	$202.0	$1,233.2
Domestic retail	156,645	232.6	10.6%	$1,496.9	8.9%	$0.1	$3.5
International retail	3,385	48.2	2.2%	$214.8	1.3%	$0.1	$1.4
Domestic financial institution	4,228	376.2	17.1%	$2,673.6	15.9%	$67.1	$227.2
Domestic non-financial institution	14,891	321.1	14.6%	$1,948.6	11.6%	$6.5	$62.7
International institution	8,125	1,082.9	49.2%	$9,375.2	55.9%	$68.2	$359.8
Total	187,570	2,201.6	100.0%	$16,784.2	100.0%		
Panel B: Price support investors	N. Investors	Price support shares		Price support value			
Government	66	2.8	0.9%	$33.0	1.4%	$325.7	$1,114.1
Domestic retail	4,430	24.3	8.1%	$121.7	5.1%	$0.4	$3.6
International retail	169	10.6	3.5%	$40.2	1.7%	$0.1	$0.6
Domestic financial institution	913	68.8	23.0%	$569.7	24.0%	$87.5	$262.0
Domestic non-financial institution	1,174	30.1	10.1%	$225.2	9.5%	$13.4	$91.3
International institution	1,084	162.3	54.3%	$1,387.3	58.4%	$194.2	$583.5
Total	7,836	298.8	100.0%	$2,377.2	100.0%		
Panel C: Secondary investors	N. Investors	Secondary shares		Secondary value			
Government	68	1.6	0.4%	$17.4	0.5%	$80.3	$546.6
Domestic retail	30,026	76.1	18.3%	$420.4	12.4%	$0.1	$5.9
International retail	990	19.8	4.8%	$99.5	2.9%	$0.2	$2.8
Domestic financial institution	1,141	44.5	10.7%	$317.8	9.4%	$22.9	$112.0
Domestic non-financial institution	4,019	132.8	32.0%	$1,113.5	32.9%	$2.6	$36.2
International institution	2,069	140.3	33.8%	$1,415.4	41.8%	$31.3	$190.3
Total	38,313	415.2	100.0%	$3,384.1	100.0%		

Table 4: Price Support and HPER: This table reports coefficients and t-statistics (clustered by year) in parentheses for standard OLS regressions with the *1, 2, 3, 6, and 12 month HPERs* as the dependent variables. The *HPER* is the IPO company holding period return in excess of a company matched on *MV* and *BV/MV*. The sample period is from 1993 to 2007. All variables are defined in Table A1. Columns 1 to 5 and 6 to 10 includes all 188 companies and only the 35 companies with exact data on IPO allocations, respectively.

	1	2	3	4	5	6	7	8	9	10
HPER =	1 mo.	2 mo.	3 mo.	6 mo.	12 mo.	1 mo.	2 mo.	3 mo.	6 mo.	12 mo.
Price support	-1.68	-10.11	-19.96	-32.62	-27.20	-8.47	-11.52	-27.82	-38.61	-33.36
	-(1.4)	-(3.8)	-(4.3)	-(7.4)	-(3.9)	-(3.5)	-(3.0)	-(5.1)	-(4.6)	-(2.2)
Market value	-2.93	-2.19	-2.89	-2.37	-1.44	-8.87	-1.96	19.48	-7.34	-5.72
	-(3.0)	-(2.3)	-(2.2)	-(1.2)	-(0.5)	-(1.2)	-(0.3)	(1.8)	-(0.3)	-(0.1)
BV/MV	1.80	3.25	2.36	6.11	9.25	7.71	6.24	8.24	11.46	15.86
	(1.9)	(1.6)	(0.6)	(1.5)	(2.4)	(1.9)	(2.0)	(2.2)	(1.9)	(1.0)
VC	-4.32	-1.19	-4.96	-22.44	-29.84	17.60	17.75	25.38	-12.20	38.71
	-(1.4)	-(0.2)	-(0.6)	-(1.9)	-(2.4)	(4.6)	(2.0)	(2.6)	-(0.5)	(1.2)
First day return	-0.25	-6.02	4.50	5.90	10.31	4.54	-7.11	18.43	11.97	33.39
	-(0.1)	-(0.8)	(0.4)	(0.4)	(0.5)	(1.4)	-(0.7)	(1.3)	(0.7)	(1.5)
Top-tier dummy	-0.61	-1.41	1.16	-6.82	1.53	-15.51	-12.57	0.23	-12.87	-16.32
	-(0.2)	-(0.4)	(0.4)	-(1.1)	(0.2)	-(3.5)	-(1.1)	(0.0)	-(0.5)	-(0.6)
Tech	7.35	4.91	8.29	18.00	10.66	-23.96	-15.61	-11.48	2.95	-5.25
	(2.1)	(1.5)	(2.1)	(2.2)	(0.5)	-(6.0)	-(1.3)	-(1.0)	(0.2)	-(0.1)
Offer size	2.13	-0.08	6.03	-11.51	-21.18	-34.92	-9.06	-10.77	-30.20	-35.59
	(1.1)	(0.0)	(0.4)	-(0.7)	-(2.1)	-(3.9)	-(0.8)	-(0.7)	-(0.9)	-(0.5)
Bubble dummy	21.40	31.83	10.70	27.94	20.46	27.08	26.54	31.57	51.92	113.60
	(9.4)	(7.2)	(1.6)	(3.7)	(2.4)	(4.8)	(3.0)	(2.8)	(2.1)	(2.4)
Post bubble dummy	12.15	17.66	-0.81	4.69	3.81	-4.72	-10.27	1.69	-7.67	36.26
	(9.8)	(4.9)	-(0.1)	(0.8)	(0.4)	-(0.5)	-(1.2)	(0.1)	-(0.4)	(0.9)
Time gap	-1.49	-2.74	-4.44	-6.53	-6.61	1.44	5.34	-7.83	-4.98	-16.74
	-(2.3)	-(1.7)	-(1.9)	-(1.2)	-(0.9)	(0.3)	(0.9)	-(1.0)	-(0.6)	-(1.1)
Constant	-20.65	-23.05	-3.27	8.47	12.03	8.71	-9.71	-10.93	4.68	-25.72
	-(15.2)	-(10.5)	-(1.1)	(1.9)	(2.8)	(1.5)	-(1.6)	-(1.3)	(0.3)	-(0.7)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	188	188	188	188	188	35	35	35	35	35
Adjusted R^2	10.9%	5.8%	1.2%	5.2%	2.4%	8.2%	10.4%	0.0%	0.0%	0.0%

Table 5

Fama-French 3-Factor Time-series Regressions

This table reports intercept coefficients and t-statistics in parentheses for standard time-series portfolio regressions of monthly excess returns on the three Fama-French (1993) factors representing market risk, size, and the book-to-market ratio. The market return is calculated by the OSE main market index (the OBX). Monthly excess returns are adjusted by the risk free rate (3 month NIBOR). The table is based on 188 IPOs in the period January 1993 to September 2007. It is assumed that each IPO is purchased at the first day closing price and held for six months. The portfolio *Price support* invests a rolling portfolio in all IPOs with price support. The portfolio *No Price support* invests a rolling portfolio in all IPOs with no price support. In panel A, B, and C the *Price support* portfolio invests in IPOs with a cut-off on more than 6.7%, 8.5%, and 9.5% *Price support* (equivalent to the top 33%, the top 25%, and the top 20% of IPOs with price support, respectively). N is the number of months with observations of portfolio returns.

	Alpha	t-stat.	Adjusted R^2	N
Panel A:				
Price support	-1.87%	-(1.8)	15.1%	82
No Price support	-0.60%	-(0.8)	29.1%	148
Panel B:				
Price support	-1.90%	-(1.7)	15.5%	72
No Price support	-0.07%	-(0.9)	29.4%	148
Panel C:				
Price support	-2.14%	-(1.8)	16.2%	72
No Price support	-0.70%	-(0.9)	29.9%	148

Table 6

Price Support and Future IPO Allocations

This table reports coefficients and t-statistics (clustered by year) in parentheses for standard OLS regressions with Ln(*IPO allocation)* as the dependent variable. The sample period is from 1993 to 2007. All variables are defined in Table A1. All 188 companies with allocation data are included. *Past price support* is the cumulative number of times an allocated international institutional investor has purchased more shares immediately after the listing divided by the cumulative number of times the investor has participated in IPOs by the same bank. *Past price support* is interacted with *Oversubscription*. In regressions 1, 2, and, 3 *Oversubscription* takes the value of one for IPOs that are more than two, three, and four times oversubscribed (the top 33%, top 25%, and top 20% of oversubscription, respectively).

	Ln (IPO allocation)					
	1		2		3	
Past price support	1.54	(3.7)	1.49	(3.4)	1.53	(3.5)
Past price support*Oversubscription	1.58	(2.5)	2.03	(3.7)	2.02	(2.7)
Oversubscription	-1.13	-(2.8)	-1.37	-(3.1)	-1.39	-(3.1)
Commission	1.48	(3.3)	1.48	(3.2)	1.48	(3.2)
Portfolio	1.03	(2.9)	1.04	(2.9)	1.04	(2.9)
Past pair	1.83	(3.9)	1.82	(4.1)	1.83	(3.9)
Past buy-hold	0.09	(0.8)	0.08	(0.7)	0.08	(0.6)
Held cold	0.16	(0.7)	0.10	(0.6)	0.16	(0.9)
Market value	-0.69	-(3.5)	-0.65	-(3.5)	-0.64	-(3.5)
BV/MV	-0.08	-(0.7)	-0.06	-(0.7)	-0.07	-(0.7)
Offer price	0.04	(1.0)	0.04	(1.2)	0.04	(1.2)
VC	0.68	(1.0)	0.56	(0.9)	0.67	(1.0)
Tech	1.87	(3.1)	1.76	(3.3)	1.71	(3.3)
Bubble dummy	1.28	(2.9)	1.35	(3.4)	1.10	(3.3)
Post bubble dummy	1.87	(6.4)	2.06	(6.9)	2.04	(7.0)
Time gap	0.30	(2.6)	0.27	(2.6)	0.33	(2.7)
Constant	-5.40	-(10.4)	-5.39	-(11.7)	-5.46	-(11.5)
Year fixed effects	Yes		Yes		Yes	
Observations	187,570		187,570		187,570	
Oversubscribed >	2		3		4	
Adjusted R^2	65.2%		66.0%		66.1%	

Table 7

Price Support and Secondary Investors

This table reports coefficients and robust t-statistics in parentheses for standard OLS regressions. The dependent variables in columns 1, 2, 3, 4, and 5 are *First day return %*, Ln(*Secondary value*), Ln(*Secondary shares*), Ln(*Secondary fraction*), and *Secondary change*, respectively. *Secondary value*, *shares*, and *fraction* are defined as the shares purchased by non-allocated investors immediately after the listing in million USD, in number of shares, and as a fraction of outstanding shares, respectively. *Secondary change* is the change in secondary investor ownership (as a percentage of outstanding shares) from (T = 1) to (T = 6) after the listing. *Price support* is defined as the number of additional shares purchased by the allocated international institutions immediately after the listing as a fraction of the shares issued in the IPO. In column 5 six companies are dropped to observe six months of post-listing holdings on *Secondary change*.

	1	2	3	4	5
Price support	8.37	0.72	0.59	0.28	2.09
	(5.4)	(3.1)	(2.9)	(2.5)	(4.3)
Market value	1.90	0.79	0.54	0.00	0.31
	(2.0)	(3.1)	(2.6)	(0.1)	(2.0)
BV/MV	-3.79	-0.33	-0.49	-0.10	0.08
	-(1.6)	-(2.0)	-(2.9)	-(0.8)	(0.4)
VC	-3.61	-0.59	-0.53	-0.42	2.18
	-(0.9)	-(1.5)	-(1.3)	-(1.3)	(2.7)
First day return		0.75	0.27	0.50	0.33
		(1.5)	(0.5)	(1.3)	(0.3)
Top-tier dummy	1.27	0.43	0.34	0.03	0.32
	(0.3)	(1.6)	(1.2)	(0.2)	(0.5)
Tech	11.39	-0.43	0.09	0.24	-0.93
	(1.7)	-(1.3)	(0.2)	(0.9)	-(1.5)
Offer size	10.89	0.05	-0.18	0.23	0.45
	(1.9)	(0.1)	-(0.3)	(0.5)	(0.4)
Bubble dummy	-18.14	1.30	1.89	0.68	-3.27
	-(2.1)	(2.7)	(2.9)	(1.2)	-(2.6)
Post bubble dummy	-16.45	0.93	1.61	0.22	-1.92
	-(1.6)	(1.8)	(2.4)	(0.4)	-(1.8)
Time gap	4.66	-0.11	-0.07	-0.14	0.18
	(1.3)	-(0.8)	-(0.5)	-(1.1)	(0.9)
Constant	14.83	13.96	11.93	-3.88	-0.96
	(1.9)	(38.3)	(22.3)	-(7.5)	-(2.8)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
N	188	188	188	188	182
Adjusted R^2	14.5%	21.1%	19.9%	4.4%	0.0%

Table 8

Secondary Investor Future Participation

This table reports coefficients, Incident Rate Ratios (IRR), and robust z-statistics in parentheses for standard Poisson count model regressions with *Future participation* as the dependent variable. *Future participation* is the number of times (within two years of the listing) the secondary investor buys shares immediately after future IPOs if the investor is not allocated IPO shares. In columns 1-4 and 5-8 all 188 companies and only companies before 2005 are included, respectively. Columns 1, 3, 5, and 7 include standard coefficients. Columns 2, 4, 6, and 8 include Incident Rate Ratios (IRR).

	Future participation							
	1	2	3	4	5	6	7	8
Price support dummy	-0.15	0.86	-0.12	0.89	-0.30	0.74	-0.23	0.79
	-(2.8)	-(2.8)	-(2.2)	-(2.2)	-(4.4)	-(4.4)	-(3.3)	-(3.3)
Loss dummy			-0.18	0.83			-0.32	0.73
			-(4.2)	-(4.2)			-(4.8)	-(4.8)
Portfolio	0.75	2.13	0.76	2.14	0.92	2.52	0.93	2.52
	(6.1)	(6.1)	(6.2)	(6.2)	(4.5)	(4.5)	(4.5)	(4.5)
Market value	-0.18	0.84	-0.17	0.84	-0.24	0.78	-0.13	0.87
	-(8.7)	-(8.7)	-(8.2)	-(8.2)	-(3.8)	-(3.8)	-(2.1)	-(2.1)
BV/MV	-0.27	0.77	-0.26	0.77	-0.41	0.66	-0.42	0.65
	-(4.2)	-(4.2)	-(4.2)	-(4.2)	-(4.1)	-(4.1)	-(4.3)	-(4.3)
VC	0.39	1.47	0.39	1.47	0.15	1.16	0.19	1.21
	(5.2)	(5.2)	(5.2)	(5.2)	(1.1)	(1.1)	(1.5)	(1.5)
First day return	-0.13	0.87	-0.12	0.89	-0.12	0.89	-0.21	0.81
	-(1.2)	-(1.2)	-(1.1)	-(1.1)	-(1.0)	-(1.0)	-(1.7)	-(1.7)
Top-tier dummy	-0.02	0.98	0.00	1.00	0.11	1.12	0.19	1.21
	-(0.3)	-(0.3)	(0.0)	(0.0)	(1.5)	(1.5)	(2.5)	(2.5)
Tech	0.10	1.10	0.11	1.11	0.19	1.22	0.24	1.27
	(1.4)	(1.4)	(1.6)	(1.6)	(2.2)	(2.2)	(2.7)	(2.7)
Offer size	-0.37	0.69	-0.37	0.69	-0.04	0.96	-0.11	0.90
	-(4.4)	-(4.4)	-(4.4)	-(4.4)	-(0.3)	-(0.3)	-(0.8)	-(0.8)
Bubble dummy	0.07	1.07	0.00	1.00	dropped	dropped	dropped	dropped
	(0.3)	(0.3)	(0.0)	(0.0)				
Post bubble dummy	-2.31	0.10	-2.32	0.10	dropped	dropped	dropped	dropped
	-(9.4)	-(9.4)	-(9.5)	-(9.5)				
Time gap	-0.10	0.90	-0.12	0.88	0.07	1.07	0.10	1.10
	-(5.2)	-(5.2)	-(6.0)	-(6.0)	(1.7)	(1.7)	(2.3)	(2.3)
Constant	-0.16	0.85	0.00	1.00	-0.18	0.83	0.11	1.12
	-(0.7)	-(0.7)	(0.0)	(0.0)	-(0.8)	-(0.8)	(0.5)	(0.5)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coefficient/IRR	Coef.	IRR	Coef.	IRR	Coef.	IRR	Coef.	IRR
N	38,313	38,313	38,313	38,313	23,977	23,977	23,977	23,977
Log-likelihood	-31056	-31,056	-31018	-31,018	-18,501	-18,501	-18445	-18,445
Pseudo R^2	6.9%	6.9%	7.0%	7.0%	6.0%	6.0%	6.3%	6.3%

Table A1

IPO Timeline

This table shows the timeline for the planned listing process provided in one of the IPO listing prospectuses. The prospectus is issued in November 1993.

Example of an IPO Timeline:

	Date
	1993
First day of applications	26. November
Last day of applications	10. December
Allocation notification sent to applicant	17. December
Payment date	23. December
Registration of new shares in the VPS	30. December
	1994
Listing on the exchange:	10. January

Table A2

Variable Definitions

The OSE, VPS, and prospectus indicate the variable is obtained from the Oslo Stock Exchange, the VPS database, and the listing prospectus, respectively.

Bubble dummy	Takes the value of one (zero otherwise) for companies listed in 2005. (Prospectus, OSE)
BV/MV	The book value of equity, after the IPO, divided by the Market value. (Prospectus)
Capital raised in the IPO	The number of issued shares from the VPS database times the IPO offer price. In million USD. (VPS, Prospectus)
Commission	Monthly portfolio turnover in the 24 months prior to the IPO allocation times the market share prices and a fixed rate of 0.075%. Only buy generated commission is included. Minimum for one transaction is $15. In million USD. (VPS, OSE)
Future participation	The number of times (within two years of the listing) the secondary investor buys shares immediately after future IPOs if the investor is not allocated IPO shares. (VPS)
Held cold IPO	Takes the value of one (zero otherwise) if the investor is allocated shares in a previous IPO from the same underwriter with a negative underpricing. (VPS)
HPER	(The holding period return in % in the issuing company) – (The holding period return in % on a company matched on MV and BV/MV). Measured from the first day closing price to the first 1, 2, 3, 6, and 12

	month closing price. (OSE)
Institutional allocation %	The average equally weighted allocation to institutional investors in the 188 IPOs. (VPS).
IPO allocation	The number of allocated shares to each investor in % of the number of shares issued in the IPO. (VPS)
Loss dummy	Takes the value of one (zero otherwise) if the investor has a negative 1 month HPER (VPS, OSE)
Market value	Outstanding shares at the listing day times the first day closing prices. In million USD. (VPS, OSE)
Market return	The return on the main market index (the OBX). (OSE)
Offer price	The IPO offer price in USD. (Prospectus)
Offer size	Allocated shares in the IPO as a fraction of outstanding shares in the company. (VPS)
Oversubscription	The total number of applied for shares divided by the total number of issued shares. (Oversubscription is voluntarily reported in the newspapers after the listings)
Past buy-hold	The cumulative number of times, out of all prior IPO allocations from the same bank, the allocated investor has been a buy-and-hold investor in the past (minus the cumulative number of times the investor has flipped shares). Buy-and-hold is when more than 50% of allocated shares are held for more than six months. Flipping is when more than 50% of allocated shares are sold within one month. (VPS, Prospectus)
Past price support	The cumulative number of times an allocated international institutional

	investor has purchased more shares immediately after the listing divided by the cumulative number of times the investor has participated in IPOs by the same bank. (VPS, Prospectus)
Past pair	The cumulative number of times, out of all prior IPOs by the same bank in the sample, the allocated investor has received allocations. (VPS, Prospectus)
Portfolio	Market portfolio value for each investor at 31.12.xx in the year before the IPO. In billion USD. (VPS)
Post bubble dummy	Takes the value of one (zero otherwise) for companies listed in 2006 or 2007. (Prospectus)
Price support	The number of additional shares purchased by the allocated international institutions immediately after the listing as a fraction of the shares issued in the IPO. (VPS)
Price support dummy	Takes the value of one (zero otherwise) for IPOs with a positive value for *Price support*.
Risk free rate	3-month NIBOR.
Secondary fraction	The number of shares purchased by non-allocated secondary investors immediately after the listing in a fraction of outstanding shares. (VPS)
Secondary change	The change in total secondary investor ownership (as a percentage of shares outstanding) from one month (T = 1) to six months (T = 6) after the listing. (VPS)
Secondary shares	The number of shares (in million) purchased by non-allocated secondary investors immediately after the listing in total. (VPS)

Secondary value	The value of shares (in million USD) purchased by non-allocated secondary investors immediately after the listing. (VPS)
Tech	Takes the value of one (zero otherwise) for IT -companies. (Prospectus)
Time gap	The time difference between the IPO allocation and the listing date in months. (VPS).
Top-tier dummy	Takes the value of one (zero otherwise) for IPOs with a manager ranked among the eight highest (out of 32 possible managers) based on market capitalization of the issues. This is the manager ranking developed by Megginson and Weiss (1991). (Prospectus, OSE)
VC	Takes the value of one (zero otherwise) for IPOs with venture capital backing. (Prospectus)

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The Centre for Corporate Governance Research (CCGR) conducts research on the relationship between corporate governance, firm behavior, and stakeholder welfare. Our projects pay particular attention to the governance of closely held firms and family firms, and the research teams come from different disciplines in several countries. Financing is provided by private sponsors and the Research Council of Norway.

The CCGR is organized by the Department of Financial Economics at BI Norwegian Business School in Oslo, Norway (http://www.bi.edu)

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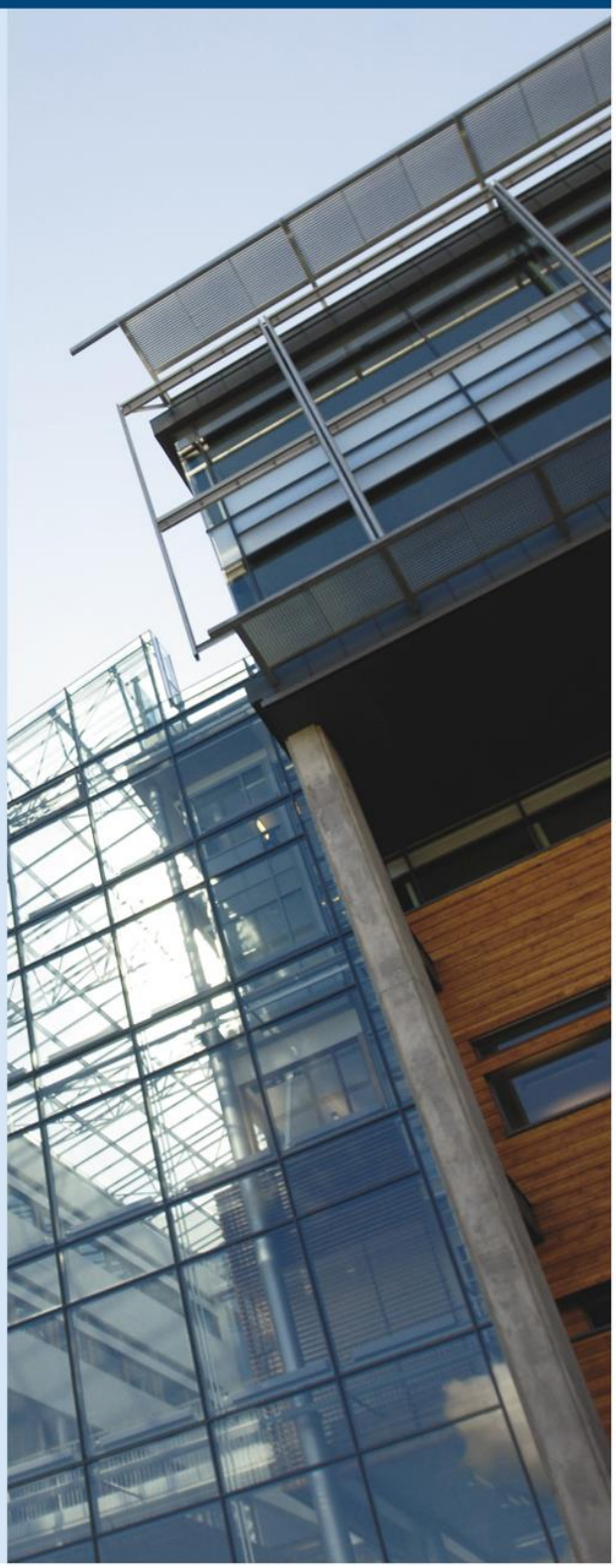

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