STOCKHOLM SCHOOL of ECONOMICS
Finance Department
Master Thesis in Corporate Finance

DUAL-CLASS SHARE STRUCTURE AND IPO LONG-RUN PERFORMANCE

An Empirical Study of the Swedish IPO market

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This study analyzes the effects of a dual-class share structure on firm long-run underperformance following an IPO. The sample consists of 204 IPO firms during 1998-2007, whereof 86 had a dual-class share structure and 118 had a one-share one-vote structure. When testing for long-run IPO underperformance we use Cumulative Abnormal Returns (CAR), mean Buy-and-Hold Abnormal Returns ($\overline{BHAR}$) and the Calendar-Time approach. When using CAR we use value-weighted returns whereas when using the two latter methods we use both equally-weighted (EW) and value-weighted (VW) returns for our calculations. In line with what earlier has been found on the US equity market, we find no support that dual-class IPOs should perform worse than single-class IPOs in the long-run; however, we find some indications of the opposite relationship. In addition, regression results on price-to-book indicate that the Swedish market seems to take into account the positive long-run performance of dual-class IPO firms.

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1. Introduction

1.1 Background

Numerous studies have been conducted on IPO long-run underperformance. The aim of this paper is to contribute to existing research within the field and to compare two types of IPO firms we find in Sweden, namely single- and dual-class IPO firms. The objective is to analyze whether long-run underperformance exists among the IPO firms in our sample and if it in anyway differs between these two types of IPO-firms. We will also include a section on firm valuation, by using a price multiple regression; we aim to distinguish whether single- and dual-class IPO firms are valued differently by the market. As a final element, we consider several corporate governance parameters which might serve as explanatory variables to the potential cross-sectional difference between the two IPO groups, both in terms of long-run underperformance as well as firm valuation.

We find the research field of interest since theories such as convergence of opinion and minority expropriation problem discusses issues we believe could lead to cross-sectional difference in long-run IPO underperformance and firm valuation between single- and dual-class firms. Our interest for the Swedish equity market arise from the fact that Sweden is among the top countries in Europe with the most widely use of a dual-class share structure, yet the research on dual-class IPOs is relatively scarce.[1] In Sweden dual-class share IPOs have accounted for 42 percent of all IPOs on the Stockholm Stock Exchange and the Nordic Growth Market during the past 10 years, it should however be noted that they are decreasing in popularity.[2] Finally, there is today an on-going debate within the European Union of whether or not a dual-class share structure is value destructing for shareholders and whether such a share structure should be acceptable.[3]

This thesis covers the time-period 1998-2007. To our knowledge, nobody has performed a similar analysis on long-run underperformance between dual- and single-class IPO firms on Swedish data during the chosen time period. Thus, our analysis will hopefully shed further light on the characteristics of Swedish dual-class IPO companies. Secondly, several studies have been

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[1] Adams et al 2007

[2] The Owners and Power in Sweden, edition 2008

[3] Adams et al 2007

covering dual-class companies general distinctiveness, one of the more in depth papers on the Swedish market ended its research period in 1997 (Cronqvist and Nilsson, 2003). Thirdly, our model captures the ex ante and ex post IT bubble, which can be viewed as both a strength and a weakness. We consider it to be a strength since there was extensive IPO activity during the time period which increase the size of our sample and robustness of our test. Conclusively, the selected time frame offers us the opportunity to investigate the single and dual-class IPO firms from several new perspectives.

Our original "population" was obtained from the book "*The Owners and Power in Sweden"*, published by SIS Ägarservice, which covers the Stockholm Stock Exchange (OMX) and the smaller Nordic Growth Market (NGM). From 1998-2007 SIS Ägarservice stated that 238 firms in total went public on these two lists; out of these 99 firms had a dual-class share structure at the time of the IPO. From the total population we have chosen to exclude firms that already were listed on either of these two lists and only changed listing place. We have further chosen to exclude companies that were domiciled abroad and firms for which we could not find sufficient data. In order to find each firm's accounts we have downloaded data from both DataStream Advance and SIX Trust database. In the appendix a list of the total population is included see *Table I-II*; all firms in the final data sample are presented by name and date of the IPO as well as a list of the excluded IPO firms and the underlying reason for why they were excluded. The final IPO-sample consists of 204 companies whereof 86 had a dual-class share structure.

Several scholars, among them Ritter (1991) and Loughran and Ritter (1995), have chosen to examine the underperformance of initial public offerings (IPOs), their studies have focused on the US equity market during the past twenty years. Others have chosen to analyze IPO long-run underperformance from different perspectives; some have divided IPO firms into different categories based on for example funding. Brav and Gompers (1997) divided the IPO firms into two subgroups including venture capital backed IPOs and non-venture capital backed IPOs and tested for differences in long-run underperformance. There have also been studies conducted on the Swedish equity market with the same focus, for example Björcke and Menzel (2006). The purpose is consequently to test whether IPO long-run underperformance is general and equal across all firms or if there exists cross-sectional differences and if certain firm characteristics can explain such a cross-sectional variance. We have only found a few papers that explicitly studies

IPO long-run underperformance from a single in opposition to dual-class share structure perspective, amongst them are Zutter (2001) and Smart et al (2007). These papers investigate long-run underperformance on the U.S equity market between the two categories respectively. We consider both papers to be inspirational but deem it to be even more interesting to apply the research approach on the Swedish equity market since the proportional occurrence of dual-class firms is much more prevalent in Sweden than in the U.S.

Furthermore, Zutter (2001) also performs pricing multiplier regressions in order to examine whether dual-class IPOs are discounted against single-class IPOs in terms of firm valuation. A study concerning firm valuation on the Swedish market was conducted by Cronqvist and Nilsson (2003), who analyzed how certain corporate governance mechanisms such as different controlling owner categories are reflected in the valuation of a firm.

Different corporate governance characteristics such as founder CEO ratios and founder retention in connection with firm long-run performance has been the focus of many studies; the main focus has been on related agency problems and the effects on firm performance. Renee Adams et al. (2008) study for example the effect of founder CEOs on firm performance while Jain and Kini (1994) study the post-IPO operating performance and the equity retention by the original entrepreneur. Other studies focus instead on the relationship between corporate governance characteristics and firm value (Cronqvist and Nilsson, 2003).

In summary, even though some studies previously has been done within the field on other markets, to our knowledge no earlier study has been conducted in Sweden which compare single- and dual-class IPO long-run underperformance neither before nor during the chosen time period. In order to investigate the long-run underperformance we use several different approaches. In event time we use the cumulative abnormal return technique (CAR), as well as the mean buy-and-hold abnormal return method ($\overline{BHAR}$), for CAR we use equally-weighted returns while for BHAR we use both equally- and value-weighted returns. In addition, we apply the calendar-time measure; for this technique we use both equally- and value-weighted returns. To measure the firm value we use a price multiple regression with the price-to-book ratio as the dependent variable. Our contribution will accordingly be to study IPO long-run underperformance from a new perspective and examine whether single- and dual-class firms differ in IPO long-run underperformance or firm valuation and whether this potential dispersion can be attributed to certain corporate governance characteristics.

Over a three-year period we find that dual-class IPOs show no signs of greater long-run underperformance than single-class IPO firms, neither using equally- nor value-weighted returns. This is most evident from the BHAR results and calendar-time regressions. The single-class IPO's performance is in the lower range when comparing the two groups of IPO firms. For the total IPO portfolio, the results are somewhat differing depending on the measuring technique. Moreover, we find that over the research time period dual-class IPO firms trade at higher price-to-book ratios than single-class IPO firms. Apparently, the market seems to rationally value dual-class IPO firms. Since, we assume that certain corporate governance characteristics are more prevalent among dual-class IPO firms we investigate how these corporate governance characteristics affect the long-run underperformance and the firm valuation. In terms of long-run performance, IPO firms with a controlling shareholder from a founder-family seem to perform slightly better than an IPO firm with a corporation as controlling shareholder. Moreover, our findings illustrate no severe discount of dual-class intensive controlling shareholder portfolios; consequently we find no underlying reason to believe that the high prevalence of founder family controlled IPO firms should be reflected in lower price-to-book ratios for dual-class IPO firms compared to single-class IPO firms. Furthermore, there are evidently indications that IPO firms with a founder CEO have a positive impact on IPO long-run performance. However, in terms of valuation founder CEO IPO firms trade at significantly lower price-to-book ratios than non-founder CEO IPO firms.

1.2 Clarification of Concepts

A firm is classified as a single-class IPO firm if it at the time of the initial public offering had one class of shares (B-shares) with a one-share one-vote structure. However, some firms issue a second class of shares called A-shares with superior voting rights; this is usually done to ensure that the firm's founders and other top executives can retain a high ratio of control even after an IPO. These superior-voting shares are usually not publicly traded and the most common controlling shareholder group in dual-class companies is firm founders and their families. Historically, Sweden had voting ratios up to 1:1000 but nowadays the most common vote ratio is that an A share carry 10 (1) votes, while ordinary class-B shares carry 1 (0.1) vote.

1.3 Disposition

The structure of this paper is as follows. Section II describes the theoretical framework used throughout the study and the hypotheses which underlies the paper. Section III presents the applied methodology and the following section IV describes in detail the data sample used. Section V presents the event- and calendar-time results for single and dual-class long-run IPO underperformance as well as an interpretation of the findings. The section also includes the findings from the valuation regressions as well as an analysis of the corporate governance characteristic associated with single- and dual-class IPO firms. Section VI concludes the paper with a summary and recommendations for further research.

2. Theoretical Framework

2.1 Long-Run Underperformance

A firm is assumed to go public primarily in order to raise outside capital for investment or as an exit for current owners. It is evident that the original shareholders will have inside information regarding the quality of their firm's investment opportunities, and they decide whether to go public, how much capital to raise and invest, and how to price the IPO. If we relax the assumption of homogeneous expectations in the marketplace we expect to see outside investors with different opinions about the firm’s future prospects. Outside investors can be assumed to consist of two types: the first kind is considered being overly optimistic about IPO prospects while other investors are categorized as being pessimistic. A large divergence of opinion about the IPO firm’s future should indicate that investors are uncertain about the firm’s true value and consequently whether the initial public offering price is right or not. Given that the voting rights and cash flow rights are separated in a dual-class firm yet another element of uncertainty comes into play as a value also has to be attributed to the votes. Voting and cash flow rights will most certainly be valued differently between investors and also lead to a higher *divergence of opinion* for dual-class IPO firms and a difference in long-run performance pattern.

Unlike the efficient-market theories, the model of heterogeneous expectations suggests that the investor who is optimistic enough to buy the share will also set the price (the marginal investor). By observing new information the marginal investors will reevaluate their expectations which will be reflected in a decline of the share price. With time, the valuation and price set by the marginal investor comes closer to the average investor’s valuation. Conclusively, the impact of overly optimistic investors will be negative on IPO long-run performance and as the degree of uncertainty (divergence) about the firm’s true value increases so will also the long-run underperformance. Teoh et al. (1998a, 1998b) argue that firms actively manipulate their accounts to raise valuations prior to selling stock by creating trends of growing earnings. This implies that analysts are excessively optimists about IPOs and their growth prospects (Rajan and Servaes, 1996). In line with this reasoning we would argue that influential controlling shareholder in dual-class firms would to a greater extent be able to actively manipulate the firms’ accounts which would lead to dual-class IPO firms being overvalued more often than single-class IPO firms, which in turn would lead to greater long-run underperformance. In conclusion, the divergence of opinion at the time of the IPO would be greater for dual-class IPO firms than for single-class IPO firms suggesting that it would require time for the market to fully comprehend its mispricing.

Dual-class firm deviates from the standard one-share one-vote rule by issuing a special class of stock that in most cases conveys superior voting rights to insiders. The resulting division between dual-class insiders' voting rights and cash flow claims creates the potential for severe agency problems. Certain owners can possess a high ratio of control through superior voting shares but risk only a small amount of equity that may lead to a *minority expropriation problem* (Jensen and Meckling, 1976). The intuition is that the controlling shareholder can divert company funds or engage in non-wealth maximizing actions to produce either non-financial benefits to himself such as hiring non-qualified related persons or financial such as excessive remuneration packages. This is typically known as the private benefits control. These actions become beneficial for the controlling shareholder since he does not have to bear the full costs for these actions but enjoys the total benefits. The costs are instead divided between all shareholders and the minority, which doesn't receive any of the benefits of the controlling shareholders actions (Zutter, 2001). In line with Zutter we argue that these actions consequently would benefit the controlling shareholder but have a negative effect on IPO long-run performance. The underlying economic reasoning is based on the assumption that the market may fail to fully incorporate how entrenched managers in dual-class firms expropriate firm resources and consequently apply an inadequate discount at the IPO which in the long-run would lead to greater underperformance (Zutter, 2001).

In line with the theories above, our main hypothesis reads as follow:

***H1**: Dual-class IPO firms show signs of greater long-run underperformance than single-class IPO firms.*

2.3 Firm Valuation

When you buy a stock you are buying a proportional share in a company, hence in order to find the correct stock price an analysis based on fundamental data has to be made. This is done by examining the financials and future prospects of the firm; once a total firm value has been determined this is converted into per-share values. Evidently an important part of valuation is to look at the long-run performance and profitability of a firm. If we assume that two firms should share all the same firm characteristics with the exception that one firm has a slightly more positive long-run performance than the other then we assume that an efficient market to rationally price the share higher than its peer and trade at higher multiples. In an efficient market only changes in fundamental factors, such as profits or dividends, ought to affect share prices. Moreover, the efficient market hypothesis predicts that all price movement (in the absence of change in fundamental information) is random (i.e. non-trending). It has generally been believed that securities markets are extremely efficient in reflecting information about individual stocks and about the stock market as a whole.

Valuation ratio are sometimes used to compare how different firms are valued by the market, the intuition is that if single- and dual-class share IPO firms were equivalent and shared the same long-run underperformance and other firm characteristics then they should also trade at the same multiples. The key is to look at comparable firms since all measures differ among industries and between other characteristics. A priori it is reasonable to believe that if the market generally has trouble pricing IPOs as Zutter (2001) notes, investors may have trouble pricing duals. Consistent with Jensen and Meckling (1976), Zutter (2001) argues that given that the price investors pay for IPOs fully reflect differences in corporate governance, ceteris paribus if the market misprices relevant considerations regarding the company at the IPO, a future market correction will be necessary. The connection between valuation and performance is however a bit more complicated since companies that have lower valuation than industry average might still perform better than the industry average. Possible explanations might be that in some firms too much capital is kept inside the firm instead of being paid out as dividends, ineffective acquisitions or over-investments, which all affect firm valuation and performance to various degrees. Another contribution factor is that founder controlled IPO firms might be more unwilling to take on debt to finance growth which typically is positive for relative valuations. Although there could be reasons for opposing effects in performance and valuation, many studies assume that they usually point in the same direction.[4] Therefore, to remain consistent with our previous hypothesis we assume that:

H2: *The market discount the shares of dual-class IPO firms relative to shares issued by single-class IPO firms.*

[4] Zutter, 2001

2.3 Corporate Governance Characteristics

Due to the separation between ownership and control in dual-class companies, some corporate governance characteristics will be investigated in relation to long-run underperformance and firm valuation theory. Much of the dual-class and firm-performance studies base their hypotheses on different kind of agency theories, it is believed that when certain owners posses a high ratio of control through superior voting shares but only have to invest a small amount of equity they may first of all focus on private benefits rather than total shareholder value. Secondly, they may be able to keep key positions within the management even though their skills might not be adequate. Consequently, the higher the vote retention the more determined should the entrepreneur and founder-family be to keep control of the firm and hence a dual-class share structure should facilitates the preservation of certain controlling positions within the firm such as CEO or Chairman of the Board. Without enough voting rights, it can be difficult for other dispersed shareholders to affect the corporate strategy and control for unprofitable projects. If the founder has retained a high ratio of shares the risk is that the remaining shareholders will be dispersed and that monitoring from the non-controlling shareholders will be lower. Consequently, little or no use of monitoring and a separation of ownership and control could lead to the expropriation of private benefits and severely affect the firm's long-run performance. To sum up, the separation of ownership and control in dual-class companies cause controlling shareholder's wealth not to be affected to the same extent as if the company had adopted a single-class structure. Rationally this would lead to dual-class IPO firms showing sign of worse long-run underperformance than single-class IPO firms. Hence we assume that certain corporate governance characteristics might serve as explanatory factors for a cross-sectional difference in long-run underperformance and firm valuation. Consequently, we will investigate the following hypotheses:

H3: *Certain owner categories such as founder-families will more often than other owner categories prefer a dual-class share structure at the time of the IPO and achieve higher share ownership and vote dispersal.*

H4: *Firm founders that want to retain a high control ratio in the firm will use a dual-class share structure and often maintain controlling positions such as CEO or Chairman.*

3. Method

Since there is an on-going debate regarding which expected return or realized return measurement is to be preferred, this study includes several alternative research approaches to evaluate long-run underperformance. Our intention is to make a comprehensive examination of the long-run underperformance of dual- and single-class firms for the first, second and third year following the IPO in order to find potential evidence of negative abnormal returns. Additionally, we test whether the firm valuation between the two types of IPO firms differs. As a final step, we will examine whether potential differences in either long-run underperformance or firm value can be explained by some corporate governance parameters. In the following section we have included an in depth presentation of the models used within the respective categories: long-run underperformance, firm valuation and corporate governance characteristics.

3.1 Long-Run Underperformance

We examine monthly stock returns and conduct event-time and calendar-time methods in order to investigate whether a significant post IPO abnormal return is present for single- and dual-class firms in the long-run. The returns will be equally-weighted while calculating the cumulative abnormal returns and both equally and value-weighted while calculating mean buy-and-hold returns and using the calendar-time approach. We use the OMX index as our benchmark throughout the tests. We find the OMX index suitable since a majority of the IPO firms trade on the exchange. In addition, it is the broadest index on the Swedish equity market, which implies that it will include a sufficient amount of other non- IPO firms in order for us to use it as a reliable benchmark. As for risk-free rate we use the Swedish one month t-bill.

3.1.1 Cumulative Abnormal Returns Method (CAR)

The Cumulated Abnormal Return method measures if a firm steadily earns abnormal returns compared to its benchmark. We will use three different event windows, one-, two- and three years, we do this in order to follow the IPO firms' return development against the OMX index. Naturally, we will measure the cumulative abnormal return for the entire IPO-sample and for the dual-class and single-class IPO firms respectively. The cumulative abnormal return tests will be performed using event-time.

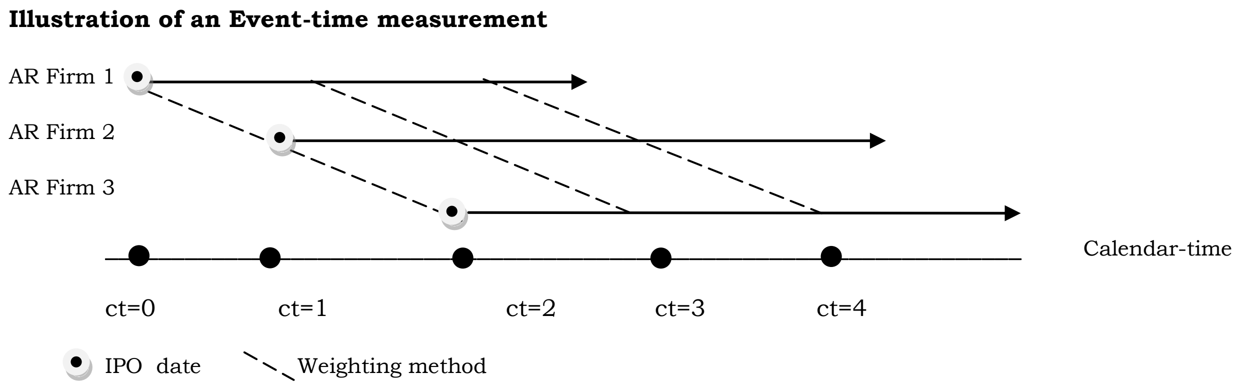


Figure 3.1 Illustration of an Event-time measurement

Figure 3.1 illustrates how the cumulative abnormal returns are calculated. Company 1 goes public at point zero. The two following months two other firms go public. The first month that each of these issuing firms are traded publicly is called event month 1. This means that event month 1 will be three different calendar months for the three issuing firms. The abnormal performance for each of the IPO firms starts in their respective event month 1 (for firm 1 between point 0 and 1). The abnormal return is calculated by comparing the return of each firm to the return of the OMX-index during the same month. The three resulting abnormal returns for the three firms are then tied together as IPO abnormal performance in event month 1. The same method is applied for event month 2, 3, … , until the last month within the event window.

In order to make overall inferences regarding the event of interest, the abnormal returns are aggregated, both through time and across securities. The benchmark adjusted return in event month *t* for stock *i* is defined as:

$ar_{it} = r_{it} - r_{mt}$ r_{it} = The stock return at time t r_{mt} = The OMX return at time t

The mean benchmark-adjusted return on a portfolio of *n* stocks for event month *t* is the equally-weighted arithmetic average of the benchmark-adjusted returns: $AR_{it} = \frac{1}{n}\sum_{i=1}^{n} ar_{it}$

Under the null hypothesis of no abnormal performance CAR follows a normal distribution. We further assume that γ is (L2 x 1) vector with ones in positions τ_1 to τ_2 and 0's otherwise. Then,

$CAR_i(\tau_1, \tau_2) = \gamma' \varepsilon_i^*$ and $VAR[CAR_i(\tau_1, \tau_2)]_i^2(\tau_1, \tau_2) = \gamma' V_i \gamma$

$CAR_i(\tau_1, \tau_2) = \gamma' \varepsilon_i^* \sim N(0, \sigma_i^2(\tau_1, \tau_2))$.

In order to see if the IPO-sample has signs of abnormal returns we use a t-test and the J1 and J2 test statistics. We are interested in investigating if the IPO sample's average cumulative abnormal return for the included firms is zero or not during our respective event windows. Throughout the J1 and J2 tests we imagine no correlation across abnormal returns of different stocks. Also, we assume no clustering and that the maintained distributional assumptions regarding the abnormal returns across securities will be independent. Given a sample of N events, the definition of the average abnormal return and its variance will be:

$$\bar{\varepsilon}^* = \frac{1}{N}\sum_{t=1}^{N}\hat{\varepsilon}^*_i \qquad Var\left[\bar{\varepsilon}^*\right] = V = \frac{1}{N^2}\sum_{t=1}^{N}V_i$$

The test statistic for J1 is defined as follows:

$$J_1 = \frac{\overline{CAR}(\tau_1,\tau_2)}{[\hat{\sigma}^2(\tau_1,\tau_2)]^{\frac{1}{2}}} \overset{a}{\sim} N(0,1)$$

H_0: $J_1 = 0$ which implies that the average CAR is =0

H_1: $J_1 \neq 0$ which implies that the average CAR≠0

The J1 statistic gives equal weight to the cumulative abnormal return of each security, this means that it is most adequate to use when the true abnormal return is larger for securities with higher variance.

The test statistic for J2 is defined as follows:

$$J_2 = \left(\frac{N(L_1-4)}{L_2-2}\right)^{\frac{1}{2}} \overline{SCAR}(\tau_1,\tau_2) \overset{a}{\sim} N(0,1)$$

$$\overline{SCAR}(\tau_1,\tau_2) = \frac{1}{N}\sum_{t=1}^{N} SCAR_t(\tau_1,\tau_2)$$

H_0: $J_2 = 0$ H_1: $J_2 \neq 0$

The J2 -statistic gives equal weight to each event, SCAR, standardized cumulative abnormal return. Therefore it is more appropriate to use J2 it if the true abnormal return is constant across securities since this implies that we should give more weight to events with lower abnormal return variance.

However, in most studies the results are not expected to be sensitive to the choice between the J1 and J2 due to the fact that the variance of CAR is of similar magnitude across securities. Consequently, we will not make any tests regarding the advantage of the different statistics.

In Fama (1998) the advantages and disadvantages of CAR are discussed. A drawback of using CAR is that it is claimed not to correctly measure the long-run return. For example, BHARs are expected to better measure the "long term post-event investor experience" (Fama, 1998). However, since average abnormal returns avoid statistical problems such as extreme skewness, the statistical problems of both BHAR and CAR are of more or less the same degree (Barber et al. (1997)).

3.1.2 Buy-and-hold Abnormal Returns (BHAR)

Barber and Lyon (1997) and Lyon et al. (1999) advocate the use of buy-and-hold abnormal returns as a measure of long-run performance. Using a simple regression of buy-and-hold abnormal returns against cumulative abnormal returns, Barber and Lyon (1997) show that cumulative abnormal returns are a positively biased predictor of buy-and-hold abnormal returns. Given this evidence they promote buy-and-hold abnormal returns in tests intended to detect long-run abnormal stock returns. The buy-and-hold return of an issuing firm *i* (BHR_i) is obtained by compounding its monthly returns over a chosen time period following the month of the IPO. This measure replicates an investment strategy that consists in buying and holding shares for a period of time. The same logic applies to the reference portfolio associated with the issuing firm *i*. The difference between the BHR of the issuing firm and the BHR of its reference portfolio, which in this case is corresponds to the OMX market index, is the buy-and hold abnormal return (*BHARs*). The *t*-period buy-and-hold abnormal return ($BHAR_{i,t}$) for sample firm *i* equals:

$$BHAR_i = \prod_{t=1}^{T}[1 + R_{i,t}] - \prod^{T}[1 + E(R_{Benchmark,t})]$$

where $R_{i,t}$ is the *t*-period buy-and-hold return for firm *i* and $E\left(R_{Benchmark,t}\right)$ is the *t*-period expected buy-and-hold return for an event firm *i*. Where the mean buy-and-hold abnormal return is the weighted average of the individual BHARs:

$$\overline{BHAR} = {}_{i=1}^{N} w_i \times BHAR_i$$

where t is the period of investment in months and $R_{i,t}$ is the simple return in month t for the $i=1,,,,n_t$ firms that comprise the reference portfolio for firm i. The monthly rebalancing of reference portfolios creates a rebalancing bias that tends to dampen measures of abnormal return Barber and Lyon (1997). One could use the following parametric t-statistic to test the null hypothesis of a zero mean buy-and-hold abnormal return for a sample of n firms, $BHAR_n$:

$$t_{BHAR} = \overline{BHAR}_{i,t} / (\sigma(BHAR_{i,t}) / \sqrt{n})$$

where $\overline{BHAR}_{i,t}$ is the sample average and $\sigma\left(BHAR_{i,t}\right)$ is the cross-sectional sample standard deviation of abnormal returns for the sample of n firms. However, within the limitation of this paper we decided not to include the t-test, we find the mean buy-and-hold abnormal return measure adequate as it is known for accurately representing investor experience (Mitchell and Stafford, 1999).

As already discussed, it is not evident which of the two measures CAR and BHAR is to be preferred. CAR uses arithmetic rather than geometric average and consequently for BHAR close to zero (and below), CAR is higher while for a large BHAR, CAR is much lower. Theoretically at least, BHAR should as mentioned above give more accurate results. However, the use of buy and-hold abnormal returns suffers from three drawbacks (Barber and Lyon, 1997). As with cumulative abnormal returns, buy-and-hold abnormal returns are subject to the new listing bias. Since newly listed firms underperform market averages (Ritter, 1991), we anticipate that the new listing bias will lead to a positive bias in the population mean of long-run buy-and-hold abnormal returns. In addition, long-run buy-and-hold abnormal returns are severely positively skewed. It is common to observe a sample firm with an annual return in excess of 100 percent, but uncommon to observe a return on the market index in excess of 100 percent. Since abnormal returns are calculated as the sample firm return less the market return, the abnormal returns are positively skewed. Each offering event in our sample is followed during three time periods, 12/24/36 months. Firms that have not been listed during the full respective time period are dropped; hence we are using a full sample approach instead of truncated.[5] The monthly returns, with exclusion of the event month, are compounded and the $\overline{BHAR}$ for the respective holding portfolios is estimated.

3.1.3 Calendar-Time Approach Method

In the calendar-time approach we track the long-run performance of an event portfolio in calendar-time relative to the benchmark index.

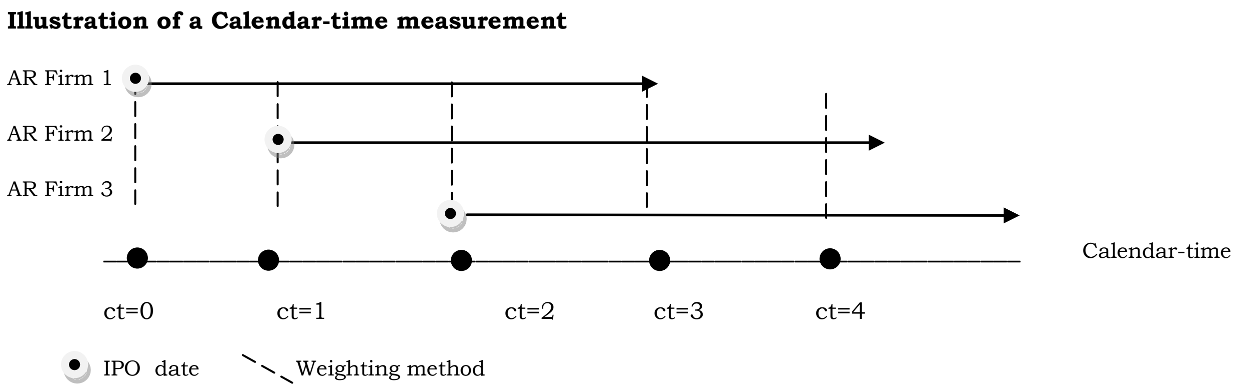


Figure 3.2 Illustration of a Calendar-time measurement

Figure 3.2 illustrates the procedure behind the calendar-time measurement; one period is one year and a company is categorized as an IPO firm for the three years following the issue. At the first measuring occasion, company 1 alone is weighted into the portfolio of IPOs. On the second occasion, firm 1, which has been traded publicly for “one period”, is weighted into the portfolio together with firm 2, the most recent IPO. At the third point in time one more firm has issued, consequently, we have three firms in the portfolio; this will go on for all coming periods. At the fourth measuring occasion, firm 1 is no longer in the IPO portfolio, due to the definition of an IPO firm; it is no longer considered an IPO firm since it has been traded for more than three years.

The event portfolio is composed each month to include all companies that have completed an IPO within the prior periods. At all points in calendar-time, the cross-sectional correlations of the individual IPO firm returns will be repeatedly accounted for in the portfolio variance by forming

[5] Truncated returns are calculated by including all observations within the event-time even if a firm is delisted, i.e. the aftermarket development is truncated and missing values are replaced by the market return development.

IPO (event) portfolios. To calculate calendar-time abnormal returns, we first form equally-weighted and value-weighted portfolios of all our sample firms that participated in the IPO within the coming three-years, 36 months. In addition, we divided our sample by single- and dual-class IPO companies, in order to investigate if these groups' long-run performance development differs. Portfolios are rebalanced monthly to drop all companies that reach the end of their three-year period and add all companies that have recently initiated a public offering. In line with Mitchell and Stafford (1999) the portfolio has to contain a minimum of 10 companies each month. We clear the data of months that do not fulfil this limitation. Since the number of firms in the portfolio changes over time the variance may also fluctuate, causing heteroscedasticity. By involving at least 10 firms in the event portfolio at each point in time, which accounts for the majority of the diversification effect of the portfolio residual variance, Mitchell and Stafford (1999) argues that the problem with heteroscedasticity can be mitigated.

The long-run performance is evaluated by regressing portfolio excess return on the capital asset pricing model (CAPM):

We define the CAPM-model as follows:

$$R_{p,t} - R_{f,t} = a_p + b_p\left(R_{m,t} - R_{f,t}\right) + e_{p,t}$$

In addition, we have constructed a three-factor model with influences from both Fama & French (1992) and Skogsvik & Skogsvik (2005).

Our three-factor model is defined as follows:

$$R_{p,t} - R_{f,t} = a_p + b_p\left(R_{m,t} - R_{f,t}\right) + s_p lnMV + h_p lnBM + e_{p,t}$$

The original Fama & French three-factor model is defined as follows:

$$R_{p,t} - R_{f,t} = a_p + b_p\left(R_{m,t} - R_{f,t}\right) + s_p SMB_t + h_p HML_t + e_{p,t}$$

In all three models, the intercept a_p measures the average monthly abnormal return on the portfolio of IPO firms, a_p is zero under the null of no abnormal performance. Excess return is defined as the difference between the return on the stock of interest and the risk free rate each month.

In the Fama & French model the small-minus-big variable controls for firm size and the high-minus-low variable controls for book-to-market, i.e. firm growth. Since Fama & French's three-factor model's is known for its high explanation rate of long-run abnormal return, we considered it would be an interesting contribution to use a similar model as a measurement of long-run abnormal return. However, due to the complications associated with applying the original Fama & French model on Swedish data we use proxies for the size- and growth variables. Skogsvik & Skogsvik (2005) evaluated long-run performance by regressing market excess return, following the methodology of Holthausen & Larcker (1992). In line with these scholars we add additional explanatory variables to control for size and growth. In our three-factor model, the natural logarithm of market capitalization control for size and the natural logarithm of book-to-market control for growth.

The calendar-time portfolio approach has been used in several papers, amongst the first ones to utilize it were Jaffe (1974) and Mandelker (1974). Mitchell & Stafford (1999) argues, in line with Fama (1998), that the method has several improvements compared to the traditional BHAR approach. The main intuition behind the advantage of the calendar measurement is that the individual event firm's abnormal returns are cross-sectionally correlated (Mitchell & Stafford, 1999).

There are however several potential problems that should be addressed when using the calendar-time portfolio approach. Mitchell & Stafford (1999) mentions a few; firstly, the regressions assume that the factor loadings in the given time period are constant through time, which is dubious since each month the composition of the event portfolio changes. Furthermore, IPOs tend to cluster through time by industry and different industries are characterized by having different factor loadings. The portfolio composition is probably heavily weighted in a few industries at each point in time, but different industries at longer intervals. This may lead to biased estimates. Secondly, the changing portfolio composition may give rise to heteroscedasticity, as the variance is related to the number of firms in the portfolio. This may lead to the OLS estimator to be inefficient, but, it will not lead to the estimates being biased. Even though Mitchell & Stafford (1999) says that one way to adjust for this is to incorporate at least 10 companies each month, this may not be enough and hence they use a bootstrapping method. Thirdly, the calendar-time portfolio approach weights each month equally, so that months that reflect heavy event activity are treated the same as months with low activity (Loughran and Ritter, 1999). Furthermore, the third point might cause difficulties to detect abnormal returns. This is related to the fact that the full sample period regression, which tests for average monthly abnormal returns, will have low power against the alternative of abnormal performance in "hot" markets and no abnormal performance otherwise (Mitchell & Stafford, 1999). Also Loughran and Ritter (1999) argued that the calendar-time portfolio regressions have low power to detect abnormal performance. To solve the problem they repeat the calendar-time portfolio analysis by using the calendar-time abnormal return (CTAR) methodology. The CTAR results are similar to the portfolio regression results for different event samples for the most part, indicating that the regression results are somewhat robust. The main difference is that virtually all of the CTARs are smaller in magnitude than the corresponding regression estimate, suggesting that the regression intercepts are not biased towards zero as some of the potential concerns predict (Mitchell and Stafford, 1999).

3.1.4 Risk associated with the long-run performance measurements

Before exploring the long-run performance of duals and singles, we would like to state some of the risks of using long-run event studies. Fama (1998) points out two systemic problems that papers using long-run event studies must confront; the bad model problem and the sensitivity of results to model specification.

The bad model problem arises from the fact that a proper test of market efficiency must jointly test a model capable of generating expected returns. The problem is that neither the academic nor the professional finance community has developed an error-free model that can fully describe normal return patterns. What is more, the bad-model problem worsens as the return horizon increases since expected return errors grow faster than the volatility of the returns their intended to model. The problem with long-run event-case studies is the sensitivity to model specification. Different methods for calculating abnormal returns can produce very diverse results. Moreover, value-weighting event-firm returns will often diminish or eliminate otherwise inconsistent equally weighted returns.

3.2 Firm Valuation

3.2.1 Regressions on Price-to-Book

The following step in the thesis is to determine whether or not dual-class IPOs are discounted when valued by the market, by conducting a price multiple regression. We have chosen to look at the price-to-book (P/B) ratio as a proxy for firm stock valuation. A lower P/B ratio could mean that the stock is undervalued but it can also be an indicator that something is essentially wrong with the company. As with most multiples and ratios it is important to keep in mind that they may significantly differ across industries. In order to assess the effect of the dual-class share structure and other control variables we run a multivariate regression with the P/B-ratio as the dependent variable. Since we have omitted variables that are constant over time but vary between cases, and others that may be fixed between cases but vary over time we run a panel data regression with a random effect alternative and robust standard errors since both types of variables can be included. The random-effects estimator is a weighted average of fixed and between effects. The model is presented below, where $y_{i,t}$ is the price-to-book ratio:

$$y_{i,t} = \propto_{i,t} + \beta_1 x_{i,t} + \beta_2 x_{i,t} + \beta_3 x_{i,t} + \beta_4 x_{i,t} + e_{i,t}$$

3.2.2 Comparison with Tobin's q

There are however limitations with the price-to-book ratio when used to evaluate whether a stock is discounted to its fair value. Firstly, although the ratio usually works quite well for companies with high ratios of fixed assets in their balance sheet; firms with a high ratio of intangible assets (goodwill, patents, etc.) will not be correctly valued since intangible assets are ignored by the book value calculation. Thus, it may not be very applicable for firms such as service firms. Secondly, acquisitions can increase the book value and decrease the P/B ratio as a result and finally share repurchase programs lead to lower book values. Several scholars favor instead the Tobin's Q measure, which is the ratio of the market value of an asset against the costs of replacing it. Tobin's Q is used to explain phenomena like diversification and investment decisions, the relationship between managerial equity and firm value, financing and dividends (Abeysekera, 2003). If the replacement cost of a firm's assets is lower than its market value, then the company is getting higher than normal returns, monopoly rents, on its investment (Dzinkowski, 2000). Despite its similarity to the conventional ratio of price to book value, Tobin's Q compares the market value of a company's tangible assets to its replacement value focusing on the financial performance based on its tangible assets. It has been favored by many scholars as an indicator of over- or under-valued markets, however given the complexity of estimating replacement values of a company's assets, it is hard to apply. It should be mentioned that there are also many other pricing multiples used in other studies, but since the main scope of this thesis is not to evaluate different valuation methods but rather to just give an indication of whether single- and dual-class IPOs are valued differently by the market we consider the price-to-book ratio to be a satisfactory pricing multiple.

3.3 Corporate Governance Characteristics

3.3.1 Controlling Shareholders

In line with the study of Cronqvist and Nilsson (2003) we have chosen to study the characteristics of controlling shareholders in dual-class and single-class firms respectively. We use the same definition as Cronqvist and Nilsson (2003), i.e. a shareholder is categorized as being a controlling shareholder if the owner posses 25 percent or more of the firm's votes. Controlling 25 percent of the votes "*should be enough for an owner to exert the main influence on the firm's decisions*", Cronqvist and Nilsson (2003). The classification of controlling owners is based on the ultimate ownership of the firms. If there were to be several owners, within the same or across different owner categories, who individually control 25 percent or more of the firm's votes then the owner with the highest ratio of votes is considered to be the controlling shareholder. On the other hand, if no shareholder possesses 25 percent of the firm's votes, the firm is classified as having a dispersed ownership. We have considered same 4 distinct controlling owner categories as Cronqvist and Nilsson (2003):

Founder Families – This include the founder and his/hers immediate family. If the firm had several founders, the one with the highest ratio of voting rights is considered to be the controlling shareholder.

Non-Founder Family – This block include families/individuals how are not affiliated with the founder.

Corporation – Corporate vote ownership is vote ownership by companies without a family as an ultimate controlling owner. In one case this category also includes vote ownership by the government.

Financial Institutions – Controlling vote ownership by financial institutions is the aggregate vote ownership by banks, mutual funds, pension funds, insurance companies and private equity firms.

Since we assume that certain owner categories such as founder-families will more often than other owner categories prefer a dual-class share structure at the time of the IPO we will build a probit model. The dependent variable used is a dummy which is set to one if the IPO firm has a dual-class share structure at the time of the IPO, as explanatory variables we will use dummy variables for the controlling owner categories. We also include the log of firm size and year dummies since we assume that controlling shareholders to a higher extent have to use a dual-class share structure to exert control in large companies. As mentioned we are interested to see whether certain owner categories are more likely than others to use a dual-class share structure at the time of the IPO and whether this in turn affects the performance results between owner category portfolios. If we presume a trading strategy which invest in owner category specific IPO portfolios, founder family and non-founder family portfolios are assumed to underperform those of corporations and financial institutions due to the favored dual-class share structure among these two groups (Cronqvist and Nilsson, 2003).

Since we assume that there are corporate governance factors that might affect the performance of IPO firms we are interested to see whether there are differences in performance between these owner categories. We regress calendar-time abnormal returns with the different controlling owner categories; to do this we first formed EW and VW portfolios of all sample firms that had their IPO within the previous three-years, 36 months. Portfolios were rebalanced monthly to drop all companies that reach the end of their three-year period and add all companies that had just executed an IPO. Since the number of firms in the portfolio changes over time the variance may also fluctuate, causing heteroscedasticity, hence the portfolios were tested with the constraint proclaimed by Mitchell and Stafford that all portfolios had to contain a minimum of 10 companies each month. We clear the data of months that do not fulfil these constraints.

We are also conducting a price multiple regression in line with the price to-book regression above, the P/B-ratio is consequently the dependent variable with the controlling shareholder category dummies as main explanatory variables. The dummy variable takes on the value of one for each respective category dummy if the controlling shareholder possessed more than 25 percent of the votes in the IPO firm in each respective month and zero otherwise. The estimation period was 1998-2007 and all regressions include year effects in form of time dummies and also a proxy for firm size is included, we present all results including robust t-statistics in *Table X*.

3.3.2 Founder CEO

Another corporate governance factor we assume to affect the underperformance of IPO firms is the prevalence of founder CEOs. We regress calendar-time abnormal returns with the two portfolios founder CEOs and non-founder CEOs; to do this we employ the same method as previously and form EW and VW portfolios of all sample firms that had their IPO within the previous three-years, 36 months. Portfolios were rebalanced monthly to drop all companies that reach the end of their three-year period and all companies that have just executed an IPO are added. Since the number of firms in the portfolio changes over time we continue to use a minimum of ten firms each month to control for heteroscedasticity. We clear the data of months that do not fulfil these constraints.

We are also conduction a price multiple regression with the price to-book-ratio as the dependent variable and the founder CEO as the main explanatory variable. This variable takes on the value of one if the founder possessed the position as CEO at the time of the initial public offering and zero otherwise. We have made a simplification and assumed that founder CEOs remain their positions throughout our estimation period. The estimation period was 1998-2007 and all regressions include year effects in form of time dummies and also a proxy for firm size is included, we present all results including robust t-statistics in the Appendix. Because it is reasonable to believe that the founder CEO variable is correlated with certain other CEO characteristics, the results could, due to omitted variables, reflect spurious correlations between founder CEO and firm valuation if not taken into consideration. In our regression we therefore include an additional CEO characteristic in an attempt to correct for this problem. We identify CEO ownership of capital as a good proxy variable, since it is more likely that a founder that holds a disproportionately large fraction of the firm's equity also has the power and incentive to retain the position as CEO. The same approach has been employed among others by Adams et al. (2008). They have however also chosen to include several other variables such as tenures and CEO's compensation. These variables are of course interesting to include in a more in-depth founder CEO and firm performance studies, but we find this to be out of the scope of this study.

4. Data

Because of the investigating purpose of this thesis, very extensive data collection had to be done. We decided to investigate the time-period 1998-2007 for three main reasons, firstly, to our knowledge, nobody has performed a similar analysis on long-run underperformance and valuation differences between dual- and single-class IPOs on Swedish data during the chosen time period. Thus, our analysis will hopefully shed further light on the characteristics of Swedish dual-class IPO companies. Secondly, several studies covering dual-class companies general distinctiveness has been conducted, but one of the more extensive ones covering the Swedish market was made in 1997.[6] Moreover, our model captures the ex ante and ex post IT bubble, which can be viewed as both a strength and a weakness. We consider it to be as a strength in the sense that several of the companies listed during this period used a dual-class share structure, thus, increasing the size of our sample. On the other hand, it can due to clustering jeopardize the robustness of our findings. Conclusively, the selected time frame offers us the opportunity to investigate dual-class IPO firms from several new perspectives.

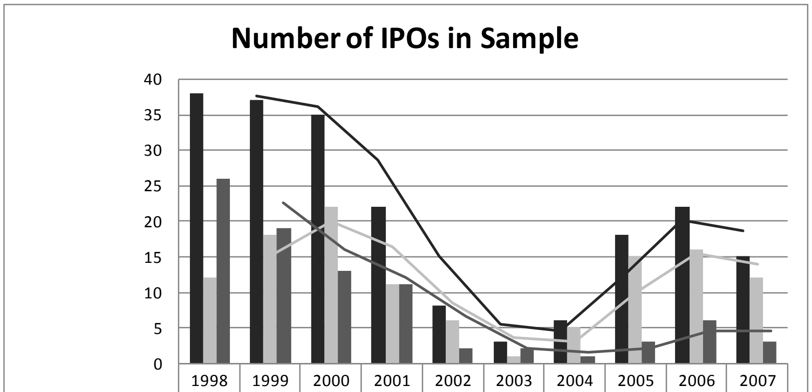
Sweden in comparison to the rest of the world has a substantial number of dual-class companies, which generates a strong platform for research within the chosen field. In the selection of our companies we were somewhat limited by difficulties in finding liable company data. In order to find which companies that were listed with two classes of shares we used the ten latest editions of the "*The Owners and Power in Sweden"* published by SIS Ägarservice. The Owners and Power series provide data for all Swedish companies whose shares are listed on the Stockholm Stock Exchange (OMX) and NGM Stock Exchange. In line with "*The Owners and Power in Sweden*" we have excluded companies that are domiciled abroad, additionally we have also chosen to exclude firms that only have switched from one of the two lists to the other. The reason for this is that we are only interested in studying a firm's IPO behavior once. We used "*The Owners and Power in Sweden*" as a starting point in selecting which companies to include in our survey, since we made the limitations mentioned above we ended up with somewhat fewer total number of IPOs than is stated in "*The Owners and Power in Sweden*". We consider a

[6] Cronqvist and Nilsson(2003)

company as an IPO firm from its first publicly documented observation in "*The Owners and Power in Sweden*" and a large part of our data set consists of companies listed on the larger OMX stock exchanges. We consider this to be a strength since this list should be the most efficient one on the Swedish market and should therefore provide us with the most correct information. However, we also have a substantial amount of observations from the smaller exchange the Nordic Growth Market, former SBI. Even though this exchange might be less efficient than the Stockholm Stock Exchange we believe it adds value and depth to our analysis to include these companies. There has also been substantial IPO activity on the NGM in recent years and therefore we consider it to be misleading not to include these companies that operate on an exchange which is growing in importance.

Our total population was initially 238 firms but due to the two restrictions above the population was reduced to include 229 IPO companies whereof 99 firms had a dual-class share structure.[7] After sorting and limiting the population due to company information constraints we ended up with a final IPO data sample comprising 204 IPO firms whereof 86 were dual-class IPO firms. Out of the final sample 133 firms were listed on the OMX while 71 were listed on NGM (former SBI), the ratio of dual-class IPO firms on the two exchanges was 39.8 percent and 46.5 percent respectively. To be able to perform our planned tests CAR, BHAR, Calendar-Time and valuation regressions we needed to download market value, price, and total return and book-to-market ratios for each company. We have been using two data bases in order to find necessary company data, both DataStream Advance and the SIX Trust Database. It is important to emphasize that even though both DataStream Advance and SIX Trust Database are considered to be very solid and reliable they in some instances fail to give us the necessary information needed in order to incorporate a company in the survey. This is the main reason for why the IPO population had to be reduced from 233 companies to 204. *Table 4.1* displays all the IPOs in our sample and the rolling average of IPO activity for the respective categories. In Appendix *Table I-II* the interested reader can find list of all of the IPO-firms by name and date, including the ones we had to exclude due to inadequate company data. Our ambition is not to investigate short-term effects such as first-day underpricing. Therefore, we have adjusted for underpricing effects and not incorporated the first month's observations following the IPO-date in our statistical tests.

[7] The Owners and Power, edition 1999-2008



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
TOTAL IPOs	38	37	35	22	8	3	6	18	22	15
Single-Class IPOs	12	18	22	11	6	1	5	15	16	12
Dual-Class IPOs	26	19	13	11	2	2	1	3	6	3

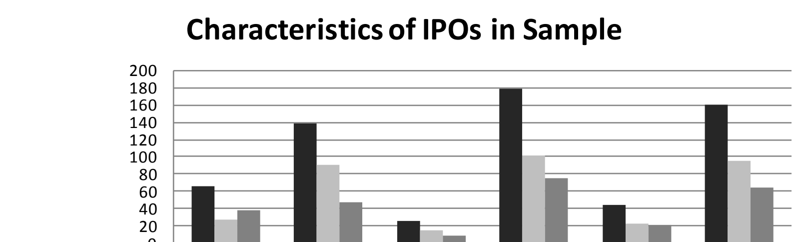
Table 4.1 IPO activity on the Stockholm Stock Exchange and the NGM Stock Exchange (Source: The Owners and Power in Sweden)

We are using the following methodology in order to handle our dual-class companies in the IPO sample. Inspired by Gompers et al. (2006), we are assuming equal prices across share classes. According to Gompers et al. (2006) non-traded stocks often make up a small part of the capital structure and therefore this assumption should not have a significant effect on our results. In addition they tested the robustness of the assumption by giving the a-shares a ten percent premium on the traded b-shares which proved to have no significant effect on their results. In order to illustrate correct prices for each group we performed the same test for robustness, by assuming a 6.5 percent premium on A-shares which earlier has been found for the Swedish market.[8] We did not either find any significant differences and hence we use the methodology advocated by Gompers et al., i.e. throughout all of the statistical tests we assume equal prices across non-traded and traded share classes. As our return measure we use total returns since it includes reinvested dividends and is therefore more suitable when determining a given company's performance from an investor's point of view. Our data sources provided us with price-to-book ratios which we inverted in order to find book-to-market proxies. In cases were no ratios were found for the first trading day, we have used the first observed value for that period.

We will in our study also look at the characteristics of the two categories of IPO firms and all our ownership data in terms of controlling shareholder's retention and founder's retention has been manually inscribed from "*The Owners and Power in Sweden*". In order to find out who founded

[8] Lecture held by Mike Burkhart at Stockholm School of Economics, course 4120 Corporate Governance

each firm we have mainly investigated each company's website and used Affärsdata or Newsline Group AB's research engine. In *Table 4.2* below one can see that out of our final sample 66 IPO firms had a founder as the CEO and out of these 39 were part of the dual-class IPO firm sample. The ratio of chairman of the board and founder was somewhat lower with a total of 26, out of which a majority 16 belonged to single-class IPO firms. During our time period 44 firms have been delisted, either because of corporate strategy or as a result of acquisitions or mergers. The amount is relatively evenly distributed among the two firm categories, 23 for sing-class IPOs and 21 for dual-class IPOs.



	CEO / Founder	CEO / Non-Founder	Chairman / Founder	Chairman / Non-Founder	Delisted	Active
TOTAL IPOs	66	138	26	178	44	160
Single-Class IPOs	27	91	16	102	23	95
Dual-Class IPOs	39	47	10	76	21	65

Table 4.2 IPO sample characteristics for firms listed on the OMX and NGM Stock Exchange (Source: The Owners and Power in Sweden and Newsline Group AB)

5. Analysis

5.1 Long-Run Underperformance

5.1.1 Cumulative Abnormal Returns (CAR) Results

The resulting cumulative abnormal returns are reported in *Table III* in the Appendix. The overall impression from the three different event windows is that the total IPO sample is experiencing an overall positive mean cumulative abnormal return development in comparison to the benchmark index (*see Table 5.1*).

Event window (years) =1			
	Total sample	Dual-class IPOs	Single-Class IPOs
Mean Cumulative Abnormal Return	.1344621	**.3098123**	-.0054809
Mean Standardized Cumulative Abnormal Return	-.4131135	**-.0900442**	-.6709477
Event window (years) = 2			
	Total sample	Dual-class IPOs	Single-Class IPOs
Mean Cumulative Abnormal Return	.2131427	**.5739768**	-.0897797
Mean Standardized Cumulative Abnormal Return	.4257755	**1.1833**	-.2101708
Event window (years) = 3			
	Total sample	Dual-class IPOs	Single-Class IPOs
Mean Cumulative Abnormal Return	.3231027	**.6265197**	.0196857
Mean Standardized Cumulative Abnormal Return	.9703704	**1.365549**	.5751914

Table 5.1. Mean CAR & SCAR over our research period

When comparing the two subgroups, dual-respectively single-class IPOs, the former appears to experience a more positive mean cumulative abnormal return over the three event windows. The same tendency, that dual-class IPOs perform slightly more positive in the long-run versus single-class IPOs seems to hold when comparing the standardized cumulative abnormal returns over all three event windows. This difference between the two groups in terms of mean cumulative abnormal return appears to reach its peak in the second period were we observe the greatest differences in between the two classes of firms. Moreover, the signs from the J2-tests regarding the mean standardized cumulative abnormal return also indicate that single-class IPOs should perform worse than dual-class IPOs. In order to find out whether these mean cumulative abnormal returns and the mean standardized cumulative abnormal returns are statistically significant we continued with the J1- and J2 tests. A summary of these test statistics is presented in *Table 5.2.* The interested reader can also see *Table III* in the Appendix for more detailed statistics.

		Df.	T_{crit}	J_1	T_{obs}	P-value	J_2	T_{obs}	P-value
	Total Sample	186	2.6025	4.025693	1.4476	0.1494	4.3556254	-1.2310	0.2199
1Y	Dual-class IPOs	82	2.6371	5.4445605	1.7872	**0.0776**	15.127758	-0.2059	0.8374
	Single-class IPOs	103	2.6249	4.445755	-0.0595	0.9527	4.2541048	-1.3618	0.1762
	Total Sample	148	2.6095	6.8140871	1.6185	0.1077	8.2359568	0.9473	0.3450
2Y	Dual-class IPOs	67	2.6512	26.564242	2.3394	**0.0223**	11.99832	1.9361	**0.0571**
	Single-class IPOs	80	2.6387	.88493276	-0.7539	0.4531	5.8747448	-0.3267	0.7447
	Total Sample	121	2.6171	7.7498219	1.8394	0.0683	9.6551567	1.7454	0.0835
3Y	Dual-class IPOs	60	2.6603	8.0229189	1.9531	**0.0555**	20.74032	1.7880	**0.0788**
	Single-class IPOs	60	2.6603	1.7444208	0.1448	0.8854	22.211788	0.7090	0.481

Table 5.2 Overview over J1 - & J2 – test statistics and the resulting t-values

The interpretation was conducted identically for all three time periods as well as on the differing firm-classes. The following paragraph describes how we found our results. First, the null hypothesis of the average abnormal return being zero for the estimation period following the event can be rejected if $|t_{obs}| > |t_{crit}$. This approach was used both for the J1- and the J2-test. We use the size 1 percent ($\alpha = 0.01$) to document the power, consequently, the same critical t-value will apply to both the J1- and J2-test. Moreover, we look at the p-value and the sign of the corresponding confidence interval for both tests. Since both J1- and J2-statistics follows a normal distribution we use the following critical values to test the null hypothesis; on a 5 percent significance level, the critical values are -1.96 and 1.96. An observed J1 or J2 value outside of the interval implies a rejection of the null hypothesis. Depending on the p-value we can reject on different levels of significance.

As illustrated in *Table 5.2*, the mean CAR and SCAR results indicate positive long-run performance; however, the statistical significance varies between the three periods. For time period one, the J1- and J2- test statistics' large figures indicate a rejection of the null hypothesis of the average abnormal return being zero for the estimation period following the event. The same is true for the two subsequent periods for the total sample and the dual-class IPOs; however the J1 and J2 statistic for single-class IPOs indicates the opposite. Evidently, the high p-values illustrate that the J1- and J2-figures are seldom significant. Concerning the p-values, we reject the null hypothesis on a ten percent significance level; the results can be seen in *Table 5.3*.

		Rejection of the null hypothesis	
		J1	**J2**
	Total Sample	NO	NO
1Y	Dual-class IPOs	YES	NO
	Single-class IPOs	NO	NO
	Total Sample	NO	NO
2Y	Dual-class IPOs	YES	YES
	Single-class IPOs	NO	NO
	Total Sample	YES	YES
3Y	Dual-class IPOs	YES	YES
	Single-class IPOs	NO	NO

Table 5.3 Overview over rejection of the null hypothesis of the average abnormal return being zero for the estimation period following the event based on J1 & J2 and their corresponding p-values.

Contradictory, the t-test values indicate that we cannot reject the null hypothesis; this is the case for all time periods. Moreover, the varying signs of the confidence intervals indicate that the mean CAR and the mean SCAR are both in the negative to the positive range. To conclude, both the J1- and the J2- test statistic show some indications that in particular the dual-class IPOs experience positive long-run performance. The results are significant on a ten percent level in all tests, except for the mean standardized cumulative abnormal return with an event window of one year where it is not statistically significant. Thus, the results offer no real support for our first hypothesis that dual-class IPO firms show sign of greater long-run underperformance than single-class IPO firms, it does however illustrate weak indications of dual-class IPOs performing slightly better than single-class IPOs.

5.1.2 Buy-and-Hold Abnormal Returns (BHAR) Results

Table 5.4 presents the long-run mean buy-and-hold abnormal returns ($\overline{BHAR}$) for our IPO sample; the results have been computed using both equally-weighted and value-weighted returns.

		Mean	Std. Err.	[95% Conf.	Interval]	Number of obs
Total IPO Sample						
Year 1	EW	0.2657805	0.1252100	0.0187663	0.5127947	187
	VW	0.0252049	0.0535939	-0.0805253	0.1309350	187
Year 2	EW	0.0348592	0.0854099	-0.1339211	0.2036396	149
	VW	-0.1414260	0.0421907	-0.2248000	-0.0580521	149
Year 3	EW	0.0292648	0.1031856	-0.1750182	0.2335479	122
	VW	-0.0912145	0.0432892	-0.1769170	-0.0055121	122
Single-Class IPO Sample						
Year 1	EW	0.3467508	0.2062953	-0.0623873	0.7558889	104
	VW	0.0030407	0.0737855	-0.1432955	0.1493770	104
Year 2	EW	0.0116797	0.1222016	-0.2315094	0.2548687	81
	VW	-0.1703624	0.0466683	-0.2632352	-0.0774896	81
Year 3	EW	-0.0352086	0.1177606	-0.2707648	0.2003476	61
	VW	-0.1146591	0.0421710	-0.1990137	-0.0303045	61
Dual-Class IPO Sample						
Year 1	EW	0.1643237	0.1136323	-0.0617270	0.3903745	83
	VW	0.1409887	0.0680539	0.0056077	0.2763696	83
Year 2	EW	0.0624702	0.1185246	-0.1741060	0.2990464	68
	VW	0.0980523	0.1182902	-0.1380560	0.3341606	68
Year 3	EW	0.0937383	0.1701113	-0.2465350	0.4340115	61
	VW	0.1916149	0.1627023	-0.1338382	0.5170680	61

Table 5.4 Equally- and Value-Weighted Mean Buy-and-Hold Abnormal Returns

As displayed in the table, the one year EW $\overline{BHAR}$ for the total IPO sample is approximately 0.266. The wealth relative, which is calculated by dividing the average gross return of the event firms divided by the average gross return of the benchmark (displayed in *Table 5.5*), is 1.2408 which implies that investing in an IPO portfolio generates approximately 24.08 percent more total wealth after one year than a strategy to invest in a market portfolio. If an investor had invested $1 in a company that participated in an IPO, he would on average over a one year horizon have approximately $0.27 more than an investor who invested the same dollar amount in the benchmark portfolio, the OMX-index. The VW $\overline{BHAR}$ is much lower at 0.025. The value-weighted $\overline{BHAR}$ is lower than the mean BHAR for equally weighted portfolios which is in line with the findings of Brav, Geczy and Gompers (1999) that found that the abnormal performance is reduced with the use of a value weighted method.

Average 1-year holding period total return			
	IPOs (%)	*Benchmark (%)*	*Wealth relative*
Total IPOs	36,9569	10,3789	1,2408
Single-Class IPOs	42,9564	8,2813	1,3202
Dual-Class IPOs	29,4396	13,0072	1,1454
Average 2-year holding period total return			
	IPOs (%)	*Benchmark (%)*	*Wealth relative*
Total IPOs	16,4761	12,9901	1,0309
Single-Class IPOs	7,1272	5,9592	1,0110
Dual-Class IPOs	27,6122	21,3652	1,0515
Average 3-year holding period total return			
	IPOs (%)	*Benchmark (%)*	*Wealth relative*
Total IPOs	1,5889	-1,3376	1,0297
Single-Class IPOs	-5,4981	-1,9773	0,9641
Dual-Class IPOs	8,6759	-0,6979	1,0944

Table 5.5 Average Holding Period Total Returns

The one year EW $\overline{BHAR}$ for the dual-class IPO sample is approximately 0.164 and the wealth relative is 1.1454, which implies that investing in an dual-class IPO portfolio generates 14.54 percent more total wealth after one year than a strategy to invest in a market portfolio. The VW $\overline{BHAR}$ is 0.141. The one year EW $\overline{BHAR}$ for the single-class IPO sample is approximately 0.347 and the wealth relative is 1.3202, which implies that investing in an single-class IPO portfolio generates 32.02 percent more total wealth after one year than a strategy to invest in a market portfolio. The VW $\overline{BHAR}$ is 0.003. Conclusively, investing in an IPO portfolio generate superior value over a one year horizon; this might be a result of the high IPO activity and boosting stock prices during the IT-bubble. Many IPO firms were listed during the period and their remarkable stock returns seem to be reflected in superior performance relative to the OMX index. We see that the single-class IPO portfolio performs better than both the benchmark and the dual-class IPO portfolio, i.e. over a one year time horizon the single-class IPO portfolio seems to be the ideal investment strategy. However the influence of this kind of temporary abnormal stock returns are assumes to be less influential when looking at longer time horizons, next we will study the 36 month event window which we consider to be a better proxy for evaluating long-run underperformance.

The three year EW $\overline{BHAR}$ for the total IPO sample is approximately 0.029 and the wealth relative is 1.0297, which implies that that investing in an IPO portfolio generates 2.97 percent more total wealth after three years than a strategy to invest in a market portfolio. The mean BHAR was 0.029, which implies that if an investor invested $1 in a company that participated in an IPO, he would over the 3 year event window have approximately $0.029 more than an investor who invested the same dollar amount in the benchmark portfolio. The VW $\overline{BHAR}$ is however negative at -0.09 percent indicating possible long-run underperformance. The three year EW $\overline{BHAR}$ for the dual-class IPO sample is approximately 0.094 and the wealth relative is 1.0944, which implies that that investing in an dual-class IPO portfolio generates 9.44 percent more total wealth after three years than a strategy to invest in a market portfolio. The VW $\overline{BHAR}$ is also positive and even higher at 0.192. The three year EW $\overline{BHAR}$ for the single-class IPO sample is approximately -0.035 and the wealth relative is 0.9641, which implies that that investing in a single-class IPO portfolio generates 3.59 percent less total wealth after three years than a strategy to invest in a market portfolio. The VW $\overline{BHAR}$ is -0.115.

The findings regarding long-run IPO underperformance are arbitrary, the total IPO portfolio seem to perform marginally better than the benchmark when using equally-weighted returns but when using value-weighted returns we see some signs of IPO long-run underperformance. What is also evident is that all the wealth relatives are decreasing when looking at the BHARs on a yearly basis (except for the dual-class 36 months IPO portfolio); there are thus indications that in the long-run we might expect IPO long-run underperformance to be prevalent on the Swedish market as well. Our findings partly support earlier findings by Loughran & Ritter (1995) who found that IPO firms show signs of long-run underperformance. They found that nominal five-year buy-and-hold returns are fifty percent lower for the latest IPOs than the buy-and-hold returns for comparable size-matched firms.

One of the more interesting finding is that in our sample the long-run IPO underperformance it seems as if the long-run underperformance can be attributed to single-class IPO firms. The single-class IPO portfolio consisting of 61 firms show signs of negative mean buy-and-hold abnormal returns over the three year event-window, both when the returns are equally-weighted and value-weighted. On the contrary, the dual-class IPO portfolio, consisting of an equal amount of IPO firms, shows positive mean buy-and-hold abnormal returns over the same time horizon, both using equally-weighted and value-weighted returns. The difference in long-run underperformance is evident when using equally-weighted returns and becomes even more remarkable using value weighted-returns since the dispersion increases outstandingly. We have as dictated used the full sample approach and we feel confident that this approach should give proper results, but as earlier stated a truncated sample approach is also possible. Consequently we find no evidence that would support our main hypothesis that dual-class IPO firms show sign of greater long-run underperformance than single-class IPO firms. When Zutter (2001) analyzed the US equity market he also found that dual-class share companies were not showing any tendency to underperform following the IPO in comparison to IPO firms with a one-share one-vote structure. Our BHAR results rather point in the opposite direction that the negative cross-sectional difference in long-run underperformance is attributed to single-class IPO firms.

In conclusion we can state that when looking at mean BHARs we find that IPO firms over a three year time horizon on average underperform the market using value-weighted returns and that the underperformance is increasing with time. Thus, there is no evidence which support the assumption that dual-class IPO firms would underperform single-class IPO firms over a three-year period; conversely we find that single-class IPO firms might underperform dual-class IPO firms in the long-run.

5.1.3 Calendar-Time Results

The results from the equally- and value–weighted CAPM regression on the total IPO sample, as well as the two sub groups, dual-and single class IPOs are presented in *Table 5.6.*

	Equally-weighted			Value-weighted		
	Alpha (t-stat)	R^2 N	P-value	Alpha (t-stat)	R^2 N	P-value
Total IPO Sample	.01413658 (1.8791496)	0.5171 115	0.063	.0194544 (2.5355821)	0.4824 115	0.013
Dual-Class IPOs	**.02863904** (1.9471642)	0.3149 85	**0.055**	**.0324167** (1.9399819)	0.1573 85	**0.056**
Single-Class IPOs	.00848807 (1.261771)	0.5952 110	0.210	.02340356 (2.6407532)	0.4591 110	0.009

Table 5.6 Alpha results, R^2 and p-value

The interested reader can find the detailed statistics in *Table IV*. The constant, which should demonstrate any eventual effect of the event, is being compared between our different groups. For the total IPO sample the observed constant is positive and significant at a ten percent significance level since the p-value < 0.10. This holds, for both the equally-and value-weighted returns. Thus, we can reject the null hypothesis of no effect caused by the event. For the equally-weighted- and value-weighted returns the constants indicates that IPO companies experience an increase in their long run performance averaging 1.4 percent and 1.9 percent per month in comparison to the risk-free asset.[9] For the dual- and the single-class IPOs firms the same holds as above, even though the statistical significance varies and seems to be higher when measuring value-weighted returns. Interestingly, the long-run performance appears to be slightly more positive for the dual-class firms, since the observed constant's values in both the equally-and value weighted method have the greatest values of the two groups. A further strength is that this is statistically significant at the ten percent level, and in line with both the results from CAR and BHAR. The regressions results and whether we can reject the null hypothesis of the IPO not having an impact on the firm's long-run performance can be found in *Table 5.7*.

[9] The 1 month Swedish T-bill

Rejection of the null hypothesis		
	Equally-weighted	Value-weighted
Total IPO Sample	YES	YES
Dual-Class IPOs	YES	YES
Single-Class IPOs	NO	YES

Table 5.7 Rejection or not of the null hypothesis

Moreover, when looking at the market factor beta values, the substantially higher beta for the dual-class portfolio indicates higher expected return, this also an indication of higher market risk for the dual-class IPO portfolio. Two reasons why we generally observe higher percentage figures in the value-weighted regressions can be related to that the value-weighted portfolio has higher returns since larger companies get a larger weight, in addition, these firms do not normally underperform, as a result the value-weighted constant will be positively biased.

The results from the three-factor model can be found in *Table V* in the Appendix. In terms of interpreting the results from the model, we encounter a few obstacles. Even though the R^2 is slightly higher than in our one-factor model, it is difficult to see any pattern in line with our previous results, since the alphas are of an unrealistic large size. Most disconcerting this is true for the equally-weighted regressions for single-class IPOs. In the value weighted regressions the alphas are significant on the ten percent level for all groups. Additionally, the positive signs of the constants for the total sample are in line with the results from the CAPM regressions. When comparing the constants from the value-weighted regressions, the dual-class IPOs appear to experience more positive long-run performance in comparison to single-class IPOs. But, as already stated the figures of the coefficients are unrealistically large. Thus, we conclude that this model partly strengthens the results from the CAPM model, but to a very small extent.

As observed the regression results from the CAPM is in line with both BHAR and CAR, where the null hypothesis that the event has no impact on the stock price was rejected; the effect of an IPO appears to be positive and the IPO firms seem to experience an increase in returns following the event. To sum up, it appears to be a difference in long-run performance between dual-and single-class IPO firms since dual-class IPOs show indications of positive long-run performance, on the contrary to what we assumed to find according to our main hypothesis.

Since no similar studies have been conducted on Swedish data, we compare our findings to Zutter (2001) who made a similar study on IPO companies in the US. Zutter (2001) did not find any evidence that dual-class IPOs should underperform more severely than single-class IPOs. Zutter (2001) obtained the result by performing Fama-French three-factor regressions and even though the model is of more complex nature than the CAPM, we would argue that our methods are close enough in order to compare our results. Smart et al (2007) also compared long-run returns between dual-and single–class IPOs, by utilizing using the Fama-French-Carhart model, they reach to the same conclusion as Zutter (2001). Our results give inclinations of differences in performance pattern between the dual-class IPOs and single-class IPOs, in opposite direction suggested by our main hypothesis. A reason might be that dual-class IPOs operates differently on the Swedish market. Perhaps, the strong tradition around the dual-class share structure leads to self-regulation and that the controlling shareholders do not use the dual-class firms to expropriate private benefits to the same extent as the market assumes and hence investors might be overly sceptical and punishing dual-class IPO firms for actions and behaviour that will never materialize (Zutter, 2001). The excessive discount at the IPO might offer a possible explanation for the unexpected indications of overperformance.

5.2 Firm Valuation

5.2.1 Regression on Price-to-Book Results

The results from the Price-to-Book regression are described in *Table VI* in the Appendix, the estimation period was 1998-2007 and the regression includes year effects and each outcome including respective robust t-statistics (clustered by firm) are reported in the table. When our chosen explanatory variables are regressed against the price-to-book ratio we find that the key explanatory variable the dual-class IPO firm dummy is positively correlated with the price-to-book ratio and significant at a 5 percent significance level. The proxy form firm size *ln*Total firm value is also positively correlated with the P/B-ratio and significant at all reasonable significance levels. Among the Time Dummies some are significantly both positively and negatively correlated with the P/B-ratio.

The estimates show that a dual-class share structure does not reduce IPO firm valuation in the sense of a lower price-to-book ratio. On the contrary a dual-class IPO firm has a significantly higher P/B-ratio than a single-class IPO firm. A dual-class share structure is apparently not viewed negatively by the market and the dual-class IPO shares are hence not traded with lower valuation multiples. Our estimate indicates that, at a dual-class IPO firm's relative valuation in the form of the price-to-book ratio would on average increase by approximately 0.22 percent, ceteris paribus. The estimate is statistically significant but unexpectedly the coefficient is positive. Our result does consequently not support the hypothesis that dual-class companies are discounted by the market. Instead the findings coincide well with the findings in the preceding section; in the long-run dual-class IPO firms outperform single-class IPO firms which appear to be reflected in a higher price-to-book firm valuation. In his study, Zutter (2001) also came to the conclusion that dual-class IPO firms do not underperform in the long-run compared to single-class IPO firms, he did however still find proof that the market appeared to discount the dual-class stocks. Thus, according to Zutter (2001) the market initially appears to punish companies that favor controlling shareholders, even though they do not perform any worse than single-class firms. As we investigate the development of firm valuation over time of the respective IPO groups, we do not find any support for such a market punishment. Rather our results illustrate that the market rationally identifies the positive effects a dual-class structure will have on firm performance and consequently sets higher prices.

5.3 Corporate Governance Characteristics

5.3.1 Controlling Shareholders Results

In *Table 5.8* we present a summary of the IPO sample characteristics, it is evident that at the time of the initial public offering most firms (100) in our sample had no controlling shareholder, in the sense that no single owner controlled 25 percent or more of the votes. Out of the firms with a controlling shareholder, the most common owner category was founder family; in the entire sample 39 IPO firms had a controlling shareholder who belonged to a founder-family, out of these 30 were found in dual-class IPO firms while 9 belonged to single-class IPO firms. The second largest category was corporations with 37 controlling shareholders in the entire sample, 21 in the single-class IPO section and 16 in the dual-class IPO section. The other two owner categories non-founder families and financial institutions had approximately an equal amount of controlling shareholders in the sample, 15 and 13 respectively. A majority of the non-founder families were found among dual-class IPOs (16) whereas a majority of the controlling shareholders belonging to the financial institutions' category were found among sing-class IPO firms (9).

Ownership Structure at IPO					
	Founder Family (%)	*Non-Founder Family (%)*	*Corporation (%)*	*Financial Institution (%)*	*Dispersed Ownership (%)*
TOTAL IPOs (N)	39	15	37	13	100
Mean (median) ownership of votes	52,52%	42,69%	45,01%	39,55%	N/A
	(50,30%)	(35,40%)	(38,60%)	(37,60%)	N/A
Mean (median) ownership of capital	35,54%	27,52%	38,04%	31,45%	N/A
	(34,60%)	(27,20%)	(35,00%)	(36,60%)	N/A
Single-Class IPOs (N)	9	4	21	9	75
Mean (median) ownership of votes	43,83%	31,05%	41,86%	35,31%	N/A
	(41,10%)	(30,25%)	(35,30%)	(37,60%)	N/A
Mean (median) ownership of capital	43,83%	31,05%	41,86%	35,31%	N/A
	(41,10%)	(30,25%)	(35,30%)	(37,60%)	N/A
Dual-Class IPOs (N)	30	11	16	4	25
Mean (median) ownership of votes	55,13%	46,92%	48,99%	49,08%	N/A
	(53,65%)	(45,40%)	(45,15%)	(34,75%)	N/A
Mean (median) ownership of capital	33,05%	26,24%	33,02%	22,78%	N/A
	(31,35%)	(21,30%)	(32,45%)	(20,85%)	N/A

Table 5.8 Ownership Structure at IPO (Source: The Owners and Power in Sweden)

Table 5.8 shows that in the total sample most families are majority owners whereas financial institution is the category with the lowest ratio of vote ownership on average. Founder family is also the category which manages to create the highest equity and vote dispersal, with an average ownership of 35.53 percent of the capital they still on average manage to achieve simple majority by controlling 52.52 percent of the votes. Non-founder families also manage to create relatively high vote dispersal; on average they control 27.52 percent of the capital and 42.69 percent of the votes. Finally all four categories of controlling owners have a lower ownership of capital than votes, but the two family categories succeed to a greater extent than corporations and financial institutions to achieve a larger degree of control with a smaller equity stake. Hence family categories must, more often than other owner categories, make use of the dual-class share structure with superior voting shares. These findings offer support for our third hypothesis that founder-families favor a dual-class share structure and also achieve higher equity stake and vote dispersal.

Confirming these results is the usage of dual-class shares at the time of the IPO, in our sample founder families and non-founder families use a dual-class share structure 76.9 and 73.3 percent of the times while the matching figure for corporations is only 43.2 percent and for financial institutions 30.8 percent. The figures in *Table VII* in the Appendix, illustrate the estimated marginal effects of our probit model when changing a controlling owner dummy from zero to one. An IPO firm that is controlled by a family at the IPO date is at least two times more likely to use a dual-class share structure compared to an IPO firm controlled by a corporation (5 percent sign. level). According, to the results both family categories are individually more likely to use dual-class than the two other categories even though the probit regression is not statistically significant for financial institutions. Our findings correspond with the findings of Cronqvist and Nilsson (2003) that also found that both founder and non-founder families are more likely to use dual class shares than the two other categories. It should however be mentioned that Cronqvist and Nilsson (2003) studied listed firms in general and not IPO firms in specific.

The results for the equally-weighted and value-weighted CAPM regression are presented in *Table VIII* in the Appendix. Since we want to avoid heteroscedasticity we are using the restriction proclaimed by Mitchell and Stafford. From the findings in *Table VIII* we see that we only receive results for IPOs with founder families and corporations as controlling shareholders since the non-founder family and financial institution variables are dropped due to insufficient number of observations. The constants for the founder family portfolio are positive both using equally-weighted and value-weighted returns, for the value-weighted model the constant is significant at 1percent significance level. The constants for the corporation portfolio are negative both using equally-weighted and value-weighted returns, the constants are however not significant at reasonable significance levels. The equally-weighted and value-weighted portfolio betas are all significant at all significance levels and if we compare the betas for the founder family portfolio with the corporation portfolio we see that the betas for founder family are higher suggesting founder-family being a higher-beta portfolio than the corporation portfolio. The CAPM equation suggests that the higher the beta, the higher the expected return. It should be noted that this is the only kind of risk that is rewarded in the CAPM model; it is usually referred to as systematic or non-diversifiable risk. This risk is rewarded with expected return and hence we assume the founder-family portfolio to have a higher expected return than the corporation portfolio. If we were to interpret these results we would argue that IPOs with founder-families are expected to perform slightly better than at least IPO firms controlled by corporations. There are evidently some indications that IPO firms with somebody from the founder family as a controlling shareholder might have a positive impact on an IPO firm's long-run performance. Hence a portfolio strategy involving firms with high founder family retention might generate more total wealth than a strategy to invest in corporation controlled IPO firms; decisively this becomes a question of investing in dual-class IPO firms or single-class IPO firms. This would consequently not serve as a reasonable explanation for our hypothesis, that dual-class IPO firms could experience greater long-run underperformance than single-class IPO firms, since the family founder controlling shareholder category which has the highest usage of a dual-class share structure seem to perform slightly better than at least corporations with more frequent usage of single-class shares. It would rather indicate that the opposite relationship holds as true, this might serve as an explanation for the previously unforeseen results in our study i.e. that in the long-run dual-class IPO firms seem to outperform single-class IPO firms on the Swedish equity market. We can however not make any definitive conclusions since we do not have results for the two remaining controlling shareholder category portfolios. We do not find this to be a great drawback since the general purpose of this thesis is only to investigate the general characteristics of single- and dual-class IPOs on the Swedish equity market. Hence we leave it open for further studies to more in-depth investigate controlling shareholder effects on general firm performance.

As for the firm valuation, i.e. price multiple regression, we see that the coefficients in *Table X* are all positive and significant for each respective controlling shareholder category. The estimation period was 1998-2007 and all regressions include year effects and results are included with respective robust t-statistics. The proxy for firm size *ln* Total firm market value is consistently with the price-to-book regression above positively correlated with price-to-book at all reasonable significance levels. The highest valuation premium has financial institution with a coefficient of 0.013 which is closely followed by founder families at 0.012. Hence the controlling shareholder category "financial institution", with the highest proportional ratio of single-class IPO firms, is more or less valued equivalent by the market as the founder family portfolio with the highest ratio of dual-class IPO firms. Non-founder family and corporation are valued somewhat lower in terms of price-to-book ratios with coefficients around 0.02. These findings show no severe discount of dual-class intensive controlling shareholder portfolios;

consequently we find no underlying reason to believe that the high prevalence of founder family controlled dual-class IPO firms should be reflected in lower price-to-book ratios for the general dual-class IPO category compared with the single-class IPO firm portfolio.

5.3.2 Founder CEO Results

As illustrated in the data section, we saw that founder CEOs were proportionally more common among dual-class IPO firms, which strengthens our fourth hypothesis that firm founders in dual-class IPO firms often retain controlling positions. In *Table IX* in the Appendix the results from the equally-weighted and value-weighted CAPM regressions are presented both for the founder CEO and non-founder CEO portfolios. Since we want to avoid heteroscedasticity we continue to use the restriction proclaimed by Mitchell and Stafford. In the results in *Table IX,* we see that the constants for the founder CEO portfolio are both positive and significant for the value-weighted returns at a 5 percent significance level. The constants for the non-founder CEO portfolio are also positive and significant using the value-weighted approach at a 5 percent significance level. The portfolio betas are all significant at all significance levels and if we compare the betas for the founder CEO and non-founder CEO portfolios we see that the betas for founder CEO are higher both using equally-weighted and value-weighted returns suggesting founder CEO being a higher-beta portfolio than the non-founder CEO portfolio. According to the same reasoning as above the CAPM equation suggests that the higher the beta, the higher the expected return. Therefore we assume a founder CEO portfolio to have higher expected return than a non-founder CEO portfolio. If we were to interpret these results we would argue that IPO firms with a founder as the CEO at the time of the initial public offering are expected to perform better than IPO firms with an external CEO. There are evidently indications that IPO firms with a founder CEO have a positive impact on IPO long-run performance. Hence a portfolio strategy involving firms with founder CEO should generate more total wealth than a strategy to invest in IPO firms run by external CEOs. This finding does not either serve as an explanation for why dual-class IPO firms could experience a greater long-run underperformance than single-class IPO firms. Dual-class IPO firms have to a much higher extent the founder as the CEO at the time of the IPO, on the other hand it would strengthen the findings in the rest of this paper that in the long-run dual-class IPO firms seem to outperform single-class IPO firms on the Swedish equity market.

Table XI reports the results from the firm valuation regression using the price-to-book ratio as the dependant variable, we see that the founder CEO variable is negatively correlated with the pricing multiple price-to-book and it is significant at a 5 percent significance level. The estimation period was 1998-2007 and all regressions include year effects and results including robust t-statistics. The proxy for firm size *ln* Total firm market value is of the same magnitude as before and still positively with the price-to-book ratio at all reasonable significance levels. We also see that the founder retention is positively reflected in a higher price-to-book ratio. In conclusion, the market seems to discount firms with a founder as the CEO at the time of the IPO but it values founder retention of the equity stake. Since the founder CEO ratio is much higher for dual-class IPO firms we could expect that a dual-class IPO portfolio to trade at lower price-to-book multiples (*see Table XI*), however since the founder retention is generally higher among dual-class IPO firms this discount might totally or at least in part be off set. Adams et al. (2008) found that founder CEOs have a positive and large effect on firm performance and valuation, our results confirm that a founder CEO portfolio seem to perform better in the long-run than a non-founder CEO portfolio. However, in terms of valuation founder CEO firms trade at significantly lower price-to-book ratios than non-founder CEO firms. This could offer an explanation to the findings by Zutter (2001) who found that in the long-run dual-class IPO firms do not show signs of more severe long-run underperformance than single-class IPO firms but that they were still valued significantly lower by the market. The market might anticipate that entrenched managers will expropriate firm resources and hence founder CEO firms to underperform the market. Consequently, investors will be overly skeptical, punishing dual-class IPO firms with high founder CEO ratios for bad behavior that will never materialize, in which case they will apply an excessive discount for the firm.

6. Conclusion

In contrast to what we initially assumed, we have not found any evidence which suggests that dual-class IPOs show signs of greater long-run underperformance than single-class IPO firms, neither using equally- nor value-weighted returns. This is most evident from the BHAR results and Calendar-Time regressions. We however find some indications that dual-class IPOs marginally outperform single-class IPOs during a three year period when using equally-weighted returns for the mean BHAR and Calendar-Time approach. These results become even more obvious while using value-weighted returns.

We use the results from Smart et al. (2007) and Zutter (2001) in order to compare our findings; they reach the conclusion that there is no clear evidence of a different long-term underperformance pattern in between these two IPO groups. Thus, the underperformance seem to be a characteristic of all IPO firms, regardless of whether they have a dual-class share structure at the time of the IPO or not. We conclude that the long-run underperformance to a greater extent should be attributed to single-class IPO firms. We believe, that one reason behind the divergence in result between the Swedish equity market and the US equity market can be explained by the high frequency of dual-class firms in Sweden.[10] Perhaps, the strong tradition around the dual-class share structure leads to self-regulation and that the controlling shareholders do not use the dual-class firms to expropriate private benefits to the same extent as the market assumes and hence investors might be overly sceptical and punishing dual-class IPO firms for actions and behaviour that will never materialize (Zutter, 2001). The excessive discount at the IPO might offer a possible explanation for the unexpected indications of overperformance.

Furthermore, we believe that the observed long-run performance pattern could partly be explained by theory covering the corporate governance mechanisms incorporated in a dual-class share structure. We conclude from our regression results that dual-class IPO firm’s trade at somewhat higher price-to-book ratios than single-class. Our results illustrate that the market

[10] Zutter, 2001

rationally identifies the positive effects a dual-class structure will have on firm performance and consequently sets higher prices.

In addition, we found that certain controlling shareholder categories performed better than others, amongst them founder families. It seemed as if high founder retention and key management positions such as CEO has a positive effect on firm-performance and the high prevalence of these corporate governance mechanisms in dual-class firms could offer some explanation to our findings. These characteristics are also reflected in the valuation, with the exception for founder CEOs which the market seems to discount.

Further Research:

We leave it open for further research to more in-depth evaluate each specific corporate governance mechanism. The study could also be conducted by using truncated return series which include all firms. More focus could be on in-depth firm valuation of single- and dual-class IPO firms with several pricing multiples as dependent variables. Also a study including the adjusted monthly firm size and book value portfolios could be conducted in order to use a Fama and French three-factor model. In addition other benchmark portfolios could be used to test the robustness of the findings; perhaps a matching portfolio approach used by Ritter (1991) could be interesting to develop further.

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8. APPENDIX

Table I. Included Initial Public Offerings 1998-2007

Company	IPO-Date	Dual-class IPO	List	Delisted
Daltek	23-Mar-98	Yes	SBI	Yes
reCulture	23-Mar-98	No	SBI	Yes
Target Games	03-Mar-98	Yes	SBI	Yes
Asticus	03-Apr-98	No	O	Yes
Karo Bio	03-Apr-98	Yes	O	No
Nilörngruppen	06-Jun-98	Yes	OTC	No
Intra International	20-Apr-98	No	SBI	Yes
ACSC	12-May-98	No	SBI	No
BioGaia	28-May-98	Yes	O	No
Guide Konsult	27-May-98	Yes	O	Yes
Lifco	18-May-98	Yes	O	Yes
MNW Records	28-May-98	Yes	SBI	Yes
MSC Konsult	19-May-98	Yes	O	No
Prevas	29-May-98	Yes	O	No
Global Direct	18-May-98	Yes	SBI	Yes
Academedia	18-Jun-98	Yes	SBI	No
Affärsstrategerna	26-Jun-98	Yes	O	No
Balder	30-Jun-98	No	O	Yes
Broströms	17-Jun-98	Yes	O	No
Mandamus	15-Jun-98	No	O	Yes
Nexus	02-Jun-98	No	SBI	No
Saab	18-Jun-98	Yes	O	No
BIP	15-Jun-98	No	SBI	Yes
MediRox	18-Jun-98	No	SBI	No
Nimbus Boats	15-Jun-98	Yes	SBI	Yes
InfiniCom	18-Jun-98	Yes	SBI	No
Corona Petroleum	09-Jul-98	Yes	SBI	Yes
PA Resources	07-Sep-98	Yes	SBI	No
Sifo Group	10-Sep-98	Yes	O	Yes
Sweco	21-Sep-98	Yes	O	No
Confidence	26-Oct-98	Yes	SBI	No
Isokern	07-Oct-98	No	SBI	Yes
Inac	26-Oct-98	Yes	SBI	No
3L Systems	20-Nov-98	No	SBI	No
Autofill	16-Dec-98	Yes	O	Yes
Opcon	30-Dec-98	No	O	No
Probi	16-Dec-98	Yes	SBI	No
Softronic	03-Dec-98	Yes	O	No
Nocom	04-Jan-99	Yes	O	No
Malmbergs Elektriska	12-Mar-99	Yes	O	No
Sectra	03-Mar-99	Yes	O	No
SwitchCore	18-Mar-99	No	SBI/O	No
Telelogic	08-Mar-99	No	O	No
Capona	15-Mar-99	No	O	No
Frango	23-Apr-99	Yes	O	Yes
HIQ international	12-Apr-99	No	O	No
Jeeves	21-Apr-99	No	O	No
Kungsleden	14-Apr-99	No	O	No
Obducat	08-Apr-99	Yes	O	No
Teligent	12-Apr-99	No	O	No
DV Sweden	28-Apr-99	No	O	No
RKS	17-May-99	Yes	O	Yes
Boliden	05-Dec-01	No	O	No
Iquity System	26-May-99	No	SBI	Yes
Boss Media	24-Jun-99	No	O	No
Net Insight	07-Jun-99	Yes	O	No
Novotek	30-Jun-99	Yes	O	No
Poolia	23-Jun-99	Yes	O	No
Readsoft	22-Jun-99	Yes	O	No
Adera	10-Jun-99	Yes	O	No
Framfab	23-Jun-99	No	O	No
Wilh Sonesson	15-Jun-99	Yes	O	No
Glycorex Transplanation	28-Dec-99	Yes	SBI	No
Clas Ohlson	05-Oct-99	Yes	O	No
Perbio Science	18-Oct-99	No	O	Yes
Proffice	11-Oct-99	Yes	O	No
A-Com	04-Nov-99	No	O	No
European Inst. Of Science	15-Nov-99	Yes	SBI	No
Friluftsbolaget	26-Nov-99	No	SBI	Yes
Cyber Com	01-Dec-99	No	O	No
M2S	06-Dec-99	Yes	O	Yes
Precise Biometrics	13-Dec-99	No	SBI	No
Q-Med	06-Dec-99	No	O	No
Micro Systemation	01-Dec-99	Yes	SBI	No
SafePay	15-Dec-99	Yes	SBI	Yes
SBI Holding	01-Feb-00	Yes	SBI	No
Glocalnet	05-Jun-00	No	O	Yes
Micronic Laser Systems	09-Mar-00	No	O	No
C Technologies	16-Jun-00	No	O	No
Fingerprint Cards	19-Apr-00	Yes	O	No
JC	19-Apr-00	No	O	Yes
Novestra	21-Jun-00	No	O	No
Utfors	11-Dec-00	No	O	Yes
CashGuard	29-May-00	Yes	O	No
Mekonomen	29-May-00	Yes	O	No
Smarteq	02-May-00	Yes	SBI	No
Kipling	19-May-00	No	O	Yes
Viking Telecom	30-May-00	No	O	No
Axis	27-Jun-00	No	O	No
Beijer Electronics	08-Jun-00	No	O	No
IAR Systems	11-Jul-00	No	O	Yes
Mind	13-Jun-00	No	O	Yes
Scandinavia Online	07-Jun-00	No	O	Yes
TeliaSonera	13-Jun-00	No	O	No
Pyrosequencing	30-Jun-00	No	O	No
Arcam	03-Jul-00	Yes	SBI	No
HQ	03-Jul-00	Yes	O	No
Thalamus Networks	09-Sep-00	Yes	O	No
The Empire	07-Jul-00	Yes	O	No
Tripep	14-Jul-00	No	O	No
Forum SQL	30-Aug-00	Yes	SBI	No
Audio Dev	21-Sep-00	Yes	O	No
Focal Point	08-Sep-00	Yes	SBI	Yes
Jobline	15-Sep-00	No	O	Yes
NetWise	28-Sep-00	Yes	O	Yes
Capio	16-Oct-00	No	O	Yes
Eniro	10-Oct-00	No	O	No
NeoNet	20-Oct-00	No	O	No
Orc Software	19-Oct-00	No	O	No
LC-Tec Holding	09-Oct-00	No	SBI	Yes
Sensys Traffic	31-Jan-01	No	O	No
Dimension	20-Feb-01	No	O	Yes
Studsvik	04-May-01	No	O	No
Aspiro	06-Jun-01	No	O	No
BioInvent	12-Jun-01	No	O	No
D. Carnegie	31-May-01	No	O	No
Pergo	19-Jun-01	No	O	Yes
RNB Retail and Brands	26-Jun-01	No	O	No
Vitrolife	26-Jun-01	No	O	No
BTS Group	06-Jun-01	Yes	O	No
Epsilon	12-Jun-01	Yes	O	Yes
Live Networks	20-Jul-01	Yes	NGM	Yes
Sigma	28-Sep-01	Yes	O	No
Addtech	03-Sep-01	Yes	O	No
Lagercrantz Group	03-Sep-01	Yes	O	No
Bedminster	21-Sep-01	Yes	NGM	Yes
Cartesia	28-Sep-01	Yes	NGM	Yes
Countermine	28-Sep-01	Yes	NGM	No
Parisab	28-Sep-01	Yes	NGM	No
Zip Structure	19-Oct-01	Yes	NGM	No
Billerud	20-Nov-01	No	O	No
Svenska Kaolin	21-Dec-01	No	NGM	Yes
NGS	01-Mar-02	No	NGM	No
Alfa Laval	17-May-02	No	O	No
Intrum Justitia	07-Jun-02	No	O	No
Nobia	19-Jun-02	No	O	No
Ballingslöv	19-Jun-02	No	O	No
LifeAssays	28-Jun-02	No	NGM	No
Active Capital	05-Nov-02	Yes	O	No
Hebi Health Care	01-Sep-02	Yes	NGM	No
Push Development	17-Apr-03	No	NGM	No
Rejlerkoncernen	08-May-03	Yes	NGM	No
Brinova Fastigheter	20-Nov-03	Yes	O	No
Gexco	23-Feb-04	No	NGM	No
Connecta	30-May-05	No	O	No
NetonNet	25-May-04	No	O	No
Note	23-Jun-04	No	O	No
Paynova	23-Jun-04	No	NGM	No
Strand Interconnect	06-Sep-04	Yes	NGM	No
Central Asia Gold	29-Mar-05	No	NGM	No
Wihlborgs Fastigheter	12-May-05	No	O	No
International Gold Exploration	26-May-05	No	NGM	No
Gunnebo Industrier	14-Jan-05	No	O	No
Tele5 Voice Services	28-Jun-05	Yes	NGM	No
TMG International	31-May-05	No	NGM	No
Invik&Co	01-Sep-05	Yes	O	Yes
Indutrade	05-Oct-05	No	O	No
Hemtex	06-Oct-05	No	O	No
Tretti	17-Oct-05	No	NGM	No
Wayfinder Systems	21-Oct-05	No	NGM	No
Tradedoubler	08-Nov-05	No	O	No
Orexo	09-Nov-05	No	O	No
Paradox Entertainment	25-Nov-05	No	NGM	No
Hakon invest	08-Dec-05	Yes	O	No
Chemel	21-Dec-05	No	NGM	No
Guideline Oil Drilling Tech	15-Dec-05	No	NGM	No
Polyplank	30-Dec-05	No	NGM	No
Kappahl	23-Feb-06	No	Mid Cap	No
Gant Company	28-Mar-06	No	Mid Cap	No
Catena	26-Apr-06	No	Small Cap	No
Diös	22-May-06	No	Small Cap	No
Benchmark Oil&Gas	12-Jun-06	No	NGM	No
Husqvarna	13-Jun-06	Yes	Large Cap	No
AIK Fotboll	31-Jul-06	Yes	NGM	No
Panaxia Security	19-Aug-06	No	NGM	No
Svithoid Tankers	13-Jul-06	Yes	Small Cap	No
Biovitrum	15-Sep-06	No	Mid Cap	No
Melker Schörling	06-Dec-06	No	Large Cap	No
Securitas Direct	29-Sep-06	Yes	Mid Cap	No
Securitas Systems	29-Sep-06	Yes	Mid Cap	No
Carl Lamm	10-Oct-06	No	Small Cap	No
Generic Sweden	30-Oct-06	No	NGM	No
Aarhus Karlshamn	11-Sep-06	No	Mid Cap	No
BE Group	24-Nov-06	No	Mid Cap	No
Rezidor	28-Nov-06	No	Mid Cap	No
Uniflex	01-Nov-06	Yes	Small Cap	No
Lindab	01-Dec-06	No	Mid Cap	No
Arena Personal	04-Dec-06	No	NGM	No
Tilgin	15-Dec-06	No	Small Cap	No
Net Entertainment	05-Apr-07	Yes	NGM	No
Björn Borg	07-May-07	No	Mid Cap	No
Nederman Holding	16-May-07	No	Small Cap	No
Ginger Oil	28-May-07	No	NGM	No
Aerocrine	15-Jun-07	No	Small Cap	No
Oasmia Pharmaceutical	18-Sep-07	No	NGM	No
HMS Networks	19-Oct-07	No	Small Cap	No
Peab Industri	01-Oct-07	Yes	Mid Cap	No
Sagax	08-Oct-07	Yes	Small Cap	No
Systemair	12-Oct-07	No	Mid Cap	No
Sveriges Bostadsrätts Centrum	02-Nov-07	No	NGM	No
East Capital Explorer	09-Nov-07	No	Mid Cap	No
PanAlarm	05-Nov-07	No	NGM	No
Duni	14-Nov-07	No	Mid Cap	No
Scandinavian Clinical Nutrition	12-Nov-07	No	NGM	No

Table II. Excluded Initial Public Offerings 1998-2007

Companies not included in our Survey	IPO-Date	List	Reason for exclusion
New Science Svenska	23-jun-04	NGM	Lack of data
Aurec Reci	30-sep-98	SBI	Lack of data
CItyMail	03-jul-98	O	Acquired
Drott	24-sep-98	O	Acquired
LightLab	08-jun-98	SBI	Lack of data
KMT	03-apr-98	O	Lack of data
Santa Monica Europé	25-maj-98	SBI	Lack of data
Aqua of Sweden	16-jun-99	SBI	Lack of data
KonfTel	01-mar-99	SBI	Lack of data
Svensk Vodka	31-maj-99	SBI	Acquired
AU-System	21-jun-00	O	Acquired
Facile & Co	05-apr-00	SBI	Lack of data
Tele1 Europé	16-mar-00	O	Lack of data
TeleTrade	19-apr-00	O	Merged
TimeSpace Radio	27-apr-00	O	Liquidated
TMT One	27-nov-00	O	Lack of data
Robux IT	28-sep-01	NGM	Lack of data
SBT	24-sep-01	NGM	Lack of data
Sonesta	28-sep-01	NGM	Acquired
Translink	28-sep-01	NGM	Lack of data
Ainax	01-dec-04	O	Liquidated
LinkMed	12-dec-06	Mid Cap	Lack of data
Tritel Media	20-dec-05	NGM	Lack of data
Naturkompaniet	21-apr-99	O	Lack of data
Enlight Interactive	12-okt-99	O	Lack of data
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Table III. J1 & J2 Test for the three event windows, please see end of Appendix, since it is in landscape-format

Table IV. Calendar-Time Regressions One-factor model

Equally-weighted returns
Total Sample

reg excess_return rm_rf

Source	SS	df	MS		Number of obs	115
					F(1, 113)	= 121.02
Model	.700955936	1	.700955936		Prob > F	= 0.0000
Residual	.654517992	113	.005792195		R-squared	0.5171
					Adj R-squared	= 0.5129
Total	1.35547393	114	.011890122		Root MSE	= .07611
excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	1.186836	.1078865	11.00	0.000	.9730938	1.400579
_cons	.0141366	.0075229	1.88	0.063	-.0007676	.0290407
test _cons					. mat l cons_t	
(1) _cons = 0					cons_t[1,2]	
					constant	t-value
F(1, 113) = 3.53					EW_CAPM .01413658	1.8791496
Prob > F = 0.0628						

Equally-weighted returns
Single-class IPOs

reg excess_return rm_rf

Source	SS	df	MS		Number of obs	110
					F(1, 108)	= 158.82
Model	.718576206	1	.718576206		Prob > F	= 0.0000
Residual	.488628467	108	.004524338		R-squared	= 0.5952
					Adj R-squared	= 0.5915
Total	1.20720467	109	.011075272		Root MSE	= .06726
excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	1.24707	.0989537	12.60	0.000	1.050927	1.443214
_cons	.0084881	.0067271	1.26	0.210	-.0048462	.0218224
test _cons					mat l cons_t	
(1) _cons = 0					cons_t[1,2]	
					constant	t-value
F(1, 108) = 1.59					EW_CAPM .00848807	1.261771
Prob > F = 0.2097						

Equally-weighted returns
Dual-class IPOs

reg excess_return rm_rf

Source	SS	df	MS		Number of obs	85
					F(1, 83)	= 38.16
Model	.592342613	1	.592342613		Prob > F	= 0.0000
Residual	1.28848255	83	.015523886		R-squared	= 0.3149
					Adj R-squared	= 0.3067
Total	1.88082516	84	.022390776		Root MSE	= .12459
excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	1.163342	.1883308	6.18	0.000	.78876	1.537925
_cons	.028639	.0147081	1.95	0.055	-.0006147	.0578928
test _cons					mat l cons_t	
(1) _cons = 0					cons_t[1,2]	
					constant	t-value
F(1, 83) = 3.79					EW_CAPM .02863904	1.9471642
Prob > F = 0.0549						

Value-weighted returns
Total Sample

reg excess_return rm_rf

Source	SS	df	MS		Number of obs	115
					F(1, 113)	= 105.30
Model	.637133221	1	.637133221		Prob > F	= 0.0000
Residual	.683731355	113	.00605072		R-squared	= 0.4824
					Adj R-squared	= 0.4778
Total	1.32086458	114	.011586531		Root MSE	= .07779
excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	1.110418	.1082118	10.26	0.000	.8960304	1.324805
_cons	.0194544	.0076726	2.54	0.013	.0042537	.0346551
test _cons					. mat l cons_t	
(1) _cons = 0					cons_t[1,2]	
					constant	t-value
F(1, 113) = 6.43					VW_CAPM .01945441	2.5355821
Prob > F = 0.0126						

Value-weighted returns
Single-class IPOs

reg excess_return rm_rf

Source	SS	df	MS		Number of obs	110
					F(1, 108)	= 91.68
Model	.72059502	1	.72059502		Prob > F	= 0.0000
Residual	.848873115	108	.007859936		R-squared	= 0.4591
					Adj R-squared	= 0.4541
Total	1.56946813	109	.01439879		Root MSE	= .08866
excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	1.235132	.1289963	9.57	0.000	.979439	1.490825
_cons	.0234036	.0088625	2.64	0.009	.0058366	.0409705
test _cons					mat l cons_t	
(1) _cons = 0					cons_t[1,2]	
					constant	t-value
F(1, 108) = 6.97					VW_CAPM .02340356	2.6407532
Prob > F = 0.0095						

Value-weighted returns
Dual-class IPOs

reg excess_return rm_rf

Source	SS	df	MS		Number of obs	85
					F(1, 83)	= 15.49
Model	.312873723	1	.312873723		Prob > F	= 0.0002
Residual	1.67634861	83	.020196971		R-squared	= 0.1573
					Adj R-squared	= 0.1471
Total	1.98922233	84	.023681218		Root MSE	= .14212
excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	.8262484	.2099274	3.94	0.000	.4087111	1.243786
_cons	.0324167	.0167098	1.94	0.056	-.0008184	.0656518
. test _cons					mat l cons_t	
(1) _cons = 0					cons_t[1,2]	
					constant	t-value
F(1, 83) = 3.76					VW_CAPM .0324167	1.9399819
Prob > F = 0.0558						

Table V. Calendar-Time Regressions Three-factor model

Equally-weighted returns
Total Sample

reg excess_return rm_rf lnMV lnBM

Source	SS	df	MS		Number of obs	115
					F(3, 111)	= 40.32
Model	.70681016	3	.235603387		Prob > F	= 0.0000
Residual	.648663768	111	.005843818		R-squared	= 0.5214
					Adj R-squared	= 0.5085
Total	1.35547393	114	.011890122		Root MSE	= .07644
excess_ret~n	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
rm_rf	1.163141	.1109804	10.48	0.000	.9432261	1.383056
lnMV	-.0107105	.0138953	-0.77	0.442	-.038245	.016824
lnBM	-.0166605	.0178841	-0.93	0.354	-.052099	.0187781
_cons	.1717862	.1583035	1.09	0.280	-.1419028	.4854752
test _cons					mat l cons_t	
(1) _cons = 0					cons_t[1,2]	
					constant	t-value
F(1, 111) = 1.18					EW_ProxyFF .1717862	1.0851697
Prob > F = 0.2802						

Value-weighted returns
Total Sample

reg excess_return rm_rf lnMV lnBM

Source	SS	df	MS		Number of obs	115
					F(3, 111)	= 41.41
Model	.697581775	3	.232527258		Prob > F	= 0.0000
Residual	.623282802	111	.00561516		R-squared	= 0.5281
					Adj R-squared	= 0.5154
Total	1.32086458	114	.011586531		Root MSE	= .07493
excess_ret~n	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
rm_rf	1.034391	.1096317	9.44	0.000	.8171486	1.251634
lnMV	-.0050872	.0064864	-0.78	0.435	-.0179405	.0077661
lnBM	-.0553523	.0172935	-3.20	0.002	-.0896206	-.021084
_cons	.3825196	.1159081	3.30	0.001	.1528399	.6121992
test _cons					mat l cons_t	
(1) _cons = 0					cons_t[1,2]	
					constant	t-value
F(1, 111) = 10.89					VW_ProxyFF .38251957	3.3001971
Prob > F = 0.0013						

Equally-weighted returns
Single-class IPOs

reg excess_return rm_rf lnMV lnBM

Source	SS	df	MS		Number of obs	110
					F(3, 106)	= 51.24
Model	.71452614	3	.23817538		Prob > F	= 0.0000
Residual	.492678533	106	.004647911		R-squared	= 0.5919
					Adj R-squared	= 0.5803
Total	1.20720467	109	.011075272		Root MSE	= .06818
excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	.0119065	.0010991	10.83	0.000	.0097274	.0140857
lnMV	-.0281561	.0139661	-2.02	0.046	-.0558453	-.0004669
lnBM	-.0283007	.0157347	-1.80	0.075	-.0594964	.0028949
_cons	.3135316	.1409906	2.22	0.028	.0340039	.5930592
test _cons					mat l cons_t	
(1) _cons = 0					cons_t[1,2]	
					constant	t-value
F(1, 106) = 4.95					EW_ProxyFF .31353156	2.2237759
Prob > F = 0.0283						

Value-weighted returns
Single-class IPOs

reg excess_return rm_rf lnMV lnBM

Source	SS	df	MS		Number of obs	110
					F(3, 106)	= 29.71
Model	.716881935	3	.238960645		Prob > F	= 0.0000
Residual	.8525862	106	.008043266		R-squared	= 0.4568
					Adj R-squared	= 0.4414
Total	1.56946813	109	.01439879		Root MSE	= .08968
excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	.0115022	.0014326	8.03	0.000	.008662	.0143424
lnMV	-.0093092	.0070502	-1.32	0.190	-.023287	.0046686
lnBM	-.0365781	.0166871	-2.19	0.031	-.0696619	-.0034943
_cons	.2866717	.1170306	2.45	0.016	.0546471	.5186963
test _cons					mat l cons_t	
(1) _cons = 0					cons_t[1,2]	
					constant	t-value
F(1, 106) = 6.00					VW_ProxyFF .28667171	2.4495445
Prob > F = 0.0159						

Equally-weighted returns
Dual-class IPOs

reg excess_return rm_rf lnMV lnBM

Source	SS	df	MS		Number of obs	85
					F(3, 81)	= 12.55
Model	.596889632	3	.198963211		Prob > F	= 0.0000
Residual	1.28393553	81	.015851056		R-squared	= 0.3174
					Adj R-squared	= 0.2921
Total	1.88082516	84	.022390776		Root MSE	= .1259
excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	1.155218	.1933091	5.98	0.000	.7705936	1.539842
lnMV	-.0099822	.0197871	-0.50	0.615	-.0493523	.0293879
lnBM	-.0051949	.0294849	-0.18	0.861	-.0638607	.0534709
_cons	.111472	.24914	0.45	0.656	-.3842384	.6071824
test _cons					mat l cons_t	
(1) _cons = 0					cons_t[1,2]	
					constant	t-value
F(1, 81) = 0.20					EW_ProxyFF .111472	.44742718
Prob > F = 0.6558						

Value-weighted returns
Dual-class IPOs

reg excess_return rm_rf lnMV lnBM

Source	SS	df	MS		Number of obs	85
					F(3, 81)	= 6.93
Model	.406158905	3	.135386302		Prob > F	= 0.0003
Residual	1.58306342	81	.019543993		R-squared	= 0.2042
					Adj R-squared	= 0.1747
Total	1.98922233	84	.023681218		Root MSE	= .1398
excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	.8575914	.2076883	4.13	0.000	.4443569	1.270826
lnMV	-.0124404	.0168428	-0.74	0.462	-.0459524	.0210715
lnBM	-.080322	.0373646	-2.15	0.035	-.1546659	-.0059782
_cons	.5758833	.2929653	1.97	0.053	-.0070258	1.158792
test _cons					. mat l cons_t	
(1) _cons = 0					cons_t[1,2]	
					constant	t-value
F(1, 81) = 3.86					VW_ProxyFF .57588325	1.9657045
Prob > F = 0.0528						

Table VI. Price-to-Book Regression

Price-to-Book Valuation Regression						
Random-effects	GLS regression		Number of obs			11975
Group variable	(i): permno		Number of groups			204
R-sq: within	= 0.0316		Obs per group: min			1
between	= 0.0114		avg			58.7
overall	= 0.0086		max			116
Random effects	u_i ~ Gaussian		Wald chi2(11)			235.88
corr(u_i, X)	= 0 (assumed)		Prob > chi2			0.0000
		Robust				
markettobook	*Coef.*	*Std. Err.*	*z*	*P>z*	*[95% Conf.*	*Interval]*
dualclass1	.0021504	.0010048	2.14	0.032	.0001811	.0041197
lnsize	.0034769	.0003532	9.84	0.000	.0027846	.0041692
TimeDummy2	-.0019213	.0023252	-0.83	0.409	-.0064786	.002636
TimeDummy3	-.0071559	.0018301	-3.91	0.000	-.0107428	-.0035691
TimeDummy4	-.0063087	.0017681	-3.57	0.000	-.0097742	-.0028432
TimeDummy5	-.0081344	.0018421	-4.42	0.000	-.0117449	-.0045239
TimeDummy6	-.0053548	.0019478	-2.75	0.006	-.0091724	-.0015371
TimeDummy7	.0051464	.0020127	2.56	0.011	.0012015	.0090913
TimeDummy8	-.0066367	.0018351	-3.62	0.000	-.0102334	-.0030399
TimeDummy9	-.0099492	.002099	-4.74	0.000	-.0140631	-.0058352
TimeDummy10	.000073	.0027469	0.03	0.979	-.0053109	.0054569
_cons	-.0111008	.0016145	-6.88	0.000	-.0142653	-.0079363
sigma_u	.00803815					
sigma_e	.02524621					
rho	.09204201	(fraction of variance due to u_i)				

Table VII. Probit Regression

Probit Regression						
			Number of obs			204
			Wald chi2(14)			53.29
			Prob > chi2			0.0000
Log pseudolikelihood		-108.73465	Pseudo R2			0.2171
		Robust				
dualclass1	*Coef.*	*Std. Err.*	*z*	*P>z*	*[95% Conf.*	*Interval]*
FounderDummy	1.26269	.2735825	4.62	0.000	.7264784	1.798902
NonFounder~y	1.09442	.3868687	2.83	0.005	.3361715	1.852669
CorporateD~y	.5481591	.2675256	2.05	0.040	.0238186	1.0725
FinancialD~y	.3393396	.4038039	0.84	0.401	-.4521015	1.130781
lnsize	-.1011861	.0634237	-1.60	0.111	-.2254943	.0231221
TimeDummy2	-.3030922	.3250432	-0.93	0.351	-.9401651	.3339807
TimeDummy3	-.5064335	.3402689	-1.49	0.137	-1.173348	.1604812
TimeDummy4	-.3854593	.3511133	-1.10	0.272	-1.073629	.3027102
TimeDummy5	-1.223249	.4629823	-2.64	0.008	-2.130677	-.3158202
TimeDummy6	-.3912985	1.019568	-0.38	0.701	-2.389615	1.607018
TimeDummy7	-1.303878	.7622185	-1.71	0.087	-2.797799	.1900426
TimeDummy8	-1.30107	.436224	-2.98	0.003	-2.156054	-.4460871
TimeDummy9	-.6978026	.391372	-1.78	0.075	-1.464878	.0692724
TimeDummy10	-.8705164	.4720094	-1.84	0.065	-1.795638	.0546051
_cons	.4831185	.4223317	1.14	0.253	-.3446365	1.310874

Table VIII. Calendar-Time Results for Controlling Shareholder Categories

Controlling Shareholder Category 1 (Equally-Weighted Returns)

Source	SS	df	MS	Number of obs	48
				F(1, 46)	46.98
Model	.586159247	1	.586159247	Prob > F	0.0000
Residual	.573944541	46	.012477055	R-squared	0.5053
				Adj R-squared	0.4945
Total	1.16010379	47	.024683059	Root MSE	.1117

excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	1.346272	.1964179	6.85	0.000	.9509033	1.741641
_cons	.0273915	.0178014	1.54	0.131	-.0084408	.0632239

test _cons	mat l cons_t
(1) _cons = 0	cons_t[1,2]
F(1, 46) = 2.37	constant t-value
Prob > F = 0.1307	EW_CAPM .02739152 1.5387299

Controlling Shareholder Category 1 (Value-Weighted Returns)

Source	SS	df	MS	Number of obs	48
				F(1, 46)	60.48
Model	.632558554	1	.632558554	Prob > F	0.0000
Residual	.481143122	46	.010459633	R-squared	0.5680
				Adj R-squared	0.5586
Total	1.11370168	47	.02369578	Root MSE	.10227

excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	1.396737	.1796066	7.78	0.000	1.035207	1.758266
_cons	.0485405	.0163061	2.98	0.005	.0157181	.0813629

test _cons	mat l cons_t
(1) _cons = 0	cons_t[1,2]
F(1, 46) = 8.86	constant t-value
Prob > F = 0.0046	VW_CAPM .04854049 2.9768369

Controlling Shareholder Category 2 (Equally-Weighted Returns)

Insufficient number of observations

Controlling Shareholder Category 2 (Value-Weighted Returns)

Insufficient number of observations

Controlling Shareholder Category 3 (Equally-Weighted Returns)

Source	SS	df	MS	Number of obs	58
				F(1, 56)	92.54
Model	.30668304	1	.30668304	Prob > F	0.0000
Residual	.185584918	56	.003314016	R-squared	0.6230
				Adj R-squared	0.6163
Total	.492267958	57	.00863628	Root MSE	.05757

excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	1.025664	.1066197	9.62	0.000	.8120791	1.239249
_cons	-.0058714	.0087158	-0.67	0.503	-.0233313	.0115885

test _cons	mat l cons_t
(1) _cons = 0	cons_t[1,2]
F(1, 56) = 0.45	constant t-value
Prob > F = 0.5033	EW_CAPM -.00587141 -.67364833

Controlling Shareholder Category 3 (Value-Weighted Returns)

Source	SS	df	MS	Number of obs	58
				F(1, 56)	30.17
Model	.192276188	1	.192276188	Prob > F	0.0000
Residual	.356892003	56	.006373071	R-squared	0.3501
				Adj R-squared	0.3385
Total	.549168191	57	.00963453	Root MSE	.07983

excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	.7950068	.144738	5.49	0.000	.5050618	1.084952
_cons	-.0095257	.0120875	-0.79	0.434	-.03374	.0146885

test _cons	mat l cons_t
(1) _cons = 0	cons_t[1,2]
F(1, 56) = 0.62	constant t-value
Prob > F = 0.4340	VW_CAPM -.00952573 -.78806338

Controlling Shareholder Category 4 (Equally-Weighted Returns)

Insufficient number of observations

Controlling Shareholder Category 4 (Value-Weighted Returns)

Insufficient number of observations

Table IX. Calendar-Time Results for Founder CEO Portfolios

CEO=Founder (Equally-Weighted Returns)

Source	SS	df	MS	Number of obs	67
				F(1, 65)	31.24
Model	.822313708	1	.822313708	Prob > F	0.0000
Residual	1.71078777	65	.026319812	R-squared	0.3246
				Adj R-squared	0.3142
Total	2.53310148	66	.038380325	Root MSE	.16223

excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	1.369468	.2450048	5.59	0.000	.8801597	1.858776
_cons	.0287901	.0215922	1.33	0.187	-.0143326	.0719127

test _cons	mat l cons_t
(1) _cons = 0	cons_t[1,2]
F(1, 65) = 1.78	constant t-value
Prob > F = 0.1871	EW_CAPM .02879006 1.3333537

CEO=Founder (Value-Weighted Returns)

Source	SS	df	MS	Number of obs	67
				F(1, 65)	49.61
Model	1.02217629	1	1.02217629	Prob > F	0.0000
Residual	1.33927874	65	.020604288	R-squared	0.4329
				Adj R-squared	0.4241
Total	2.36145503	66	.035779622	Root MSE	.14354

excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	1.526725	.2167588	7.04	0.000	1.093828	1.959622
_cons	.041219	.019106	2.16	0.035	.0030617	.0793763

test _cons	mat l cons_t
(1) _cons = 0	cons_t[1,2]
F(1, 65) = 4.65	constant t-value
Prob > F = 0.0347	VW_CAPM .04121902 2.157387

CEO≠Founder (Equally-Weighted Returns)

Source	SS	df	MS	Number of obs	114
				F(1, 112)	121.83
Model	.573858141	1	.573858141	Prob > F	0.0000
Residual	.527537771	112	.004710159	R-squared	0.5210
				Adj R-squared	0.5168
Total	1.10139591	113	.009746866	Root MSE	.06863

excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	1.086975	.098477	11.04	0.000	.8918552	1.282095
_cons	.0100145	.0068177	1.47	0.145	-.0034938	.0235229

test _cons	mat l cons_t
(1) _cons = 0	cons_t[1,2]
F(1, 112) = 2.16	constant t-value
Prob > F = 0.1447	EW_CAPM .01001453 1.468909

CEO≠Founder (Value-Weighted Returns)

Source	SS	df	MS	Number of obs	114
				F(1, 112)	118.41
Model	.501180761	1	.501180761	Prob > F	0.0000
Residual	.474031511	112	.004232424	R-squared	0.5139
				Adj R-squared	0.5096
Total	.975212272	113	.008630197	Root MSE	.06506

excess_ret~n	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf.*	*Interval]*
rm_rf	.9855446	.0905678	10.88	0.000	.8060961	1.164993
_cons	.0145477	.0064417	2.26	0.026	.0017842	.0273111

test _cons	mat l cons_t
(1) _cons = 0	cons_t[1,2]
F(1, 112) = 5.10	constant t-value
Prob > F = 0.0259	VW_CAPM .01454769 2.2583534

Table X. Controlling Shareholder Category Valuation Regression

Controlling Shareholder Category Valuation Regression (Price-to-Book)						
Random-effects	GLS regression		Number of obs			11975
Group variable	(i): permno		Number of groups			204
R-sq: within	= 0.0487		Obs per group: min			1
between	= 0.0076		avg			58.7
overall	= 0.0084		max			116
Random effects	u_i ~ Gaussian		Wald chi2(14)			248.94
corr(u_i, X)	= 0 (assumed)		Prob > chi2			0.0000
		Robust				
markettobook	*Coef.*	*Std. Err.*	*z*	*P>z*	*[95% Conf.*	*Interval]*
Founder	.0118104	.0029495	4.00	0.000	.0060295	.0175913
NonFounder	.0020434	.0005532	3.69	0.000	.0009592	.0031276
Corporation	.0024085	.0006381	3.77	0.000	.0011579	.0036591
Financial	.0128816	.0037235	3.46	0.001	.0055836	.0201796
lnsize	.0037435	.0003851	9.72	0.000	.0029888	.0044982
TimeDummy2	-.0024864	.0025044	-0.99	0.321	-.0073949	.0024222
TimeDummy3	-.0066315	.0017679	-3.75	0.000	-.0100966	-.0031665
TimeDummy4	-.0064369	.0018302	-3.52	0.000	-.010024	-.0028498
TimeDummy5	-.0087052	.0020126	-4.33	0.000	-.0126498	-.0047605
TimeDummy6	-.0061016	.0021289	-2.87	0.004	-.0102742	-.0019289
TimeDummy7	.0058024	.0020376	2.85	0.004	.0018087	.009796
TimeDummy8	-.0069128	.0018734	-3.69	0.000	-.0105846	-.003241
TimeDummy9	-.0099349	.0020954	-4.74	0.000	-.0140419	-.005828
TimeDummy10	-.0017808	.002752	-0.65	0.518	-.0071748	.0036131
_cons	-.0148192	.0019119	-7.75	0.000	-.0185664	-.0110719
sigma_u	.00807413					
sigma_e	.0250194					
rho	.09432173	(fraction of variance due to u_i)				

Table XI. Founder CEO Valuation Regression

CEO/Founder Valuation Regression (Price-to-Book)						
Random-effects	GLS regression		Number of obs			11963
Group variable	(i): permno		Number of groups			203
R-sq: within	= 0.0427		Obs per group: min			1
between	= 0.0057		avg			58.9
overall	= 0.0088		max			116
Random effects	u_i ~ Gaussian		Wald chi2(12)			234.30
corr(u_i, X)	= 0 (assumed)		Prob > chi2			0.0000
		Robust				
markettobook	*Coef.*	*Std. Err.*	*z*	*P>z*	*[95% Conf.*	*Interval]*
ceofounder1	-.0020894	.0010171	-2.05	0.040	-.0040829	-.0000958
founderret~l	.029874	.0048374	6.18	0.000	.0203928	.0393552
lnsize	.0036605	.0003718	9.85	0.000	.0029318	.0043893
TimeDummy2	-.0034472	.0024507	-1.41	0.160	-.0082504	.001356
TimeDummy3	-.0069642	.0018661	-3.73	0.000	-.0106216	-.0033067
TimeDummy4	-.0076803	.0019387	-3.96	0.000	-.01148	-.0038805
TimeDummy5	-.0084016	.002013	-4.17	0.000	-.012347	-.0044562
TimeDummy6	-.0034187	.0017547	-1.95	0.051	-.0068579	.0000205
TimeDummy7	.0043522	.0022822	1.91	0.057	-.0001208	.0088253
TimeDummy8	-.0080672	.0021427	-3.77	0.000	-.0122668	-.0038677
TimeDummy9	-.0119264	.0024223	-4.92	0.000	-.016674	-.0071788
TimeDummy10	-.0014412	.0029842	-0.48	0.629	-.0072901	.0044078
_cons	-.0122611	.0021989	-5.58	0.000	-.0165708	-.0079514
sigma_u	.00797553					
sigma_e	.0251143					
rho	.09161122	(fraction of variance due to u_i)				

TABLE III. Detailed J1 & J2 statistics

One-year event window

Total IPO-sample

display carmean/(est_varmean^0.5)
4.025693

ttest cumulative_abnormal_return=0 if dif==0
One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
cumula~n	187	.1344621	.0928888	1.270235	-.0487889	.3177131

mean = mean(cumulative_abnormal_return) t = 1.4476
Ho: mean = 0 degrees of freedom = 186
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.9253 Pr(T > t) = 0.1494 Pr(T > t) = 0.0747

display (((187*(12-4))/(12-2))^0.5)*scarmean
4.3556254

ttest SCAR = 0 if dif==12
One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
SCAR	187	-.4131135	.3356049	4.589328	-1.075195	.2489678

mean = mean(SCAR) t = -1.2310
Ho: mean = 0 degrees of freedom = 186
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.1099 Pr(T > t) = 0.2199 Pr(T > t) = 0.8901

Dual-class IPOs

display carmean/(est_varmean^0.5)
5.4445605

ttest cumulative_abnormal_return=0 if dif==0
One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
cumula~n	83	.3098123	.1733476	1.579272	-.0350313	.654656

mean = mean(cumulative_abnormal_return) t = 1.7872
Ho: mean = 0 degrees of freedom = 82
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.9612 Pr(T > t) = 0.0776 Pr(T > t) = 0.0388

display (((83*(12-4))/(12-2))^0.5)*scarmean
15.127758

ttest SCAR = 0 if dif==12
One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
SCAR	83	-.0900442	.4372949	3.983947	-.9599631	.7798747

mean = mean(SCAR) t = -0.2059
Ho: mean = 0 degrees of freedom = 82
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.4187 Pr(T > t) = 0.8374 Pr(T > t) = 0.5813

Single-class IPOs

display carmean/(est_varmean^0.5)
4.445755

ttest cumulative_abnormal_return=0 if dif==0
One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
cumula~n	104	-.0054809	.0921719	.9399724	-.188282	.1773203

mean = mean(cumulative_abnormal_return) t = -0.0595
Ho: mean = 0 degrees of freedom = 103
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.4763 Pr(T > t) = 0.9527 Pr(T > t) = 0.5237

display (((104*(12-4))/(12-2))^0.5)*scarmean
4.2541048

. ttest SCAR = 0 if dif==12
One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
SCAR	104	-.6709477	.4927074	5.02465	-1.648117	.3062213

mean = mean(SCAR) t = -1.3618
Ho: mean = 0 degrees of freedom = 103
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.0881 Pr(T > t) = 0.1762 Pr(T > t) = 0.9119

Two-year event window

Total IPO-sample

display carmean/(est_varmean^0.5)
6.8140871

ttest cumulative_abnormal_return=0 if dif==0
One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
cumula~n	149	.2131427	.1316914	1.607498	-.0470956	.473381

mean = mean(cumulative_abnormal_return) t = 1.6185
Ho: mean = 0 degrees of freedom = 148
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.9462 Pr(T > t) = 0.1077 Pr(T > t) = 0.0538

display (((149*(24-4))/(24-2))^0.5)*scarmean
8.2359568

ttest SCAR = 0 if dif==24

One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
SCAR	149	.4257755	.4494534	5.486278	-.4623995	1.31395

mean = mean(SCAR) t = 0.9473
Ho: mean = 0 degrees of freedom = 148
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.8275 Pr(T > t) = 0.3450 Pr(T > t) = 0.1725

Dual-class IPOs

display carmean/(est_varmean^0.5)
26.564242

ttest cumulative_abnormal_return=0 if dif==0
One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
cumula~n	68	.5739768	.2453517	2.023222	.0842527	1.063701

mean = mean(cumulative_abnormal_return) t = 2.3394
Ho: mean = 0 degrees of freedom = 67
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.9888 Pr(\|T\| > \|t\|) = 0.0223 Pr(T > t) = 0.0112

display (((68*(24-4))/(24-2))^0.5)*scarmean
11.99832

ttest SCAR = 0 if dif==24

One-sample t test

Variable |	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
SCAR |	68	1.1833	.6111637	5.039785	-.0365882	2.403188

mean = mean(SCAR) t = 1.9361
Ho: mean = 0 degrees of freedom = 67
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.9715 Pr(\|T\| > \|t\|) = 0.0571 Pr(T > t) = 0.0285

Single-class IPOs

display carmean/(est_varmean^0.5)
.88493276

ttest cumulative_abnormal_return=0 if dif==0
One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
cumula~n	81	-.0897797	.1190843	1.071758	-.326765	.1472055

mean = mean(cumulative_abnormal_return) t = -0.7539
Ho: mean = 0 degrees of freedom = 80
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.2266 Pr(T > t) = 0.4531 Pr(T > t) = 0.7734

display (((81*(24-4))/(81-2))^0.5)*scarmean
5.8747448

. ttest SCAR = 0 if dif==24

One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
SCAR	81	-.2101708	.6432395	5.789156	-1.490258	1.069917

mean = mean(SCAR) t = -0.3267
Ho: mean = 0 degrees of freedom = 80
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.3724 Pr(T > t) = 0.7447 Pr(T > t) = 0.6276

Three-year event window

Total IPO-sample

display carmean/(est_varmean^0.5)
7.7498219

ttest cumulative_abnormal_return=0 if dif==0
One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
cumula~n	122	.3231027	.1756579	1.940205	-.0246586	.6708639

mean = mean(cumulative_abnormal_return) t = 1.8394
Ho: mean = 0 degrees of freedom = 121
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.9658 Pr(T > t) = 0.0683 Pr(T > t) = 0.0342

display (((122*(36-4))/(36-2))^0.5)*scarmean
9.6551567

ttest SCAR = 0 if dif==36

One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
SCAR	122	.9703704	.5559657	6.140842	-.1303105	2.071051

mean = mean(SCAR) t = 1.7454
Ho: mean = 0 degrees of freedom = 121
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.9583 Pr(T > t) = 0.0835 Pr(T > t) = 0.0417

Dual-class IPOs

display carmean/(est_varmean^0.5)
8.0229189

ttest cumulative_abnormal_return=0 if dif==0
One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
cumula~n	61	.6265197	.3207758	2.505339	-.0151275	1.268167

mean = mean(cumulative_abnormal_return) t = 1.9531
Ho: mean = 0 degrees of freedom = 60
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.9723 Pr(T > t) = 0.0555 Pr(T > t) = 0.0277

display (((61*(36-4))/(36-2))^0.5)*scarmean
20.74032

ttest SCAR = 0 if dif==36

One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
SCAR	61	1.365549	.7637407	5.965005	-.1621594	2.893258

mean = mean(SCAR) t = 1.7880
Ho: mean = 0 degrees of freedom = 60
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.9606 Pr(T > t) = 0.0788 Pr(T > t) = 0.0394

Single-class IPOs

display carmean/(est_varmean^0.5)
1.7444208

ttest cumulative_abnormal_return=0 if dif==0
One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
cumula~n	61	.0196857	.1359615	1.061893	-.2522778	.2916491

mean = mean(cumulative_abnormal_return) t = 0.1448
Ho: mean = 0 degrees of freedom = 60
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.5573 Pr(T > t) = 0.8854 Pr(T > t) = 0.4427

display (((61*(36-4))/(36-2))^0.5)*scarmean
22.211788

ttest SCAR = 0 if dif==36

One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
SCAR	61	.5751914	.8112888	6.336368	-1.047628	2.198011

mean = mean(SCAR) t = 0.7090
Ho: mean = 0 degrees of freedom = 60
Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.7595 Pr(T > t) = 0.4811 Pr(T > t) = 0.2405