

STOCKHOLM SCHOOL OF ECONOMICS

Bachelor Thesis in Finance

IPO Share Lockups – Unlock Day Effect

An empirical study on Nordic data

LAVE BECK-FRIIS

21125@live.hhs.se

HENRIK GEIJER

21043@live.hhs.se

ABSTRACT

This paper studies the expiration of IPO lockup periods' impact on stock price and volume behavior on 148 Nordic firms over the years of 1995-2009. We find a statistically significant abnormal return of -0.6% when the lockup expires, but no support for an increased abnormal trading volume. Further, this paper analyses how pre IPO management ownership affect the market adjusted return. Even though management controlled firms report having significantly lower abnormal return, we cannot find a clear linear relationship between management ownership and abnormal return around the unlock day.

Keywords: Lockup agreements, Efficient Market Hypothesis, Moral Hazard, Market Anomalies

Tutor: Ulf von Lilienfeld-Toal

Presented: May 27th, 2010

1. Introduction

In connection to a company's initial public offering ("IPO"), insider shareholders are often subject to lockup agreements, prohibiting these shareholders from trading in a specified time period after the IPO. Lockup agreements are a contractual agreement between the insider shareholders and the IPO underwriter and are not regulated by law. It is therefore only visible in the prospectus of the listing. The fundamental purpose behind these lockup agreements can be explained by the economic theory of information asymmetries; in particular the moral hazard problem. These types of information asymmetry decisions occur when the party with more information about his actions or agenda has incentives to act inconsistently with the will of the party with less information: often the party paying the price of the risk. The most common moral hazard dilemma is the principal-agent problem that arises when a principal hires an agent, not necessarily having the same objectives as the principal, to pursue the principal's interests. In connection to an IPO, lockup agreements act to reduce two major information asymmetries; 1) the principal-agent problem, that the managers/owners will continue to exert their effort (in the case of management holding shares) and 2) that large insiders will not sell off at an early stage, thus trading on information not available to the market. Lockups are hence a method to align the interest of old and new shareholders as old shareholders continue to hold a significant economic interest in the company. In this way the lockup agreements has as a signalling function (e.g. Leland & Pyle, 1977), hence reducing the information asymmetries. At the same time, there is a risk associated with insiders being locked-up as insider sales itself has an important market function. Insider positions are means for market participants to infer private information and to thus reduce information asymmetries. Lockup expirations therefore render for share price revisions as the market participants include the private information from insider sales.

This study is based on the efficient market hypothesis (e.g. E. Fama, 1969), which claims that one cannot achieve returns in excess of average market returns on a risk-adjusted basis and that prices instantly reflect all public historical data. Since the period and shareholders subject to lockups are clearly stated in the prospectus, being public information, any price reactions should already be predicted and there should not be any abnormal returns connected to the lockup expiration, according to the weak form of the efficient market hypothesis. In this context our study belongs to the same category as studies examining other calendar-day market anomalies (e.g. the January effect, Keim, 1983). There is evidence against the efficient market hypothesis and previous studies on lockup agreements have found significant abnormal returns associated with lockup expirations. Consequently, this strongly proposes that information

asymmetries exist. The Ofek & Richardson (2000), Field & Hanka (2001) and Brav & Gompers (2003) studies find a strong drop in firms' share price connected to the lockup expiration date. The Field and Hanka (2001) study, conducted on 1,948 share lockups in the U.S, results in a statistically significant three-day (from one day before to one day after the lockup expiration date) abnormal return of -1.5%. The Brav & Gompers (2003) study uses 2,794 U.S IPO's and finds abnormal returns of -2% on the lockup day. Both studies also report abnormal trading volume around the expiration of the lockup period.

Furthermore, this study tests the existence of abnormal returns associated with the expiration of lockup periods on a Nordic region sample - defined as the major stock indices in Denmark, Finland, Norway and Sweden. Market participants in this region are not as attentive to lockup expirations as the ones in the U.S market. In the U.S, the lockup expiration dates are to a much larger extent discussed in the media, e.g. published in the Wall Street Journal. Moreover, companies even warn their shareholders that insiders could sell extensively in connection to the lockup expiration. On the contrary, lockups are neither published in the press nor extensively warned in the prospectuses in the Nordic region. This U.S "fear - that the market will be flooded with sell orders" being discussed by Field & Hanka (2001), appears not to be present in the Nordic region. It is therefore interesting to study if there are abnormal returns related to lockup expirations in the Nordic region. Such returns would propose some kind of market anomaly connected to lockup expirations, however now reducing the possibility that abnormal returns only are psychological effects due to the lockup "fear".

As lockup expiration dates do not often coincide with report dates coupled with that insiders rarely report sale of shares before lockup expirations, these events have previously been used as a valuable test of information asymmetries and, more specifically, moral hazard problems associated with insider trading. Brav & Gompers (2003) find evidence for lockup agreements functioning as commitment guarantees to overcome moral hazard problems prior to the IPO. The Lilienfeld-Toal (2009) study examines the moral hazard problem related to owner managers either holding shares in a company or selling them and the related trade-off between increases in firm value against the private costs of effort. The study further suggests that the negative abnormal returns around lockup days are reactions to the positive abnormal returns due to owner managers being locked-up. These positive returns could be explained by the owner managers' effort being anticipated as guaranteed, out ruling the moral hazard dilemma. This is consistent with Lilienfeld-Toal & Roenzi's (2008) and Fahlenbrach's (2008) empirical studies examining owner manager and CEO founder firms respectively. These results claim that owner manager firms and CEO founder firms outperform the market with 10-15% and 10% respectively.

Several studies have concentrated on examining different pre and post IPO ownership structures' effect on abnormal returns, using lockup expiration as a natural experiment. The Field & Hanka (2001) and Bradley, Jordan, Roten & Yi (2001) studies focus on differences in abnormal returns in venture backed- and non venture backed IPO's and The Lilienfeld-Toal (2009) study focus on owner manager firms. Taking a stand from these studies the second step of our study has been to examine any differences in abnormal returns explained by the degree of management ownership prior to the IPO.

We study a sample of 148 observations of lockups in the Nordic region during the time period 1995-2010. On a three-day basis, we find a statistically strong abnormal return of -0.6%. However, we cannot report a statistically increased volume trading. With a management controlled firm being defined as a pre IPO shareholding of over 50%, we find that the abnormal returns for these firms are -1.4% compared to -0.3% for firms with less than 50% management ownership. On the other hand, we report a -1.2% three-day abnormal return for firms with less than 5% management shareholding. Thus, it is hard to verify a strictly negative correlation between management ownership and abnormal return around the lockup day. We can subsequently not verify the theoretic results from the Lilienfeld-Toal (2009) study where an increased ratio of management shares being locked-up would outperform the market followed by greater negative abnormal returns around the lockup expiration. When analysing other cross-sectional variables, there seems to be no clear connection of abnormal volume on abnormal return, and vice versa. Nevertheless, we find statistical significance that abnormal returns rose (more positive) during 2005-2008 relative to 1996-2004 and decreased (more negative) for lockup days exceeding 180 days.

The paper will continue accordingly. In 2 C, we present the abnormal return model and abnormal volume model used in this study. This is followed by our results in 3 A, B where the abnormal return and abnormal volume for the event-day are presented. In 3 C, any differences in abnormal return due to management control pre IPO are presented. Finally in 3 D, any cross-sectional differences in abnormal returns are examined. In 4, the study is summarized and our conclusion is presented.

2. Data Source and Methodology

A. The Sample

As opposed to the study of Field & Hanka (2001), we have not gathered information from an existing database containing information about lockup periods. The Nordic region has no record of lockup dates for publicly traded companies, equivalent to Securities Data Corporation (SDC) database where information to

a large extent can be found about U.S companies. All the observations in this study have for that reason been hand collected from each specific company. Lockup periods are, as previously mentioned, not regulated by any law and are therefore not saved by any legal authority; these are hence only stated in the listing/IPO prospectus of the company.

In order to receive a large enough sample, we have chosen to sequester our examination to the countries Sweden, Norway, Finland and Denmark, and during the time period 1995-2010. Our IPO observations have primarily been collected from Thomson Reuters's "*Thomson One*", but also from Thomson Reuters's "*Datastream*". An initial total sample of 486 IPO were found, ranging from the 10th of January 1995 to the 18th of December 2009. However, downsizing the sample was essential due to several limitations.

First, since several companies have gone bankrupt, been acquired, or were not possible to get a reach of, we had troubles collecting prospectuses. The Swedish Financial Supervisory Authority has gathered all the Swedish prospectuses from 1996-2006; but neither Oslo Børs, the finance inspectorate of Finland and the Danish FSA, have been collecting these historically. Prospectuses were hence found for 81% of the Swedish IPO's, and the corresponding figures for Norway, Finland and Denmark were 39%, 15%, and 40%. Second, there were problems associated with the prospectuses we were able to get a reach of. A minority of the Finnish prospectuses were only available in Finnish, which made it hard to distinguish the lockup. Furthermore, given that only 85% of the companies reported their lockup period, our sample size further diminished. We have also excluded 20 lockups since the expirations were in connection with an earnings announcement, making it hard to distinguish the sole effect from the expiration of the lockup. Finally, some companies were only listed for such a short time that we did not receive the share price development and the traded volume. Alternatively, the expiration of the lockup period did not have time to occur. After sift out the sample, we ended up with a total of 148 observations; IPO's ranging from the 22nd of November 1996 to the 3rd October 2008.

The firms' ownership structures were hand collected from the prospectuses. For some firms, the shareholders' lockup periods diverged and some shareholders had their holding divided over several lockups dates. To simplify our work, we have in these cases used the date when the major holding of the largest shareholder's was locked up. We defined management ownership as executive managers or board members, except from benchers who were there in the use of financing e.g. venture capitalists, owning shares in the company. These are separated into different clusters, depending on their share of capital with a scale from 0-5 divided as follows:

- 0: < 5%,
- 1: 5-10%,
- 2: 10-15%,
- 3: 15-25%,
- 4: 25-50%,
- 5: \geq 50%

We have used the pre IPO shareholding if shareholders have continued to hold a large share of capital post IPO.

B. Summary Statistics

Table I exhibits the summary statistics for the sample divided into country, IPO year, fraction of management controlled firms and length of lockup period during 1996-2008. Due to a higher IPO frequency in a booming economy coupled with the ease of unearthing later years' prospectuses, we can see an overweight of IPO's in our sample from the years 2005-2007. The fraction of management controlled firms (defined as companies with larger than 50% management ownership pre IPO) amounts to 31% of the entire sample. However, due to our limited sample, this ratio randomly varies across the years, as well as for the country specific subsamples. Nonetheless, the large difference between the ratio of management controlled firms in the Norwegian and Swedish samples can to some extent be explained by the different types of industries that are represented in the IPO's, where the Norwegian sample is concentrated in capital heavy industries.

Moreover, Table I states the length of the lockup period. The mean lockup period - 275 days - differs from Field & Hanka's (2001), Bradley et al. (2001) and Brav & Grumpers' (2003) U.S reports where they observed a convergence to a standardized 180 day lockup period. The majority in our sample has a lockup period of 365 days, with 51% of the lockup periods exceeding 180 days, 47% equalling 180 days (including the majority of the larger companies), and only 4% less than 180 lockup days. There are however outliers in form of small companies in which owners are locked up in more than three years.

C. Model – Abnormal Return

To analyse the effect of the expiration, we have used the MacKinlay (1997) event studies framework as a base for our study. Nevertheless, our model for measuring abnormal return ("AR") during the expiration of the lockup periods follows the one used in the Field & Hanka (2001) report. It measures the three day

return of a specific company, divides it by its corresponding index figure, and subtracts one to receive a measurement for a three-day cumulative abnormal return (“CAR”). We have used the OMX Stockholm, OMX Copenhagen, OMX Helsinki, and Oslo Exchange as index measures for companies listed in Sweden, Denmark, Finland, and Norway respectively.

$$CAR = \left[\prod_{t=-1}^{+1} \left(\frac{1 + R_{i,t}}{1 + R_{m,t}} \right) - 1 \right]$$

In order to test the existence of abnormal return around unlock days, we will use a hypothesis testing with $H_0 : CAR=0$. Results will be presented by return over one day, as well as for over several days. By using the three-day abnormal return, we will be able to capture the whole effect from the expiration, as well as smoothen out big, sudden and unexpected price changes. We will further make a cross-sectional regression in order to analyze how different variables affect abnormal returns during the expiration of lockup periods.

D. Model – Abnormal Trading Volume

As for the analysis regarding the abnormal trading volume (“ATV”), we will test the trading volume during the expiration relative to the moving average of the same stock.

$$ATV = \left(\frac{V_{i,T}}{\frac{1}{20} \sum_{t=-25}^{-6} V_{i,t}} \right)$$

where $V_{i,t}$ is the traded volume for company i at time t . We will also use a cumulative three-day abnormal return in order to capture changes closely related to the unlock day. When analysing the trading volume, we have excluded 8 observations in our sample of 148 companies. Caused by illiquidity, some companies have abnormal trading volume of 3000% on different reporting days. These observations have been deleted, leaving us with a sample of 140 companies when analysing the volume traded.

3. Results

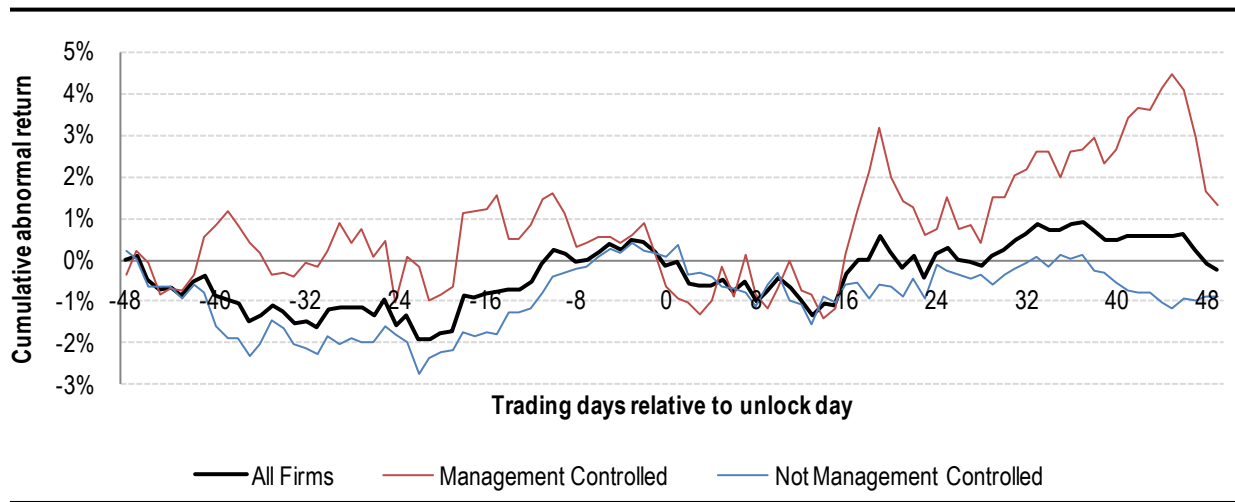
Our main results from our event study are presented in Table II which illustrates the three day CAR for our sample of 148 IPOs in the Nordic Region. The sample is also grouped after degree of management ownership and the three day CAR for these different subsamples are presented. In Table III, we have further analyzed abnormal returns as well as the abnormal traded volume in subsamples after management control, country and lockup period duration. In order to manage the vagueness with estimating the standard deviation from a sample, the tests rely on Student's t-distribution. Since they are based on interdependence of the observations, these t-values are though likely to overstate significance.

A. Event-Day Abnormal Return

By looking at Figure I, it is hard to distinguish any immediate effects from the expiration of the lockup period. It seems that the abnormal returns follow a random walk, and it does not visually show a fall related to the lockup expiration. Prior to the unlock day, the Field & Hanka (2001) data shows a convergence of abnormal returns to around zero percent as well as a significant drop at lockup expiration. Whether the reason for this pattern being absent in our result is due to our small sample or to different data characteristics is hard to determine. It is though clear that as the sample increases, the abnormal return should by theory (law of large numbers) stabilize around zero percent.

However, by looking at the hypothesis testing in Table II, we conclude that the observations around day 0 are more compressed and have lower variance, than for other time periods. Abnormal returns during the unlock day are hence more statistically significant different from 0%. The three day cumulative abnormal return for the time period -1 to +1 amounts to -0.6% and shows a t-value of -2.3; hence being statistically significant at the 2% level in a two tailed t-test. Interesting is also to look in relative terms. None of the grouped periods prior to day -1 and after day +1 report t-statistics higher than the absolute number of 1. Therefore, the lockup days clearly seem to have a significant negative impact on abnormal returns. This is in line with the result from The Field & Hanka (2001) study and Brav & Grumpers (2003), however these studies showing a steeper fall in abnormal returns.

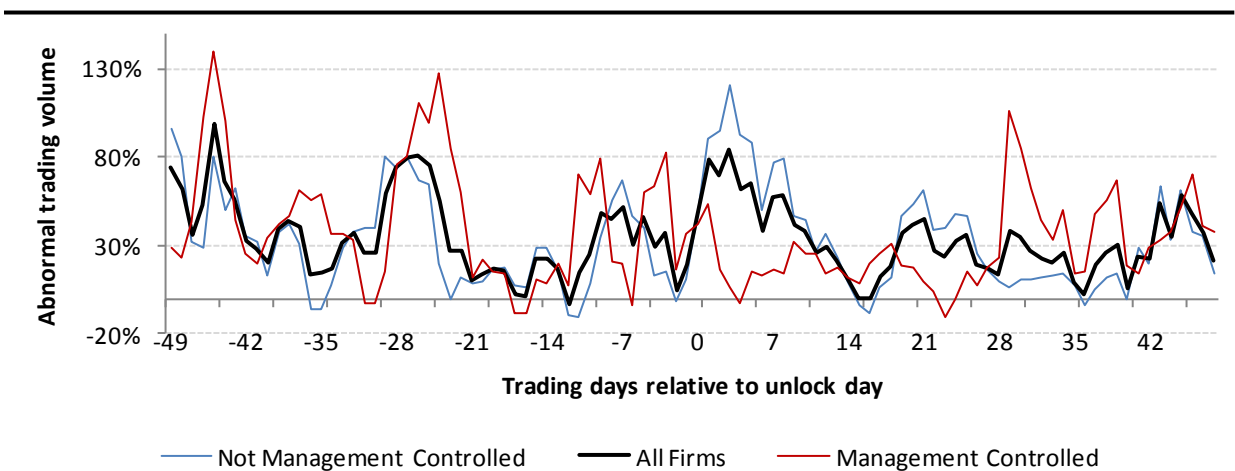
Figure I. Abnormal returns around the lockup day. Sample is 148 Nordic IPOs from 1996 to 2009. CAR is calculated as a firms return relative to its corresponding value-weighted index. The start day for the cumulative return is day -48.



B. Event-Day Abnormal Trading Volume

Depicted in Table III, we find an abnormal trading volume of 48% (t-value = 2.7) for the entire sample, which is significant at the 1% level in a two tailed t-test. This can be compared to Field & Hanka’s (2001) abnormal trading volume of 80% on the day after the unlock day. Yet, our sample has given us very dissimilar result. Graph 2 shows that abnormal trading volume seems to stay mainly positive both before and after the unlock day. All the time periods show statistically large t-values with $H_0 : ATV=0$, so looking in relative terms the period around the unlock day does not seem to differ. A problem with illiquidity could be a potential answer as well as the arithmetic scale favouring positive abnormal trading volumes

Figure II. Abnormal trading volumes around the lockup day. Sample is 148 Nordic IPOs from 1996 to 2009. Abnormal trading volume is a calculated as a firms trading volume relative to a 20 days moving average.



C. Management Controlled Firms

Table IV shows a summary of the management owned firm's influence on abnormal return for day -1 to day +1. As seen, the means of the different management subsamples are vastly different; starting at negative abnormal returns, surpassing to a positive one, but then falling down to a clearly negative abnormal return when pre IPO management ownership exceeds 50 %. It shall though be emphasized that around two-thirds of the total sample consists of either companies of type 0 or 5.

Furthermore, Table IV reports a more detailed summary on the relationship between abnormal returns and different levels of management ownership. We observe significant prominent results (significance levels of 1%) that negative abnormal returns are statistically significant when firms are management controlled ($\geq 50\%$) and when there is no significant management ownership ($< 5\%$). On the other hand, since the companies with management ownership between these values (companies of type 2, 3 and 4) have positive abnormal return means around the unlock day, we report less negative returns and also less significant results when we increase our definition of management ownership as larger than 5, 10, 15 and 25 percent. We cannot consequently find any clear linear relationship between increased management ownership and increased negative abnormal returns around lockup expiration.

This bottom line is also concluded through the cross-sectional regression in Table V. Two regressions are made with two different management ownership variables. First, the dummy variable for companies with management ownership over 50% shows a negative beta, in accordance with the precedents arguments. Second, when having a numeric variable for management ownership we see a positive relationship between abnormal returns and an increased management ownership (beta of 0.2 with t-value of 1.4). This clearly states the non linear distribution of CAR for the subsamples of management ownership. The Field & Hanka (2001) study reports a negative beta of -1.2 (t-value of -4.0) for the dummy variable for venture backed firm. However, there exists no analysis on how changes in the definition, in terms of percentage ownership, affect abnormal returns. The authors have simply defined venture backing firms as companies with venture ownership larger than some specific percentage point, and thereafter received significant prominent results. Our study would receive similar results if we would narrow down our pre IPO management ownership definition to larger than 50% shares. Furthermore, as seen in the regression and in Table III, management ownership does not seem to have large impact on abnormal trading volume around the unlock day.

D. Other Cross-Sectional Differences

Depicted in Table V, we have analysed the three day cumulative abnormal return (dependent variable) in a cross-sectional multiple regression. The independent variable of management ownership has already been elaborated, however the regression has controlled for several variables.

We have received significant results for negative abnormal returns when companies are of type 0 or 5. Since companies with less than 5 percent management ownership (type 0) could be characterized with other large shareholders, it could be interesting to control for companies with large shareholders. This reason seems to be quite adequate as big sell-downs of big shareholders would affect the share price negatively. In our sample we have defined large shareholder as companies with either management ownership over 50% or venture capitalist with greater than 50% shares pre IPO. Note that these are not collectively exhaustive since industrial buyers/owners, funds etcetera are excluded. The beta for large shareholders is the insignificant -0.7%. Large shareholders are hence not explaining abnormal returns.

When testing for venture backed firms, we cannot observe the significant relationship between negative abnormal returns and venture capital ownership that are found in Field & Hanka's and Gompers & Brav's studies. This is independently analysed from different definitions of venture backed firms, in terms of percentage ownership as seen in Table VII. In fact, we receive the highest significant results (CAR \neq 0%) when companies has no venture financing at all, which totally contradicts the results of previous studies. Note though that there should be a great correlation between having no venture financing and having a large management ownership, hereof making the results in our study plausible.

Moreover, neither does the logarithm of the three day abnormal volume have significant impacts on CAR, nor does country specifics. However, for lockup periods exceeding 180 days we see an abnormal return of -1.6% at the 1% significance level; being statistically prominent. This means that the negative abnormal return associated with lockup expirations are concentrated in firms with lockups exceeding 180 days. This disaffirms Bradley et al's (2001) findings that significant abnormal returns are concentrated in firms with shorter lockup periods. More detailed results of the independent variables of CAR, as well as a cross-sectional regression on the logarithm of three day abnormal trading volume around the unlock day, can be find in Table V.

E. Robustness Check

The Field & Hanka (2001) study discusses potential problems regarding the unlock day effect and asks themselves if negative abnormal returns could be a day 180 effect. 80% of their sample consists of

observations with a 180 days long lockup day, while the equivalent figure for our sample is 47%. Although this test is quite irrelevant for our sample due to this dissimilar figure (we have though already disproved it through the high significant level for the subsample over 180 days length of lockup), the thought has an important message; we do not know if the negative abnormal returns are true lockup expiration effects. Companies have a lot of share sensitive information and announcements and the effect we are reporting could unluckily be a simple coincidence. It is though hard to find the sole effect from the unlock day, and to address this problem is difficult.

Furthermore, this study does not analyze if the locked up managers sell their shares in connection to the lockup day, but simply what happens at the unlock day independent on if locked up shares are sold or not. We are not trying to find answers to if the negative market adjusted returns are results of locked-up shares being sold or if it is shares not locked up causing the fall in CAR. A possible explanation for the negative abnormal return could be that the locked up managers sell their shares which naturally will drive the share price down; another could be that non-insiders sell their shares. This vagueness of what is causing the negative abnormal returns obstructs our abilities to interpret the results. A contributing test would thus be to check if negative abnormal returns are created during the lockup day, when managers are keeping their locked up shares.

As for the statistical analysis, our results are based on certain assumptions regarding the t-statistics. The Student t-distribution assumes independency, and in particularly normality in the observations of the sample. As previously mentioned, the t-values are likely to overstate significance, due to these observations to some extent being interdependent, especially for longer time periods. An informal way to test for normality is the graphic method of histogram, where you visually examine if the sample distribution follows normality. By looking at table VI, we conclude a bell shaped distribution very much alike a normal distribution.

4. Conclusion and implication

This study aims to investigate, by using 148 observations during 1996-2009 in the Nordic region, the impact from the expiration of IPO lockup period on stock prices and traded volumes. As we find a significant abnormal return of -0.6% arising around the unlock day, and that this expiration day is publicly historically known, a market anomaly is supported and the efficient market hypothesis is hence rejected. This is in line with the precedent results from the studies of Field & Hanka (2001) and Brav & Gompers (2003), as they

found negative abnormal return around the expiration of the unlock day. With this study covering another sample, geographic region and time period, this abnormal return can be generalized into a larger time and area. Additionally, since the market attention to lockup periods are very low in the Nordic Region in comparison to the U.S our results also reduce lockup “fear” as a large component in the abnormal return. This suggests that the negative returns are a result of locked up insiders selling their shares rather than other shareholders.

From our sample it is hard to draw any distinct economic conclusions regarding the relationship between abnormal return and management owned firms, as we thought with the Lilienfeld-Toal (2009) study in mind. Even though there is clear significant results that management controlled firms and non-management owned firms (<5%) affect abnormal returns, there is no linear relationship between these two. Interesting is also that we did not find any significant result supporting that venture backed firms have a more negative abnormal return than others during the unlock day.

Henceforth, it would be interesting to continue the research about lockup periods. The Field & Hanka (2001) study tries to find explanation to the negative abnormal return, in forms of different hypothesis such as an increased proportion of trades at the bid, price pressure, trading costs and a downward-sloping demand curve. However, there are still no good regression models explaining the abnormal return. The fact that our cross-sectional regression model has a R^2 value of around 0.05 indicates that there are still more research necessary to explain the negative abnormal return. More independent variables should be tested, including management controlling and venture backing variables. Bradley et al. (2001) worked from an argument that venture backing firms actually were instruments to other variables. These firms could be synonymous with special industries, sizes, or past performances. This could also naturally be done for management owned firms. More interesting would be to look at the fraction of managers actually selling down their initial position after the unlock day. It is first then we can say more about what causes this lock up day market anomaly.

5. References

Bradley, D., B. Jordan, I. Roten, and H. Yi, 2001, "*Venture Capital and IPO Lockup Expiration: An Empirical Analysis*," forthcoming in *Journal of Financial Research*

Brav, A., and P. Gompers, 2003, "*The Role of Lockups in Initial Public Offerings*", *The Review of Financial Studies*, 16(1), 1-29.

Blonski, M., and U. von Lilienfeld-Toal, 2008, "*Excess Returns of Companies with a Distinguished Player*", Working paper, Johann Wolfgang Goethe-University Frankfurt

Chao, C., Field, L., and G. Hanka, 2004, "*Does Insider Trading Impair Market Liquidity? Evidence from IPO Lockups*," *Journal of Financial and Quantitative Analysis*, 39, 25-46

Fahlenbrach, Rudiger, 2008, "*Founder-CEOs, Investment Decisions, and Stock Market Performance*," *Journal of Financial and Quantitative Analysis*, forthcoming.

Fama, F., 1969, "*Efficient Capital Markets: A Review of Theory and Empirical Work*," *Journal of Finance*, 25, No.2, Papers and Proceedings of the Twenty-Eighth Annual Meeting of the American Finance Association New York, N.Y. December, 28-30, 1969 (May, 1970), pp. 383-417

Field, L., and G. Hanka, 2001, "*The Expiration of IPO Share Lockups*," *Journal of Finance*, 56, 471-500.

Keim, D., 1983, "*Size related anomalies and stock return seasonality: Further empirical evidence*," *Journal of Financial Economics*, 12, 13-32.

Leland, H., and D. Pyle, 1977, "*Informational Asymmetries, Financials Structures and Financial Intermediation*," *Journal of Finance*, 32, 371-387.

Lilienfeld-Toal von, U., 2009, "*Why Managers Hold Shares of Their Firm: Stock Returns and Lockup Agreements*," Working paper Stockholm School of Economics

Lilienfeld-Toal von, U. and S. Ruenzi, 2008, "*Why Managers Hold Shares of Their Firm: An Empirical Analysis*," Working paper.

Mackinlay, C., 1997, "*Event Studies in Economics and Finance*," *Journal of Economic Literature*, 35, 13-39

Ofek, E., and M. Richardson, 2000, "*The IPO lockup period: Implications for market efficiency and downward sloping demand curves*," Unpublished working paper, Stern School of Business, New York University.

TABLE I

Summary statistics - sample size, management controlled firms, and distribution of lockup period

The sample consists of 148 companies from Sweden, Norway, Denmark and Finland with lockup periods ranging from 1996 to the end of 2008. The lockup period has been hand collected from the companies IPO prospectus's. "Fraction of Management Controlled Firms" consists of companies with larger than 50% management ownership pre IPO.

Issue Year / Country	Sample Size				Total	Fraction of Management Controlled Firms	Mean Lockup Period (Days)	Length of Lockup		
	Sweden	Norway	Denmark	Finland				<180	180	>180
1996	1	0	1	0	2	50%	365	0%	0%	100%
1997	9	1	0	0	10	30%	264	0%	50%	50%
1998	4	0	0	2	6	17%	321	0%	33%	67%
1999	9	0	1	4	14	64%	344	0%	14%	86%
2000	8	3	2	1	14	29%	285	0%	43%	57%
2001	5	1	2	0	8	25%	296	0%	38%	63%
2002	1	0	0	0	1	0%	180	0%	100%	0%
2003	0	0	0	0	0	-	-	-	-	-
2004	1	3	0	0	4	25%	273	0%	50%	50%
2005	6	10	2	2	20	20%	246	5%	55%	40%
2006	17	12	4	2	35	40%	259	0%	60%	40%
2007	14	9	6	0	29	21%	268	3%	48%	48%
2008	3	2	0	0	5	20%	232	20%	40%	40%
Total	78	41	18	11	148	31%	275	2%	47%	51%
Sweden	-	-	-	-	78	42%	291	0%	38%	62%
Norway	-	-	-	-	41	10%	224	5%	63%	32%
Denmark	-	-	-	-	18	33%	336	6%	33%	61%
Finland	-	-	-	-	11	27%	247	0%	64%	36%

TABLE II
Abnormal returns - time periods and level of management control

The sample consists of 148 companies from Sweden, Norway, Denmark and Finland with lockup periods ranging from 1996 to the end of 2008. The cumulative abnormal return (CAR) is defined as the three day cumulative return divided by its correspondent index. The three day cumulative abnormal return around the expiration of the lockup day is shown in bold, bordered in red. "MGMT" is management ownership.

Period	CAR													
	TOTAL		MGMT < 5 %		MGMT ≥ 5%		MGMT ≥ 10%		MGMT ≥ 15%		MGMT ≥ 25%		MGMT ≥ 50%	
	Mean	T-value	Mean	T-value	Mean	T-value	Mean	T-value	Mean	T-value	Mean	T-value	Mean	T-value
Day -48 to -6	0.0%	0.1	0.1%	0.7	0.0%	0.3	-0.1%	-0.8	-0.1%	-0.5	-0.1%	-0.7	0.0%	0.3
Day -5	0.2%	0.4	0.2%	0.4	0.1%	0.2	0.1%	0.1	0.5%	0.9	0.3%	0.6	-0.1%	-0.1
Day -4	0.2%	0.5	0.4%	0.7	0.1%	0.2	0.2%	0.3	0.5%	1.0	0.3%	0.6	0.0%	0.0
Day -3	0.0%	0.0	-0.2%	-0.5	0.2%	0.3	0.2%	0.3	0.2%	0.2	0.6%	0.8	0.3%	0.3
Day -2	0.0%	-0.1	-0.2%	-0.4	0.1%	0.1	0.2%	0.2	-0.1%	-0.1	0.0%	-0.1	-0.2%	-0.1
Day -1	-0.6%	-1.3	-1.3%	-2.3	-0.3%	-0.4	-0.2%	-0.3	-0.5%	-0.7	-0.8%	-1.0	-1.2%	-1.0
Day 0	-0.5%	-1.1	-0.6%	-0.9	-0.5%	-0.8	-0.5%	-0.8	-0.3%	-0.4	-0.8%	-1.1	-1.8%	-2.2
Day +1	-0.8%	-1.6	-1.7%	-2.7**	-0.3%	-0.4	-0.2%	-0.3	-0.4%	-0.6	-0.9%	-1.4	-1.2%	-1.6
Day -5 to +1	-0.2%	-1.3	-0.5%	-2.2	-0.1%	-0.4	0.0%	-0.2	0.0%	0.0	-0.2%	-0.7	-0.6%	-1.8
Day -1 to +1	-0.6%	-2.3*	-1.2%	-3.4**	-0.3%	-0.9	-0.3%	-0.8	-0.4%	-1.0	-0.8%	-1.9	-1.4%	-2.6**
Day +2 to +10	-0.1%	-0.7	-0.3%	-1.3	0.0%	-0.1	0.0%	0.1	0.1%	0.5	-0.1%	-0.2	0.1%	0.2
Day +11 to +49	0.0%	0.1	-0.2%	-1.9	0.1%	1.2	0.1%	0.9	0.1%	0.7	0.1%	0.7	0.2%	1.0
Fraction with negative CAR for days -1 to +1	57%		59%		55%		53%		53%		55%		60%	
Sample Size	148		52		96		91		81		66		46	

*, **, Significantly different from zero at the 2 percent and 1 percent levels, respectively (two-tailed test)

TABLE III

Analysis on abnormal return and abnormal volume - subsamples

The sample consists of 148 companies from Sweden, Norway, Denmark and Finland with lockup periods ranging from 1996 to the end of 2008. "Managed controlled firms consists of companies with larger than 50% management owned pre IPO. CAR is based on a three day cumulative return divided by the correspondent value weighted index. Abnormal Trading Volume is calculated as the three day trading volume divided with the average traded volume for days -25 to -6. T-statistics are shown in parantheses.

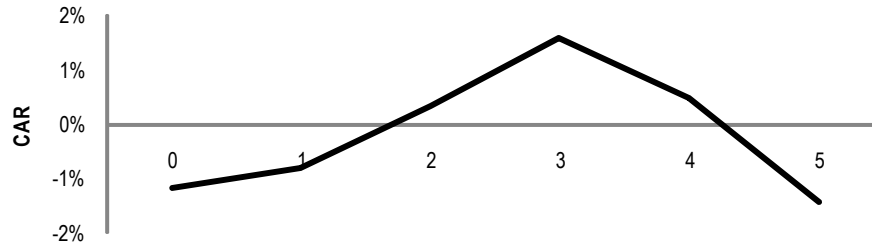
	All	Management Controlled Firms (>50%)	Not Management Controlled Firms (<50%)	Not Management Controlled Firms (<5%)	Country				Lockup	
					Sweden	Norway	Denmark	Finland	≤ 180 Days	> 180 Days
CAR day -1 to +1	-0.6% (-2.3)*	-1.4% (-2.6)**	-0.3% (-0.9)	-1.2% (-3.4)**	-0.6% (-1.4)	-0.4% (-0.9)	0.4% (0.6)	-3.6% (-4.3)**	0.4% (1.1)	-1.6% (-3.8)**
Fraction with negative CAR	57%	60%	55%	60%	56%	56%	50%	70%	51%	62%
Abnormal Trading Volume	48% (2.7)**	44% (2.5)*	50% (2.0)	74% (1.7)	37% (3.3)**	117% (1.7)	0% (0.0)	-11% (-1.2)	86% (2.4)*	13% (1.6)
Sample size (CAR)	148	46	102	52	78	41	18	11	72	76
<i>of total</i>	100%	31%	69%	35%	53%	28%	12%	7%	49%	51%
Sample size (ATV)	140	45	95	47	77	34	18	11	67	73

*, **, Significantly different from zero at the 2 percent and 1 percent levels, respectively (two-tailed test)

TABLE IV

Management ownership - statistics

Line diagram of the management ownership mean for 148 Nordic companies from 1996-2008. CAR is based on three day cumulative return divided by its correspondent index. Sample consist of days -1 to +1 where day 0 is the unlock day



Level	0	1	2	3	4	5
Ownership	< 5%	5-10%	10-15%	15-25%	25-50%	> 50%
Sample size	52	5	10	15	20	46
of total	35%	3%	7%	10%	14%	31%
Mean	-1.2%	-0.8%	0.3%	1.6%	0.5%	-1.4%
Standard deviat	4.4%	4.6%	8.7%	5.8%	5.5%	6.4%

TABLE V

Cross-sectional regression for abnormal returns

The sample consists of 140 companies from Sweden, Norway, Denmark and Finland with lockup periods ranging from 1996 to the end of 2008. 8 outliers have been deleted. The Abnormal Return is based on a three day cumulative return divided with the correspondent value weighted index. Abnormal Trading Volume is calculated as the three day trading volume divided with the average traded volume for days -25 to -6. The regression is controlled for heteroskedasticity. Management controlled firms is numbered by the amount of shares owned by management pre IPO:

0 = 0-5% , 1 = 5-10% , 2 = 10-15% , 3 = 15-25% , 4 = 25-50% , 5 = > 50%

T-statistics are shown in parantheses.

Dependent variable	Three day Abnormal Return (percent)						Log of (1+Three day Abnormal Traded Volume)					
	All firms				Management controlled firms	Not Management Controlled Firms (< 50%)	All firms				Management controlled firms	Not Management Controlled Firms (< 50%)
	reg. (1)	reg. (2)	reg. (3)	reg. (4)	(> 50%)		reg. (1)	reg. (2)	reg. (3)	reg. (4)	(> 50%)	
Intercept	-0.9 (-1.4)	-0.7 (-1.1)	-0.6 (-1.0)	-0.7 (-1.1)	-1.5 (-1.1)	-0.3 (-0.4)	-0.2 (-1.7)	-0.2 (-2.0)*	-0.2 (-2.1)*	-0.2 (-2.1)	-0.4 (1.0)	-0.3 (-2.3)*
Management controlled firm (0-5)	0.2 █ (1.4)	-	-	-	-	-	-0.4 █ (1.4)	-	-	-	-	-
Dummy variable for managent ownership (> 50%)	-	-0.7 (-1.1)	-	-	-	-	-	-0.1 (-0.7)	-	-	-	-
Dummy variable for large shareholders (> 50%)	-	-	-0.7 (-1.2)	-	-	-	-	-	0.0 (-0.3)	-	-	-
Dummy variable for venture backed firms (>50%)	-	-	-	-0.1 (-0.1)	-	-	-	-	-	0.1 (0.35)	-	-
Log (1 + three day abnormal traded volume)	0.4 █ (1.4)	0.4 █ (1.3)	0.4 █ (1.4)	0.4 █ (1.4)	0.3 █ (0.5)	0.5 █ (1.6)	-	-	-	-	-	-
Dummy variable for lockup >180 days	-2.2 (-3.7)**	-1.7 (-2.8)	-1.8 (-3.2)**	-2.0 (-3.2)**	-2.2 (-2.0)*	-1.6 (-2.1)*	0.1 █ (0.8)	0.1 █ (0.5)	0.0 █ (0.3)	0.0 █ (0.3)	0.0 (-0.0)	0.1 █ (0.9)
Dummy variable for 2005-2008 (relative 1996-2004)	1.4 (2.2)*	1.4 (2.4)*	1.6 (2.6)**	1.4 (2.4)*	2.6 (2.1)*	0.8 █ (1.1)	-0.3 (-2.7)**	-0.3 (-2.8)**	-0.3 (-2.6)**	-0.3 (-2.8)**	-0.5 (-2.6)*	-0.2 █ (1.5)
Dumy variable for Sweden	0.6 █ (1.0)	0.9 █ (1.7)	1.0 █ (1.7)	0.8 █ (1.4)	0.7 █ (0.8)	0.8 █ (1.3)	0.2 (2.3)*	0.2 (2.0)*	0.2 █ (1.9)	0.2 █ (1.8)	0.5 (2.5)*	0.1 █ (0.9)
Three day Abnormal Return (percent)	-	-	-	-	-	-	0.01 █ (1.5)	0.01 █ (1.4)	0.01 █ (1.4)	0.01 █ (1.4)	0.01 █ (0.5)	0.02 █ (1.7)
R ²	0.055	0.055	0.055	0.052	0.076	0.036	0.038	0.035	0.034	0.034	0.098	0.022

*, **, Significantly different from zero at the 5 percent and 1 percent levels, respectively (two-tailed test)

Table VI
Histogram

The sample consists of 148 companies from Sweden, Norway, Denmark and Finland with lockup periods ranging from 1996 to the end of 2008. The cumulative abnormal return (CAR) is defined as the cumulative return for day -1 to +1, where day 0 is the unlock day.

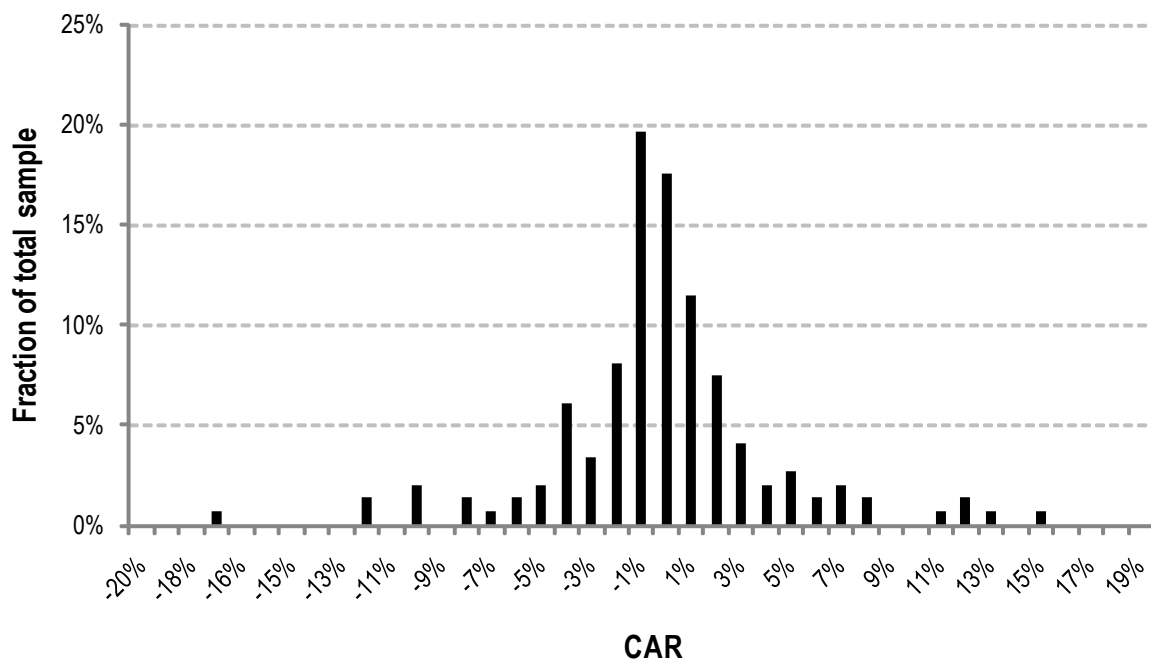


TABLE VII

Abnormal returns - time periods and level of venture backed firms

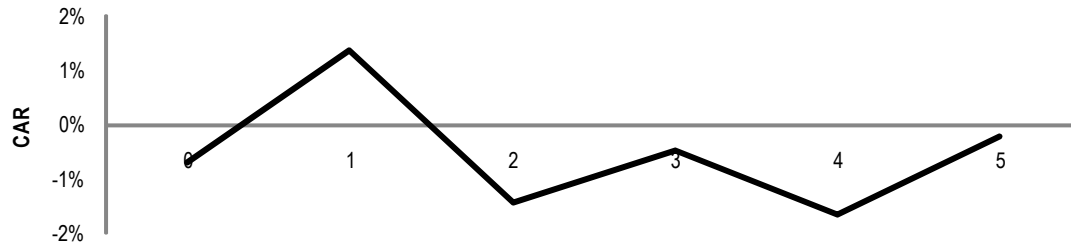
The sample consists of 148 companies from Sweden, Norway, Denmark and Finland with lockup periods ranging from 1996 to the end of 2008. The cumulative abnormal return (CAR) is defined as the three day cumulative return divided with its correspondent index. The three day cumulative abnormal return around the expiration of the lockup day is shown in bold, bordered in red. "VENT" is venture backed ownership.

Period	CAR													
	TOTAL		VENT < 5 %		VENT ≥ 5%		VENT ≥ 10%		VENT ≥ 15%		VENT ≥ 25%		VENT ≥ 50%	
	Mean	T-statistics	Mean	T-statistics	Mean	T-statistics	Mean	T-statistics	Mean	T-statistics	Mean	T-statistics	Mean	T-statistics
Day -48 to -6	0.0%	0.1	-0.1%	-0.6	0.1%	0.9	0.0%	-0.1	0.0%	-0.3	-0.2%	-1.9	-0.2%	-1.4
Day -5	0.2%	0.4	0.3%	0.6	-0.1%	-0.2	0.0%	0.0	0.1%	0.2	0.2%	0.3	-0.1%	0.0
Day -4	0.2%	0.5	0.3%	0.6	0.0%	0.0	-0.1%	-0.2	-0.1%	-0.1	-0.1%	-0.2	-0.5%	-0.6
Day -3	0.0%	0.0	-0.6%	-1.2	0.9%	1.1	0.5%	0.7	0.5%	0.7	0.6%	0.9	0.2%	0.3
Day -2	0.0%	-0.1	-1.1%	-2.0	1.5%	1.4	1.0%	1.1	1.0%	1.0	1.2%	1.1	1.2%	1.1
Day -1	-0.6%	-1.3	-13.5%	-2.9**	0.4%	0.4	-0.1%	-0.1	-0.2%	-0.2	0.5%	0.4	1.2%	1.0
Day 0	-0.5%	-1.1	-0.4%	-0.8	-0.7%	-0.8	-0.6%	-0.8	0.5%	-0.6	-0.8%	-0.8	-0.2%	-0.2
Day +1	-0.8%	-1.6	-0.3%	-0.5	-14.2%	-2.0	-1.3%	-1.8	-1.2%	-1.6	-1.7%	-2.1	-1.6%	-1.5
Day -5 to +1	-0.2%	-1.3	-0.4%	-2.2	0.1%	0.3	-0.1%	-0.3	-0.1%	-0.2	0.0%	-0.1	0.0%	0.0
Day -1 to +1	-0.6%	-2.3*	-0.7%	-2.2	-0.6%	-1.1	-0.7%	-1.5	-0.6%	-1.3	-0.7%	-1.2	-0.2%	-0.3
Day +2 to +10	-0.1%	-0.7	0.1%	0.6	-0.5%	-1.9	-0.5%	-2.1	-0.4%	-1.5	-0.3%	-1.3	-0.5%	-1.4
Day +11 to +49	0.0%	0.1	0.0%	-0.2	0.1%	0.5	0.1%	0.7	0.1%	0.4	0.1%	0.5	0.0%	0.2
Fraction with negative CAR for days -1 to +1	57%		57%		56%		57%		56%		56%		55%	
Sample Size	148		88		60		56		52		41		28	

*, **, Significantly different from zero at the 2 percent and 1 percent levels, respectively (two-tailed test)

TABLE VIII
Venture backed firms - statistics

Scatter diagram of the venture backed mean for 148 Nordic companies from 1996-2008. CAR is based on three day cumulative return divided with its correspondent index. Sample consist of days -1 to +1 where day 0 is the unlock day



Level	0	1	2	3	4	5
Ownership	< 5%	5-10%	10-15%	15-25%	25-50%	> 50%
Sample size	88	4	4	11	13	28
of total	100%	5%	5%	13%	15%	32%
Mean	-0.7%	1.4%	-1.4%	-0.5%	-1.7%	-0.2%
Standard deviation	5.1%	11.2%	3.0%	6.6%	6.7%	6.1%