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M A S T E R`S   T H E S I S

PRICE PERFORMANCE AND VOLATILITY ANALYSIS AROUND LOCK-UP DATES OF IPOs

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INTRODUCTION

Initial public offerings are a very popular topic for researchers. Many studies are carried out according to underpricing, long-term and short-term price performance, impact of lock-up dates and other issues as well. In the search for similar studies, I have not found any that integrate earnings announcements, volatility, and price performance around the lock-up date into one conclusion.

The central point of the present master's thesis is the analysis of price performance and volatility of IPOs around the lock-up date. The conducted research includes the earnings announcement surprise, the first day return, industry, market capitalization and the PEVC backing variable by which I try to discover a statistically significant impact on the return of IPOs around the lock-up date. Furthermore, the master's thesis also includes volatility tests to determine whether the latter differs when faced with different variables.

The goal of the master's thesis is to check if first day return, industry, market capitalization and the PEVC (private equity and venture capital) backing variable really have an impact on returns of IPOs around the lock-up date as was documented by previous studies and if the earnings surprise variable, which is new, has an impact as well. For all those variables, I also check if volatility is greater for those which tend to experience the largest price decline around the lock-up date.

The master's thesis consists of four chapters. In the first chapter, I provide a brief description of initial public offerings where I discuss the procedure involved in the initial public offering process, why lock-up dates exists, and what type of lock-ups can be used by companies in various stock markets around the world. At the end of this chapter, I also mention potential explanations for the lock-up date impact documented so far. In the next chapter, I write about explanatory variables mentioned previously. All the hypotheses for price performance and volatility analysis are enumerated and backed up with recent empirical discoveries from other researchers. The third chapter describes the sample formation and the methodology used for empirical testing. This chapter refers to detailed information on which data is used and how major and separated samples are constructed. Finally, the last chapter presents the empirical results of price performance and volatility analysis. Results are shown numerically and graphically for easier interpretation. At the end, the thesis familiarizes the reader with empirical findings for each variable tested and provides some recommendations for further research.

1 BRIEF DESCRIPTION OF INITIAL PUBLIC OFFERINGS

The majority of shares of closely held companies or startups are usually owned by corporate insiders. Startups and other companies that begin to operate with negative free cash flow because of their growth potential and product development costs must raise additional funds during high-growth periods. In case that existing shareholders and other key employees are not able to provide funding for the company, they are compelled to raise capital using outside sources. One option is for the company to decide to offer its new shares to the public. If the company uses this option, the next step includes choosing its investment bank, also called the underwriter, which will sell their shares to the public. Firstly, the underwriter assesses how many shares should be issued and determines the preliminary offering price range. In the next step, the underwriter sells shares to the interested clients. In this phase the reputation and experience of the underwriter plays a crucial role, because they must convince the new investors that the shares on offer are not overpriced, which usually comforts investors. In order to provide all key information on the issue, a so called "red hearing" prospectus is given to investors, explaining all the details except the final price. The latter is set one trading day before the new shares are offered to the public. In the last step, the underwriter establishes an analyst's coverage for the stock, which helps to maintain an interest for the shares issued (Brigham & Daves, 2004). Before the shares are ready to be traded on the stock exchange, the underwriter requires that corporate insiders and large prepublic owners sign the lock-up agreement, according to which they agree to abstain from selling their shares for a specified time period (Brav & Gompers, 1999).

Academic research on IPOs has firstly been done with respect to underpricing. Later, academics started to analyze the long-run performance of IPOs and other institutional features such as various pricing methods, the reasons for the companies to go public, the role of the underwriters in the process as well as regulatory issues which also include lock-up dates and auditory quality (Kraus & Burghof, 2003). Filed and Hanka (2001) examined the expiration of IPO share lock-ups and established that the cumulative abnormal return 5 days before the lock-up date and 50 days after the lock-up date is significantly negative, resulting in -2.7 percent (t=-4.5). Similarly, Brav and Gompers (1999) found an average abnormal return of -1.2 percent on the lock-up expiration date. Many other professionals who carried out price performance analysis around IPO lock-up dates established a statistically significant negative abnormal return, not just in the U.S. market but also in other developed markets around the world. Overall, academic studies suggest different reasons for the decrease in stock price.

According to the results of recent studies, lock-up dates also coincide with other interesting findings. Field and Hanka (2001) also found an abnormal volume on the lock-up date which was 75 percent greater for venture financed companies and only 15 percent greater for non-venture financed companies. Ahmad (2012) studied the relationship between the lock-up length and the survival likelihood of IPO companies and concluded that the coefficient between the lock-up period and survival time is positive and highly statistically significant with p-value of 0.003. Krishnamurti, Subrahmanyam and Thong's (2009) results on negative abnormal returns during the lock-up date period even challenge the efficient market hypothesis on how the returns on the lock-up date could be consistently worse than expected.

1.1 Why do lock-up dates exists

During the initial public offering process, managers, directors, employees and venture capitalist shareholders usually commit themselves to abstain from selling their own shares until the lock-up date expiration (Brau, Lambson & McQeen, 2005). Hoque (2011) defines the lock-up date as a voluntary agreement between corporate insiders and an underwriter, which prevents the selling of shares until the specified date which is already known in advance. Bartlett (1995) emphasizes that such an agreement is governed only by the underwriter and is not empowered by any Securities and Exchange Commission or state securities laws that regulate insider trading. During the so-called lock-up expiration period, the insiders cannot sell their shares because of information asymmetries between shareholders and managers. Such selling can be taken as a bad signal to the market and the price of shares can accordingly drop substantially. Brav and Gompers (2003) explain that lock-up agreements started being drawn up so that the insiders would not have an advantage over the outside shareholders, selling their shares immediately after the initial public offering. In their study they found evidence that the primary role of a lock-up agreement is to overcome moral hazard problems after the initial public offering. However, lock-up agreements bolster confidence but do not entirely mitigate the information asymmetry problem among managers and shareholders. The majority of lock-up expiration periods in the United States lasts only 180 days, which means that during this lock-up period only two earnings reports are announced by the company. Investors are aware that after the lock-up period expires, the insiders can sell their personal shares, so they become very cautious as the expiration day approaches (Brau, Carter, Chirstophe & Key, 2004).

Teoh, Wong and Rao (1994) and Teoh, Welch and Wong (1998a) argue that companies, which go public, may use window dressing techniques for accruals, cash flows and earnings before the IPO process in order to tailor investor expectation. They also suggest that techniques for managing earnings are likely to be used after the initial public offering. In the course of further research, Teoh, Welch and Wong (1998b) discovered that lock-up agreements lower the probability of earnings management and give more time to investors to figure out the true value of the company without the adverse effect of insider selling. In such a case, the lock-up agreements work as a bonding mechanism, linking the issuer with exaggerated forecasts from the issuing company. Arthurs, Lowell, Busenitz, Hoskisson and

Johnson (2009) also agree that lock-up agreements act as a bonding mechanism. They said that chances of accurate information being provided by management to potential investors increase with a longer lock-up expiration period which minimizes moral hazard problems after the IPO process. In case that management forecasts were oversold, investors could immediately sell their shares once they realized the stock had weaker prospects. Such action would be reflected in lower share prices held by corporate insiders and, consequently, as a greater loss for them.

Field and Hanka (2001) explain that during the lock-up expiration period, the trading shares of a company that went public are significantly different from those of established public companies. In the case of companies going public, usually just one third of the outstanding shares are being traded. Authors highlight that lock-up expiration periods also help underwriters to ensure the price support of company shares by temporarily limiting the supply of shares. Krishnamurti and Peh (2005) also argue that lock-up agreements strengthen the underwriters' effort to control the supply of shares after a company has gone public. As a consequence, greater price support contributes to the better reputation of investment banks. Mohan and Chen (2000) said that price stabilization and lock-up agreements lower the probability that shares of companies, which had gone public, underperform in the short and long-term. Thus both the investors and underwriters benefit from lock-up agreements.

1.2 Different types of lock-up dates

In various stock markets around the world we can find different types of lock-up dates after a company goes through the initial public offering process. Field and Hanka (2001) explain that initial public offerings in the United States of America usually have lock-up dates set in terms of calendar dates while in the United Kingdom they differ significantly (Espenlaub, Goergen, & Khurshed, 2001). Hoque (2011) identified four types of lock-up dates:

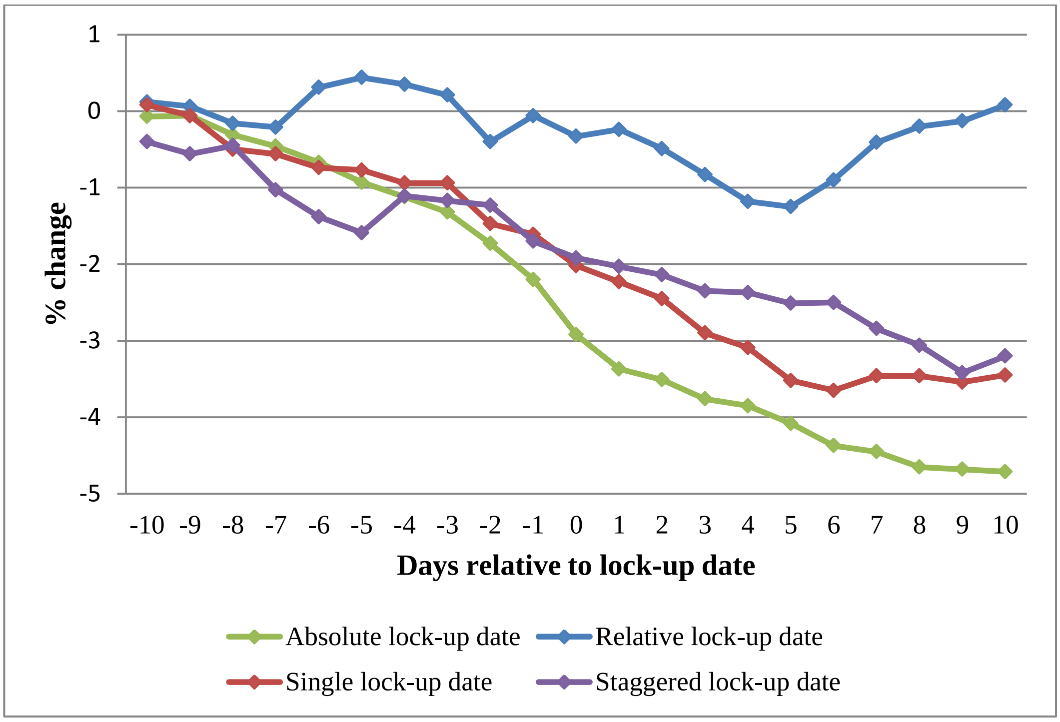
- Absolute lock-up dates
- Relative lock-up dates
- Single lock-up dates
- Staggered lock-up dates

The author explains that absolute lock-up dates are determined as calendar dates and thus most closely resemble US lock-up dates. On the other hand, the relative lock-up dates are set in conjunction with other corporate events which are usually quarterly or annual earnings reports. Furthermore, the companies can choose between a single lock-up date, where locked up shares are released all at once, or they can opt for staggered lock-up dates, which means that shares are released gradually.

Goergen, Renneboog and Khurshed, (2006) explain that in some countries stock exchanges require a minimum length for a lock-up date. If the company decides to quote on the Milan or Amsterdam stock exchange, the minimum lock-up expiration period is one year. Companies in France are able to choose between the length of the lock-up expiration period and the percentage of shares locked, while German companies have just the first option. The authors, in the course of their study, point out that in the majority of European markets, companies use staggered lock-up dates which is the opposite of the common practice in the United States where companies use single lock-up dates.

Hoque (2011) in his study analyzed price performance of different lock-up dates 10 days prior to the lock-up date and 10 days after. The results are shown in Figure 1 below.

Figure 1: Price performance around lock-up expirationperiods for different types of lock-up dates.



Source: H. Hoque, The Choice and Role of Lockups in IPOs: Evidence from Heterogeneous Lockup Agreements, 2011, Table 9.

Hoque (2011) in his study shows that absolute lock-up dates -4.71% have the highest decline in price during a 20-day interval, while relative lock-up dates end even with a positive abnormal return of 0.08%. The difference between single lock-up date and staggered lock-up date returns are very similar during the observed time period and both end between -3% to -3.5%. The author explains that underpricing is higher for those IPOs with absolute lock-up dates, which means that IPOs with higher information asymmetry prefer to choose absolute lock-up dates. Higher information asymmetry was also found for single lock-up dates, which is consistent with previous studies.

1.3. Potential explanations of lock-up date impact so far

Many academics have tried to explain various IPO phenomena, such as underpricing, lock-up date effects, and others postulating different hypotheses based on a relationship between IPO companies, investors, and investment bankers. Generally, the current explanations are not mutually exclusive, whereas the evidence is usually in line with more hypotheses simultaneously (Zheng, Ogden & Jen, 2002). In their work, Krishnamurti, Subrahmanyam and Thong (2009) mentioned several potential explanations for negative abnormal returns around lock-up dates.

- Statistical Artifact

Krishnamurti, Subrahmanyam and Thong (2009) say that if the majority of transactions around the lock-up date are sell orders executed at the bid price and placed by corporate insiders, then the price decrease will be spuriously negative, even the bid and ask prices will not be changed. Field and Hanka (2001) empirically demonstrated that abnormal returns around the lock-up date are reflected by permanent and parallel declines in bid and ask prices. They thus suggest that abnormal return is not a consequence of a larger or lower proportion of trades at bid price.

- Price Pressure

The price pressure explanation suggests that during the lock-up date stock prices might be under temporary selling pressure because of many sell orders (Krishnamurti, Subrahmanyam & Thong, 2009). As shown before, Field and Hanka (2001) demonstrated in their study that abnormal returns around the lock-up date tend to be permanent with no rebound in the near future. Based on that fact, the price pressure explanation is invalid.

- Increase in Trading Costs

The third possible explanation for the price reaction on the lock-up date are larger trading costs owed to a greater chance of information asymmetry, which is due to increased insider selling activity (Krishnamurti, Subrahmanyam & Thong, 2009). Cao, Field and Hanka (2004), as well as Field and Hanka (2001), reported, despite considerable insider transactions, little evidence of significantly greater bid-ask spreads after the lock-up date expired. In fact, they pointed out that the quoted debt and trading activity is much greater. Cao, Field and Hanka (2004) discovered an interesting fact in their study, stating that in cases where insider transactions were disclosed, spreads actually lowered. Similar evidence was also found by Thong and Krishnamurti (2008) saying that dispositioning by corporate insiders is related to lower quoted and effective spreads.

- Downward Sloping Demand Curve

Krishnamurti, Subrahmanyam and Thong (2009) said that the assumption for this explanation is that demand curves for shares slope downward. Practitioners often represent this effect as the "scarcity premium" for those IPOs which have a small public floatation. When the lock-up date expires, the public float of shares increases permanently because insiders sell their holdings. In such a case, the demand curve effect sets a drop in share prices. The authors state that the downward sloping demand curve explanation is different from the price pressure explanation because the latter results in a temporary increase of sell orders. Overall the empirical evidence for the downward sloping demand curve explanation is disparate. Field and Hanka (2001) argued that the abnormal return around the lock-up date declines more if the company which had gone public has locked up the greater part of its shares. Further they examined the companies which had a 3-day trading volume lower than 1% of the public float and concluded that such companies also had negative abnormal returns. They next tested the companies where the 3-day trading volume was below the mean volume before the lock-up date and still received significantly negative abnormal returns. Those tests clearly did not support the downward sloping demand curve explanation. Aggrawal, Krigman and Womack (2001) explained the relationship between the underpricing, analysts coverage and lock-up date expiration effect. They argued that higher first day return creates momentum, which is followed by more recommendations by non-lead underwriter research analysts. Assuming a downward sloping demand curve, they suggest that increased research coverage shifts the demand curve for stock outward, allowing insiders to sell their holdings at the lock-up date at prices higher than otherwise. Ofek and Richardson (2000) investigated volume and price patterns at lock-up dates, and documented that there was a 3 percent drop in the stock price, and a 40 percent increase in volume. They argued that the evidence is consistent with a downward sloping demand curve explanation.

- High Unexpected Insider Sales

In general, large insider sales cause negative impact on stock prices because they signal lower confidence and lower future incentives for management to maximize the value of the company (Krishnamurti, Subrahmanyam & Thong, 2009). Field and Hanka (2001) tested abnormal returns on the lock-up date for companies which reported insider sales and those that did not had any insider sales, concluding that for both groups the negative abnormal return was statistically significant. Based on that fact, they suggest that the negative abnormal return on the lock-up date is not driven just by high unexpected insider sales.

So far, none of the explanations discussed above give us a rational explanation of negative stock returns around lock-up dates. For now, academics argue that the negative abnormal return around the lock-up date is an anomaly unexplained by rational investor behavior. On the other hand, they encourage researchers to pursue an alternative explanation grounded in investor rationality (Krishnamurti, Subrahmanyam & Thong, 2009). As a consequence, numerous researchers began to study various variables that could lead to better understanding of price behavior around the lock-up date.

2 EXPLANATORY VARIABLES AND DEVELOPING HYPOTHESES

So far, many researchers studied various variables trying to explain the lock-up expiration effect. In this section I summarize the findings relevant to different explanatory variables tested so far and introduce new variables backed up by scientific literature.

2.1 Explanatory variables and developing hypotheses for price performance analysis of a major sample around lock-up date

For price performance analysis of a major sample around lock-up dates I use the next four variables:

- First day return
- Industry
- Market capitalization
- Private equity and/or venture capital backing (PEVC)

Aggrawal, Purnanandam and Wu (2006) empirically proved that IPOs with tie-in agreements have a very high first day return. With further research, they established that those stocks have significantly lower returns around the lock-up date than IPOs without tie-in agreements. They also tested long term performance of IPOs and concluded that stocks which experienced very high first day return tend to underperform after six months. This is again proof of the lock-up date being an important milestone, as the majority of U.S. IPOs have a lock-up period length of 180 days, i.e. exactly six months (Brav & Gompers, 2003).

Field and Hanka's (2001) empirical results show that high-technology companies experienced a larger negative stock return around the lock-up date compared to companies which were classified as belonging to other industries. Because Field and Hanka (2001) tested many cross-sectional variables, they discovered an interesting combination of venture backed companies and those that were classified as high-technology companies. Their test indicates that statistical significance is confined only to high technology companies which are not venture backed. This is the opposite of what Jordan, Bradley, Roten and Yi (2000) concluded in their research. They found that companies that were venture backed and classified as high technology ones experienced the largest negative return around lock-up day while companies that were not venture backed had relatively lower negative returns, regardless of the industry sector.

Jordan, Bradley, Roten and Yi (2000) tested numerous variables in the course of their research and one of the statistically significant variables was also company size. They tested abnormal return around lock-up day (-2,+2) and concluded that company size is significantly positive at the 5-percent level, suggesting that companies with larger market capitalization suffer smaller declines in value than companies with smaller market capitalization, after controlling for performance. Brau, Carter, Chirstophe and Key (2004) argue that in general information asymmetry is greater for small companies than for large companies, which is also consistent with opinion put forth by Barry and Brown (1984). In their study, during which they tested the total asset variable, they received results which suggest that small cap IPOs experience higher negative abnormal return around the lock-up date than is customary for large cap IPOs.

Field and Hanka (2001) also tested price performance of venture backed IPOs and those that were not. According to their study, venture backed IPOs performed much worse than non-venture backed. The difference in the three-day abnormal return around the lock-up date is almost three times higher for venture financed companies than on average, amounting to -2.3 percent as opposed to only -0.8 percent for non-venture IPOs. Similarly, Jordan, Bradley, Roten and Yi (2000) found in their study that the lock-up date expiration effect has usually little impact on non-venture backed companies, while venture backed companies experience significant negative abnormal returns ranging between three to four percent. More evidence for this can be found in a study done by Brau, Carter, Chirstophe and Key (2004) who tested a 5-day cumulative abnormal return and concluded that the venture capital backing variable is significantly related to negative abnormal returns (p-value=0,036). Kraus and Burghof (2003), who studied initial public offerings on Germany`s Neuer Markt, also concluded that venture backed IPOs suffered larger price decline around the lock-up date then non-venture backed ones. This study proves that the venture capital backing variable tends to matter also on European stock markets and not just on the U.S. stock market, where the majority of data are used for similar studies. Nowak (2004), studying 142 IPOs on Germany`s Neuer Markt, arrived at the same conclusion about the venture backing variable, which adds further evidence to the recent studies based on U.S. stock market data.

All the above mentioned variables are tested on the following chosen time periods:

- 14 days before the lock-up expiration period
- On the lock-up date
- 15 days after the lock-up expiration period
- During the entire 30-day interval

Hypothesis number 1: Abnormal returns for those companies, which had a first day return lower than 15.28% are higher than those for companies, which had a first day return higher than 15.28%. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date, 15 days after the lock-up expiration period, as well as during the 30-day interval.

Hypothesis number 2: Abnormal returns for non-technology companies are higher than those for technology companies. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date, 15 days after the lock-up expiration period, as well as during the 30-day interval.

Hypothesis number 3: Abnormal returns for large, mid and small-cap companies are higher than those for micro and nano-cap companies. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date, 15 days after the lock-up expiration period and during the 30-day interval.

Hypothesis number 4: Abnormal returns for companies, which were not backed by a venture capitalist or private equity, are higher than those for companies that were backed by a venture capital or private equity. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date, 15 days after the lock-up expiration period, as well as during the 30-day interval.

2.2 Explanatory variables and developing hypotheses for price performance analysis of a separated sample around lock-up date

Here I add an earnings announcement surprise variable, meaning that a major sample is now separated into two groups using the following criterion. The first group (beat group) contains companies, which beat the revenue and earnings per share that analysts forecasted on the latest earnings announcement before the lock-up date, while the second group (miss group) contains companies reporting worse revenues and earnings per share than analysts expected on the latest earnings announcement before the lock-up date.

Damodaran (2012) explains that positive (negative) earnings announcements surprise cause a positive (negative) market response to stock price performance. Ghosh, Gu and Jain (2005) studied whether the earnings quality is greater when it is supported by increasing revenues. They found that earnings for companies also reporting an increase in revenues are of higher quality than for companies, which increased earnings through cost savings. The authors explain that companies, which also reported an increase in revenues, have more persistent earnings, all the while having a smaller chance of manipulated earnings than cost-reduction companies. This is because earnings are more easily manipulated through expenses than through revenues. Furthermore, the company's increase in revenues is proactive and has limitless potential, while cost saving techniques are applied as a responsive measure and have limited potential. Porter (1980, 1985) applies the same logic, saying that the likelihood of the sustainability of earnings, also supported by an increase in revenues, is greater, since revenues have a key role as a value driver. Ertimur, Livnat and Martikainen (2003) examined the investors' reaction to surprise revenue and surprise expense in value and growth companies. They found statistically significant results suggesting that the investor reaction to a one dollar revenue surprise is stronger than for a dollar surprise in cost reduction. The authors also point out interesting results for growth and value companies. Market participants who invested in growth companies tend to place a higher value on a dollar surprise in revenues, while those who invested in value companies prefer cost a reduction surprise. Foster, Olsen and Shevlin (1984) are just one group of many researchers who studied the cumulative abnormal return of the post earnings announcement drift. According to their results, the 80 percent variation in abnormal cumulative return during the first 60 days after the earnings announcement date can be explained by higher or lower than anticipated announced earnings. The authors point out the fact that a greater positive or negative earnings surprise causes greater positive or negative post announcement abnormal returns. They also found that the greatest cumulative abnormal returns are associated with small cap companies. Jegadeesh and Livnat (2006) decided to investigate the abnormal returns of companies which reported revenue surprises. After they controlled for the earnings surprise variable, they found statistically significant abnormal returns during the post-announcement period for companies reporting a substantial revenue surprise.

According to the above stated findings, the IPOs with positive earnings and revenue surprise should have less selling pressure around the lock-up date because of better than expected and more healthy operating performance. Another potential source of support is the post-announcement drift effect and the fact that the majority of IPOs are small cap companies, which are going through a high growth period (Initial public offering, 2013).

The tests in this section will not simply include the earnings announcement surprise variable. Following the earnings announcement tests, the same four variables (first day return, industry, market capitalization and PEVC backing), as in the previous section, are tested simultaneously to see whether a positive or negative earnings announcement surprise tends to matter as a filter providing better results for the mentioned variables. It is important to note that just one variable at a time is added simultaneously. This approach will indicate if any of the four previously mentioned variables is complementary with the earnings surprise variable. The testing time periods are the same as in the previous section.

Hypothesis number 1: Abnormal returns from the companies which beat analytically predicted revenues and earnings per share on the latest earnings announcement before the lock-up date are higher than those from companies reporting revenues and earnings per share that are worse than the analysts expected. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date, 15 days after the lock-up expiration period, as well as during the 30-day interval.

Hypothesis number 2: Abnormal returns for companies which had a lower first day return than 15.28% and beat analytically predicted revenues and earnings per share on the latest earnings announcement before the lock-up date are higher than those for companies which had a higher first day return than 15.28%, reporting revenues and earnings per share that are worse than analysts expected. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date, 15 days after the lock-up expiration period, as well as during the 30-day interval.

Hypothesis number 3: Abnormal returns for non-technology companies which beat analytically predicted revenues and earnings per share on the latest earnings announcement before the lock-up date are higher than those for technology companies, reporting revenues and earnings per share that are worse than analysts expected. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date, 15 days after the lock-up expiration period, as well as during the 30-day interval.

Hypothesis number 4: Abnormal returns for large, mid and small-cap companies which beat analytically predicted revenues and earnings per share on the latest earnings announcement before the lock-up date are higher than those for micro and nano-cap companies reporting revenues and earnings per share that are worse than analysts expected. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date, 15 days after the lock-up expiration period and during the 30-day interval.

Hypothesis number 5: Abnormal returns of companies which beat analytically predicted revenues and earnings per share on the latest earnings announcement before the lock-up date and were not venture capital or private equity backed are higher than those for companies reporting revenues and earnings per share that are worse than analysts expected and were venture or private equity backed. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date, 15 days after the lock-up expiration period and during the 30-day interval.

2.3 Explanatory variables and developing hypotheses for volatility analysis around lock-up date

So far I have found just one study made by Nowak (2004) that describes the linkage between price performance of stocks after the initial public offering and the volatility pattern. This author explains that his study found greater negative abnormal returns for companies with high volatility, superior performance after IPO, and low free float. Among many other researchers, Cheung and Ng (1992) argue that volatility of shares and the share price have an inverse relationship. This means that volatility decreases subsequently to the rise in share prices and vice versa. Academics suggest that this happens because of the so called "leverage effect". As explained by Figlewski and Wang (2000), the decline in the company's stock value in relation to its market value of debt causes an increase in the company's debt to equity ratio which contributes to the greater volatility of its shares.

In this section, each hypothesis listed in the previous two sections is tested for volatility, except those which pertained to "the 30-day interval". Under these hypotheses, I provide tests of volatility using standard deviation of the stock price as a measure. Standard deviation is a very important measure in finance and it is often used as a proxy for volatility where the standard deviation on the rate of return of stock is a measure of its volatility (Goldstein & Taleb, 2007).

Hypothesis number 1: The volatility of those companies which had a lower first day return than 15.28% is lower than the volatility of companies possessing a higher first day return than 15.28. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date, as well as 15 days after the lock-up expiration period.

Hypothesis number 2: The volatility of non-technology companies is lower than the volatility of technology companies. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date, as well as 15 days after the lock-up expiration period.

Hypothesis number 3: The volatility of large, mid and small-cap companies is lower than the volatility of micro and nano-cap companies. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date and 15 days after the lock-up expiration period.

Hypothesis number 4: The volatility of companies not backed by venture capital or private equity is lower than the volatility of companies that were backed by venture capital or private equity. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date and 15 days after the lock-up expiration period.

Hypothesis number 5: The volatility of companies which beat analytically predicted revenues and earnings per share on the latest earnings announcement before the lock-up date is lower than the volatility of companies reporting revenues and earnings per share that are worse than analysts expected. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date and 15 days after the lock-up expiration period.

Hypothesis number 6: The volatility of companies which had a lower first day return than 15.28% and beat analytically predicted revenues and earnings per share on the latest earnings announcement before the lock-up date is lower than volatility of companies which had a first day return higher than 15.28%, reporting revenues and earnings per share that are worse than analysts expected. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date and 15 days after the lock-up expiration period.

Hypothesis number 7: The volatility of non-technology companies which beat analytically predicted revenues and earnings per share on the latest earnings announcement before the lock-up date is lower than volatility for technology companies reporting revenues and earnings per share that are worse than analysts expected. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date and 15 days after the lock-up expiration period.

Hypothesis number 8: The volatility of large, mid and small-cap companies which beat analytically predicted revenues and earnings per share on the latest earnings announcement before the lock-up date is lower than the volatility of micro and nano-cap companies reporting revenues and earnings per share that are worse than analysts expected. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date, as well as 15 days after the lock-up expiration period.

Hypothesis number 9: The volatility of the companies which beat analytically predicted revenues and earnings per share on the latest earnings announcement before the lock-up date and were not venture capital or private equity backed is lower than the volatility of companies reporting revenues and earnings per share that are worse than analysts expected and were venture or private equity backed. The hypothesis is tested 14 days before the lock-up expiration period, on the lock-up date, as well as 15 days after the lock-up expiration period.

3 DATA AND METHODOLOGY

3.1 Data and sample formation

The primary data source for this study was the Bloomberg Professional service (Bloomberg Professional service, 2013). The sample covers initial public offerings from 1 January 2000 to 31 December 2012 issued in the United States of America. The initial sample of 4227 units was firstly reduced by those issues which obtained preferred stocks. I then excluded the American Depository Receipts, the Real Estate Investment Trusts, close-end funds, country funds, debt funds and private equity funds. The initial public offerings which were withdrawn, pending, postponed or simply lacked a specified lock-up date were then deleted. The potential sample which needed to be checked for reported revenues and earnings per share beat consisted of 1367 units. In the next step, the sample was narrowed down to those companies possessing available revenue and earnings per share forecasts for the latest earnings announcements before their lock-up date expiration. Stocks, reporting either revenues or earnings per share (or both) in line with analysts' estimates, as well as those reporting better than expected revenues and worse than expected earnings per share and vice versa, were excluded. Companies from which analysts expected profit but which actually announced a loss and also had lower revenues than the analysts' estimates and vice versa are also included in the sample. There is also one case where the analysts expected the company to generate revenue, however that turned out not to be the case. Because earnings per share were lower than the analysts' estimates, the company was also included in the sample. For analysts' estimates, I chose the standard consensus on the Bloomberg Professional service. This process resulted in a final sample of 268 units. In the following text, I will quote the final sample as the major sample. For those companies, I used the Bloomberg Professional service to collect information about the offer type, the lock-up date, the industry group, the offer price, the offer to first day return, the percentage surprise in revenues (reported versus estimated) and the percentage surprise in earnings per share (reported versus estimated). The price data for the stocks were downloaded from Thomson Reuters DataStream (Thomson Reuters DataStream, 2013), while volatility values were obtained from the professional web-based charting software ProRealTime.com (ProRealTime, 2013). All the downloaded prices were denominated in United States Dollars.

3.2 METHODOLOGY

Calculations for the percentage surprise of reported revenues and earnings per share were based on the growth rate equation (Arh, 2006):

$$S_{t/0} = 100 \times \frac{Y_t - Y_0}{Y_0} \quad (1)$$

Where $S_{t/0}$ is the percentage surprise of reported revenues or earnings per share, Y_t the reported value of revenues or earnings per share and Y_0 is the analysts' estimate value of revenues or earnings per share.

Cumulative returns of stocks for testable time periods were market adjusted and were calculated as a difference between stock return and market return (Yip, Su & Ang, 2009). For market return, the return of Standard & Poor's 500 Stock Market Index was used.

$$CAR_{it} = \sum_{l=1}^{t} [R_{il} - R_{ml}] \quad (2)$$

Where R_{il} is the daily return for stock i on day l, R_{ml} is the daily return for market index on day l and CAR_{it} represents the market-adjusted cumulative abnormal return for stock i from day 1 to day t.

As a volatility measure for stock prices, the 15 day standard deviation of share price applied on the close of the trading day was used. Standard deviation values were obtained from the professional web-based charting software ProRealTime.com (ProRealTime, 2013).

The statistical procedure for the analysis of the above mentioned sample was an independent samples t-test, which provides a statistical test for whether or not the means of two groups are equal, therefore generalizing the t-test to these groups. An F-test for both groups was also performed in order to determine whether the variances are equal or different. For the F-test, the Bartlett's F-test was used (Košmelj & Rovan, 2006):

$$F = \frac{S_1^2}{S_2^2} \tag{3}$$

Where F is the value of the F-test, S_1^2 is the variance for group one and S_2^2 is the variance for group two.

When I knew whether variances are equal or different I performed the independent samples t-test equation (Košmelj & Rovan, 2006):

$$t = \frac{(\overline{Y_1} - \overline{Y_2}) - (\mu_1 - \mu_2)}{se_{(\overline{Y_1} - \overline{Y_2})}} \tag{4}$$

Where t is the value of the t-test, $\overline{Y_1}$ is the mean value of the first group and $\overline{Y_2}$ is the mean value for the second group. $Se_{(\overline{Y_1} - \overline{Y_2})}$ stands for the estimate of the standard error of two arithmetic means.

The statistical procedure mentioned above was used for comparing the returns and volatility of specified time intervals around the lock-up date. For mean returns, four time periods were tested: 14 days before the lock-up date, on the lock-up date, 15 days after the lock-up date, as well as during 30-day interval. Using the above mentioned statistical methods, I calculated the mean return of each group and tested (for statistical significance) whether it is changes depending on one of the four time periods. Tests performed for volatility are based on the same procedure but exclude the 30-day interval time period.

The empirical results of the price performance and volatility analysis are also shown in the histograms where one can find data about the mean return difference for price performance analysis and the mean standard deviation difference for volatility analysis. The histogram also contains labels which indicate the level of statistical significance for the obtained results.

4 EMPIRICAL RESULTS

In this section, empirical results from the major and separated sample tested for price performance and volatility are presented. Results are shown in tables and histograms for better transparency. At the end, all results for individual variables are summarized with potential explanations. Some recommendations for further studies are also provided.

4.1 Price performance analysis of major sample around lock-up date

In this section, the major sample has been tested for variables, which have been scientifically proven in recent studies. The major sample is composed of companies which beat the analytically predicted revenue and earnings per share on the latest earnings announcement before the lock-up date and companies reporting revenues and earnings per share that are worse than analysts expected on the latest earnings announcement before the lock-up date.

For the first variable, the first day return, I calculated the mean first day return of the major sample and used it for the separation criterion to form 2 groups on which the results are based. The mean first day return of the major sample was 15.28%. All IPOs, having a first day return lower than 15.28%, were in group 1, while those possessing a first day return higher than 15.28% were in group 2. The industry variable actually divides IPOs to non-technology and technology based businesses. For technology based businesses, I have chosen all companies that, according to Bloomberg's classification, are categorized under the heading of biotechnology, computers, energy-alternate sources, internet, semiconductor and software industry group,. The Bloomberg Professional service provides access to industry classification for all public companies in the world (Bloomberg Professional service, 2013). The boundary for the formation of 2 groups in the market capitalization variable is $300 million. The amount $300 million was chosen as a criterion because small cap stocks generally range between $300 million and $2 billion (Small cap, 2013). The majority of IPOs in the major sample are classified as small cap and micro cap stocks. It was thus decided that large cap, mid cap and small cap stocks are tested against micro cap and nano cap stocks. IPOs depending on the PEVC backing variable were also divided into 2 groups. The first group contains IPOs which were not private equity and/or venture capital backed, while the second group includes only IPOs which were private equity and/or venture capital backed. The results in all tables are based on the two-tailed F-test and the one-tailed T-test, which is consistent with the above written hypotheses. All test results summarized in Table 1 are based on 268 units.

Table 1 shows the mean return difference and T-test results for variables tested in the major sample. The null and alternative hypotheses for F-test and T-test are:

$$\text{F-test:} \quad H_0 : \sigma_1^2 = \sigma_2^2 \qquad H_1: \sigma_1^2 \neq \sigma_2^2 \tag{5}$$

$$\text{T-test:} \quad H_0 : \mu_1 - \mu_2 = A_0 \qquad H_1: \mu_1 - \mu_2 > A_0 \tag{6}$$

Table 1: Mean return difference and T-test results of first day return, industry, market capitalization, PEVC backing variables in major sample for observed time periods.

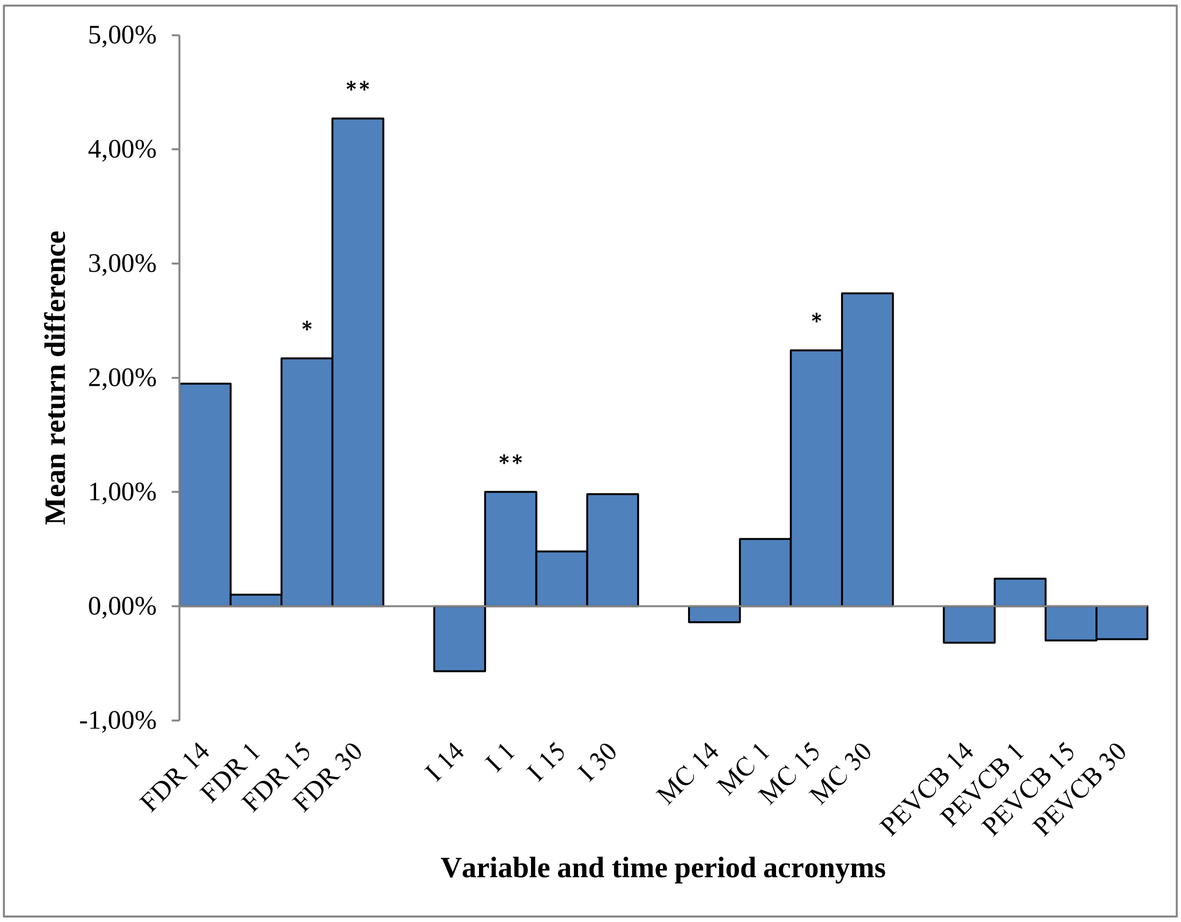
Tested variable	**Number of units observed**	**14 days before lock-up date**		**On lock-up date**		**15 days after lock-up date**		**30-day interval**	
		Mean return difference (A_0) in %	**One-tailed t-test (p-value)**	**Mean return difference (A_0) in %**	**One-tailed t-test (p-value)**	**Mean return difference (A_0) in %**	**One-tailed t-test (p-value)**	**Mean return difference (A_0) in %**	**One-tailed t-test (p-value)**
First day return	N=268	1,95	0,1037	0,10	0,4108	2,17	0,0759*	4,27	0,0248**
Industry	N=268	-0,57	0,3687	1,00	0,0360**	0,48	0,3866	0,98	0,3425
Market capitalization	N=268	-0,14	0,4767	0,59	0,1158	2,24	0,0754*	2,74	0,1625
PEVC backing	N=268	-0,32	0,4213	0,24	0,3080	-0,30	0,4224	-0,29	0,4495

Note: ***.....significant at the 1% level
**.......significant at the 5% level
*.........significant at the10% level

Table 1 shows mean return difference and t-test results between IPOs that: had higher or lower first day return than 15.28%; are non-tech or tech ones; had market cap greater or smaller than 300 million; were non-PEVC or PEVC backed.

Tests for the first day return variable show statistical significance for the 15-day return after the lock-up date and for the 30-day interval return. The mean return difference for the 15-day return after the lock-up date amounts to 2.17% and is statistically significant at the 10% level, while for a 30-day interval return, the mean return difference is almost twice as high and statistically significant at the 5% level. Tests for the industry variable show that returns between non-technology and technology companies are statistically significant on the lock-up date at the 5% level. In this case, the difference between the means is just 1%. According to my research market capitalization tends to matter in the 15-day return after the lock-up date, with statistical significance at the 10% level. The minimum mean return difference in Table 1, which is also negative, represents the industry variable in the 14-day return before the lock-up date, while the maximum mean return difference belongs to the first day return variable for the 30-day interval return, amounting to 4.27%. The results for the mean return difference from Table 1 are also shown in Figure 2 to ensure greater transparency.

Figure 2: Mean return difference for first day return, industry, market capitalization and PEVC backing variables in major sample for observed time periods.



Note: ***.....significant at the 1% level

**.......significant at the 5% level

*.........significant at the 10% level

Table 2 shows the mean return difference and T-test results between the best and worst 30% units of numerical variables tested in the major sample. The null and alternative hypotheses for the F-test and T-test are:

F-test: $H_0 : \sigma_{1\ best\ 30\%}^2 = \sigma_{2\ worst\ 30\%}^2$ $H_1: \sigma_{1\ best\ 30\%}^2 \neq \sigma_{2\ worst\ 30\%}^2$ *(7)*

T-test: $H_0 : \mu_{1\ best\ 30\%} - \mu_{2\ worst\ 30\%} = A_0$ $H_1: \mu_{1\ best\ 30\%} - \mu_{2\ worst\ 30\%} > A_0$ *(8)*

Table 2: Mean return difference and T-test results between best and worst 30% units of first day return and market capitalization variables in major sample for observed time periods.

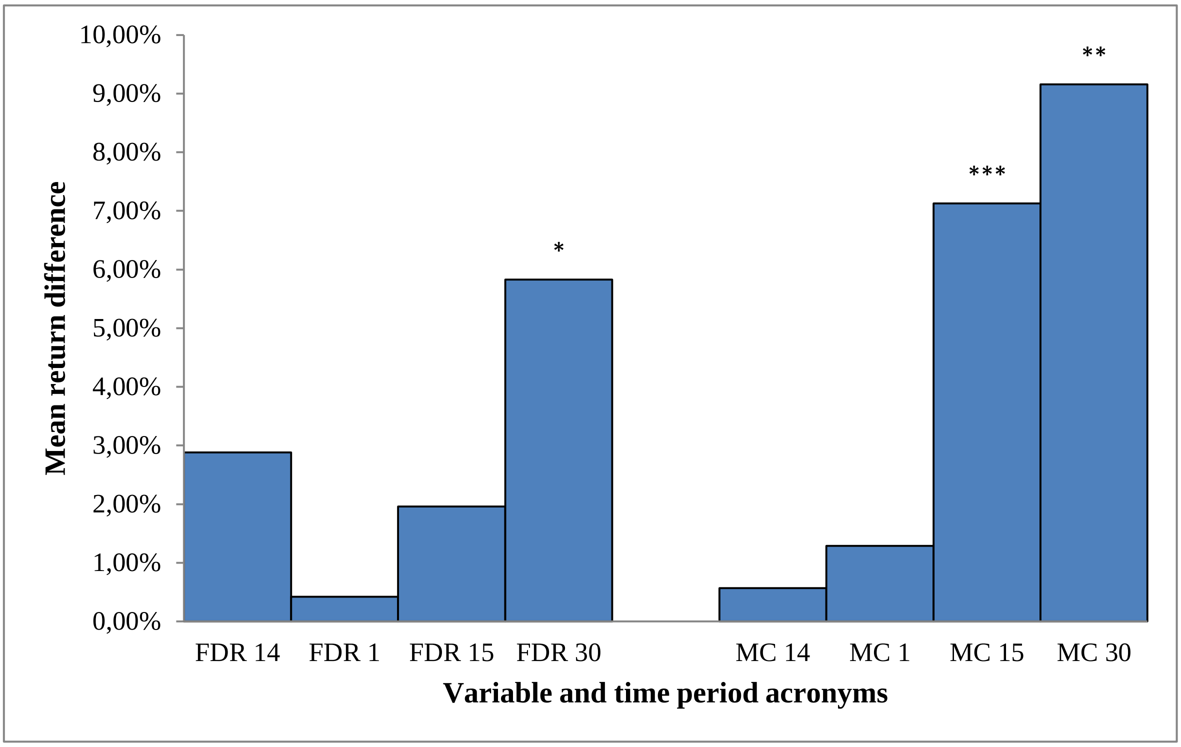
Tested variable	Number of units observed	14 days before lock-up date		On lock-up date		15 days after lock-up date		30-day interval	
		Mean return difference (A_0) in %	One-tailed t-test (p-value)	Mean return difference (A_0) in %	One-tailed t-test (p-value)	Mean return difference (A_0) in %	One-tailed t-test (p-value)	Mean return difference (A_0) in %	One-tailed t-test (p-value)
First day return	N=80	2,88	0,1791	0,42	0,2911	1,96	0,2337	5,83	0,0822*
Market capitalization	N=79	0,57	0,4349	1,29	0,1863	7,13	0,0082***	9,16	0,0487**

Note: ***.....significant at the 1% level
**.......significant at the 5% level
*.........significant at the10% level

Table 2 shows mean return difference and t-test results between best and worst 30% IPOs that: had higher or lower first day return than 15.28%; had market cap greater or smaller than 300 million.

Results for the first day return variable show statistical significance at the 10% level only for the 30-day interval return with a mean return difference of 5.83%. Compared with the results in Table 1, the mean return difference increases for 1.56 basis points, while the statistical significance lowers from a 5% level to a 10% level. When testing for the market capitalization variable, I obtained much better results than in previous test. The mentioned variable is statistically significant in the 15-day return after the lock-up date and in the 30-day interval return. The mean return difference for the 15-day return after the lock-up date increases by 4.89 basis points, while the 30-day interval return sees an increase of 9.16% compared to 2.74% in the previous test. The t-test results show statistical significance at the 1% level for the 15-day return after the lock-up date and at the 5% level for the 30-day return interval. Testing for the best and worst 30% units between the groups for the first day return variable show us greater mean return differences during most tested time periods, however statistical significance drops. The other variable provides substantial, not just in greater mean return difference but also in statistical significance. I believe this to be the consequence of a greater difference between large cap stocks and small cap stocks. As stated before, the majority of stocks in the major sample belong to the small cap and micro cap category. When testing the best and worst 30% of units between groups, I actually tested large cap and mid cap stocks against micro and nano cap stocks, receiving much better results during both measures.

Figure 3: Mean return difference between best and worst 30% units of first day return and market capitalization variables in major sample for observed time periods.



Note: ***.....significant at the 1% level

**.......significant at the 5% level

*.........significant at the 10% level

Table 3 shows the mean return difference and T-test results between the best and worst 30% units of each numerical variable already divided into 2 groups and according to the major sample. The null and alternative hypotheses for F-test and T-test are:

$$\text{F-test:} \quad H_0 : \sigma_{1\ best\ 30\%}^2 = \sigma_{2\ worst\ 30\%}^2 \qquad H_1 : \sigma_{1\ best\ 30\%}^2 \neq \sigma_{2\ worst\ 30\%}^2 \tag{9}$$

$$\text{T-test:} \quad H_0 : \mu_{1\ best\ 30\%} - \mu_{2\ worst\ 30\%} = A_0 \qquad H_1 : \mu_{1\ best\ 30\%} - \mu_{2\ worst\ 30\%} > A_0 \tag{10}$$

Table 3: Mean return difference and T-test results between best and worst 30% units of each variable (first day return and market capitalization) divided into 2 groups in major sample for observed time periods.

Tested variable	**Number of units observed**	**14 days before lock-up date**		**On lock-up date**		**15 days after lock-up date**		**30-day interval**	
		Mean return difference (A_0) in %	**One-tailed t-test (p-value)**	**Mean return difference (A_0) in %**	**One-tailed t-test (p-value)**	**Mean return difference (A_0) in %**	**One-tailed t-test (p-value)**	**Mean return difference (A_0) in %**	**One-tailed t-test (p-value)**
First day return lower than 15,28%	N=100	-1,99	0,2435	-0,02	0,4904	0,94	0,3631	-0,75	0,4264
First day return higher than 15,28%	N=62	2,22	0,2763	0,75	0,0758*	-2,57	0,1684	0,80	0,4441
Large, mid and small caps	N=30	8,05	0,0211**	0,38	0,3812	7,56	0,0020***	16,35	0,0004***
Micro and nano caps	N=134	0,61	0,3784	-0,01	0,4962	-0,47	0,4083	0,25	0,4659

Note: ***.....significant at the 1% level
**.......significant at the 5% level
*.........significant at the10% level

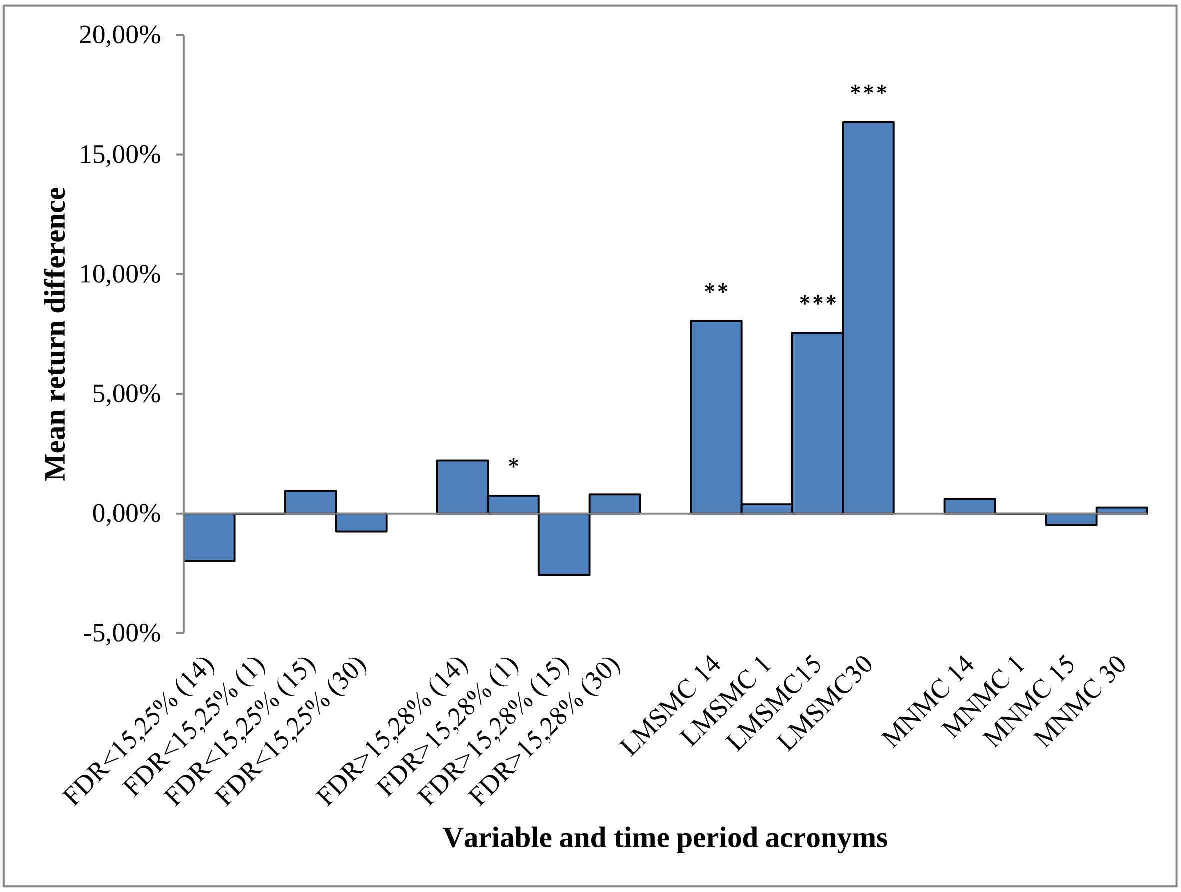
Table 3 shows mean return difference and t-test results between the best and worst 30% IPOs that: had first day return lower than 15.28%; had first day return higher than 15.28%; had large, mid or small market cap; had micro or nano market cap.

Results in Table 3 are broadly consistent with results in Table 2. For the first day return variable, you can see that even if one were to test already divided units based on the 15.28% criterion explained at the beginning of this subchapter, the 30% best and worst first day returns did not provide much statistical significance. For the best and worst 30% units, which had a first day return lower than 15.28%, I received even negative mean return differences during the 14 days before the lock-up date, on the lock-up date and during the 15 days after the lock-up date. On the other hand, the results for the best and worst 30% units, which had a first day return higher than 15.28%, show a statistically significant mean return difference at a 10% level on the lock-up date. In this case, the mean return difference amounts to 0.75%. Overall, the results are quite incoherent when spread across all four time periods. Consequently, the majority of them is not in line with the above mentioned hypotheses.

The market capitalization variable provides completely different results. Testing the largest 30% against the smallest 30% IPOs in the large, mid and small cap subgroup shows very impressive results. Statistical significant results emerged for the 14-days-before-lock-up period, the 15 days after lock-up and for the 30-day interval return. During the first mentioned time period, the mean return difference is statistical significant at the 5% level with a p-value of 0.0211 respectively, while the statistical significance during the other two time periods drops below the 1% level. Here the p-value for the 15-days-after-lock-up date amounts to 0.002, while the 30-day interval has a value of 0.0004. This is also the lowest p-value obtained in this table. These results represent very high statistical significance. As stated before, I believe that such good results for the market capitalization subgroup variable are due to the fact that the test covers the largest 30% of large caps against the smallest 30% of small caps. As one can see, the mean return differences in Table 3 are even greater than they were in Table 2. The highest mean return difference is reached between the largest 30% IPOs by market capitalization and the smallest 30% IPOs by market capitalization for the large, mid and small cap subgroup during the 30-day interval. In this case, the mean return difference amounts to 16.35%, which is also the highest mean return difference obtained in this table. Results for the micro and nano caps subgroup show no statistical significance in any of the observed time periods. Based on these facts, it is possible to conclude that I cannot say that the average mean return for the largest 30% micro caps are greater than for the worst 30% nano caps in any of the observed time periods.

For better transparency, see Figure 4, which shows the mean return difference for all subgroups tested in Table 3.

Figure 4: Mean return difference between best and worst 30% units of each variable (earnings announcement surprise, first day return and market capitalization) in major sample for observed time periods.



Note: ***.....significant at the 1% level
**.......significant at the 5% level
*.........significant at the 10% level

4.2 Price performance analysis of separated sample around lock-up dates

This section analyzes a separated sample, which is actually the major sample divided into two groups according to the following criterion. The first group (beat group) contains companies beating the revenue and earnings per share that analysts forecasted on the latest earnings announcement before the lock-up date, while the second group (miss group) contains companies which reported revenues and earnings per share that were worse than analysts expected on the latest earnings announcement before the lock-up date. Here I didn`t test just the earnings announcement surprise variable, but I added the same four variables (first day return, industry, market capitalization and PEVC backing) as in the previous section, to see whether the positive or negative earnings announcement surprise tends to operate as a filter, providing better results for the mentioned variables. Tests are made for the same 4 time periods as in the previous subchapter.

Table 4 shows the mean return difference and T-test results for variables tested in the separated sample. The null and alternative hypotheses for F-test and T-test are:

$$\text{F-test:} \quad H_0 : \sigma_{beat,\ v}^2 = \sigma_{miss,\ v}^2 \qquad H_1 : \sigma_{beat,\ v}^2 \neq \sigma_{miss,\ v}^2 \tag{11}$$

$$\text{T-test:} \quad H_0 : \mu_{beat,\ v} - \mu_{miss,\ v} = A_0 \qquad H_1 : \mu_{beat,\ v} - \mu_{miss,\ v} > A_0 \tag{12}$$

Where “v” is the chosen variable tested.

Table 4: Mean return difference and T-test results of earnings announcement surprise, first day return, industry, market capitalization, PEVC backing variables in separated sample for observed time periods.

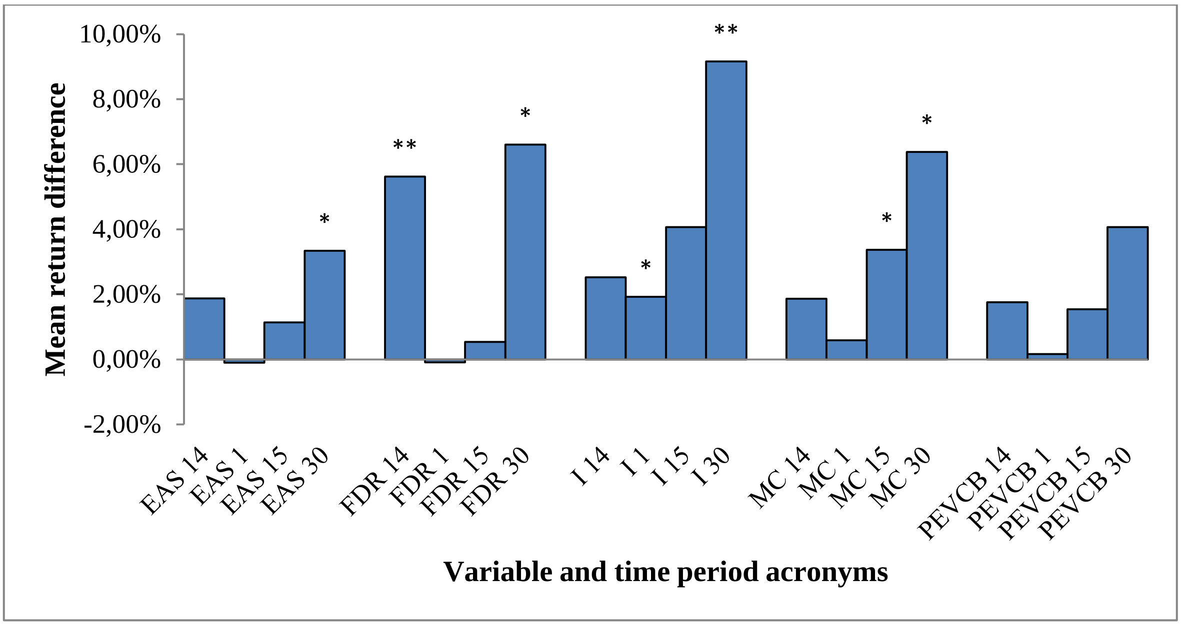
Tested variable	**Number of units observed**	**14 days before lock-up date**		**On lock-up date**		**15 days after lock-up date**		**30-day interval**	
		Mean return difference (A_0) in %	**One-tailed t-test (p-value)**	**Mean return difference (A_0) in %**	**One-tailed t-test (p-value)**	**Mean return difference (A_0) in %**	**One-tailed t-test (p-value)**	**Mean return difference (A_0) in %**	**One-tailed t-test (p-value)**
Earnings announcement surprise	N=268	1,88	0,1316	-0,10	0,4209	1,14	0,2434	3,34	0,0792*
First day return	N=128	5,62	0,0475**	-0,09	0,4448	0,54	0,4254	6,60	0,0846*
Industry	N=137	2,52	0,1746	1,92	0,0573*	4,07	0,1832	9,16	0,0127**
Market capitalization	N=94	1,87	0,2657	0,59	0,2335	3,37	0,0896*	6,38	0,0608*
PEVC backing	N=100	1,76	0,2395	0,16	0,4291	1,54	0,2983	4,07	0,1375

Note: ***.....significant at the 1% level
**.......significant at the 5% level
*.........significant at the 10% level

Table 4 shows mean return difference and t-test results between IPOs that beat or missed analysts expectations and: had higher or lower first day return than 15.28%; are non-tech or tech ones; had market cap greater or smaller than 300 million; were non-PEVC or PEVC backed.

The results for the new variable, the earnings announcement surprise, show a positive mean return difference during all the time periods, except on the lock-up date where it is slightly below 0. Based on the results from Table 4, the mean return difference is statistically significant only for the 30-day interval return. In this time period, I got also calculated the highest mean return difference for the earnings announcement surprise variable, which is significant at the 10% level. For IPOs that beat revenue and earnings per share analysts estimates and had first day return below 15.28% had on average 5.62% higher mean returns 14 days before lock-up date than IPOs which missed analysts forecasts. The mean return difference in this case is also statistically significant at the 5% level. An even higher mean return difference is present for the same companies during the 30-day time period, which amounts to 6.6% but is statistically significant only on at the 10% level. The highest mean return difference of 9.16% in Table 4 is attributed to the industry variable for the 30-day interval time period, having a statistical significance at the 5% level. The industry variable also presents a statistically significant mean return difference during the lock-up date, which amounts to 1.92%. The market capitalization variable tends to matter in 15 days after the lock-up date and during the 30-day interval with a pretty high mean return difference. 15 days after the lock-up date amounts to 3.37%, while the 30-day interval is 6.38%. Both are statistically significant at the 5% level. The PEVC backing variable did not provide any statistical significance for any given time period: Even the mean return differences are all positive. Figure 5 shows results for mean return differences for all tested variables in Table 4.

Figure 5: Mean return difference for earnings announcement surprise, first day return, industry, market capitalization and PEVC backing variables in separated sample for observed time periods.



Note: ***.....significant at the 1% level

**.......significant at the 5% level

*.........significant at the 10% level

Table 5 shows the mean return difference and T-test results between best and worst 30% units of numerical variables tested in the separated sample. The null and alternative hypotheses for F-test and T-test are:

F-test: $H_0 : \sigma_{beat,\ beast\ 30\%\ of\ v}^2 = \sigma_{miss,\ worst\ 30\%\ of\ v}^2$ $H_1 : \sigma_{beat,\ best\ 30\%\ of\ v}^2 \neq \sigma_{miss,\ worst\ 30\%\ of\ v}^2$ *(13)*

T-test: $H_0 : \mu_{beat,\ best\ 30\%\ of\ v} - \mu_{miss,\ worst\ 30\%\ of\ v} = A_0$ $H_1 : \mu_{beat,\ beast\ 30\%\ of\ v} - \mu_{miss,\ worst\ 30\%\ of\ v} > A_0$ *(14)*

Where "v" is the chosen variable tested.

Table 5: Mean return difference and T-test results between best and worst 30% units of earnings announcement surprise, first day return and market capitalization variables in separated sample for observed time frames.

Tested variable	**Number of units observed**	**14 days before lock-up date**		**On lock-up date**		**15 days after lock-up date**		**30-day interval**	
		Mean return difference (A_0) in %	**One-tailed t-test (p-value)**	**Mean return difference (A_0) in %**	**One-tailed t-test (p-value)**	**Mean return difference (A_0) in %**	**One-tailed t-test (p-value)**	**Mean return difference (A_0) in %**	**One-tailed t-test (p-value)**
Earnings announcement surprise	N=80	6,13	0,0071***	-0,14	0,4366	-0,99	0,3784	5,88	0,0766*
First day return	N=39	1,37	0,3444	-0,42	0,3160	-1,98	0,3613	-0,53	0,4776
Market capitalization	N=28	10,35	0,0048***	0,61	0,3616	10,53	0,0320**	22,06	0,0008***

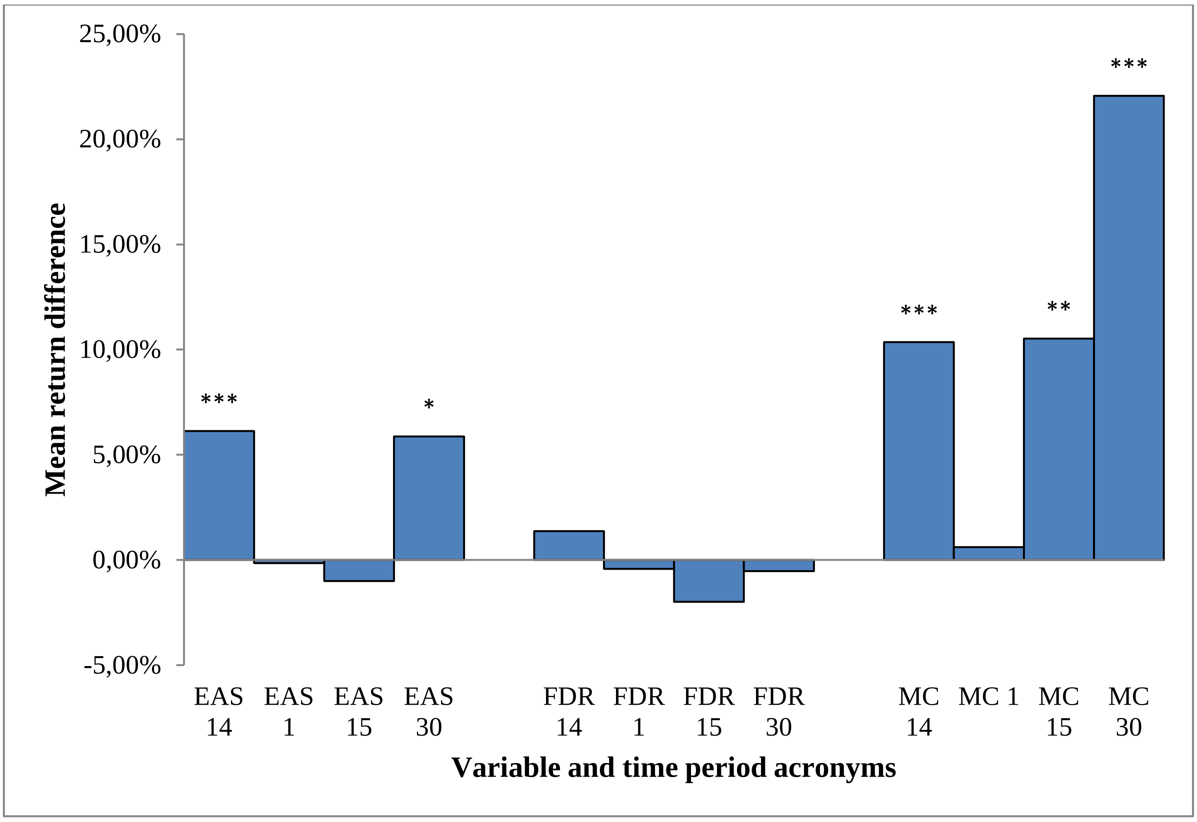
Note: ***.....significant at the 1% level
**.......significant at the 5% level
*.........significant at the 10% level

Table 5 shows mean return difference and t-test results between the best and worst 30% IPOs that beat or missed analysts expectations and: had first day return higher or lower than 15.28%; had market cap greater or smaller than 300 million.

Testing the best 30% units that beat earnings per share versus the worst 30% units that missed earnings per share, a mean return difference of 6.13% was calculated. The statistical significance was lower than at the 1% level for 14 days before the lock-up date. The p-value in this case amounts to 0.0071, which suggests high statistical significance. As mentioned before, earnings per share criterion were used to sort IPOs from best to worst when testing for the earnings announcement surprise variable. For the same variable I received a statistically significant result also for the 30-day interval return at the 10% level with a p-value of 0.0766. Here the mean return difference is 5.88%. By comparing results between Table 5 and Table 4, we can see that using a 30% filter results in a much higher mean return difference for the 14-days-before-lock-up date and for the 30-day interval. Greater statistical significance was also achieved for the first time period, while the second stayed broadly the same. The results for the 14-days-before-lock-up date and during the 30-day interval are thus in line with the alternative hypothesis. The return on the lock-up date and the 15-day return after the lock-up date are negative with no statistical significance. In Table 5, the first day return variable shows the worst results with negative mean return differences on the lock-up date, 15 days after the lock-up date and during the 30-day interval with no statistical significance. Furthermore, the mean return difference fell in all 4 time periods. The market capitalization variable shows really good results. The 14 day mean return difference the before lock-up date increased to 10.35% and is statistically significant at the 1% level, with a p-value of 0.0048. The mean return difference on the lock-up date is the only one not significant for the market capitalization variable. The next 10.53% mean return difference is added during the 15-days-after-the-lock-up date with statistical significance at the 5% level. In this case, the p-value amounts to 0/032. For the 30-day mean return difference, the tests showed a value of 22.06%, which is the highest mean return difference you will find in our test results. The p-value for this return is 0.0008, indicating a very high statistical significance. Similar to the earnings announcement variable, the market capitalization variable achieved much better returns by applying a 30% filter to the tested groups. In this case, p-values for the majority of the time periods tested were also lower. As explained in the previous section, I believe that the improved results are a consequence of a greater difference between large cap stocks and micro cap stocks. By testing best and worst 30% units between groups, I actually tested large cap and mid cap stocks that beat analysts' forecasts against micro and nano cap stocks, the latter missing the analysts' forecasts, thus improving the mean return differences and their statistical significance.

Figure 6 below, shows the mean return differences from Table 5 for better transparency.

Figure 6: Mean return difference between best and worst 30% units of earnings announcement surprise, first day return and market capitalization variables in separated sample for observed time periods.



Note: ***.....significant at the 1% level

**.......significant at the 5% level

*.........significant at the 10% level

Table 6 shows the mean return difference and T-test results between the best and worst 30% units of each numerical variable already divided into 2 groups, according to the separated sample. The null and alternative hypotheses for F-test and T-test are:

$$\text{F-test: } H_0 : \sigma_{\text{beat, best 30\% of v}}^2 = \sigma_{\text{miss, worst 30\% of v}}^2 \quad (15)$$

$$H_1 : \sigma_{\text{beat, best 30\% of v}}^2 \neq \sigma_{\text{miss, worst 30\% of v}}^2 \quad (16)$$

$$\text{T-test: } H_0 : \mu_{\text{beat, best 30\% of v}} - \mu_{\text{miss, worst 30\% of v}} = A_0 \quad (17)$$

$$H_1 : \mu_{\text{beat, best 30\% of v}} - \mu_{\text{miss, worst 30\% of v}} > A_0 \quad (18)$$

Where “v” is the chosen variable (first day return, industry, market capitalization or PEVC backing) tested.

Table 6: Mean return difference and T-test results between best and worst 30% units of each variable (earnings announcement surprise, first day return and market capitalization) in separated sample for observed time frames.

Tested variable	**Number of units observed**	**14 days before lock-up date**		**On lock-up date**		**15 days after lock-up date**		**30-day interval**	
		Mean return difference (A_0) in %	**One-tailed t-test (p-value)**	**Mean return difference (A_0) in %**	**One-tailed t-test (p-value)**	**Mean return difference (A_0) in %**	**One-tailed t-test (p-value)**	**Mean return difference (A_0) in %**	**One-tailed t-test (p-value)**
Earnings announcements with positive surprise	N=116	2,00	0,1192	-1,03	0,0548*	-3,53	0,0539*	-2,30	0,2182
Earnings announcements with negative surprise	N=44	7,43	0,0245**	-0,11	0,4625	-2,99	0,2188	4,71	0,1448
First day return lower than 15,28%	N=66	-1,34	0,3573	-0,06	0,4786	0,40	0,4505	-1,01	0,4261
First day return higher than 15,28%	N=12	7,43	0,2293	0,48	0,3805	3,08	0,3349	11,76	0,1555
Large, mid and small caps	N=20	10,65	0,0090***	1,66	0,1652	8,17	0,0119**	20,86	0,0008***
Micro and nano caps	N=36	10,12	0,0053***	-0,96	0,2160	2,10	0,3029	11,39	0,0181**

Note: ***.....significant at the 1% level
**.......significant at the 5% level
*.........significant at the 10% level

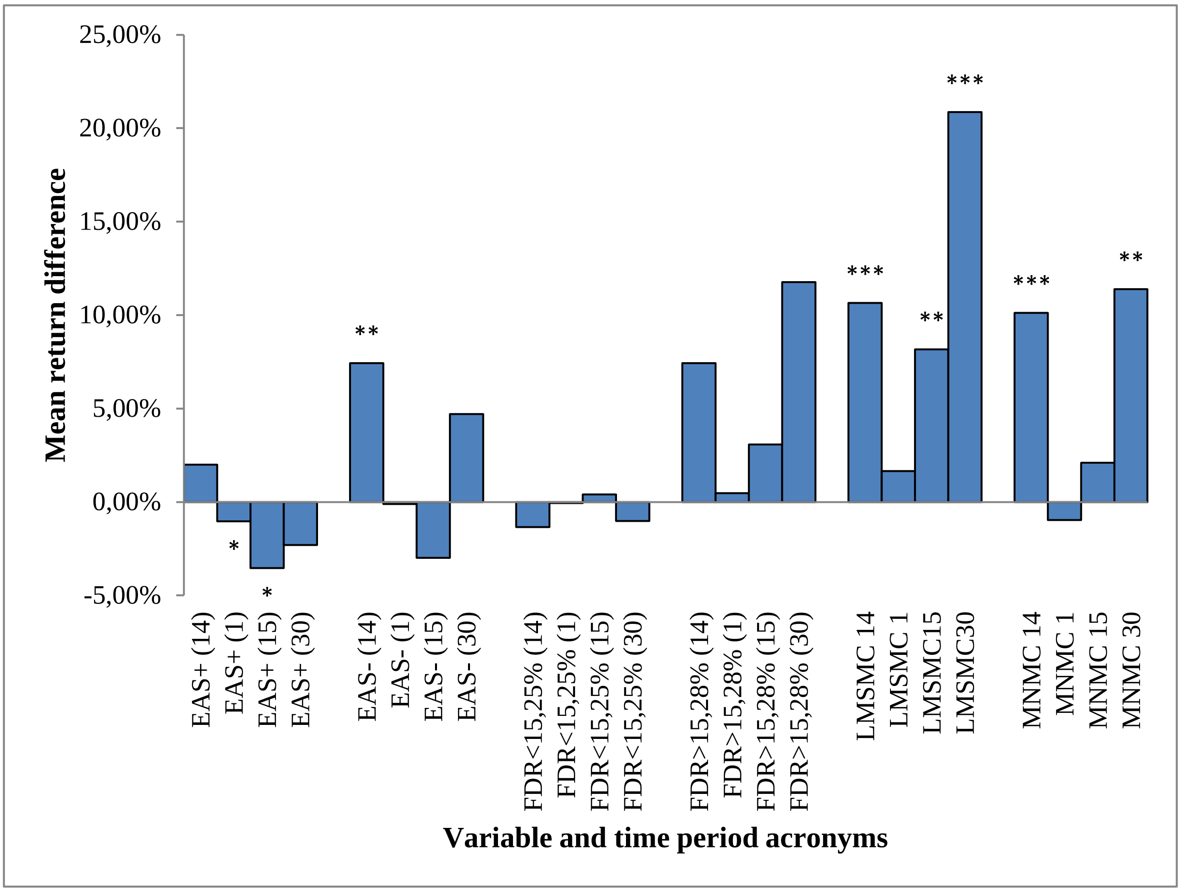
Table 6 shows mean return difference and t-test results between the best and worst 30% IPOs that: beat analysts' estimates; missed analysts' estimates; beat analysts' estimates and had first day return lower than 15.28%; missed analysts' estimates and had first day return higher than 15.28%; beat analysts' estimates and had large, mid or small market cap; missed analysts' estimates and had micro or nano market cap.

Results in Table 6 show some interesting signs for the earnings announcement variable. The best 30% and the worst 30% IPOs, beating analysts' estimates, show the opposite results than expected. The mean difference return for this subgroup is negative on the lock-up date and the 15-days-after-lock-up date with statistical significance at the 10% level. More specifically, the results tell us that the worst 30% IPOs which beat analysts' estimates experienced on average a higher return on the lock-up date and 15 days after the lock-up date than the best 30% IPOs that beat analysts' estimates. On the other hand, the best 30% of those IPOs which missed the analysts' estimates perform much better 14 days before the lock-up date than do the worst 30% of IPOs which missed analysts' estimates. The mean return difference in this case amounts to 7.43% and is statistically significant at the 5% level. These results suggests that the selling price pressure for IPOs that performed quite above analysts' estimates is greater on the lock-up date and 15 days after, than for those IPOs which only slightly beat analysts' estimates. The result for IPOs which had earnings announcements with a negative surprise 14 days before the lock-up date is consistent with the hypotheses. IPOs reporting slightly lower revenues and earnings per share than analysts forecasted dropped less than those reporting a big miss. As in Table 5, the first day return variable shows no significant results despite some very high mean return differences for the best and worst 30% IPOs, which had a higher first day return than 15.28% and missed the revenue and earnings per share analysts' forecasts. In this case, the mean return difference is 7.43% for the 14 days before lock-up date and 11.76% for the 30-day interval.

The market capitalization variable once again proved to engender the highest mean return differences and statistical significance. Testing the largest and the smallest 30% of IPOs that beat earnings announcements forecasted by analysts reveals a 10.65% mean return difference for 14 days before the lock-up date, an 8.17% mean return difference 15 days after the lock-up date and a 20.86% mean return difference for the whole 30-day interval. For the first and the third time period, statistical significance reaches a p-value below the 1% level, while the second is significant at the 5% level. The mean return difference between the best and worst 30% of micro and nano caps is greatest for 14 days before the lock-up date and amounts to 10.12%, with statistical significance below the 1% level. These results suggest that the selling price pressure for the worst 30% nano caps which missed analyst' estimates is greater during the 14 days before the lock-up date than for the best 30% micro caps that missed analysts estimates. The statistical significance result is also available for the 30-day interval return and amounts to 11.39%. In this case, the p-value is below the 5% level.

Figure 7 shows all the mean return differences from Table 6.

Figure 7: Mean return difference between best and worst 30% units of each variable (earnings announcement surprise, first day return and market capitalization) in separated sample for observed time frames.



Note: ***.....significant at the 1% level

**.......significant at the 5% level

*.........significant at the 10% level

4.3 Volatility analysis around lock-up date

In the previous two sections, I tested the mean return difference for the major and separated sample, for various variables, and in four time periods. In this section I tested each hypothesis listed in the previous two sections for volatility, except those which were marked as “for 30-day interval”. The 15-day standard deviation of the stock's closing price was used as the volatility measure. There is also another difference that the reader must note. In the previous tables above, one can see that the t-test alternative hypothesis indicates a mean return difference greater than zero, while in this section, it indicates a mean standard deviation lower than zero. Thus, the negative mean standard deviation difference is consistent with the alternative hypothesis, while the positive one is not.

Table 7 shows the mean standard deviation difference and T-test results for variables tested in the major sample. The null and alternative hypotheses for F-test and T-test are:

$$\text{F-test:} \quad H_0 : \sigma_1^2 = \sigma_2^2 \qquad H_1: \sigma_1^2 \neq \sigma_2^2 \tag{19}$$

$$\text{T-test:} \quad H_0 : \mu_1 - \mu_2 = A_0 \qquad H_1: \mu_1 - \mu_2 < A_0 \tag{20}$$

Table 7: Mean standard deviation difference and T-test results of first day return, industry, market capitalization, PEVC backing variables in major sample for observed time periods.

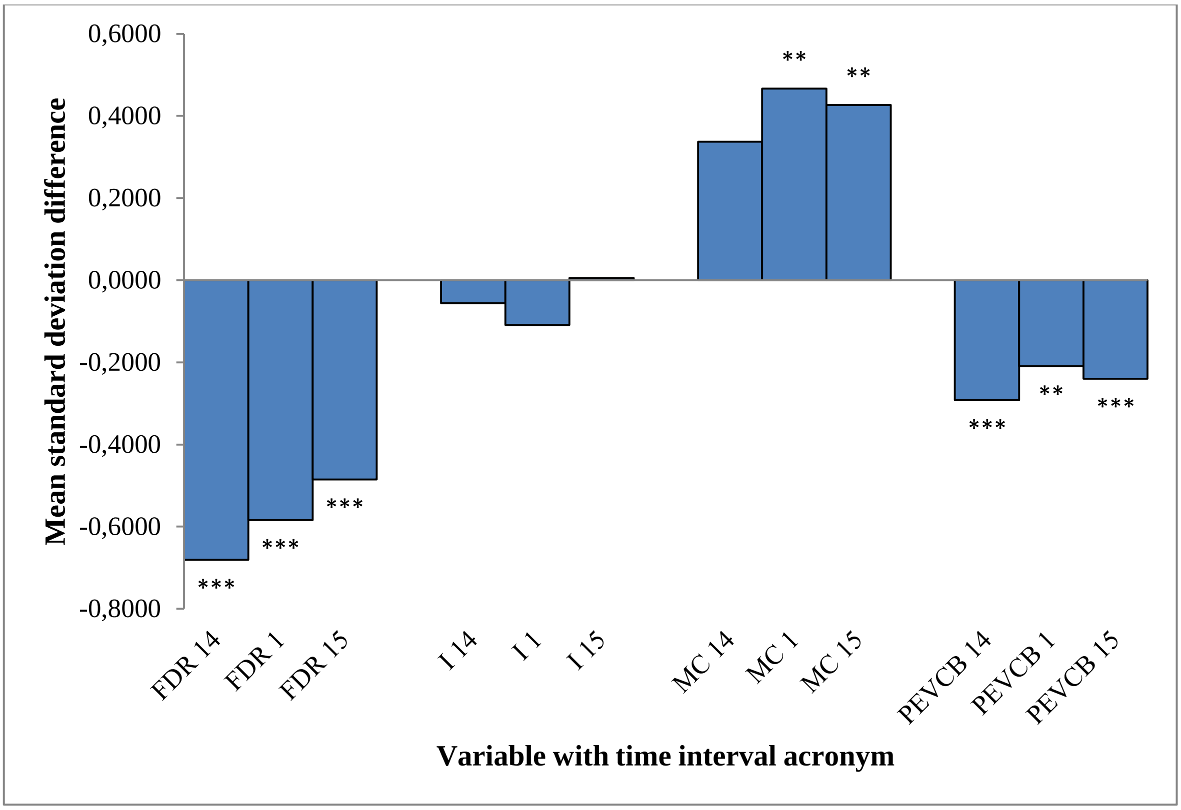
Tested variable	**Number of units observed**	**14 days before lock-up date**		**On lock-up date**		**15 days after lock-up date**	
		Mean std. dev. difference (A_0)	**One-tailed t-test (p-value)**	**Mean std. dev. difference (A_0)**	**One-tailed t-test (p-value)**	**Mean std. dev. difference (A_0)**	**One-tailed t-test (p-value)**
First day return	N=268	-0,6809	0,0000***	-0,5839	0,0000***	-0,4849	0,0000***
Industry	N=268	-0,0559	0,3225	-0,1089	0,1812	0,0054	0,4769
Market capitalization	N=268	0,3376	0,1440	0,4666	0,0405**	0,4267	0,0282**
PEVC backing	N=268	-0,2922	0,0043***	-0,2098	0,0233**	-0,2398	0,0041***

Note: ***.....significant at the 1% level
**.......significant at the 5% level
*.........significant at the10% level

Table 7 shows mean std. dev. difference and t-test results between IPOs that: had higher or lower first day return than 15.28%; are non-tech or tech ones; had market cap greater or smaller than 300 million; were non-PEVC or PEVC backed.

From Table 7, you can see that all mean standard deviation differences for the first day return and the PEVC backing variable are negative and statistically significant at the 1% level, except the PEVC backing variable on the lock-up date, which is significant at the 5% level. Those results are all in line with the alternative hypothesis and tell us that standard deviation for those IPOs which had a first day return lower than 15.28% on average had lower standard deviation 14 days before, on the lock-up date and 15 days after the lock-up date than IPOs achieving a first day return greater than 15.28%. The same is true for IPOs that were not private equity or venture capital backed. Those also had a lower standard deviation than IPOs which were private equity or venture capital backed. On the other hand, the industry variable shows no statistically significant results, while the results for the market capitalization variable suggest that large, mid and small cap IPOs had higher standard deviation on the lock-up date and 15 days after the lock-up date than micro and nano cap IPOs. The mean standard deviation differences are statistically significant at the 5% level. The greatest positive mean standard deviation difference belongs to the market capitalization variable on the lock-up date amounting to 0.4666, while the greatest negative is connected to the first day return variable, 14 days before the lock-up date and amounting to -0.6809. Figure 8 below shows the mean standard deviation differences from Table 7.

Figure 8: Mean standard deviation difference for first day return, industry, market capitalization and PEVC backing variables in major sample for observed time periods.



Note: ***.....significant at the 1% level
**.......significant at the 5% level
*.........significant at the 10% level

Table 8 shows the mean standard deviation difference and the T-test results between the best and worst 30% units of numerical variables tested in the major sample. The null and alternative hypotheses for F-test and T-test are:

F-test: $H_0 : \sigma_{1\ best\ 30\%}^2 = \sigma_{2\ worst\ 30\%}^2$ $H_1 : \sigma_{1\ best\ 30\%}^2 \neq \sigma_{2\ worst\ 30\%}^2$ *(21)*

T-test: $H_0 : \mu_{1\ best\ 30\%} - \mu_{2\ worst\ 30\%} = A_0$ $H_1 : \mu_{1\ best\ 30\%} - \mu_{2\ worst\ 30\%} < A_0$ *(22)*

Table 8: Mean standard deviation difference and T-test results between best and worst 30% units of first day return and market capitalization variables in major sample for observed time periods.

Tested variable	**Number of units observed**	**14 days before lock-up date**		**On lock-up date**		**15 days after lock-up date**	
		Mean std. dev. difference (A_0)	**One-tailed t-test (p-value)**	**Mean std. dev. difference (A_0)**	**One-tailed t-test (p-value)**	**Mean std. dev. difference (A_0)**	**One-tailed t-test (p-value)**
First day return	N=80	-0,9481	0,0001***	-0,8935	0,0002***	-0,8375	0,0019***
Market capitalization	N=79	1,1611	0,1381	1,1502	0,0801*	1,0487	0,0216**

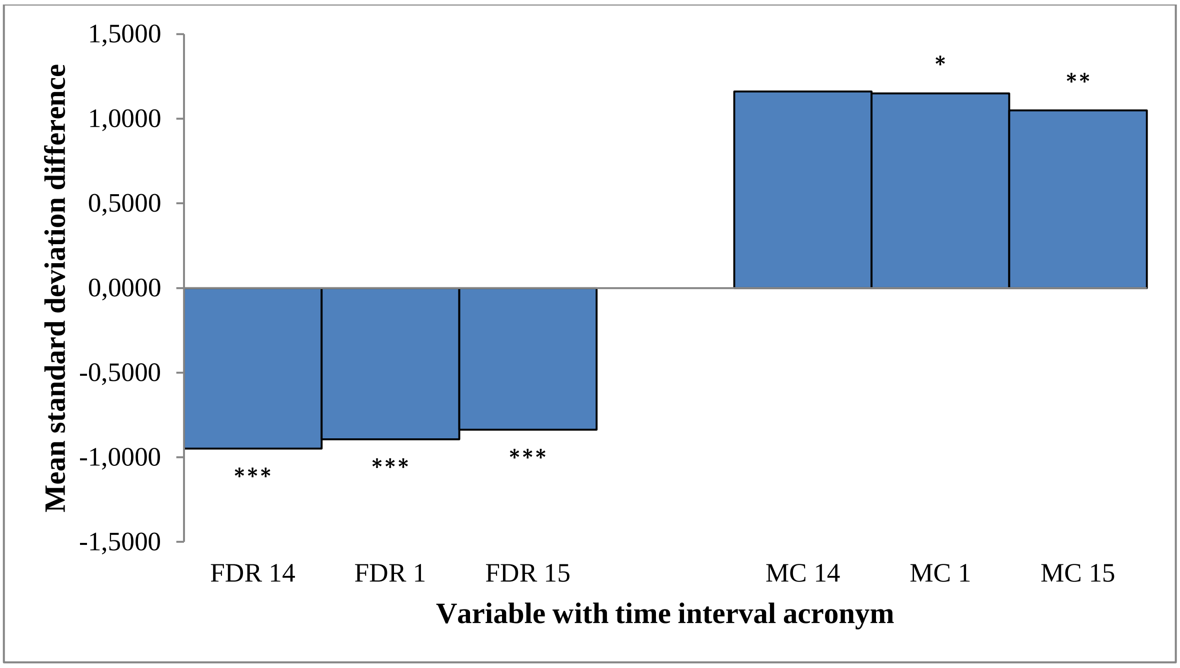
Note: ***.....significant at the 1% level
**.......significant at the 5% level
*.........significant at the10% level

Table 8 shows mean std. dev. difference and t-test results between the best and worst 30% IPOs that: had higher or lower first day return than 15.28%; had market cap greater or smaller than 300 million.

The testing of best and worst 30% units of first day return and market capitalization variables in the major sample show even greater mean standard deviation differences in all observed time periods. For the first day return variable, the greatest negative difference amounts to -0.9481, while the positive difference for the market capitalization variable reaches 1.1611. The mean standard deviation differences of the first day return variable are all negative and all statistically significant at the 1% level. The lowest p-value calculated amounted to 0.0001 for 14 days before the lock-up day, while on the lock-up date, the value is slightly higher, amounting to 0.0002. All these results represent incredibly high statistical significance. These results are all consistent with the alternative hypothesis written above Table 8. While the mean standard deviation difference more than doubled on the lock-up date for the market capitalization variable, the statistical significance dropped from a 5% to a 10% level. The mean standard deviation difference for 15 days after the lock-up date also doubles with a mostly unchanged p-value of 0.0216. Because mean standard deviation differences are positive, the results are not consistent with the alternative hypothesis, but the opposite is true.

For better transparency, see Figure 9, which shows mean standard deviation differences from Table 8.

Figure 9: Mean standard deviation difference between best and worst 30% units of first day return and market capitalization variables in major sample for observed time periods.



Note: ***.....significant at the 1% level
**.......significant at the 5% level
*.........significant at the 10% level

Table 9 shows the mean standard deviation difference and T-test results between best and worst 30% units of each numerical variable already divided into 2 groups, according to the major sample. The null and alternative hypotheses for F-test and T-test are:

F-test: $H_0 : \sigma_{1\ best\ 30\%}^2 = \sigma_{2\ worst\ 30\%}^2$ $H_1 : \sigma_{1\ best\ 30\%}^2 \neq \sigma_{2\ worst\ 30\%}^2$ *(23)*

T-test: $H_0 : \mu_{1\ best\ 30\%} - \mu_{2\ worst\ 30\%} = A_0$ $H_1 : \mu_{1\ best\ 30\%} - \mu_{2\ worst\ 30\%} < A_0$ *(24)*

Table 9: Mean standard deviation difference and T-test results between best and worst 30% units of each variable (first day return and market capitalization) divided into 2 groups in major sample for observed time periods.

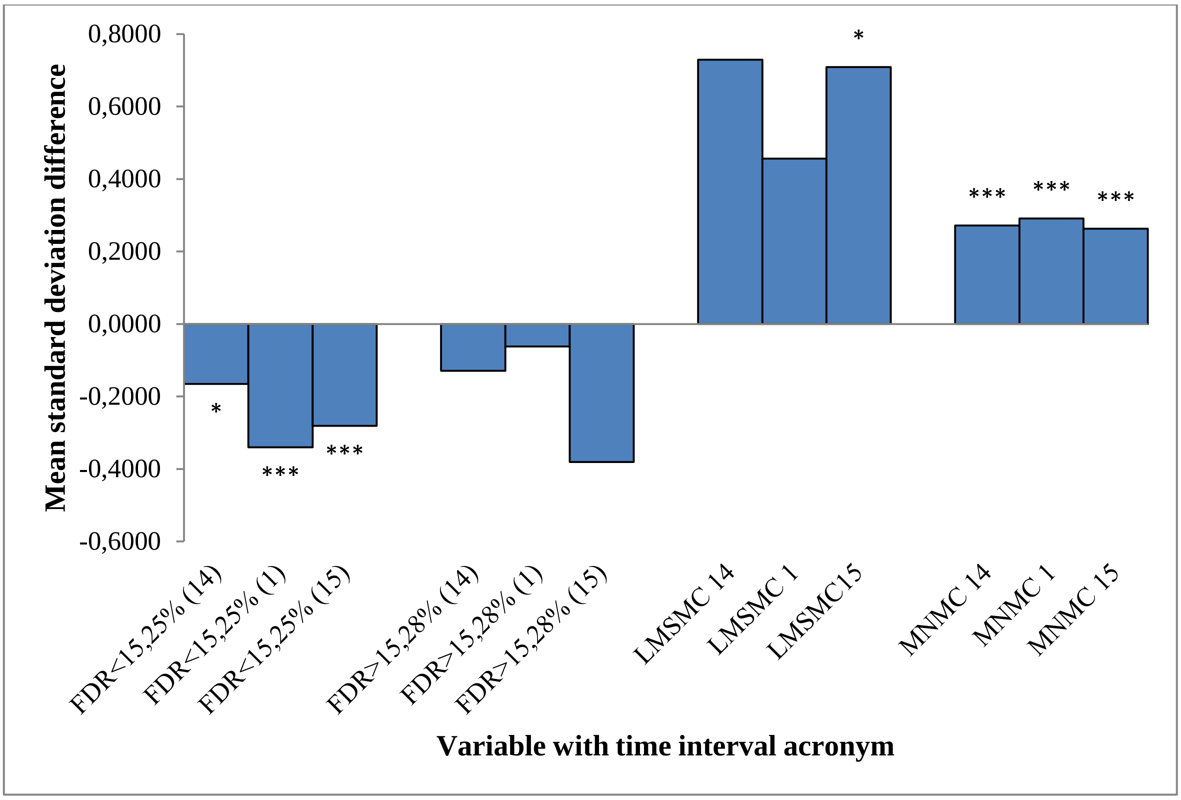
Tested variable	**Number of units observed**	**14 days before lock-up date**		**On lock-up date**		**15 days after lock-up date**	
		Mean std. dev. difference (A_0)	**One-tailed t-test (p-value)**	**Mean std. dev. difference (A_0)**	**One-tailed t-test (p-value)**	**Mean std. dev. difference (A_0)**	**One-tailed t-test (p-value)**
First day return lower than 15,28%	N=100	-0,1653	0,0518*	-0,3402	0,0005***	-0,2809	0,0010***
First day return higher than 15,28%	N=62	-0,1293	0,4182	-0,0623	0,4605	-0,3814	0,1299
Large, mid and small caps	N=30	0,7290	0,2189	0,4565	0,2751	0,7085	0,0760*
Micro and nano caps	N=134	0,2712	0,0077***	0,2909	0,0017***	0,2624	0,0015***

Note: ***.....significant at the 1% level
**.......significant at the 5% level
*.........significant at the10% level

Table 9 shows mean std. dev. difference and t-test results between the best and worst 30% IPOs that: had first day return lower than 15.28%; had first day return higher than 15.28%; had large, mid or small market cap; had micro or nano market cap.

Results from Table 9 show that the best and worst 30% of IPOs, which had a first day return lower than 15.28%, have a statistically significant mean standard deviation difference in all observed time periods. The lowest significance, at the 10% level, is applied to 14 days before the lock-up date, while it improves substantially to a 1% level on the lock-up date and 15 days after the lock-up date. All the mean standard deviation differences are negative, which means that results are consistent with alternative hypothesis written above Table 9. For IPOs which had a first day return higher than 15.28%, the t-test shows no significant results for any time period. Very poor results are also present for large, mid and small caps where I discovered a statistically significant result at the 10% level only for 15 days after the lock-up date. Testing the largest 30% micro caps against the smallest 30% nano caps in the major sample reveals impressive results. I achieved statistically significant results at the 1% level for all three time periods. Here it must be mentioned that all mean standard deviation differences were positive, meaning that the largest 30% micro caps had on average a greater standard deviation than the smallest 30% nano caps. These results are just the opposite of what is written in the alternative hypotheses above Table 9. Figure 10 shows the mean standard deviation results from Table 9.

Figure 10: Mean standard deviation difference between best and worst 30% units of each variable (earnings announcement surprise, first day return and market capitalization) in major sample for observed time periods.



Note: ***.....significant at the 1% level

**.......significant at the 5% level

*.........significant at the 10% level

Table 10 shows the mean standard deviation difference and T-test results for variables tested in the separated sample. The null and alternative hypotheses for the F-test and T-test are:

$$\text{F-test:} \quad H_0 : \sigma_{beat,\,v}^2 = \sigma_{miss,\,v}^2 \qquad H_1: \sigma_{beat,\,v}^2 \neq \sigma_{miss,\,v}^2 \tag{25}$$

$$\text{T-test:} \quad H_0 : \mu_{beat,\,v} - \mu_{miss,\,v} = A_0 \qquad H_1: \mu_{beat,\,v} - \mu_{miss,\,v} < A_0 \tag{26}$$

Where "v" is the chosen variable tested.

Table 10: Mean standard deviation difference and T-test results of earnings announcement surprise, first day return, industry, market capitalization, PEVC backing variables in separated sample for observed time periods.

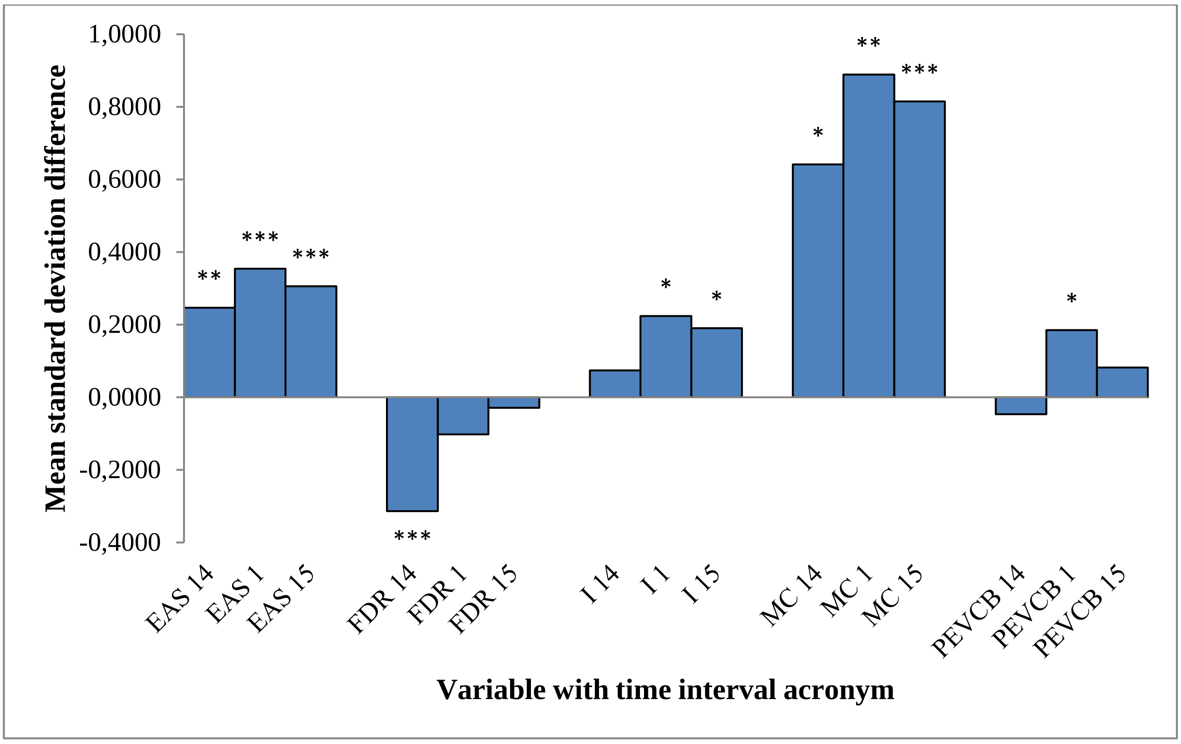
Tested variable	Number of units observed	14 days before lock-up date		On lock-up date		15 days after lock-up date	
		Mean std. dev. difference (A_0)	One-tailed t-test (p-value)	Mean std. dev. difference (A_0)	One-tailed t-test (p-value)	Mean std. dev. difference (A_0)	One-tailed t-test (p-value)
Earnings announcement surprise	N=268	0,2469	0,0120**	0,3573	0,0001***	0,3055	0,0000***
First day return	N=128	-0,3137	0,0079***	-0,1024	0,2638	-0,0292	0,4023
Industry	N=137	0,0742	0,3604	0,2238	0,0896*	0,1901	0,0675*
Market capitalization	N=94	0,6411	0,0763*	0,8888	0,0100**	0,8146	0,0052***
PEVC backing	N=100	-0,0469	0,3585	0,1846	0,0635*	0,0814	0,2241

Note: ***.....significant at the 1% level
**.......significant at the 5% level
*.........significant at the 10% level

Table 10 shows mean std. dev. difference and t-test results between IPOs that beat or missed analysts expectations and: had higher or lower first day return than 15.28%; are non-tech or tech ones; had market cap greater or smaller than 300 million; were non-PEVC or PEVC backed.

The earnings announcement surprise variable shows statistically significant results for all time periods tested. The positive mean standard deviation differences suggest that companies which beat analytically predicted revenues and earnings per share had on average a greater standard deviation than companies that did not live up to the analysts' forecasts. The results for the earnings announcement surprise variable thus tell us that the opposite of what is written in the alternative hypothesis above Table 10 is true. Testing the first day return variable in the separated sample shows statistical significance only for the 14 days before the lock-up date. In this case, the mean standard deviation difference is negative, making the result consistent with the alternative hypothesis. Industry variable results are not consistent with alternative hypothesis and thus suggest that non-technology companies had on average a greater standard deviation than technology companies on the lock-up date and 15 days after. These results are statistically significant at the 10% level. The market capitalization variable shows the same results as in the major sample tests. All mean standard deviation differences are positive and statistically significant, which is in contrast with the alternative hypothesis. The PEVC backing variable returned mixed results, with a positive mean standard deviation difference and statistical significance at the 10% level on the lock-up date. For better transparency of the mean standard deviation differences take a look at Figure 11.

Figure 11: Mean standard deviation difference for earnings announcement surprise, first day return, industry, market capitalization and PEVC backing variables in separated sample for observed time periods.



Note: ***.....significant at the 1% level

**.......significant at the 5% level

*.........significant at the 10% level

Table 11 shows the mean standard deviation difference and T-test results between best and worst 30% units of numerical variables tested in the separated sample. The null and alternative hypotheses for the F-test and T-test are:

F-test: $H_0 : \sigma_{beat,\ best\ 30\%\ of\ v}^2 = \sigma_{miss,\ worst\ 30\%\ of\ v}^2$ $H_1: \sigma_{beat,\ best\ 30\%\ of\ v}^2 \neq \sigma_{miss,\ worst\ 30\%\ of\ v}^2$ *(27)*

T-test: $H_0 : \mu_{beat,\ best\ 30\%\ of\ v} - \mu_{miss,\ worst\ 30\%\ of\ v} = A_0$ $H_1: \mu_{beat,\ beast\ 30\%\ of\ v} - \mu_{miss,\ worst\ 30\%\ of\ v} < A_0$ *(28)*

Where "v" is the chosen variable tested.

Table 11: Mean standard deviation difference and T-test results between best and worst 30% units of earnings announcement surprise, first day return and market capitalization variables in separated sample for observed time frames.

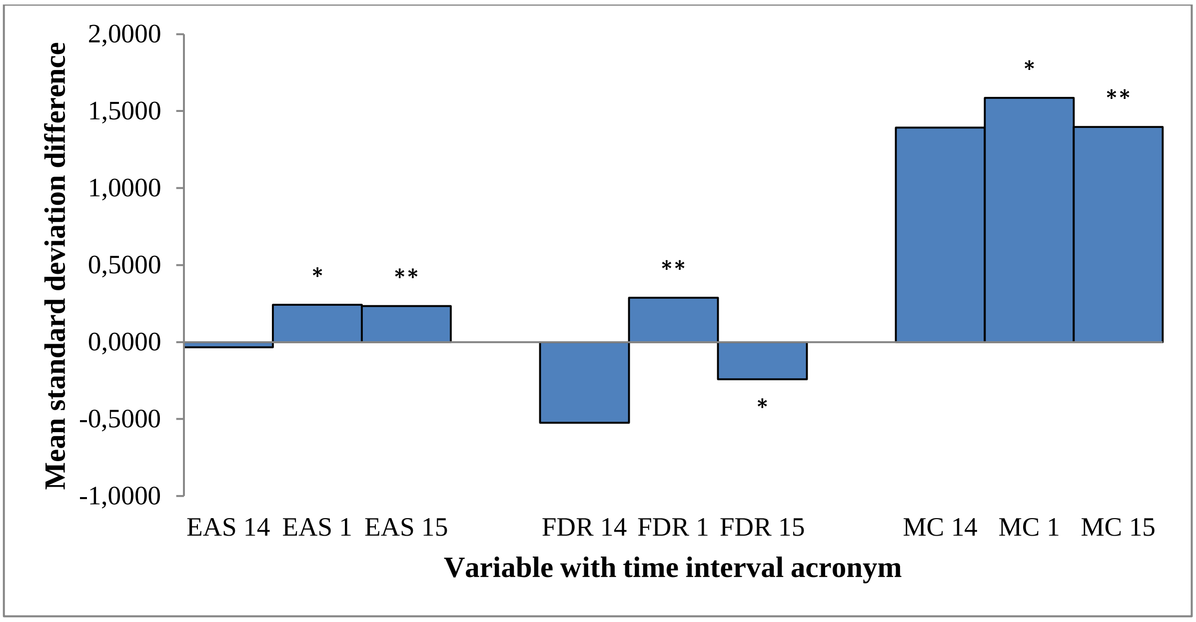
Tested variable	**Number of units observed**	**14 days before lock-up date**		**On lock-up date**		**15 days after lock-up date**	
		Mean std. dev. difference (A_0)	**One-tailed t-test (p-value)**	**Mean std. dev. difference (A_0)**	**One-tailed t-test (p-value)**	**Mean std. dev. difference (A_0)**	**One-tailed t-test (p-value)**
Earnings announcement surprise	N=80	-0,0332	0,4160	0,2418	0,0514*	0,2344	0,0165**
First day return	N=39	-0,5249	0,1401	0,2884	0,0368**	-0,2422	0,0777*
Market capitalization	N=28	1,3924	0,1579	1,5863	0,0713*	1,3978	0,0203**

Note: ***.....significant at the 1% level
**.......significant at the 5% level
*.........significant at the 10% level

Table 11 shows mean std. dev. difference and t-test results between the best and worst 30% IPOs that beat or missed analysts expectations and: had first day return higher or lower than 15.28%; had market cap greater or smaller than 300 million.

Similar results to those in Table 10 are shown in Table 11 for the earnings announcement surprise variable. Statistical significance and the mean standard deviation differences fell during all the observed time periods. The results for the first day return variable on the lock-up date are inconsistent with previous results for the mentioned variable. In this case, statistical significance reached a 5% level for the positive mean standard deviation difference, which is the opposite result to the one predicted by the alternative hypothesis. The mean standard deviation differences for the market capitalization variable increase, while statistical significance drops. Results are also shown in Figure 12.

Figure 12: Mean standard deviation difference between best and worst 30% units of earnings announcement surprise, first day return and market capitalization variables in separated sample for observed time periods.



Note: ***.....significant at the 1% level
**.......significant at the 5% level
*.........significant at the 10% level

Table 12 shows the mean standard deviation difference and the T-test results between the best and worst 30% units of each numerical variable already divided into 2 groups, according to the separated sample. The null and alternative hypotheses for the F-test and T-test are:

F-test: $H_0 : \sigma_{\text{beat, best 30\% of v}}^2 = \sigma_{\text{miss, worst 30\% of v}}^2$ *(29)*

$H_1: \sigma_{\text{beat, best 30\% of v}}^2 \neq \sigma_{\text{miss, worst 30\% of v}}^2$ *(30)*

T-test: $H_0 : \mu_{\text{beat, best 30\% of v}} - \mu_{\text{miss, worst 30\% of v}} = A_0$ *(31)*

$H_1: \mu_{\text{beat, best 30\% of v}} - \mu_{\text{miss, worst 30\% of v}} < A_0$ *(32)*

Where “v” is the chosen variable (first day reeturn, industry, market capitalization or PEVC backing) tested.

Table 12: Mean standard deviation difference and T-test results between best and worst 30% units of each variable (earnings announcement surprise, first day return and market capitalization) in separated sample for observed time frames.

Tested variable	**Number of units observed**	**14 days before lock-up date**		**On lock-up date**		**15 days after lock-up date**	
		Mean std. dev. difference (A_0)	**One-tailed t-test (p-value)**	**Mean std. dev. difference (A_0)**	**One-tailed t-test (p-value)**	**Mean std. dev. difference (A_0)**	**One-tailed t-test (p-value)**
Earnings announcements with positive surprise	N=116	-0,0188	0,4474	0,0629	0,3020	-0,0442	0,3959
Earnings announcements with negative surprise	N=44	-0,2121	0,1043	0,1489	0,2187	0,0719	0,2428
First day return lower than 15,28%	N=66	-0,2192	0,0584*	-0,2493	0,0174**	-0,2322	0,0233**
First day return higher than 15,28%	N=12	-0,4867	0,1453	-0,0302	0,4714	-0,2667	0,1399
Large, mid and small caps	N=20	0,8674	0,2683	0,7157	0,2632	0,8126	0,1307
Micro and nano caps	N=36	0,1513	0,1356	0,0975	0,1927	0,1102	0,1102

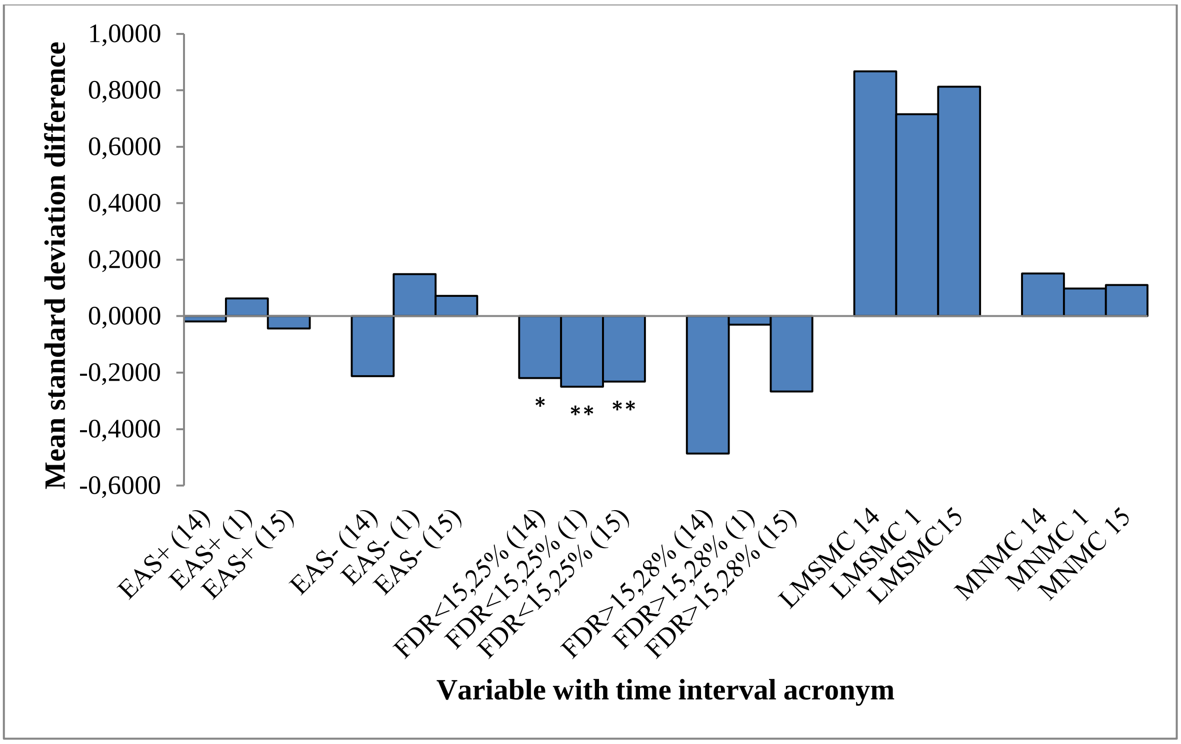
Note: ***.....significant at the 1% level
**.......significant at the 5% level
*.........significant at the 10% level

Table 12 shows mean std. dev. difference and t-test results between the best and worst 30% IPOs that: beat analysts' estimates; missed analysts' estimates; beat analysts' estimates and had first day return lower than 15.28%; missed analysts' estimates and had first day return higher than 15.28%; beat analysts' estimates and had large, mid or small market cap; missed analysts' estimates and had micro or nano market cap.

The results from Table 12 are the worst so far. The earnings announcement surprise and the market capitalization subgroups showed no statistically significant mean standard deviation differences. Statistically significant results were apparent only for the best and worst 30% of companies, receiving a first day return lower than 15.28%. The significance for 14 days before the lock-up date reaches the 10% level while the other two time periods reach the 5% level. In all three time periods, the mean standard deviation difference is negative, which is consistent with the alternative hypothesis which says that the worst 30% of companies which had a first day return lower than 15.28% had on average a higher standard deviation than the best 30% companies, which also had the first day return lower than 15.28%.

For better interpretation of the mean standard deviation differences from Table 12, see Figure 13.

Figure 13: Mean standard deviation difference between best and worst 30% units of each variable (earnings announcement surprise, first day return and market capitalization) in separated sample for observed time frames.



Note: ***.....significant at the 1% level
**.......significant at the 5% level
*.........significant at the 10% level

4.5 Findings and recommendations

4.5.1 Earnings announcement surprise variable

At first, when I tested the earnings surprise variable, the results showed that abnormal returns from companies which surpassed revenues and earnings per share, forecasted by analysts on the latest earnings announcement before the lock-up date, are higher than from companies reporting revenues and earnings per share that are worse than analysts expected. This is in line with my hypothesis for the 30-day interval return, but statistical significance was only at the 10% level. To sharpen the differences I tested the best 30% earnings announcement surprises against the worst 30% earnings announcement surprises. The results in the 30-day interval return stay significant at the 10% level, even if the mean return difference increases. The main discovery according to the earnings surprise variable is that the mean return difference during the 14 days before the lock-up date amounts to 6.13% and is statistically significant at the 1% level, with a p-value of 0.0071. Additional proof was found for earnings announcements with a negative return. I proceeded to contrast the best 30% of companies, which reported worse revenues and earnings per share than analysts were expecting, against the worst 30% of companies, reporting worse than expected revenues and earnings per share than analysts were expecting. Again the results show the mean return difference of 7.43% for 14 days before the lock-up date, with statistical significance at the 5% level. An interesting finding appeared when I tested the best 30% and the worst 30% IPOs which beat the estimates of the analysts. In this case, the results show just the opposite as expected. The mean return difference is negative on the lock-up date and 15 days after the lock-up date, with statistical significance at the 10% level. Although statistical significance is low, the results tell us that the worst 30% IPOs which beat analysts' estimates experienced on average a higher return on the lock-up date and 15 days after the lock-up date than the best 30% IPOs that beat the analysts' estimates. These findings open another question for further research. The researcher could argue that those IPOs that announced much better revenues and earnings per share on the latest earnings announcement before the lock-up date experience lower returns because corporate insiders sell their holding because of large growth in revenues and earnings per share, which is not sustainable in the long run. The overall results for the earnings surprise variable suggest that companies reporting much worse revenues and earnings per share than analysts expected on the latest earnings announcement before the lock-up date, experience lower returns 14 days before the lock-up date and during the 30-day interval than companies which beat the analysts' expectation. Presently, it is clear that the 30-day return is strongly influenced by the 14 day return before the lock-up date, which is also one of the major findings described in this master's thesis. According to these results and existing literature, I can argue that those IPOs that announced better revenues and earnings per share on the latest earnings announcement before the lock-up date experience higher returns because of post earnings announcement drift effect. In their study, Foster, Olsen and Shelvin (1984) pointed out that the 80 percent variation of abnormal cumulative return during the first 60 days after the earnings announcement date can be explained by higher or lower than anticipated earnings. Jegadeesh and Livnat (2006) investigated abnormal returns of companies which reported revenue surprise and found statistically significant abnormal returns during the post-announcement period for companies reporting a substantial revenue surprise. My results suggest that in case of IPOs, better than expected earnings per share and revenues influence the abnormal cumulative returns during the 30-day interval while the greatest impact is found during the 14 days before lock-up date.

According to volatility tests, the earnings announcement surprise variable shows results which are just the opposite of what was hypothesized. Results clearly show that the 15-day standard deviation of the IPO share price, which beat revenues and earnings per share that analysts predicted on the latest earnings announcement before the lock-up date, is on average higher than for those IPOs that reported revenues and earnings per share that were worse than analysts expected. This is true for all the time periods tested, while the highly statistical significance is discovered taking place on the lock-up date and 15 days after the lock-up date.

4.5.2 First day return variable

Tests of the first day return variable, based on the major sample, reveals a statistically significant mean return difference during the 30-day interval suggesting that abnormal returns for those companies, which had a first day return lower than 15.28%, are higher than those for companies, which had a first day return higher than 15.28%. This finding is also in line with findings by Aggrawal, Purnanandam and Wu (2006) who proved that stocks with a high first day return have significantly lower returns around the lock-up date. It is interesting that I did not obtain any statistically significant mean return difference for the other three time periods, which consists of a 30-day interval. Results for the first day return variable suggest that abnormal cumulative return builds up more gradually through the first three time periods. As Aggrawal, Purnanandam and Wu (2006) mentioned in their study, the tie-in agreements are the greatest cause for abnormal cumulative returns. Authors explain that tie-in agreements force customers who participated in IPO to buy additional shares in the secondary market creating artificial excess demand. Such action results in a very high first day return but when approaching lock-up date of IPO, shares tend to underperform.

The results for the first day return variable, based on a separated sample, lowers statistical significance of the mean return difference during the 30-day interval. Surprisingly, statistical significance is shown for the 14 days before the lock-up date. Because the results in the separated sample are based on tests where the earnings announcement surprise variable is applied as a filter before another variable criterion is applicable, I must conclude that this is just a result of the earnings announcement surprise variable described before. According to the mean return differences results I can say that abnormal returns for companies, which had a first day return lower than 15.28%, beating revenues and earnings per share predicted by analysts on the latest earnings announcement before the lock-up date, are not higher than for those companies which had a first day return higher than 15.28%, reporting worse revenues and earnings per share than analysts expected. The earnings announcement surprise and the first day return variable are thus not complementary.

The volatility tests for the first day return variable, which are based on the major sample, show a negative mean standard deviation difference with a statistical significance at the 1% level for all the time periods. This is in line with our hypotheses. Based on that, I can conclude that the volatility of companies, which had a first day return lower than 15.28%, is lower than the volatility of companies, which had a first day return higher than 15.28% during the 14 days before the lock-up date, on the lock-up date, 15 days after the lock-up date and for the 30-day interval. On the other hand, the results from the separated sample are mixed and don not offer any rational conclusion.

4.5.3 Industry variable

The industry variable, which shows results when dealing with technology and non-technology companies, suggests that abnormal returns for the latter are higher on the lock-up date than those for technology companies. These results are based on the major sample data with statistical significance at the 5% level. Based on that result, I can argue that the findings put forth in this thesis confirm Field and Hanka’s (2001) empirical results. Jordan, Bradley, Roten and Yi (2000) attributed the main reason for abnormal return of technology companies to venture capitalists. Authors explain that venture capitalist usually invest in complicated companies which often offer high risk - high reward investment in their pre-IPO stages. Because business model of technology companies corresponds to the venture capitalists criterion, they often appear to be pre-IPO owners of such companies. According to the investment policy, the venture capitalists are usually not long term investors, thus they divest or rebalance their holdings to traditional investors as soon as they can, which is typically at the lock-up date. This procedure creates a selling pressure to the shares which results in lower abnormal returns for technology companies on lock-up dates.

Tests performed on the separated sample data indicate that the mean return difference on the lock-up date almost doubles, however, statistical significance drops to the 10% level. Surprisingly, I found a 9.16% mean return difference on the 30 day interval with a p-value of 0.0127. Because the earnings announcement surprise variable did not show highly statistical results for this time period per se and the industry variable did not indicate any statistical significance during the same time period, I can conclude that these two variables complement each other during the 30-day interval. This represents a new discovery according to the relationship between earnings announcements and initial public offering literature.

The volatility results for the industry variable do not show a clear picture. Tests based on the data from the major sample did not show any statistical results, while there is small statistical significance on the lock-up date and during the 30-day interval for the separated sample. Here, the domination effect of the earnings announcement surprise variable is clearly shown. Based on these results, I can conclude that volatility for non-technology companies is not lower than volatility for technology companies, even if controlled for the earnings announcement surprise variable.

4.5.4 Market capitalization variable

The market capitalization variable proved to be the most significant one throughout all the tests. The results of testing the market capitalization variable on the major sample data were quite mild at first, barely statistically significant 15 days after lock-up date. When the sample was narrowed to the largest and smallest 30% units, the mean return difference more than tripled, reaching 7.13% in 15 days after the lock-up date, with statistical significance at the 1% level. Tests also showed significant results for the 30-day interval with a mean return difference of 9.16%. After that, I tested the largest and smallest 30% units of large, mid and small caps. Highly significant results were obtained for all the time periods, except on the lock-up date. The mean return difference 14 days before the lock-up date is 8.05%, with a p-value of 0.0211, while 15 days after the lock-up date it amounts to 7.56%, supported by a p-value of 0.0020. The largest mean return difference thus belongs to the 30-day interval and amounts to 16.35%, with a p-value of 0.0004, which is quite a good result. Because all the results are in line with the hypotheses presented in this thesis, I can conclude that abnormal returns for large, mid and small-cap companies are higher than those for micro and nano-cap companies. This is true for the 14-days-before-lock-up date, the 15-days-after-lock-up date and the 30-day interval. Brau, Carter, Christophe and Key (2004) argue that the main factor that influences such price performance between large and small cap companies is greater information asymmetry for the latter. Because small cap companies have a greater information asymmetry problem, investors attribute a higher probability of insider selling on the lock-up date than in the case of large cap companies. Insider selling is taken as a bad signal to the market, thus price of shares is under pressure.

Results for the market capitalization variable, based on separated data, are consistent with previous ones. However, the mean return differences are even higher and in general even highly statistically significant. The largest mean difference is 22.06% for a 30-day interval with a p-value of 0.0008. At this point, I can also conclude that abnormal returns for large, mid and small-cap companies, beating revenues and earnings per share that analysts forecast on the latest earnings announcement before the lock-up date, are higher than those for micro and nano-cap companies, reporting revenues and earnings per share that are worse than analysts expected. In this case, this also holds true for the 14-days-before-lock-up date, the 15-days-after-lock-up date, as well as the 30-day interval. According to these results, the earnings announcement surprise variable complements the market capitalization variable.

The volatility analysis for the market capitalization variable shows just the opposite results as hypothesized. Statistically significant results were obtained at the 5% level on the lock-up date and 15 days after the lock-up date. Because the mean standard deviation is positive, I can conclude that the volatility of large, mid and small-cap companies is higher than the volatility of micro and nano-cap companies on the lock-up date and 15 days after the lock-up date. In the case of the separated sample, the mean standard deviation difference even increases with higher significance. This means that the results of volatility analysis are consistent with the previous ones in the major sample. Based on that, I can conclude that the volatility of large, mid and small-cap companies, which surpass revenues and earnings per share projected by analysts on the latest earnings announcement before the lock-up date is higher than the volatility of micro and nano-cap companies that reported revenues and earnings per share, which were worse than analysts expected on the lock-up date and 15 days after the lock-up date.

4. 5.5 PEVC backing variable

Amazingly, the PEVC variable showed the worst results of all. With so many studies done according to the venture capital backing variable, where the majority of researchers found a statistically significant abnormal return in favor of IPOs, which were not venture capital backed, I did not find any statistical significance for any time period tested. This is true for results based on the major sample data, as well as on the separated sample data. Clearly, the results are just the opposite of what was hypothesized in the present thesis, thus I can conclude that abnormal returns for companies which were not backed by a venture capitalist or a private equity are not higher than for those companies that were backed by venture capital or private equity. This is also true in the case of the earnings announcement surprise variable used as a filter.

Here, I can point out that the present study tested IPOs, which were venture or/and private equity backed against those who were not, which is not necessary the case in the studies mentioned before. Perhaps the researchers made use of venture capital backed IPOs, excluding private equity backed ones. Because venture capital is just a subset of private equity, the present study employs both (Mergers & Inquisitions, Private Equity vs. Venture Capital, 2013). It is, however, true that venture capitalists exit from their investment sooner than private equity funds (Accredited Investor Markets, The Difference between Private

Equity and Venture Capital, 2013). I must consider the possibility that because of this, the venture capitalist divests their holding around the lock-up date faster, while private equity sells shares steadier through the years. This may be the reason why the current study was faced with insignificant results, but on the other hand, this market anomaly could start to disappear owing to the growing awareness of venture capitalist actions around the lock-up date.

The PEVC backing variable yields highly significant results from the major sample data. The results are statistically significant in all the time periods tested with the negative mean standard deviation difference. This is in line with my hypothesis, which allows me to conclude that the volatility of companies which, were not backed by a venture capital or private equity, is lower than the volatility of companies that were backed by venture capital or private equity during the 14 days before the lock-up date, on the lock-up date, 15 days after the lock-up date and for the 30-day interval. After controlling for the earnings announcement surprise variable, I did not obtain coherent results.

4.5.6 Recommendation for further studies

According to Foster, Olsen and Shevlin’s (1984) findings, the post earnings announcement drift effect is present 60 days after the earnings announcement date. I could suggest tests between IPOs which had the lock-up date during a 60-day period after the latest earnings announcement date, as well as those IPOs that had the lock-up date set during the last 30 days before another earnings announcement date. In this case, the sample should include only companies that reported better or worse revenues and earnings per share than the analysts forecasted. It would be interesting to see whether the results could support the presence of a post earnings announcement drift in case of IPO lock-up dates.

Another dilemma worth considering is the venture capital or private equity presence in IPOs. In this instance, tests between non-PEVC backed IPOs and IPOs, which were only venture capital backed or just private equity backed, would also be in order. Based on these results, researchers would be able to clarify whether the venture capitalist sells shares sooner and more aggressively than private equity funds.

As a least recommendation I think it would be interesting to test a company`s guidance as another form of variable, which could contribute to the better understanding of underperformance or over performance of IPOs around lock-up dates. Companies, raising guidance on both revenue and earnings per share, should be tested against those which lower it.

CONCLUSION

The master's thesis ascertains that the earnings announcement surprise variable has an influence of returns around the lock-up date. According to the results, this holds true for 14 days before the lock-up date where I found statistical significance at the 1% level. Based on that, I can say that the abnormal returns of the companies which beat revenues and earnings per share forecasted by analysts on the latest earnings announcement before the lock-up date are higher than those for companies reporting revenues and earnings per share that are worse than analysts expected. Such price pattern can be explained by post earnings announcement drift effect. In the studies, Foster, Olsen and Shelvin (1984) and Jegadeesh and Livnat (2006) explain that the majority of variation of abnormal cumulative return during the first 60 days after the earnings announcement date can be explained by higher or lower than anticipated earnings per share and revenues.

The results for the other four explanatory variables are generally in line with previous studies. The first day return, as well as the industry and market capitalization variable test results, confirm statistically significant returns at least during one observed time period. In case of first day return variable, the main cause for abnormal cumulative returns is contributed to tie-in agreements which force customers who participated in IPO to buy additional shares in the secondary market creating artificial excess demand which later results in underperformance of shares (Aggrawal, Purnanandam & Wu, 2006). Jordan, Bradley, Roten and Yi (2000) attributed the main reason for abnormal return of technology companies to venture capitalists that typically divest their holdings to traditional investors at the lock-up date which creates selling pressure. Considering market capitalization variable, Brau, Carter, Christophe and Key (2004) argue that the main factor that influences such price performance between large and small cap companies is greater information asymmetry for the latter. Because of that, investors attribute higher probability of insider selling on the lock-up date than in the case of large cap companies. This is taken as a bad signal to the market and price of shares usually drops. The greatest surprise in this study is the PEVC backing variable, which presented no statistical significance in any observed time period. It is interesting that this variable had the greatest empirical support from previous studies. One might argue that this might be due to the fact that the IPOs tested were venture or/and private equity backed against those who were not, which is not necessary the case in existing studies. According to the results of the separated sample, this research concludes that the earnings announcement surprise variable is complementary with the industry and market capitalization variable where I received a higher mean return difference with improved statistical significance. On the other hand, the results show that the first day return and the PEVC backing variable are not complementary with the earnings announcement surprise variable.

The volatility tests reveal that the results for the earnings announcement surprise variable are just the opposite of what was hypothesized. Results clearly show that the volatility of a company's share price which beat the analysts' forecasted revenues and earnings per share on the latest earnings announcement before the lock-up date is on average higher than for those companies, reporting revenues and earnings per share that are worse than analysts expected. This holds true for all time periods tested while the highly statistical significance is discovered on the lock-up date and 15 days after the lock-up date. All tests for the market capitalization variable show the same picture of volatility as for earnings announcement surprise. The results are statistically significant for all the time periods tested, thus I can say that volatility for large, mid and small-cap companies is higher than volatility for micro and nano-cap companies.

Conversely, the volatility tests of the first day return and the PEVC backing variable show results in line with what was hypothesized. In accordance with the first day return variable tested under the major sample data proves that volatility of those companies, having a first day return lower than 15.28%, is lower than the volatility of companies which had a first day return higher than 15.28%. After controlling for the earnings announcement surprise variable, the results become inconsistent. The same is true for the PEVC backing variable, where I get highly significant results for the major sample data, while in the case of the separated sample, where the earnings announcement surprise variable acts as a first criterion, I am confronted with incoherent results. As was already said for the price performance analysis, it is also true that when it comes to volatility analysis the earnings announcement surprise variable is complementary with the industry and market capitalization variable, while this is not the case with the first day return and PEVC backing variable.

Lastly, I would like to encourage other researchers to proceed with studies concerning lock-up dates, earnings announcements, and volatility patterns. It would be prudent to suggest that the main focus should shift to the relationship between the post earnings announcement drift effect and the lock-up date returns, the disparity between venture capitalists and private equity, as well as the introduction of a new explanatory variable, such as guidance provided by companies before their lock-up date.

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APPENDIXES

KAZALO

UVOD

V večini zasebnih družb in mladih podjetjij vlada lastniška struktura, v kateri prevladujejo začetni investitorji, ki so investirali kapital ob ustanovitvi družbe, ali pa fizične osebe, ki opravljajo tudi funkcijo poslovodstva družbe. Kadar takim družbam začne primanjkovati prostega denarnega toka in obstoječi lastniki niso več pripravljeni dokapitalizirati družbe, lahko slednja izda nove delnice in jih ponudi javnosti. Tak proces je imenovan prva javna prodaja delnic. Proces prve javne prodaje delnic zahteva izbiro investicijske banke, ki bo družbi svetovala in pomagala pri prodaji delnic (Brigham & Daves, 2004). Ko sta ponudba in povpraševanje po delnici vzpostavljena in je končna cena znana, investicijska banka od večjih obstoječih delničarjev in fizičnih oseb, ki posedujejo notranje informacije, zahteva, da podpišejo sporazum, ki preprečuje prodajo delnic pred vnaprej določenim datumom, ki je v praksi 180 dni od prvega dne, ko delnice začnejo kotirati na borzi (Brav & Gompers, 1999).

Akademiki so sprva začeli raziskovati prve javne prodaje delnic na temo podvrednotenja, pozneje pa so se posvetili tudi analiziranju cene delnic po prvi javni prodaji, različnim metodam vrednotenj, razlogom, zakaj se družbe odločajo za javno prodajo delnic, vlogi investicijske banke v procesu ter regulatornim zadevam, pod katere spadajo tudi obdobja zaklenjenih deležev.

Hoque (2011) opredeljuje obdobje zaklenjenih deležev kot prostovoljni sporazum med obstoječimi delničarji družbe, ki bo javnosti prodala delnice, in investicijsko banko, ki sodeluje v procesu prve javne prodaje. S sporazumom se obstoječi delničarji zavežejo, da ne bodo prodali svojih deležev v podjetju do vnaprej določenega datuma. Obdobja, znotraj katerih je prepovedana prodaja delnic obstoječih delničarjev, obstajajo iz več razlogov. Kot glavnega Brav in Gompers (2003) navajata problem moralnega tveganja. Avtorja pojasnjujeta, da obdobja deležev z omejeno razpoložljivostjo obstajajo zato, ker bi v nasprotnem primeru lahko obstoječi delničarji izkoristili nove delničarje in prodali vse svoje delnice takoj naslednji dan. S prepovedjo o prodajanju deležev v določenem časovnem obdobju po prvi javni prodaji s strani obstoječih delničarjev se trgu signalizira zaupanje v nove delnice in s tem reši problem moralnega tveganja, ko začnejo le-te kotirati na borzi.

Namen magistrske naloge je analizirati gibanje cene in volatilnost delnic družb, ki so se odločile za prvo javno prodajo delnic v obdobju, ko poteče sporazum deležev z omejeno razpoložljivostjo. V svoji raziskavi bom s pomočjo različnih spremenljivk poskušal odkriti statistično značilne vplive na donosnost delnic, ko preneha veljati sporazum o prepovedi prodaje deležev z omejeno razpoložljivostjo. Poleg tega bom testiral tudi volatilnost delnic za posamezne skupine družb in tako poskušal ugotoviti, ali se volatilnost med družbami z različnimi karakteristikami razlikuje.

Cilj magistrske naloge je ugotoviti statistično značilne razlike za sledeče spremenljivke:

- Pozitivno ali negativno presenečenje ob objavi kvartalnih rezultatov družb
- Donosnost delnice ob koncu prvega trgovalnega dne
- Dejavnost družbe
- Tržno kapitalizacijo družbe ob prvi javni prodaji
- Podprtost prve javne prodaje s tveganim ali/in zasebnim skladom kapitala

Za vse navedene spremenljivke bom testiral, če je volatilnost večja za tiste družbe, katerih cena delnic je ob koncu poteka obdobja deležev z omejeno razpoložljivostjo utrpela večje padce od drugih.

1 POJASNJEVALNE SPREMENLJIVKE IN RAZISKOVALNE HIPOTEZE

Mnogi raziskovalci so do sedaj z različnimi spremenljivkami poskušali pojasniti padec cene ob poteku deležev z omejeno razpoložljivostjo. V tem poglavju so obravnavane spremenljivke, ki so že v prejšnjih študijah pokazale statistično značilen vpliv na gibanje cene ob poteku deležev z omejeno razpoložljivostjo. Predstavljena pa bo tudi nova spremenljivka, ki jo bom argumentiral z obstoječo strokovno literaturo.

1.1 Pojasnjevalne spremenljivke in raziskovalne hipoteze za analizo gibanja cene ob poteku deležev z omejeno razpoložljivostjo na podlagi osnovnega vzorca

Za analizo gibanja cene, ob poteku deležev z omejeno razpoložljivostjo na podlagi osnovnega vzorca uporabim naslednje štiri spremenljivke:

- Donosnost delnice ob koncu prvega kotirajočega dne
- Dejavnost družbe
- Tržno kapitalizacijo družbe ob prvi javni prodaji
- Podprtost prve javne prodaje s tveganim ali/in zasebnim skladom kapitala

Aggrawal, Purnanandam in Wu (2006) so v svoji študiji empirično dokazali, da so družbe, ki so po prvi javni prodaji delnic kupovale slednje tudi na sekundarnem trgu, ob koncu prvega dne kotacije imele večje donosnosti. Ko so avtorji raziskovali gibanje cene omenjenih družb ob poteku deležev z omejeno razpoložljivostjo, so ugotovili, da imajo delnice takšnih družb manjšo donosnost od drugih. Zanimivi zaključki so se pokazali tudi ob testiranju dolgoročnih donosnosti delnic po prvi javni prodaji. Tukaj sta avtorja prišla do zaključka, da imajo delnice, ki ob prvem dnevu kotacije dosežejo zelo visok donos, slabše donosnosti po šestih mesecih. Glede na to, da večina obdobji deležev z omejeno razpoložljivostjo traja 180 dni po prvi javni prodaji, predstavljajo slednja velik mejnik za vlagatelje (Brav & Gompers, 2003).

Field in Hanka (2001) sta testirala donosnost tehnoloških in netehnoloških družb ob poteku deležev z omejeno razpoložljivostjo in ugotovila, da delnice tehnoloških družb utrpijo večje padce v ceni kot družbe, ki se ukvarjajo s tehnološko dejavnostjo.

Jordan, Bradley, Roten in Yi (2000) so testirali donosnost delnic dva dni pred in po poteku deležev z omejeno razpoložljivostjo in ugotovili, da so družbe z veliko tržno kapitalizacijo imele manjše izgube kot družbe z majhno tržno kapitalizacijo. Ker so bili rezultati statistično značilni, so se strinjali, da ima velikost družbe velik vpliv na donosnost delnic ob poteku deležev z omejeno razpoložljivostjo.

Field in Hanka (2001) sta v svoji študiji testirala tudi družbe, katerih lastniki so bili tvegani ali/in zasebni skladi kapitala pred prvo javno prodajo. Na podlagi dobljenih rezultatov sta zaključila, da so delnice družb, katerih lastniki so bili tvegani ali/in zasebni skladi kapitala, utrpele večje negativne donosnosti ob poteku deležev z omejeno razpoložljivostjo kot delnice družb, ki niso imele omenjenih skladov v lastniški strukturi. Iste rezultate so dobili tudi številni drugi avtorji. Jordan, Bradley, Roten in Yi (2000) so v svoji študiji pojasnili, da ima konec obdobja deležev z omejeno razpoložljivostjo na družbe, ki nimajo v lastniški strukturi skladov tveganega ali/in zasebnega kapitala, majhen vpliv. Brau, Carter, Chirstophe in Key (2004) so testirali pet dnevno kumulativno donosnost delnic ob poteku deležev z omejeno razpoložljivostjo. Analiza je pokazala statistično značilne rezultate, na podlagi katerih so lahko sklepali, da imajo delnice družb, katerih lastniki so bili tvegani ali/in zasebni skladi kapitala, večje negativne donosnosti od drugih.

Hipoteza številka 1: Presežna donosnost delnic družb, ki so imele prvi trgovalni dan donosnost manjšo od 15,28 %, je večja od presežne donosnosti delnic družb, ki so imele prvi trgovalni dan donosnost večjo od 15,28 %. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo ter v celotnem 30-dnevnem intervalu.

Hipoteza številka 2: Presežna donosnost delnic netehnoloških družb je večja od presežne donosnosti delnic tehnoloških družb. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo ter v celotnem 30-dnevnem intervalu.

Hipoteza številka 3: Presežna donosnost delnic velikih, srednjih in malih družb je večja od presežne donosnosti delnic mikro in nano družb. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo ter v celotnem 30-dnevnem intervalu.

Hipoteza številka 4: Presežna donosnost delnic družb, ki v lastniški strukturi nimajo tveganih ali/in zasebnih skladov kapitala, je večja od presežne donosnosti delnic družb, ki v svoji lastniški strukturi imajo tvegane ali/in zasebne sklade kapitala. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo ter v celotnem 30-dnevnem intervalu.

1.2 Pojasnjevalne spremenljivke in raziskovalne hipoteze za analizo gibanja cene ob poteku deležev z omejeno razpoložljivostjo na podlagi ločenega vzorca

V tem podpoglavju predstavljam pozitivno ali negativno presenečenje pri objavi kvartalnih rezultatov družb kot novo spremenljivko. To pomeni, da bo osnovni vzorec sedaj ločen na dve skupini. Prva skupina bo vsebovala družbe, ki so presegle pričakovanja analitikov v smislu prihodkov in čistega dobička na delnico, medtem ko bo druga skupina vsebovala družbe, ki so objavile prihodke in čisti dobiček na delnico pod pričakovanji analitikov.

Damodaran (2012) pojasnjuje, da se pozitivna/negativna presenečenja pri objavi rezultatov družbe posledično odrazijo v pozitivni/negativni reakciji cene delnice na trgu. Gosh, Gu and Jain (2005) so v svoji študiji odkrili, da je kvaliteta čistega dobička družbe višja, če je bil slednji dosežen s povečanimi prihodki. Avtorji pojasnjujejo, da imajo družbe, ki povečajo čisti dobiček in hkrati tudi prihodke, večjo verjetnost, da bodo tudi v prihodnje dosegale zavidljive stopnje rasti čistega dobička. V primeru, da družbe dosežejo povečanje čistega dobička zaradi stroškovnih rezov, je kakovost slednjega nižja, ker je manipulacija stroškov lažje izvedljiva kot manipulacija prihodkov družbe. Ertimur, Livnat in Martikainen (2003) so raziskovali, ali investitorji bolj cenijo povečanje prihodkov ali zmanjšanje stroškov v hitro rastočih družbah in družbah s povečano notranjo vrednostjo. Rezultati analize so pokazali, da imajo investitorji v primeru hitro rastočih družb raje povečanje prihodkov kot zmanjšanje stroškov, kar pa ne drži za družbe s povečano notranjo vrednostjo. Pri slednjih so rezultati pokazali ravno obratno. Foster, Olsen in Shelvin (1984) so eni izmed mnogih raziskovalcev, ki so proučevali kumulativno donosnost delnic po objavi rezultatov. Rezultati študije kažejo, da je 80 odstotkov variance v kumulativni donosnosti v prvih 60 dneh po objavi rezultatov pojasnjenih z večjim ali manjšim čistim dobičkom družbe od pričakovanj analitikov. Jegadeesh in Livnat (2006) sta namesto čistega dobička proučevala prihodke družbe in prišla do istega spoznanja.

Na podlagi zgoraj navedenih ugotovitev lahko sklepam, da bodo delnice družb, ki so pred potekom deležev z omejeno razpoložljivostjo objavile višje prihodke in čisti dobiček na delnico od pričakovanj analitikov, imele ob poteku deležev z omejeno razpoložljivostjo manjši prodajni pritisk od tistih, ki so objavile slabše prihodke in čisti dobiček na delnico od pričakovanj analitikov.

V tem podpoglavju ne bo testirana samo nova spremenljivka, ampak bodo hkrati dodane tudi ostale štiri spremenljivke, omenjene v prejšnjem podpoglavju. V primeru dodajanja ostalih spremenljivk moram poudariti, da bo dodana le ena hkrati, saj bo tako mogoče videti, ali je katera komplementarna s pozitivnim ali negativnim presenečenjem pri objavi kvartalnih rezultatov.

Hipoteza številka 1: Presežna donosnost delnic družb, ki so presegle pričakovanja analitikov v smislu prihodkov in čistega dobička na delnico, je večja kot donosnost delnic družb, ki so objavila prihodke in čisti dobiček na delnico pod pričakovanji analitikov. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo ter v celotnem 30-dnevnem intervalu.

Hipoteza številka 2: Presežna donosnost delnic družb, ki so imele prvi trgovalni dan donosnost manjšo od 15,28 % in so hkrati presegle pričakovanja analitikov v smislu prihodkov in čistega dobička na delnico, je večja kot donosnost delnic družb, ki so imele prvi trgovalni dan donosnost večjo od 15,28 % ter so hkrati objavile prihodke in čisti dobiček na delnico pod pričakovanji analitikov. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo ter v celotnem 30-dnevnem intervalu.

Hipoteza številka 3: Presežna donosnost delnic netehnoloških družb, ki so hkrati presegle pričakovanja analitikov v smislu prihodkov in čistega dobička na delnico, je večja kot donosnost delnic tehnoloških družb, ki so hkrati objavile prihodke in čisti dobiček na delnico pod pričakovanji analitikov. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo ter v celotnem 30-dnevnem intervalu.

Hipoteza številka 4: Presežna donosnost delnic velikih, srednjih in malih družb, ki so hkrati presegle pričakovanja analitikov v smislu prihodkov in čistega dobička na delnico, je večja kot donosnost delnic mikro in nano družb, ki so hkrati objavile prihodke in čisti dobiček na delnico pod pričakovanji analitikov. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo ter v celotnem 30-dnevnem intervalu.

Hipoteza številka 5: Presežna donosnost delnic družb, ki v lastniški strukturi nimajo tveganih ali/in zasebnih skladov kapitala in so hkrati presegle pričakovanja analitikov v smislu prihodkov in čistega dobička na delnico, je večja kot donosnost delnic družb, ki v svoji lastniški strukturi imajo tvegane ali/in zasebne slklde kapitala in so hkrati objavile prihodke in čisti dobiček na delnico pod pričakovanji analitikov. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo ter v celotnem 30-dnevnem intervalu.

1.3 Pojasnjevalne spremenljivke in raziskovalne hipoteze za analizo volatilnosti ob poteku deležev z omejeno razpoložljivostjo

Do sedaj sem našel samo en strokovni članek, v katerem je Novak (2004) preučeval donosnost delnic po prvi javni prodaji in njihovo volatilnost. Avtor pojasnjuje, da imajo delnice z večjimi negativnimi presežnimi donosnostmi tudi večjo volatilnost. To je v skladu s spoznanji Cheung in Ng (1992), ki pravita, da obstaja obratno sorazmerna povezava med ceno delnice in njeno volatilnostjo. Akademiki pojasnjujejo, da se to zgodi zaradi tako imenovanega "učinka vzvoda". Figlewski in Wang (2000) razlagata, da se padec v vrednosti cene delnic odraža kot zmanjšanje kapitala v primerjavi s tržno vrednostjo dolga družbe, zaradi česar se poveča kazalec zadolženosti, ki vpliva na večjo volatilnost delnice.

V tem podpoglavju je vsaka hipoteza iz prejšnjih podpoglavji testirana za volatilnost. Izpustil bom le časovni interval, ki zajema 30-dnevno časovno obdobje. Za merjenje volatilnosti bom uporabil standardni odklon cene delnice. Standardni odklon je na področju financ zelo uporaben statistični kazalec in je pogosto uporabljen kot mera za volatilnost (Goldstein & Taleb, 2007).

Hipoteza številka 1: Volatilnost delnic družb, ki so imele prvi trgovalni dan donosnost manjšo od 15,28 %, je manjša od volatilnosti delnic družb, so imele prvi trgovalni dan donosnost večjo od 15,28 %. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo.

Hipoteza številka 2: Volatilnost delnic netehnoloških družb je manjša od volatilnosti delnic tehnoloških družb. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo.

Hipoteza številka 3: Volatilnost delnic velikih, srednjih in malih družb je manjša od volatilnosti delnic mikro in nano družb. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo.

Hipoteza številka 4: Volatilnost delnic družb, ki v lastniški strukturi nimajo tveganih ali/in zasebnih skladov kapitala, je manjša od volatilnosti delnic družb, ki v svoji lastniški strukturi imajo tvegane ali/in zasebne sklade kapitala. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo.

Hipoteza številka 5: Volatilnost delnic družb, ki so presegle pričakovanja analitikov v smislu prihodkov in čistega dobička na delnico, je manjša od volatilnosti družb, ki so objavile prihodke in čisti dobiček na delnico pod pričakovanji analitikov. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo.

H Hipoteza številka 6: Volatilnost delnic družb, ki so imele prvi trgovalni dan donosnost manjšo od 15,28 % in so hkrati presegle pričakovanja analitikov v smislu prihodkov in čistega dobička na delnico, je manjša od volatilnosti delnic družb, ki so imele prvi trgovalni dan donosnost večjo od 15,28 % in so hkrati objavile prihodke in čisti dobiček na delnico pod pričakovanji analitikov. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo.

Hipoteza številka 7: Volatilnost delnic netehnoloških družb, ki so hkrati presegle pričakovanja analitikov v smislu prihodkov in čistega dobička na delnico, je manjša od volatilnosti delnic tehnoloških družb, ki so hkrati objavile prihodke in čisti dobiček na delnico pod pričakovanji analitikov. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo.

Hipoteza številka 8: Volatilnost delnic velikih, srednjih in malih družb, ki so hkrati presegle pričakovanja analitikov v smislu prihodkov in čistega dobička na delnico, je manjša od volatilnosti delnic mikro in nano družb, ki so hkrati objavile prihodke in čisti dobiček na delnico pod pričakovanji analitikov. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo.

H ipoteza številka 9: Volatilnost delnic družb, ki v lastniški strukturi nimajo tveganih ali/in zasebnih skladov kapitala in so hkrati presegle pričakovanja analitikov v smislu prihodkov in čistega dobička na delnico, je manjša od volatilnosti delnic družb, ki v svoji lastniški strukturi imajo tvegane ali/in zasebne sklade kapitala in so hkrati objavile prihodke in čisti dobiček na delnico pod pričakovanji analitikov. Hipoteza je testirana 14 dni pred, na dan in 15 dni po poteku deležev z omejeno razpoložljivostjo.

2 ZBIRANJE PODATKOV IN METODOLOGIJA DELA

2.1 Zbiranje podatkov

Primarni vir podatkov za mojo magistrsko nalogo je bil Bloomberg Professional service (Bloomberg Professional service, 2013). Vzorec opazovanih enot zajema prve javne prodaje delnic v Združenih državah Amerike od 1. 1. 2000 pa do 31. 12. 2012. Iz osnovnega vzorca sem sprva izključil prednostne delnice, nepremičninske in zaprte sklade kapitala. Nato sem izločil tiste prve javne prodaje delnic, ki so v zadnjem kvartalu pred potekom deležev z omejeno razpoložljivostjo objavile prihodke in čisti dobiček na delnico v skladu s pričakovanji analitikov, in tiste, ki so pozitivno ali negativno presenetile bodisi le s prihodki ali le s čistim dobičkom na delnico. Po omenjenem postopku sem dobil osnovni vzorec 268 opazovanih enot. Za slednje sem uporabil Bloomberg Professional service za zbiranje informacij o obdobjih deležev z omejeno razpoložljivostjo, industriji, v kateri družbe poslujejo, ponujeni ceni ob prvi javni prodaji, donosnosti v prvem trgovalnem dnevu in predhodni lastniški strukturi. Cene delnic sem pridobil iz Thomson

Reuters DataStream (Thomson Retuters DataStream, 2013), medtem ko sem vrednosti za volatilnost delnic izračunal s pomočjo ProRealTime.com (ProRealTime, 2013).

2.2 Metodologija dela

Za izračunavanje pozitivnih in negativnih presenečenj pri objavi prihodkov in čistih dobičkov na delnico sem uporabil enačbo s stopnjo rasti z osnovo (Arh, 2006):

$$S_{t/0} = 100 \times \frac{Y_t - Y_0}{Y_0} \tag{1}$$

Kjer $S_{t/0}$ predstavlja procentualno izraženo presenečenje ob objavljenih prihodkih in čistih dobičkih na delnico. Y_t so dejanski objavljeni prihodki ali čisti dobički na delnico, medtem ko Y_o predstavlja napovedi analitikov.

Kumulativne donosnosti delnic v proučevanih obdobjih so prilagojene donosnosti ameriškega delniškega indeksa S&P 500 in so izračunane po naslednji enačbi (Yip, Su & Ang, 2009):

$$CAR_{it} = \sum_{l=1}^{t} [R_{il} - R_{ml}] \tag{2}$$

Kjer je R_{il} dnevna donosnost delnice i, v dnevu l, R_{ml} pa dnevna donosnost delniškega indeksa v dnevu l. CAR_{it} tako predstavlja tržno prilagojeno, kumulativno donosnost delnice i od dne 1 do dne t.

Za mero volatilnosti sem uporabil 15-dnevni povprečni standardni odklon od zaključne cene delnice opazovanega trgovalnega dne. Vrednosti standardnega odklona cen delnic sem pridobil iz ProRealTime.com (ProRealTime, 2013).

Za analizo vzorca sem uporabil Studentov t-test za neodvisna vzorca. Izbral sem ga zato, ker moram ugotoviti, ali sta aritmetični sredini dveh vzorcev različni ali enaki. Preden sem apliciral postopek t-testa, sem uporabil F-test, ki nam pove, ali sta varianci dveh vzorcev enaki ali različni. V spodnji enačbi je prikazan Bartlerrov F-test, ki sem ga uporabil za izračune (Košmelj & Rovan, 2006):

$$F = \frac{S_1^2}{S_2^2} \tag{3}$$

Kjer je F, vrednost F-testa, S_1^2 varianca prve skupine in S_2^2 varianca druge skupine.

Po tem, ko sem z izračunom F-testa ugotovil, ali sta varianci enaki ali različni, sem apliciral še enačbo Studentovega t-testa za neodvisna vzorca (Košmelj & Rovan, 2006):

$$t = \frac{(\overline{Y_1} - \overline{Y_2}) - (\mu_1 - \mu_2)}{se_{(\overline{Y_1} - \overline{Y_2})}} \qquad (4)$$

Kjer je t, vrednost t-testa, $\overline{Y_1}$ vrednost aritmetične sredine za prvo supino in $\overline{Y_2}$ vrednost aritmetične sredine za drugo skupino. $Se_{(\overline{Y_1} - \overline{Y_2})}$ predstavlja oceno standardne napake dveh aritmetičnih sredin.

Omenjene statistične postopke sem uporabil za izračun presežne donosnosti in volatilnosti. Izračunal sem povprečno vrednost vsake skupne in vrednosti testiral, da bi dobil statistično značilne rezultate. V primeru presežne donosnosti sem postopek uporabil 14 dni pred, na dan in 15 dni po koncu obdobja deležev z omejeno razpoložljivostjo ter v celotnem 30-dnevnem obdobju, medtem ko sem pri izračunih volatilnosti zadnjega izpustil.

3 REZULTATI EMPIRIČNE RAZISKAVE

3.1 Pozitivno ali negativno presenečenje pri objavi rezultatov

Ko sem sprva testiral podatke o pozitivnem ali negativnem presenečenju pri objavi rezultatov, sem dobil statistično značilno razliko v presežni donosnosti v 30-dnevnem časovnem obdobju. Ker je bil slednji statistično značilen le pri α=0,1 sem se osredotočil na test, ki je zajemal 30 % najboljših in 30 % najslabših enot v vzorcu. Glavna ugotovitev se je pokazala 14 dni pred potekom deležev z omejeno razpoložljivostjo, kjer je razlika v povprečni presežni donosnosti znašala 6,13 % in je bila statistično značilna pri p=0,0071, kar predstavlja visoko statistično značilnost. Razlika v presežni donosnosti v 30-dnevnem časovnem obdobju se je sicer povečala, vendar je statistična značilnost ostala nespremenjena. Naslednjo novo ugotovitev sem dobil, ko sem testiral najboljših 30 % družb, ki so objavila slabše rezultate od pričakovanj, proti najslabšim 30 % družb, ki so objavila slabše rezultate od pričakovanj. Podobno kot pri prejšnjih testih se je tudi tukaj pokazala razlika v presežni donosnosti v višini 7,43 %, ki je bila statistično značilna pri α=0,05. Dobljeni rezultati veljajo za obdobje 14 dni pred deležev z omejeno razpoložljivostjo. V splošnem lahko na podlagi dobljenih rezultatov sklepam, da imajo družbe, ki presežejo pričakovanja analitikov v prihodkih in čistih dobičkih na delnico, v povprečju večjo presežno donosnost kot družbe, ki objavijo prihodke in čisti dobiček na delnico slabše od pričakovanj analitikov. To še posebej drži za obdobje 14 dni pred potekom deležev z omejeno razpoložljivostjo in skozi 30-dnevno časovno obdobje. Glede na dobljene rezultate in na podlagi obstoječe literature lahko sklepam, da so takšni komulativni, presežni donosi posledica "učinka boljših ali slabših poslovnih rezultatov od pričakovanj". Foster, Olsen in Shelvin (1984) so preučevali presežne kumulativne donose delnic po objavi boljših ali slabših poslovnih rezultatov od pričakovanj in ugotovili, da je 80 odstotkov variabilnosti cene v prvih 60 dneh po objavi rezultatov pojasnjene z večjim ali manjšim presenečenjem v objavljenemu čistem dobičku na delnico. Jegadeesh in Livnat (2006) sta prav tako preučevala presežne donose delnic družb, ki so objavile boljše ali slabše poslovne rezultate od pričakovanj, le da sta se osredotočila na prihodke. Rezultati študije so pokazali, da so imele delnice družb, ki so objavile znatno večje prihodke od pričakovanj, večje presežne donose po objavi poslovnih rezultatov. Rezultati moje magistrske naloge so pokazali, da v primeru prve javne prodaje delnic družbe ki objavijo boljše prihodke in čiste dobičke na delnico od pričakovanj, dosegajo presežne, komulativne donose tekom celotnega 30-dnevnega opazovanega obdobja, predvsem pa so ti značilni 14 dni pred potekom deležev z omejeno razpoložljivostjo.

Glede na rezultate testov volatilnosti lahko ugotovim, da so v popolnem nasprotju s tem, kar sem domneval sprva. Vsi rezultati so statistično značilni, tako da lahko sklepam, da je volatilnost družb, ki so objavile boljše prihodke in čisti dobiček na delnico, kot je bilo pričakovano, v povprečju višja kot volatilnost družb, ki so objavile podatke slabše od pričakovanj analitikov.

3.2 Donosnost delnice ob koncu prvega trgovalnega dne

Rezultati omenjene spremenljivke na podlagi osnovnega vzorca nakazujejo, da delnice družb, ki so imele prvi dan donosnost manjšo od 15,28 %, v povprečju dosegajo višjo presežno donosnost kot delnice družb, ki so prvi trgovalni dan zaključile nad 15,28 %. Omenjena trditev velja za 30-dnevni časovni interval. Dobljen rezultat je v skladu z rezultati predhodne študije, ki so jo naredili Aggrawal, Punanandam in Wu (2006) inodkrili, da imajo delnice z visoko donosnostjo na prvi trgovalni dan manjše donose ob poteku deležev z omejeno razpoložljivostjo od drugih. Rezultati na podlagi ločenega vzorca se odražajo v nižji statistični značilnosti in nižji razliki v povprečni presežni donosnosti, zato lahko sklepam, da se spremenljivki o pozitivnem ali negativnem presenečenju ob objavi rezultatov in o donosnosti delnice ob koncu prvega trgovalnega ne dopolnjujeta. Na takšne rezultate omenjene spremenljivke vpliva predvsem sporazum med investitorji in investicijsko banko, ki je sodelovala pri prvi javni prodaji delnic, s katerim se investitorji zavezujejo, da bodo določen delež delnic kupili tudi po prvi javni prodaji na borzi (Aggrawal, Purnanandam & Wu, 2006). Z nakupom delnic na borzi, investitorji ustvarijo umetno presežno povpraševanje, kar povzroči rast cene delnic. Avtorji na podlagi svoje študije pojasnjujejo, da delnice takšnih prvih javni prodaj dosegajo podpovprečne donose v času poteka deležev z omejeno razpoložljivostjo.

Analiza volatilnosti je za omenjeno spremenljivko pokazala statistično značilno razliko v standardnih odklonih, ki je negativna in je v skladu s hipotezo. Torej lahko sklepam, da je volatilnost delnic družb, ki so imele na prvi trgovalni dan donosnost manjšo od 15,28 %, v povprečju manjša od volatilnosti delnic družb, ki so imele donosnost večjo od 15,28 %. Navedena trditev velja za osnovni vzorec za vse tri časovne intervale. Rezultati na podlagi ločenega vzorca so se izkazali za mešane in brez statistične značilnosti, tako da ni mogoče podati racionalnega zaključka.

3.3 Dejavnost družbe

Rezultati osnovnega vzorca so pokazali, da ima dejavnost družbe statistično značilen pomen pri presežni donosnosti na dan, ko poteče obdobje deležev z omejeno razpoložljivostjo. Torej imajo delnice družb, ki ne poslujejo v tehnološkem sektorju, v povprečju višje presežne donose kot tehnološke družbe. Dobljeni rezultati so v skladu s tistimi, ki sta jih v svoji študiji pridobila Field in Hanka (2001). Novo ugotovitev sem pridobil na podlagi ločenega vzorca, kjer je razlika v presežni donosnosti med netehnološkimi in tehnološkimi družbami, v 30-dnevnem časovnem obdobju v povprečju znašala kar 9,16 %. Omenjeno razliko v presežni donosnosti podpira podatek o statistični značilnosti, p=0,0127. Ker spremenljivka o pozitivnem ali negativnem presenečenju pri objavi rezultatov ni pokazala visoko statistično značilnih donosov v tem obdobju, lahko sklepam, da sta omenjeni spremenljivki komplementarni. Glavni razlog za doseganje različnih donosnosti med tehnološkimi družbami in družbami, ki ne poslujejo v tehnološkem sektorju, so Jordan, Bradly, Roten in Yi (2000) pripisali skladom tveganega kapitala. Avtorji pojasnjujejo, da tvegani skladi kapitala najpogosteje vlagajo v novo ustanovljene družbe, ki imajo velik potencial, a tudi veliko tveganje zaradi vprašljivega poslovnega modela. Ker poslovni model večine mladih tehnoloških družb ustreza profilu investicije, v katero so pripravljeni skladi tveganega kapitala investirati, je participacija slednjih v tehnološkem sektorju zelo visoka. Strategija upravljanja naložb tveganih skladov kapitala ni dolgoročna, saj le-ti največkrat prodajo svoje lastniške deleže na borzi, po tem ko je bila izvedena prva javna prodaja delnic. Omenjena strategija tako ustvari prodajni pritisk na ceno delnice ob poteku deležev z omejeno razpoložljivostjo.

Volatilnost med netehnološkimi in tehnološkimi družbami ni dosegla dovolj visoke statistične značilnosti v nobenem preučevanem časovnem intervalu, zato lahko trdim, da volatilnost netehnoloških družb v povprečju ni manjša od volatilnosti tehnoloških družb.

3.4 Tržna kapitalizacija družbe ob prvi javni prodaji

Tržna kapitalizacija družbe ob prvi javni prodaji se je izkazala za spremenljivko, ki je dosegla največjo razliko v presežni donosnosti in hkrati tudi največjo statistično značilnost. Testiranje na podlagi osnovnega vzorca je sprva pokazalo le šibko statistično značilnost. Ko sem vzorec zmanjšal na 30 % največjih in 30 % najmanjših družb, je bila statistična značilnost pod α=0,001. Statistično značilni razliki sta se izkazali za 15-dnevni časovni interval po koncu deležev z omejeno razpoložljivostjo ter za celotni 30-dnevni časovni interval. Pri prvem je razlika v presežni donosnosti znašala 7,13 %, medtem ko je bila pri drugem še višja, 9,16 %. Visoko statistično značilne razlike so se pokazale tudi pri testu 30 % največjih in 30 % najmanjših družb med velikimi, srednjimi in malimi družbami. Na podlagi dobljenih rezultatov lahko zaključim, da imajo delnice velikih, srednjih in malih družb v povprečju večjo presežno donosnost od delnic mikro in nano družb. To drži za vsa preučevana časovna obdobja, razen na dan poteka deležev z omejeno razpoložljivostjo.

Rezultati ločenega vzorca so v skladu z osnovnim vzorcem, le da so razlike med presežno povprečno presežno donosnostjo še večje s še višjo statistično značilnostjo. Glede na rezultate lahko trdim, da sta spremenljivki tržna kapitalizacija in presenečenje pri objavi rezultatov komplementarni spremenljivki. Ker so rezultati v skladu s hipotezo, lahko trdim, da je presežna donosnost delnic velikih, srednjih in malih družb, ki so hkrati presegle pričakovanja analitikov v smislu prihodkov in čistega dobička na delnico, v povprečju večja od donosnosti delnic mikro in nano družb, ki so hkrati objavile prihodke in čisti dobiček na delnico pod pričakovanji analitikov. Kot glavni razlog za takšno razliko v komulativni, presežni donosnosti med velikimi in majhnimi družbami so Brau, Carter, Christophe in Key (2004) označili večjo asimetričnost informacij za slednje. Ker imajo manjše družbe večjo asimetrijo informaciji, investitorji pripisujejo večjo možnost, da bodo fizične osebe, ki opravljajo funkcijo poslovodstva, prodale svoje delnice ob poteku deležev z omejeno razpoložljivostjo. Ker je tak signal za trge običajno negativen, se delnice znajdejo pod prodajnim pritiskom.

Analiza volatilnosti v primeru preučevane spremenljivke postreže s popolnoma različnimi rezultati, kot je zapisano v hipotezah. Ker so slednji tudi statistično značilni na dan, ko se preneha obdobje zaklenjenih deležev in 15 dni po njem, lahko za slednja zaključim, da je volatilnost delnic velikih, srednjih in malih družb v povprečju večja od volatilnosti delnic mikro in nano družb. Rezultati za ločen vzorec so isti, zato lahko sklepam, da je volatilnost delnic velikih, srednjih in malih družb, ki so hkrati presegle pričakovanja analitikov v smislu prihodkov in čistega dobička na delnico, v povprečju večja kot volatilnost delnic mikro in nano družb, ki so hkrati objavile prihodke in čisti dobiček na delnico pod pričakovanji analitikov.

3.5 Tvegani ali/in zasebni skladi kapitala v lastniški strukturi

Kljub temu da je v svojih študijah za omenjeno spremenljivko statistično značilne rezultate pridobilo zelo veliko akademikov, se je v mojem primeru izkazala za eno najslabših spremenljivk. V analizi na podlagi osnovnega in ločenega vzorca nisem pridobil nobene statistično značilne razlike v povprečni presežni donosnosti v nobenem proučevanem časovnem intervalu. Na podlagi rezultatov lahko zavrnem hipotezo, kar pomeni, da presežna donosnost delnic družb, ki v lastniški strukturi nimajo tveganih ali/in zasebnih skladov kapitala, v povprečju ni večja od presežne donosnosti delnic družb, ki v svoji lastniški strukturi imajo tvegane ali/in zasebne sklade kapitala.

V nasprotju z rezultati presežnih donosov se volatilnost izkaže za statistično značilno na podlagi osnovnega vzorca. Ker so rezultati v skladu s hipotezo in so statistično značilni v vseh preučevanih obdobjih, lahko trdim, da je volatilnost delnic družb, ki v lastniški strukturi nimajo tveganih ali/in zasebnih skladov kapitala, v povprečju manjša od volatilnosti delnic družb, ki v svoji lastniški strukturi imajo tvegane ali/in zasebne sklade kapitala. V primeru ločenega vzorca sem dobil nejasne rezultate, na podlagi katerih ne morem podati racionalnega zaključka.

SKLEP

V svoji magistrski nalogi sem odkril, da ima pozitivno ali negativno presenečenje pri objavi rezultatov statistično značilen vpliv na donose 14 dni pred potekom deležev z omejeno razpoložljivostjo, pri α=0,001. Na podlagi dobljenih rezultatov lahko sklepam, da je povprečna presežna donosnost delnic družb, ki so presegle pričakovanja analitikov v smislu prihodkov in čistega dobička na delnico, večja od donosnosti delnic družb, ki so objavile prihodke in čisti dobiček na delnico pod pričakovanji analitikov. Dobljeni komulativni, presežni donosi so posledica "učinka boljših ali slabših poslovnih rezultatov od pričakovanj", ki pojasni 80 odstotkov variabilnosti cene v prvih 60 dneh po objavi rezultatov za družbe, ki so objavile večje ali manjše presenečenje v čistem dobičku na delnico in v prihodkih (Foster, Olsen & Shelvin, 1984; Jegadeesh & Livnat, 2006).

Rezultati analize za ostale spremenljivke so v splošnem v skladu z ostalimi empiričnimi raziskavami. Rezultati donosnosti prvega trgovalnega dne, dejavnosti in tržne kapitalizacije razkrijejo statistično značilno povprečno presežno donosnost vsaj v enem od preučevanih časovnih obdobij. Vzrok za presežne donose pri spremenljivki donosnost prvega trgovalnega dne Aggrawal, Purnanandam in Wu (2006) izpostavljajo sporazume med investicijskimi bankami in investitorji, ki slednje prisilijo v nakup delnic na borzi po prvi javni prodaji, kar delnicam omogoča visoko rast, ki se ob poteku deležev z omejeno razpoložljivostjo spremeni v negativne donosnosti. Kot glavni razlog za nižje donosnosti tehnoloških družb so Jordan, Bradly, Roten in Yi (2000) pripisali skladom tveganega kapitala, ki so prisotni v večini le-teh in prodajajo svoje lastniške deleže ob poteku deležev z omejeno razpoložljivostjo. Razlog za presežne, komulativne donose med velikimi in majhnimi družbami, so Brau, Carter, Christophe in Key (2004) pripisali večji asimetričnosti informacij za slednje, kar pomeni, da investitorji pripisujejo večjo verjetnost, da bo poslovodstvo majhnih družb prodalo svoje delnice in posledično negativno vplivalo na ceno. Največje presenečenje so pokazali rezultati spremenljivke tveganega ali/in zasebnega kapitala, ki kljub obstoječim empiričnim dokazom niso bili statistično značilni v nobenem preučevanem obdobju. Dobljeni rezultati so lahko drugačni, ker sem v svoji analizi uporabil tvegane in/ali zasebne sklade kapitala, kar pa ni nujno bilo uporabljeno v že obstoječih študijah. Na podlagi rezultatov ločenega vzorca lahko sklepam, da je spremenljivka pozitivnega ali negativnega presenečenja ob objavi rezultatov komplementarna z dejavnostjo, v kateri družba posluje, in tržno kapitalizacijo družbe ob prvi javni prodaji delnic.

Pri testiranju volatilnosti se rezultati za spremenljivki pozitivno ali negativno presenečenje ob objavi rezultatov in tržno kapitalizacijo izkažejo za nasprotne od pričakovanj, medtem ko so rezultati za spremenljivki donosnost na prvi trgovalni dan in podprtost prve javne prodaje s tveganim ali/in zasebnim skladom kapitala izkažejo v skladu s hipotezami. Pri analizi volatilnosti na podlagi ločenega vzorca se spremenljivka tržne kapitalizacije izkaže za komplementarno in izboljša dobljene rezultate osnovnega vzorca, kar pa ne drži za spremenljivki donosnosti na prvi trgovalni dan in podprtost prve javne prodaje s tveganim ali/in zasebnim skladom kapitala, kjer se rezultati poslabšajo.