NTNU – Trondheim
Norwegian University of
Science and Technology

Market Timing on Oslo Stock Exchange

A Two-dimensional Analysis of Long-term
Abnormal Stock Price Performance
Following Equity Issues

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Preface

This thesis is written as the conclusion of the author's Master of Science degree in Industrial Economics and Technology Management at the Norwegian University of Science and Technology (NTNU) during the spring of 2013. The author is specializing in Investment, Finance and Accounting and saw this thesis as an opportunity to indulge in a topic both relevant and debated, market timing effects related to equity offers.

I would like thank my supervisor, Adjunct Associate Professor Einar Belsom at the Department of Industrial Economics and Technology Management at NTNU for his valuable guidance and feedback throughout the work with this paper.

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Erik Hiller Holom

Market Timing on Oslo Stock Exchange

Abstract

I analyze the time-variation of long-term risk-adjusted abnormal stock price underperformances following equity issues on Oslo Stock Exchange between 1997 and 2011. Market timing effects are analyzed within a two dimensional framework reflecting both the pre-issue stock market performance and the short-term activity level in the equity capital market. An adjusted version of the Fama-French three-factor model is used for the risk-adjustment of stock returns. The long-term underperformance is highest following issues in periods of high activity in the equity capital market and following issues in periods of bad pre-issue stock market performance. This is explained by companies exploiting investor over-optimism as well as a failure by models to capture systematic differences in the motivations for equity issues. The results indicate that companies on average are successful on timing the market in order to benefit existing shareholders as well as marketing their issues to imply promising growth opportunities. Further, I find a long-term trend suggesting that the underperformance effect on Oslo Stock Exchange is diminishing.

Market Timing on Oslo Stock Exchange

Sammendrag

Jeg analyserer tidsvariasjonen av langsiktig, risikojustert underavkastning av aksjer etter børsnoteringer og emisjoner på Oslo Børs i perioden 1997 til 2011. Effekten av plassering av børsnoteringer og emisjoner er analysert innen et todimensjonalt rammeverk som reflekterer både utviklingen i aksjemarkedet før børsnoteringen eller emisjonen og det kortsiktige aktivitetsnivået i egenkapitalmarkedet. En tilpasset versjon av Fama og French' tre-faktormodell er brukt til risikojustering av aksjeavkastningen. Den langsiktige underavkastningen er høyest etter børsnoteringer og emisjoner i perioder med høy aktivitet i egenkapitalmarkedet og etter perioder med dårlig utvikling i aksjemarkedet. Dette forklares ved at selskaper utnytter investorers overoptimisme kombinert med at modeller ikke er i stand til å modellere systematiske forskjeller i selskapenes årsaker til å gjennomføre en børsnotering eller emisjon. Resultatene indikerer at selskaper i gjennomsnitt lykkes med å plassere børsnoteringer og emisjoner på tidspunkt som kommer de eksisterende aksjeeierne til gode og til å selge inn sine børsnoteringer og emisjoner som lovende vekstmuligheter. Den langsiktige trenden viser at effekten av underavkastning etter børsnoteringer og emisjoner på Oslo Børs reduseres over tid.

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1 Introduction

Empirical research points towards two unexplained puzzles regarding equity issues that challenge the market efficiency hypothesis. First, it has been shown that companies issuing equity on average have a negative risk-adjusted abnormal stock price performance following the issue (see e.g. Loughran and Ritter 1996). Even though it has been argued that this effect is solely due to model misspecifiation, and in particular a failure to model a decreased risk following issues of equity, a consistent overvaluation of issuing companies seems to remain.

Secondly, equity issues seem to be clustered to periods of good performance in the stock market as well as shorter periods often referred to as Windows of Opportunities (see e.g. Bayless and Chaplinsky 1996). It seems to be the case that companies are trying to time the market in order to raise as much capital as possible, to the benefit of existing shareholders. Most research seem to believe that this can be observed only in the price drop frequently observed following the announcement of equity issues (see e.g. Myers and Majluf 1984). However, Loughran and Ritter (2005) found that companies issuing equity in periods of high activity in the equity capital market also observed the most severe underperformance in the long run.

The purpose of this paper is to test whether market timing effects are visible in long-term stock price performances on Oslo Stock Exchange (OSE). Specifically, I test whether the post-issue stock price performance depends on the time of the issue along two dimensions; pre-issue stock market performance and windows of high issuing activity. To my knowledge, a study taking both these dimensions into account has never been done before.

Stock price performances following equity issues on OSE between 1997 and 2011 are analysed. For the risk-adjustment of stock price returns, I use a version of the Fama-French three-factor model, adjusted to the Norwegian market by Næs, Skjeltorp and Ødegaard (2009). All months in the sample are categorized to defined market states along the two dimensions. The differences between long-term abnormal returns following issues in different market states are then tested and discussed.

Research within the field is dominated by studies on the US market. The research of market timing effects on OSE is limited. However, Sjaastad and Smith-Sivertsen (2012) as well as Grieg (2012) examined the performance of SEO companies on OSE between 2000 and 2007, finding a significant underperformance. Both also touched upon the topic of market timing, but were limited to comparing returns following issues in different calendar years. This study uses a longer data set which includes IPOs, and has a relatively narrow focus on market timing effects in different calendar months.

The rest of the paper is organized as follows. Chapter 2 is a brief presentation of financial theory within the field, with possible explanations of the clustering of issues and the post-issue long-term underperformance. Chapter 3 outlines the model I have applied for the analysis and presents the data set. I also discuss potential biases. The results of the analysis are presented in chapter 4, while chapter 5 consists of a discussion of these results in relation to the theory presented in chapter 2. My concluding remarks can be found in chapter 6.

2 Financial Theory

It is well known that upon the announcement of an equity issue, the stock price falls on average (see e.g. Asquith and Mullins 1986 and Masulis and Korwar 1986). This announcement effect is well documented and unproblematic. However, newer research has shown that companies issuing equity on average also experience a worse stock price performance thereafter. This is important as it is an apparent breach of market efficiency. If issuing companies consistently perform worse than others, why do investors keep investing in them? It is also documented that equity issues are clustered to certain time periods. In this section I will outline how this relates to financial theory and research, and provide some possible explanations to these effects. This will motivate the analysis in chapter 3. I will start with a brief introduction to equity issues.

2.1 Introduction to Equity Issues

Companies can be looking to raise capital for a number of reasons. They can be looking to invest in order to pursue new growth opportunities, or they can be struggling to meet their obligations (Norli 2007). Either way a company has three ways to increase its capital. They can cut back their dividends, they can increase their debt, or they can issue new equity of the company, representing a dilution of ownership.

There are two categories of equity issues, Initial Public Offerings (IPOs) and Seasoned Equity Offerings (SEOs).

As the name suggests, an Initial Public Offering is conducted when a company initially goes public. As companies grow, they typically go public to gain access to large amounts of potential investors and capital, and to increase liquidity of the stock.

A Seasoned Equity Offering is conducted when an already listed company offers new equity. Although SEOs are not reported in the media as much as IPOs, Kvaal and Ødegaard (2011) show that the volume of capital raised in SEOs is much larger than for IPOs on OSE. SEOs will always take place at a discount to the current share price, as investors otherwise could have obtained the shares in the market (Kvaal and Ødegaard 2011).

Both IPOs and SEOs can be executed in different ways, as firm commitment underwriting contracts, rights offerings or private placements. The methods differ in to whom new shares are offered and who bears the risk of the issue process. The choice of flotation method for SEOs on OSE is thoroughly discussed and analyzed previously (Grieg 2012, Smith-Sivertsen and Sjaastad 2012), and I will not enter this discussion in this paper.

2.2 Long-Run Post-issue Stock Price Performance

In their famous papers, Modigliani and Miller (1958, 1963) stated their propositions, which still form the basis for thinking on capital structure. They stated that in an efficient market and in

the absence of market imperfections such as taxes, bankruptcy costs, agency costs and asymmetric information, the value of a company is unaffected by its financing. According to Modigliani and Miller, it will not matter whether a company chooses to raise its debt, issue new equity or cut back on their dividends.

However, efficient markets as described by Modigliani and Miller do not exist. Hence, as companies seek to maximize their value, the trade-off theory (Kraus and Litzenberger 1973) suggests that they seek to obtain and maintain an optimal capital structure, where the advantages and disadvantages of equity and debt are balanced. However, research shows that companies tend to issue equity when stock prices are high, although the trade-off theory would suggest that debt should instead be raised in order to restore the original leverage ratio (see Welch 2002).

The pecking-order theory, discussed by Myers and Majluf (1984), is based on the assumption that the information cost of asymmetric information will dominate the other market imperfections described in the trade-off theory. It is generally accepted that as managers have access to private information, they have a superior ability to value their companies' stocks (see Bayless and Chaplinsky 1996). As the management are better informed than investors about the state and prospects of the company, they will only issue equity when stock prices are high. When stock prices are low, they will repurchase equity. This is because the management will always act in the interest of the existing shareholders. While issuing equity at high stock prices creates value for existing shareholders, issuing equity at low stock prices implies a dilution of value.

As this mechanism is well known in the market, the announcement of an equity issue will generally convey bad signals to the market. This is also referred to as the adverse selection problem. Therefore, according to the pecking-order theory, a company will want to finance their investments with retained earnings if they can, then with raising the debt, and only issue equity as a last resort.

In a survey of 392 CFOs, Graham and Harvey (1999) find that two-thirds of CFOs agree that their judgement on whether the stock was undervalued or overvalued was an important or very important consideration in issuing equity. Recent stock price performance was the third most popular factor affecting decisions on equity issues.

The theories above are consistent with a price drop at the announcement of an equity issue. In addition to the negative signal conveyed by the issue, the leverage ratio will decrease following an issue. This decreases the risk of debt and increases the value of debt at the expense of the equity value. Decreased equity leverage will also lower exposure to inflation, lower bankruptcy costs and increase liquidity, indicating decreased expected stock returns (Eckbo, Masulis and

Norli 2000). Such a redistribution of wealth is discussed by Masulis and Korwar (1986) and by Asquith and Mullins (1986). A negative announcement effect can also be explained with shares having a downward-sloping demand curve, thus creating a short-term price decrease as more stocks are issued (Scholes 1972).

However, neither theory on corporate finance in efficient markets can explain the negative abnormal long-run performance of companies *after* the issue. Although this has also been known for some time, it was long believed that this was also tied to decreased risk following the issue. However, Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995) were among the first to show a negative long-run performance even after adjusting for risk.

In fact, according to Loughran and Ritter, the long-run underperformance after the announcement is even larger than the announcement effect. The graph below is extracted from Grieg (2012), who compiled a list of nine studies all using the Fama-French model over a three to five year holding period to find monthly post-issue abnormal underperformance.

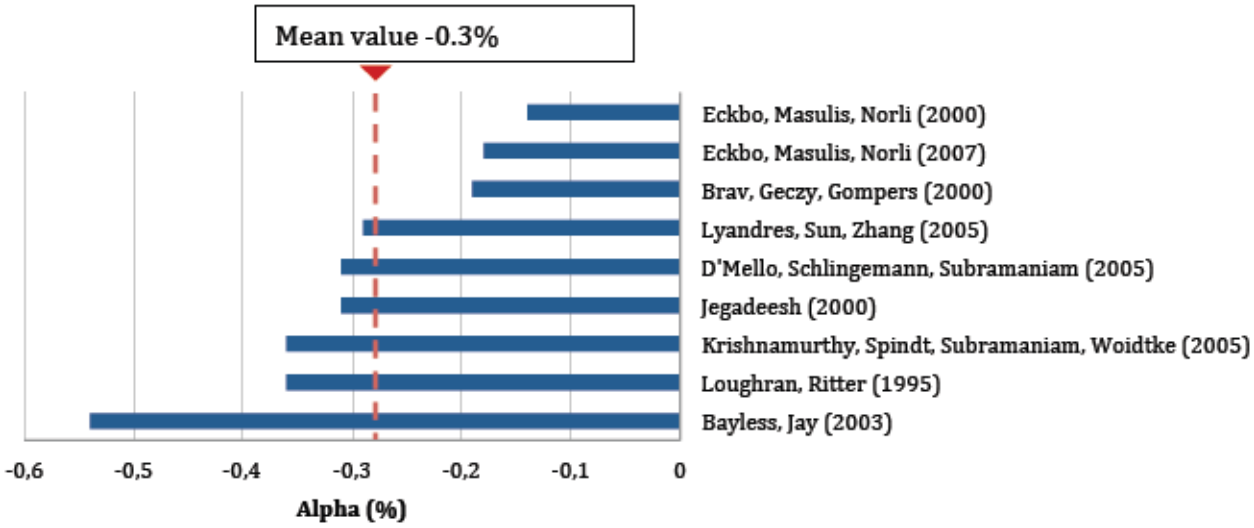

Figure 1 – Previous research – mean monthly abnormal returns over a three to five year holding period. Source: Grieg (2012)

The proposed explanations for the underperformance generally fall within two categories. Some argue that the models used are still misscpecified and not able to properly adjust for the decreased risk of the company following the issue. Others argue that even if model misspecification can explain some of the underperformance, a consistent mispricing of companies issuing equity remains. The market is over-optimistic of the prospect of the companies and underreacts to the announcement of equity issues.

Sjaastad and Smith-Sivertsen (2012) tested whether long-run underperformance for SEO companies on OSE can be explained by some rational means such as lower risk or model

misspecification. Specifically, they test for the effect of deleveraging and an increased level of investments. They do not find clear evidence of such rational explanations, supporting that issuing companies are in fact overvalued.

Before I discuss this further, I will present another apparent fact, the clustering of equity issues to certain time periods.

2.3 Clustering of Equity Issues

In the figure below, the monthly all-share index on OSE, the OSEAX, as well as the equity issue activity on OSE for the period 1997 to 2012 are shown. The best indicator for the activity in the equity capital market is probably the volume of capital raised during a given month. As OSE is dominated by a few large companies, the total number of issues per month is also presented.

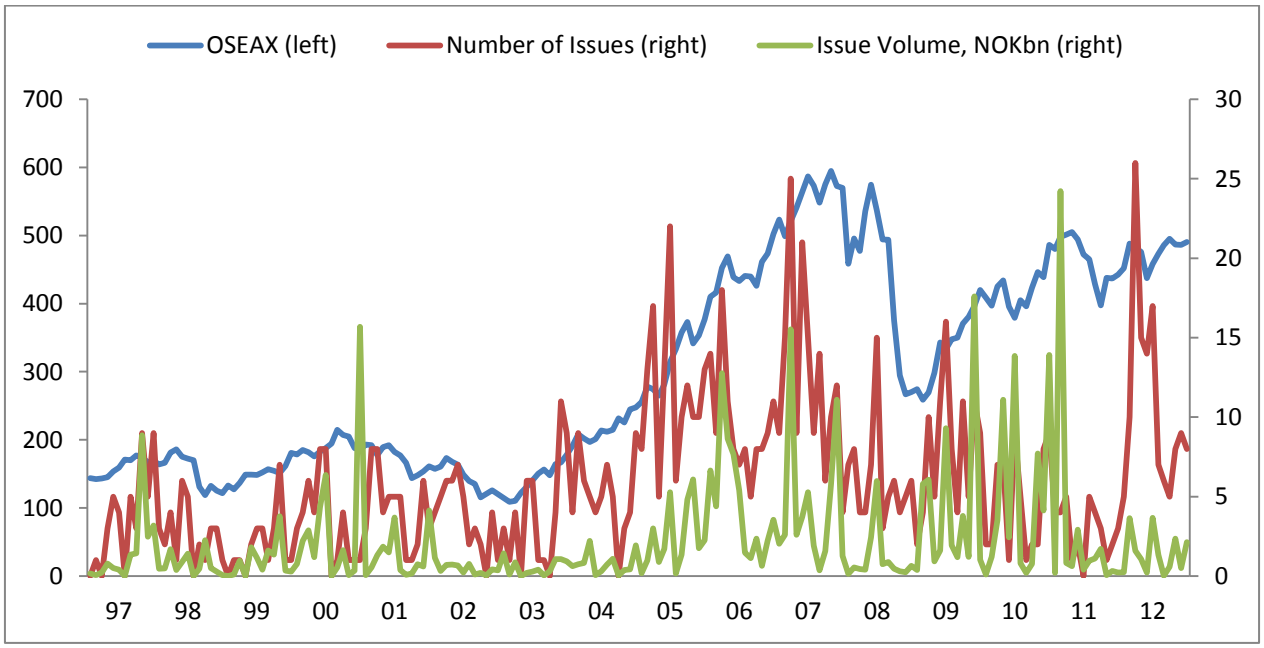

Figure 2 – All-share index and monthly issuing activity on OSE from 1997 to 2012. Source: OSE

As can be seen, the level of equity issue activity on OSE has a large variance, both in terms of number of issues and volume of capital. Equity issues seem to be clustered around certain time periods. Some correlation between stock markets and issuing activity can certainly be read from the figure.

The clustering of equity issues has been documented as early as by Hickman (1953) and later by Choe, Masulis and Nanda (1993). That companies issue more equity when stock markets are rising could easily be justified with theory discussed previously; when managers believe that their shares are overvalued, it is in the best interest of shareholders to sell new shares of the company at a price they believe represent a premium. In addition, Choe, Masulis and Nanda

(1993) argue that in times of economic growth adverse selection costs are lower, as companies more credibly lead investors to believe that the issues are not motivated by liquidity issues or an overvaluation of shares only, but can refer to growth opportunities. They show that more companies are issuing equity in expansionary periods and that these firms observe a lower price drop at announcement.

2.4 Windows of Opportunities

However, there seems to be something else also affecting the level of issues in figure 2. In shorter periods of time, a month or a couple of months in length, the activity rises for no apparent reason. This is true both during times of stable stock markets (1997 – 2002) and during times of rising stock markets.

This "something" is in literature referred to as Windows of Opportunities. According to this theory, certain time-periods, or windows, are characterized by an increased optimism in issuing companies among investors. Companies, looking to maximize value for their stock holders, are timing their equity issues to these periods.

A striking evidence of market timing is presented by Baker and Wurgler (2002). In an empirical study, they found that the results of companies timing their equity issues are very persistent. In their model, capital structure is viewed as the cumulative outcome of past attempts to time the market. This is a significant break from traditional theories as the trade-off theory, where companies are looking to maintain an optimal leverage ratio.

The most traditional explanation of Windows of Opportunities is that these are periods when the announcement price drop is low. Myers and Majluf (1984) suggest that this is consistent with the pecking order theory, as companies time their issues to periods with a lower level of information asymmetry. Korajczyk, Lucas and McDonald (1991) find that firms tend to announce equity issues following information releases in order to minimize information asymmetry, and find a lower announcement effect for issues following information releases.

Bayless and Chaplinsky (1996) find that the price drop at announcement on average is approximately 200 basis points smaller in periods of high equity issue volume. They also report evidence that investors are more concerned of firm characteristics in times of low equity issue activity. Jegadeesh (2000) finds that companies issuing seasoned equity underperform their benchmarks by twice as much around earning announcements following the issue. This would suggest a higher level of information asymmetry.

A different approach to market timing is made by Loughran and Ritter (1995). They believe that market timing is not primarily done in order to reduce the announcement effect, but rather to raise as much capital as possible. As they put it (on page 48), "Our focus is on whether the company can sell at an offer price of $28.80 rather than $20.00, not whether it will save 10

cents." This is an argument that is more consistent with the evidence of a negative long-run underperformance. Loughran and Ritter also find that companies issuing equity in years with high equity issue activity severely underperformed, while companies issuing equity in years of low activity did not underperform much at all.

2.5 Behavioural Theory

If Loughran and Ritter are right, it is hard to accept the traditional understanding that clustering of issues is due to a lower asymmetry of information. While investors apparently believe this to be case, the fact that companies issuing equity in periods of high activity in the equity capital market underperforms in the long run must be interpreted as evidence that managers are, on average, successful at market timing, and the information asymmetry must therefore in fact be larger within these windows.

Behavioural theory is a collective term for theories based on investors being overconfident in their own ability to outperform the market. It seems to be the case that this effect is larger for issuing companies than for non-issuing companies, and that this effect may vary over time.

Historically, some extremely positive returns in the stock market have been observed from companies that have recently issued equity to finance investments in growth projects, and investors might overestimate the possibility of such extremely positive outcomes. As Loughran and Ritter (1995) argue, if the true probability that a given IPO will be "the next Microsoft" is three per cent, while investors instead believe it to be four per cent, it will take a large sample over a large period of time before investors will revise their estimates. Investors also seem to underestimate the effect of management managing earnings upwards before an issue, an effect that is well documented (Jain and Kini 1994) and should be known.

Within certain time periods, Windows of Opportunities, the over-optimism seem to be particularly prominent. While investors believe that these are time periods when companies are pursuing new growth opportunities, it may seem like many companies are just taking advantage of the window itself, creating a self-reinforcing effect. As more companies issue equity, the interest among investors of investing in issuing companies rises, and other companies will fear to miss the window (Bayless and Chaplinsky 1996), and being unable to raise capital if needed later.

To summarize, there does exist a consistent overvaluation of companies issuing equity, also on OSE. In addition, issues are clustered to certain time periods, both in terms of stock market performance and shorter Windows of Opportunities. The literature differs in whether the long-term underperformance following issues varies depending on the time of the issue along these two dimensions. The purpose of my analysis, presented in the next chapter, is to shed light on this question using recent data on OSE.

3 Model Specification

In the previous chapter, I described two observed effects in financial markets; stocks of companies issuing equity tend to perform worse following the issue and issues are clustered to certain time periods, both in terms of pre-issue stock market performance and Windows of Opportunities. In this chapter, I will outline a model to test the relation between these two effects in order to answer the following question: Does long-term abnormal risk-adjusted post-issue stock price performance depend on the time of the issue on OSE?

In short, the methodology is to first specify a risk-adjustment model, in order to calculate an abnormal performance for each issue in the sample. Then, all months are defined to belong to different market states along two dimensions; pre-issue stock market performance and Windows of Opportunities. Finally, the samples of abnormal returns following issues in different market states are compared and tested.

If companies tend to issue equity in time periods where the abnormal long-term underperformance is highest, it would be evidence that companies on average are successful in market timing, to the benefit of existing shareholders.

3.1 Risk-adjustment

When studying holding periods of just a couple of days, for example in studying the announcement effect, risk adjustment is probably not necessary. However, for longer holding periods, adjusting correctly for risk becomes crucial. There are two basic approaches to measuring long-run underperformance. Some American studies compare the buy-and-hold return to some benchmark. However, it has become generally accepted that time-series regression using a factor model is a better way of risk-adjusting the stock returns. In this study, a version of the Fama and French (1993) three-factor model fitted to OSE by Næs, Skjeltorp and Ødegaard (2009) is used.

In a factor model it is assumed that the expected excess return of a stock can be expressed by a number of factors:

$$E[r_i] = \sum_j \lambda_j \beta_j^i$$

Where $E[r_i]$ is the expected excess return for stock i, λ_j is the risk premium for factor j and β_j^i is the factor loading for risk factor j to the stock. One could also add a time subscript as the factor premiums and the factor loadings change through time.

The factors represent the sensitivity of the stock return to the given risk factor. For a model to fit, a time series regression (Black, Jensen and Scholes, 1972), would imply an alpha near zero in the following linear regression for a cross-section of stocks:

$$r_i = \alpha_i + \sum_j \lambda_j \beta_j^i + \varepsilon_i$$

However, one will never be able to fit all stock returns in such a model (and even if one could it would probably be a result of overfitting). Therefore, the alpha in this regression can be used as a measure of risk-adjusted abnormal performance.

3.2 Risk Factors

I will now present the risk factors that is used in the factor model, which are the same as Næs, Skjeltorp and Ødegaard (2009) found to be the most explanatory factors on OSE. I will also briefly mention some potential risk factors not included in the analysis.

3.2.1 Market Risk

Market risk was formalized by Sharpe (1964) in the well-known Capital Asset Pricing Model (CAPM). According to CAPM, the expected excess return is equal to:

$$E[r_i] = r_f \cdot (E[r_M] - r_f)$$

Where $E[r_M]$ is the expected return of some market benchmark and r_f is the risk-free rate. Beta is defined as the stock's covariance with the market divided by the market variance:

$$\beta_i = \frac{Cov(r_i, r_M)}{Var(r_M)}$$

As can be seen, the CAPM can be seen as a special case of the Fama-French factor model, where the beta represents the only risk factor.

Although widely used, a number of anomalies not compatible with CAPM have been shown. This inspired Fama and French (1993) to introduce two additional risk factors to increase the explanatory power.

For the Norwegian market, Næs, Skjeltorp and Ødegaard (2009) show that the CAPM is insufficient to explain the Norwegian market. Still, market risk is obviously included as one of three factors.

3.2.2 Size Risk

It has been shown that large companies on average have lower risk-adjusted returns than small companies. According to Dimson and Marsh (1999), this is the most documented stock market anamoly there is. The size effect was first documented by Banz (1984) using US data from 1936-

1975. It has since been documented in 17 other countries, but the effect is highly sensible to the choice of time period. In some markets and time periods, it has in fact been negative. Brav, Geczy and Gompers (2000) suggest that small firms generate less cash flow and therefore generally issue equity to invest in growth. They also suggest that growth opportunities are generally better investments for smaller firms.

Fama and French constructed zero-investment portfolios formed by subtracting the return of a portfolio of large companies from the return of a portfolio of small companies. The monthly returns of those zero-investment portfolios, SMB_t (small minus big) is the risk factor used in the time-series regression.

Næs, Skjeltorp and Ødegaard (2008) show that there does exist a size effect on OSE, with returns falling almost monotonically with company size. The effect is judged to have considerable explanatory power and is included in their three-factor model.

3.2.3 Liquidity Risk

Liquidity risk was not included in the Fama-French three factor model. However, Næs, Skjeltorp and Ødegaard (2008) suggest that the observed stock market anomalies on OSE may be a result of unrealistic assumptions of static and frictionless markets. This inspired the inclusion of liquidity as a risk factor.

Liquidity has several dimensions; a cost dimension (how much it costs to trade), a time dimension (how fast one can trade at an acceptable price) and a quantity dimension (how much one can trade at an acceptable price).

As a measure of liquidity, Næs, Skjeltorp and Ødegaard use the relative spread, calculated as the difference between the closing bid and ask prices, relative to the midpoint price. They constructed portfolios in a similar way to the methodology of Fama and French, creating zero-investment portfolios by subtracting a portfolio of companies with high relative spread from a portfolio of companies with low relative spread. The return on such a portfolio,LIQ_t, was found to have significant explanatory power on OSE.

3.2.4 Other Risk Factors

The most notable risk factor not included in the analysis is the book-to-market ratio. Fama and French note that companies with high book-to-market ratios outperform companies with low book-to-market ratios. They construct zero-investment portfolios and included these as risk factors.

Carhart (1997) and Jagadeesh and Titman (1993) both suggest a momentum effect, as buying stocks with high prior returns while selling stocks with low prior returns has been shown to give

a risk-adjusted excess return. Carhart constructs zero-investment portfolios and includes their returns in the factor model.

Eckbo, Masulis and Norli (2000) also include a turnover factor, while Lyandres, Sun and Zhang (2007) include an investment factor.

3.3 The Model

With the three risk factors of market risk, size risk and liquidity risk, the key equation in this study is:

$$r_{i,t} - r_{f,t} = \alpha_i + \beta_{i,t} \cdot \left(r_{M,t} - r_{f,t}\right) + s_{i,t} \cdot SMB_t + l_{i,t} \cdot LIQ_t + e_{i,t}$$

$r_{i,t}$ is the stock return at time t.

$r_{f,t}$ is the risk-free return at time t.

$r_{M,t}$ is the market return at time t.

$\beta_{i,t}$ is the factor loading for the market risk of the stock at time t.

$s_{i,t}$ is the factor loading for the size risk of the stock at time t.

$l_{i,t}$ is the factor loading for the liquidity risk of the stock at time t.

SMB_t is the factor risk premium for the size risk at time t.

LIQ_t is the factor risk premium for the liquidity risk at time t.

As all of the above are known for each issue, the output of the regression will be α_i, a measure of the monthly abnormal risk-adjusted performance of the stock over the time period. It is comparable to the Jensen's alpha known from CAPM.

Months are used as time unit in the analysis. For each equity issue, two regressions were performed; one using 12 months as time horizon and one using 36 month as time horizon. This resulted in two measures of the monthly post-issue abnormal risk-adjusted return. As the first 12 months are included in the 36-month regression, the two measures are not independent, but are two different interpretations of the abnormal performance.

3.4 Data Set

Data on equity offers was obtained from the website of OSE. Originally, the data set consisted of 2,491 offers in the time period of 1997 to 2011, but for different reasons a number of the offers were excluded from the analysis:

- Offers with missing information.

- Offers with a subscription price of zero.
- Offers for companies where stock prices for different reasons were not obtainable for 12 or 36 months following the issue (this also excluded all issues in 2009 and 2010 from the 36-month analysis).
- Employee options.
- A limited number of issues with extreme post-issue equity performance, probably as a result of mistakes in the data set or the analysis.

The three last points are discussed further under "Potential Biases" below. After this screening, 1,005 equity issues remained in the 12-month analysis, while 719 of these also had stock prices available for 36 post-issue months. While the vast majority of these were SEOs, 78 (12 months) and 58 (36 months) IPOs were also available.

$r_{i,t}$, the stock returns, were calculated from end-of-month quotes obtained from the website of OSE. Adjusted stock prices (adjusted for dividends, splits, spins and mergers) were used where appropriate and obtainable.

$r_{f,t}$, the risk-free rate, was obtained from the website of Norges Bank as the one-month NIBOR rate. Norges Bank cites the one-month NIBOR in yearly terms, and I have therefore converted it to a monthly rate.

$r_{M,t}$, the market performance, was calculated as the end-of-month returns of the OSE All-share index, OSEAX.

SMB_t and LIQ_t, the size and liquidity risk factor premiums, were obtained from the website of Ødegaard, who updates his site monthly using data on OSE.

3.5 Potential Biases

There are a number of potential biases inherent in the analysis, both concerning the choice of model and the applied data set.

Regarding the risk-adjustment, there is always a potential bias when portfolios are formed to constitute the risk factors. If the risk factors are incomplete or correlated with other factors, the results may be misleading. Adjusted versions of the Fama-French model by Eckbo, Masulis and Norli (2007) as well as Lyandres, Sun and Zhang (2007) indicate that the Fama-French model may produce to large alphas. In addition, Loughran and Ritter (2000) argue that the inclusion of the issuing company in the formation of the factors reduces the power to detect abnormal returns. However, Næs, Skjeltorp and Ødegaard (2008) provide convincing results of explaining the OSE with three factors.

When using linear regressions, some implicit assumptions are made. If the factor estimates are not reasonably stable throughout the time period, the results may be misleading. However, p-values from the individual regressions are generally satisfactory.

Regarding the data set, the first month included in the regression was the month of the issue. This means that the first monthly stock return will include the days of the month leading up to the issue (only a problem for SEOs). Ideally, only the days after the issue should have been included. Due to incompatibility in the data set, this was not done. However, the issue will generally be the dominating abnormal event in the month, and this only applies to one of 12 or 36 months in the analysis.

Another potential problem was that a large number of the offers were small. Offerings that are very small compared to the company size will likely not be regarded as an offering by the market, creating unnecessary noise in the data set and potentially diminishing the effect of negative abnormal returns. As I did not have access to market capitalizations at the time of the offer, I was unable to exclude offers that were small compared to market value. Further, it was not desirable to simply remove all offerings below a certain amount, as offerings in small companies clearly are also of interest. As a large proportion of the small offers turned out to be employee options, all such offers were excluded from the analysis. Although this is not an ideal solution to the problem, it improves the quality of the data set.

All offerings are equally weighted, as opposed to a value-weighted approach. Loughran and Ritter (2008) points out that value-weighted reporting would probably give less negative abnormal results. If the goal was to analyze the performance of the *capital* invested in equity issues on OSE, value-weighting might have been desirable. However, Næs, Skjeltorp and Ødegaard (2008) argue that as OSE is dominated by a few large companies, value-weighting could also introduce a bias.

Some companies had a number of offers in the same month. To avoid overrepresentation, only one offer per company per month was included.

A more theoretical discussion relates to the use of discrete calendar months as time period. There are no good reasons apart from historical and cultural reasons to use calendar months. It could obviously have been possible to create market states not defined by months, but as intervals between dates. Calendar months are used, both for simplicity and for easier interpretation of the results.

A number of companies were delisted before they had reached 12 or 36 month following the equity issue, and therefore excluded from the analysis. This creates a certain survivorship bias in the sample, as discussed by Kothari and Warner (1997). Although a delisting could happen for a

number of reasons, it is probably safe to assume that on average, the negative risk-adjusted abnormal performance would have been even larger if delisted companies were included.

Finally, a few extremely high results influenced the results in an undesirable way. All abnormal monthly returns higher than 30%, equivalent to an abnormal yearly return of 2230%, were excluded. These observations are believed to be results of mistakes in the regression or in the stock price data. Still, a number of very high returns remain, disturbing some of the subsamples.

None of the discussed potential biases are judged to jeopardize the conclusions of the study. However, it is important to be aware of them when interpreting the results.

3.6 Definition of Market States

In order to analyze the post-issue abnormal returns in a market timing perspective, market states were defined along the two dimensions presented in earlier; Windows of Opportunities for equity issues and the pre-issue stock market performance. As mentioned previously, calendar months are used as time unit. All months in the time period were labeled along the two dimensions. In this way, the abnormal returns following issues in different market states could be compared and tested.

In this section I will present how these definitions were made. Note that the definitions are generic and can be applied for any market or time frame.

3.6.1 Markets for Equity Issues

In defining market states in terms of equity capital market activity on Oslo Stock Exchange, I follow a methodology comparable to that of Bayless and Chaplinsky (1996), with a few minor adjustments. The methodology uses the aggregated raised capital on OSE per month as a measure of activity. This differs from Ritter (1984) who uses high initial returns and Choe, Masulis and Nanda (1993) who use business cycle data.

Market states were defined based on how the capital volume in the month related to quantiles of the entire time period. A HOT market for equity issues is defined as *either* two (or more) consecutive months where raised capital exceeds the 80% quantile of the 192 months in the sample (Bayless and Chaplinsky used three consecutive months) *or* one single month with a volume above the 90% quantile. A COLD market is defined as *either* two (or more) consecutive months with a volume below the 40% quantile, *or* one single month with a volume below the 25% quantile. My definitions secure that while there is some dependence on the previous and following month, extreme outliers will still be defined as HOT or COLD. The reason for why these definitions are asymmetric is to increase the number of offers in the COLD market state somewhat, in order to obtain reasonably sized subsamples. The months that are not included in the HOT or COLD periods are defined as NORMAL.

In the graph below, the monthly equity volume and the quantiles are shown. For a month to be defined as HOT or COLD, it must either fall outside of the solid red lines, or be part of a streak of at least two consecutive months falling outside of the dashed purple lines.

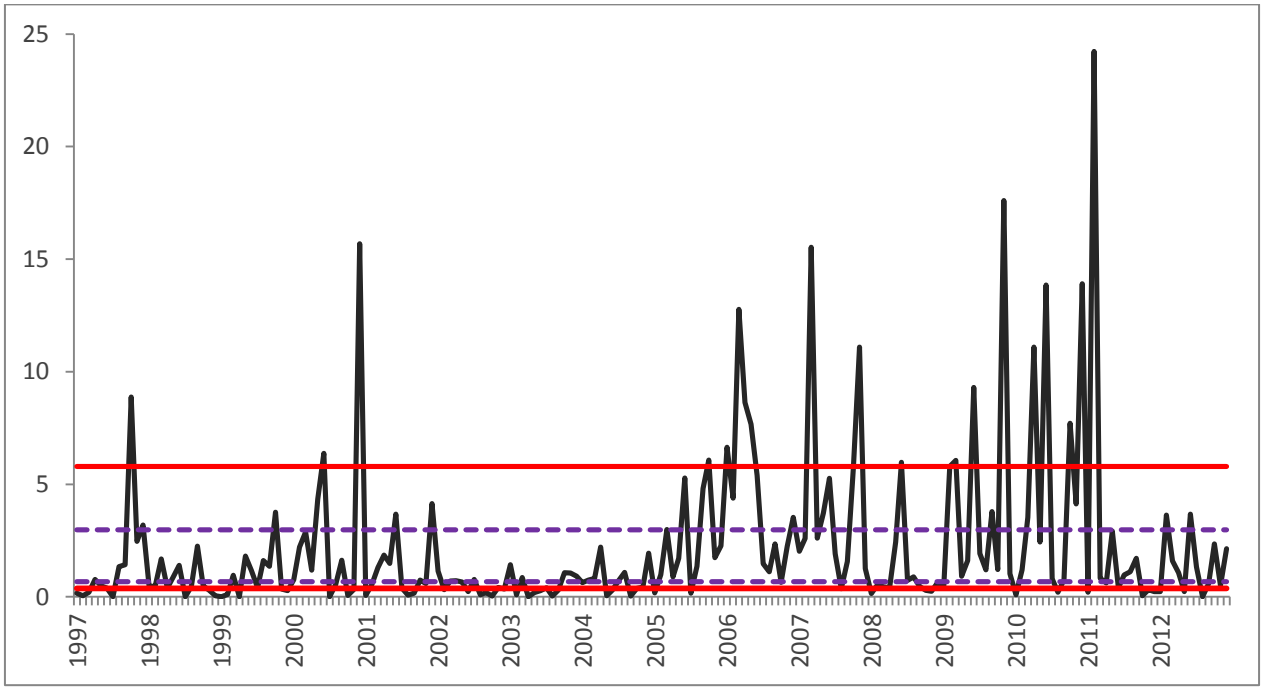

Figure 3 – Equity issue capital volume per month and thresholds for definition of market states. Source: OSE, own calculations

In figure 4, the resulting market classifications are visualized. Spikes on the positive side represent months that are defined as HOT, while spikes on the negative side represent months that are defined as COLD.

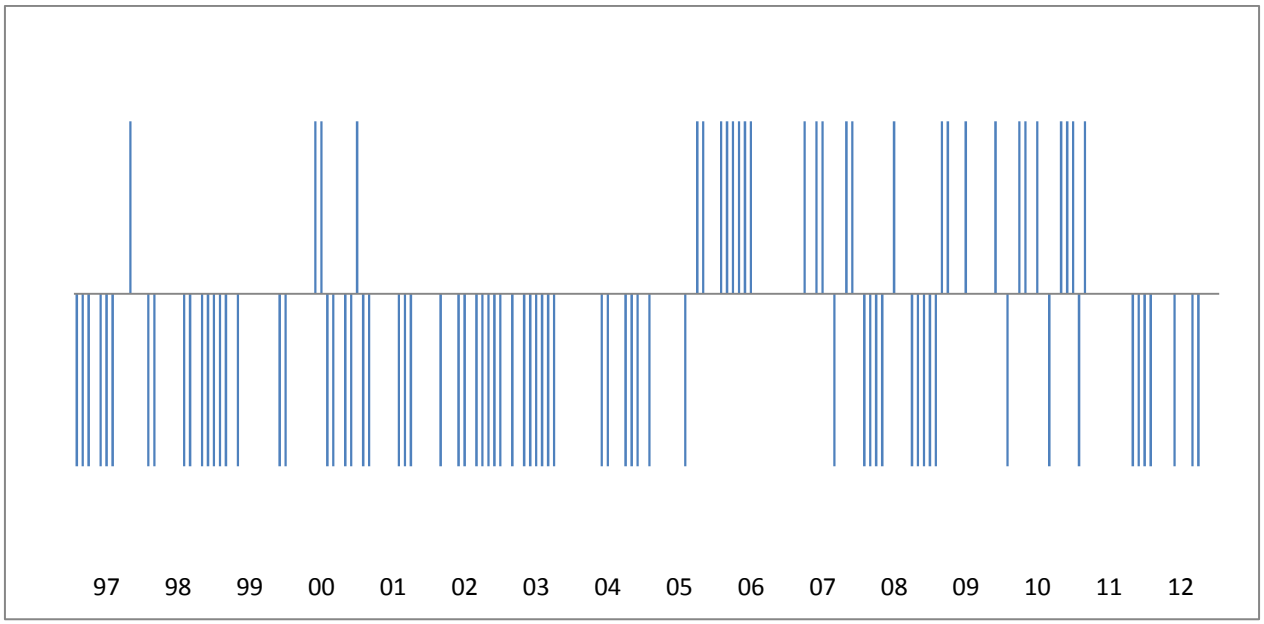

Figure 4 – Market states in terms of equity issue volume

Out of 192 months, I define 29 months (15.1%) as HOT markets and 71 months (37.0%) as COLD markets. Of the total raised equity volume, as much as 62.6% is raised in HOT market conditions, while only 3.3% is raised in COLD market conditions. In other words, companies tend to issue equity in HOT markets and avoid doing so in COLD markets. If the abnormal post-issue stock performances following issues in HOT markets are worse than those following issues in COLD markets, this would suggest that companies on average are successful on market timing.

3.6.2 Markets for Equity Performance

My definition of markets states in terms of the pre-issue stock market environment is based on the market risk premium for equity at OSE, found as the difference between the OSE All-share index (OSEAX) monthly return and the one-month NIBOR rate. Below the monthly returns of these two assets are shown from 1997 to 2012.

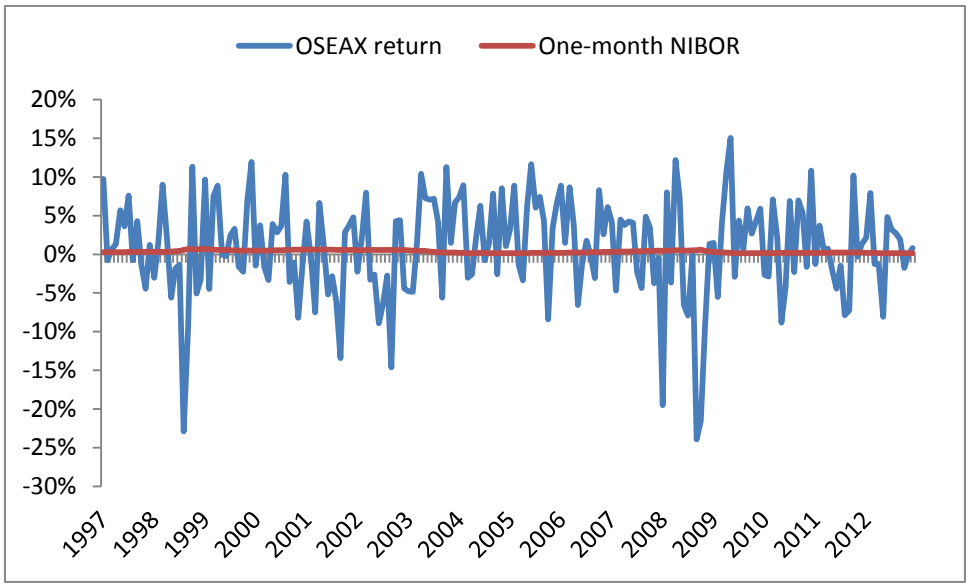

Figure 5 – Monthly returns of OSEAX and the one-month NIBOR rate from 1997 to 2012. Source: OSE, Norges Bank

As can be seen in the figure, OSEAX generally outperform the risk-free rate, but is far more volatile.

For each month, the number of months where stock returns exceeded the NIBOR for the month in question and the nine preceding months was calculated. Months where this sum was 8 or 9 (there were never 10 consecutive months of outperformance) were defined as BULL months. Months where the sum was 2, 3 or 4 (there were never less than 2 months of outperformance) were defined as BEAR months.

In this way, the definitions of BULL and BEAR markets will include a long-term perception of the performance of the stock market leading up to the issue.

The obtained market conditions are shown in figure 6, with spikes on the positive side representing BULL markets and spikes on the negative side representing BEAR markets.

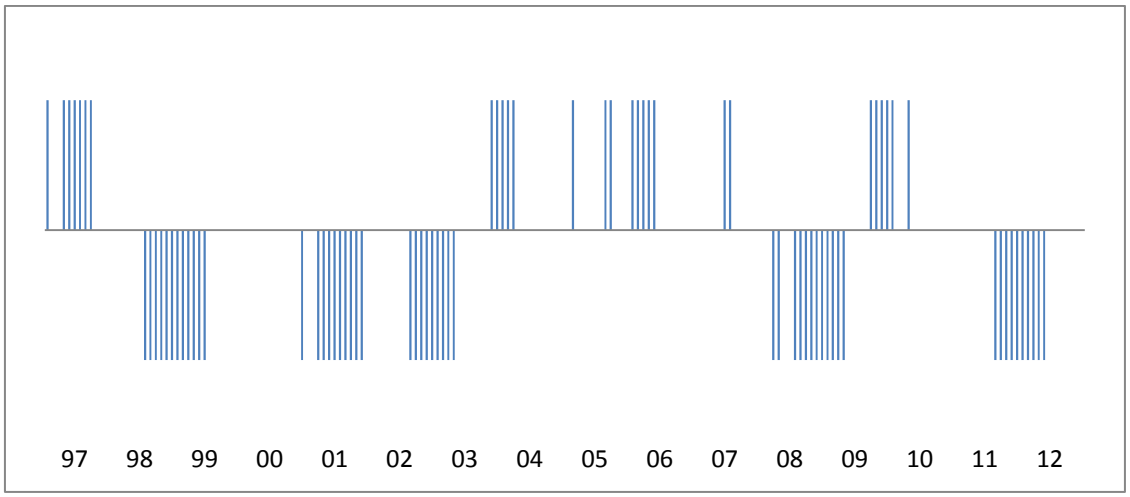

Figure 6 – Market states in terms of pre-issue equity performance

In total, there are 28 months (14.6%) of BULL market conditions, and 53 months (27.6%) of BEAR market conditions. In volume, 24.0% is raised in BULL markets and 14.1% in BEAR markets. Unsurprisingly, this suggests that companies tend to issue equity in BULL markets. If the post-issue stock performances following issues in BULL markets are worse than for issues in BEAR conditions, it would suggest that companies on average are successful on market timing.

The months that are not included in the BULL or BEAR periods are defined as STABLE.

Note that the HOT and COLD markets generally last considerably shorter than the BEAR and BULL markets. While the former often consists of only one or two months, many of the latter intervals are close to a full year in length. This is consistent with the theory presented earlier; there are long periods of general optimism or pessimism in the stock market, while there are shorter periods where the Windows of Opportunities for equity issues are open or closed.

Below I present the full distribution of the 192 months across the two dimensions, HOT, NORMAL and COLD equity capital markets, and BULL, STABLE and BEAR stock markets.

No. of months	HOT	NORMAL	COLD
BULL	9 (4.7%)	14 (7.3%)	5 (2.6%)
STABLE	17 (8.9%)	59 (30.7%)	35 (18.2%)
BEAR	3 (1.6%)	19 (9.9%)	31 (16.1%)

Table 1 – Number of months in each market state and share of total 192 months

Unsurprisingly, the months with HOT markets are characterized by a large number of BULL months, and the months with COLD markets are characterized by a large number of COLD months. Still, the two dimensions are clearly distinct from each other. In terms of total raised equity volume, the distribution is as follows:

% of raised equity	HOT	NORMAL	COLD
BULL	19.3%	4.4%	0.3%
STABLE	36.6%	23.6%	1.7%
BEAR	6.7%	6.0%	1.4%

Table 2 – Share of equity issue capital raised within each market state

These percentages should obviously not be compared directly with each other as they are reliant on my definitions of the different market states. They should be compared to the percentage of the total number of months in table 1. The table confirms the trend of companies clustering their issues to HOT and BULL markets.

4 Results

In this chapter, the results of the analysis are presented. These will be discussed further in chapter 5. For simplicity, I sometimes refer to *returns*, but I always test for *average post-issue monthly abnormal risk-adjusted returns*. Before the actual results, I will briefly discuss the concept of significance.

4.1 Discussion of Significance

In empirical research, negative studies are the most used method when testing for systematic differences. The null hypothesis, stating that there does not exist a difference between samples, is only rejected if the p-value is smaller than some threshold, typically 0.05.

In this study, there is a relatively small number of equity issues, increasing the sample variance and leading to a considerable overlap of subsamples. Therefore, p-values will generally not give an unquestionable conclusion.

Still, as the results will show, there are trends of differences between average abnormal returns in different market states. Keep in mind that if two subsamples differ with a p-value of for example 0.30, there is indeed a 70% probability for a systematic difference between the samples. If multiple tests between different samples give results within the same range, the probability for them all to be a result of random noise is further reduced. These are potentially important results that must be analysed and discussed, and potentially tested on larger markets.

Where p-values are calculated, normality is assumed. Non-parametric tests would obviously imply lower levels of significance.

4.2 Aggregate Results

The following table includes all equity offers on OSE within the time period 1997 to 2011, with the exceptions noted in chapter 3.4.

	12 month	36 month
Number of offers in analysis	1005	719
Average abnormal return	-0.615 %	-0.370 %
Standard deviation	0.057	0.031
P-value (mean < 0)	0.0003	0.0008

Table 3 - Aggregate results

As can be seen, a negative long-term abnormal risk-adjusted return for companies issuing equity on OSE is found. The underperformance is largest in the 12-month horizon. Although the effect is around halved for the 36-month horizon, it is still significantly negative with a p-value very close to zero. The effect being smaller for the 36-month horizon is expected, as the effect of the offer diminishes and is confounded with other events.

However, note that an average monthly loss of -0.370% over three years will give a larger loss in absolute terms than one year with an average loss of 0.615%, indicating that companies on average also have a negative abnormal performance between year one and year three.

The mean abnormal returns are equivalent to yearly abnormal returns of -7.13% and -4.35%, for the 12-month and 36-month analysis respectively.

Histograms (with relative frequencies) for the two data sets are presented below. Note that all returns with absolute values between 10% and 25% are presented as one group. For comparision, the same y-axis is used in both histograms.

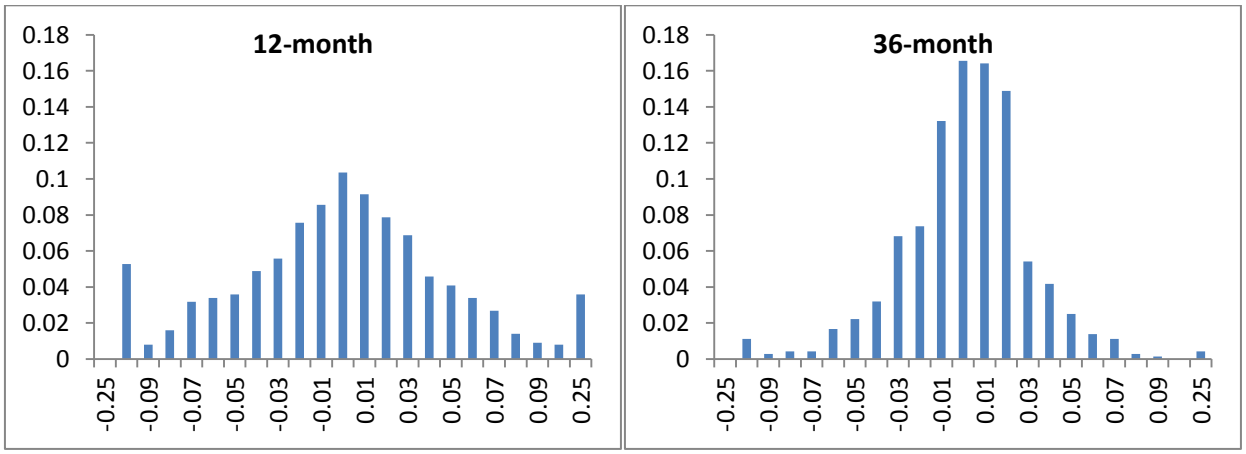

Figure 7 – Distributions of 12-month and 36-month monthly abnormal returns. Relative frequencies

The distributions seem fairly symmetric, although slightly skewed towards the left, especially in the 36-month sample. Unsurprisingly, the standard deviation is almost twice as high in the 12-month analysis. With a longer time horizon, more stocks gather around the mean abnormal return.

The variance can be seen to be quite high, which underscores the point that some issuing companies obviously perform both very well and some very poorly. Standard deviations for subsamples are reasonably stable and will not be presented.

In chapter 4.8, I present the aggregate results for the different risk factors applied in the model, as outlined in chapter 3.2.

4.3 Results for HOT, NORMAL and COLD Markets

In the following table and figure, the average stock price performances following offers in my previously defined hot, normal and cold market states are presented.

	12 month			36 month		
	HOT	NORMAL	COLD	HOT	NORMAL	COLD
Number of offers in analysis	300	547	158	204	402	113
Average abnormal return	-0.671 %	-0.625 %	-0.471 %	-0.546 %	-0.292 %	-0.330 %
P-value (mean < 0)	0.02	0.01	0.15	0.01	0.03	0.13
P-value (mean ≠ other 2 combined)	42 %	47 %	36 %	17 %	23 %	44 %

Table 4 – Results along the HOT/NORMAL/COLD-dimension

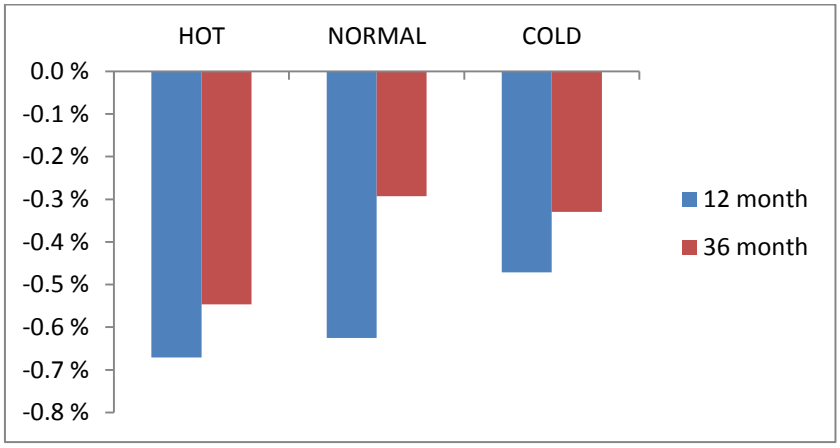

Figure 8 – Results along the HOT/NORMAL/COLD-dimension

As can be seen, there is a larger negative risk-adjusted abnormal return following offers in HOT market conditions. In the 12-month analysis, the offers in the NORMAL state have a negative performance of almost the same magnitude, while the abnormal performance is smallest for the offers in the COLD market conditions. In the 36-month analysis, offers in NORMAL and COLD market states have a roughly similar performance, actually slightly more negative for offers in the NORMAL market state. In absolute terms, the difference between the average monthly abnormal returns in the HOT and COLD market states is around 0.20%.

Different sample sizes make the pattern of p-values somewhat different than the pattern of means. All subsamples have means that are significantly negative, although this is least significant for the offers in COLD markets. In the bottom line of table 4, p-values for the returns in one market state to be different from the returns of the two other market states combined are calculated. A 58% (12-month) and 83% (36-month) probability that the returns following offers in HOT markets are worse than those following offers not in HOT markets (both COLD and STABLE markets) is found.

Also, there is a 64% (12-month) and 56% (36-month) probability that the performances following offers in COLD markets are better than those following other offers. Offers in the NORMAL market state seem to be representative for the entire sample in the 12-month analysis, but are worse in the 36-month analysis.

Finally, the difference between the HOT and the COLD market states was tested. As the p-values in table 5 show, there is roughly a two-thirds probability for the subsamples to have a different post-issue abnormal return. This difference is clearest in the 36-month analysis.

	12-month	36-month
P-value (HOT ≠ COLD)	0.36	0.28

Table 5 – P-values for the HOT and COLD subsamples to differ

Although small samples with a high degree of overlap lead to relatively high p-values, the trend is clear; offers in HOT markets with high activity in the equity capital market are followed by worse abnormal stock price performances. Knowing from chapter 3.6.1 that more companies issue equity in HOT markets, this strengthens the theory of Windows of Opportunities for equity offers and suggests that companies on average are somewhat successful in market timing.

4.4 Results for BULL, STABLE and BEAR Markets

In the following table and figure, the average stock price performances following offers in my previously defined bull, stable and bear market states are presented.

	12 month			36 month		
	BULL	STABLE	BEAR	BULL	STABLE	BEAR
Number of offers in analysis	223	638	144	175	455	89
Average abnormal return	-0.452 %	-0.632 %	-0.789 %	-0.205 %	-0.375 %	-0.672 %
P-value (mean < 0)	0.12	0.003	0.05	0.19	0.01	0.02
P-value (mean ≠ other 2 combined)	31 %	45 %	35 %	21 %	48 %	17 %

Table 6 – Results along the BULL/STABLE/BEAR-dimension

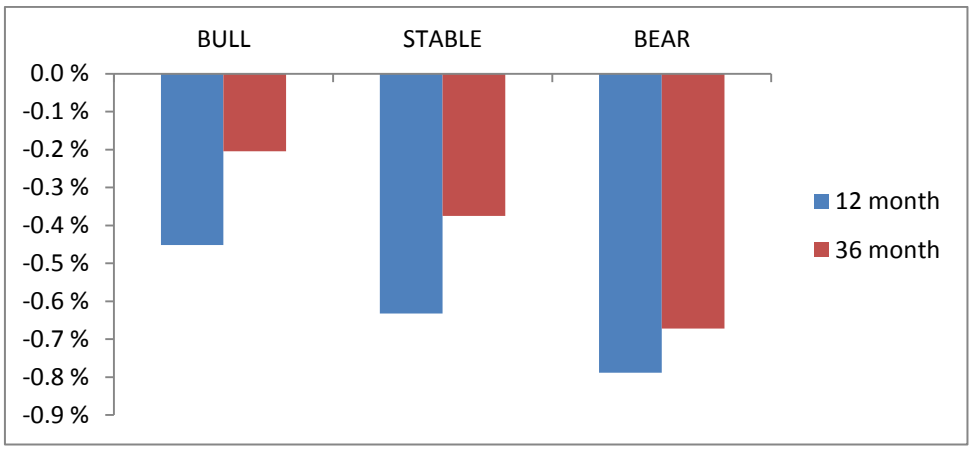

Figure 9 – Results along the BULL/STABLE/BEAR-dimension

As can be seen, there is a larger negative risk-adjusted abnormal return following the offerings in BEAR market conditions, while the stocks are closest to the all-share index performance following offerings in BULL market conditions.

The p-values show that offerings in all market states lead to negative post-issue abnormal performances, although this is least significant in BULL markets. In general, the BULL and BEAR markets are even more distinct than what was found for HOT and COLD markets, both in absolute terms and when testing for the difference between the BULL and the BEAR subsample. Indeed the difference between BULL and BEAR 36-month performances is the most significant result so far.

	12-month	36-month
P-value (BULL ≠ BEAR)	0.29	0.13

Table 7 – P-values for the BULL and BEAR subsamples to differ

Even though the p-values are not above the conventional thresholds for significance, there is a clear trend of offerings in BEAR markets to be followed by worse post-issue abnormal stock price performances. This will be discussed thoroughly in chapter 5.

4.5 Two-dimensional Analysis

I will now present the results for the subsamples created when crossing the two dimensions of market states. These subsamples obviously have even lower number of observations, making it harder to draw any clear conclusions. The subsamples HOT/BEAR and COLD/BULL are particularly small. As the 12-month analysis has a higher number of observations, these results are emphasized slightly.

Overall results are shown in the table and figure below:

	HOT			NORMAL			COLD		
		#	Abnormal return		#	Abnormal return		#	Abnormal return
BULL	12 month	105	-0.219 %	12 month	107	-0.722 %	12 month	11	-0.037 %
	36 month	83	-0.536 %	36 month	85	0.107 %	36 month	7	-0.064 %
STABLE	12 month	180	-1.076 %	12 month	368	-0.500 %	12 month	90	-0.287 %
	36 month	111	-0.495 %	36 month	271	-0.291 %	36 month	73	-0.505 %
BEAR	12 month	15	1.026 %	12 month	72	-1.121 %	12 month	57	-0.846 %
	36 month	10	-1.198 %	36 month	46	-1.041 %	36 month	33	0.001 %

Table 8 – Results presented across two dimensions

There is a high variance between the average abnormal returns in different subsamples. Given the previous results, one would expect that the bottom left corner of the matrix would contain very low returns. This seems to be the case, disregarding the 12-month-analysis in the

HOT/BEAR market state (only 10 observations). In the HOT/STABLE and NORMAL/BEAR samples (180 and 72 observations), the 12-month monthly average underperformance is actually larger than 1%. Similarly, in the top-right corner, the tendency is for the underperformance to be lower.

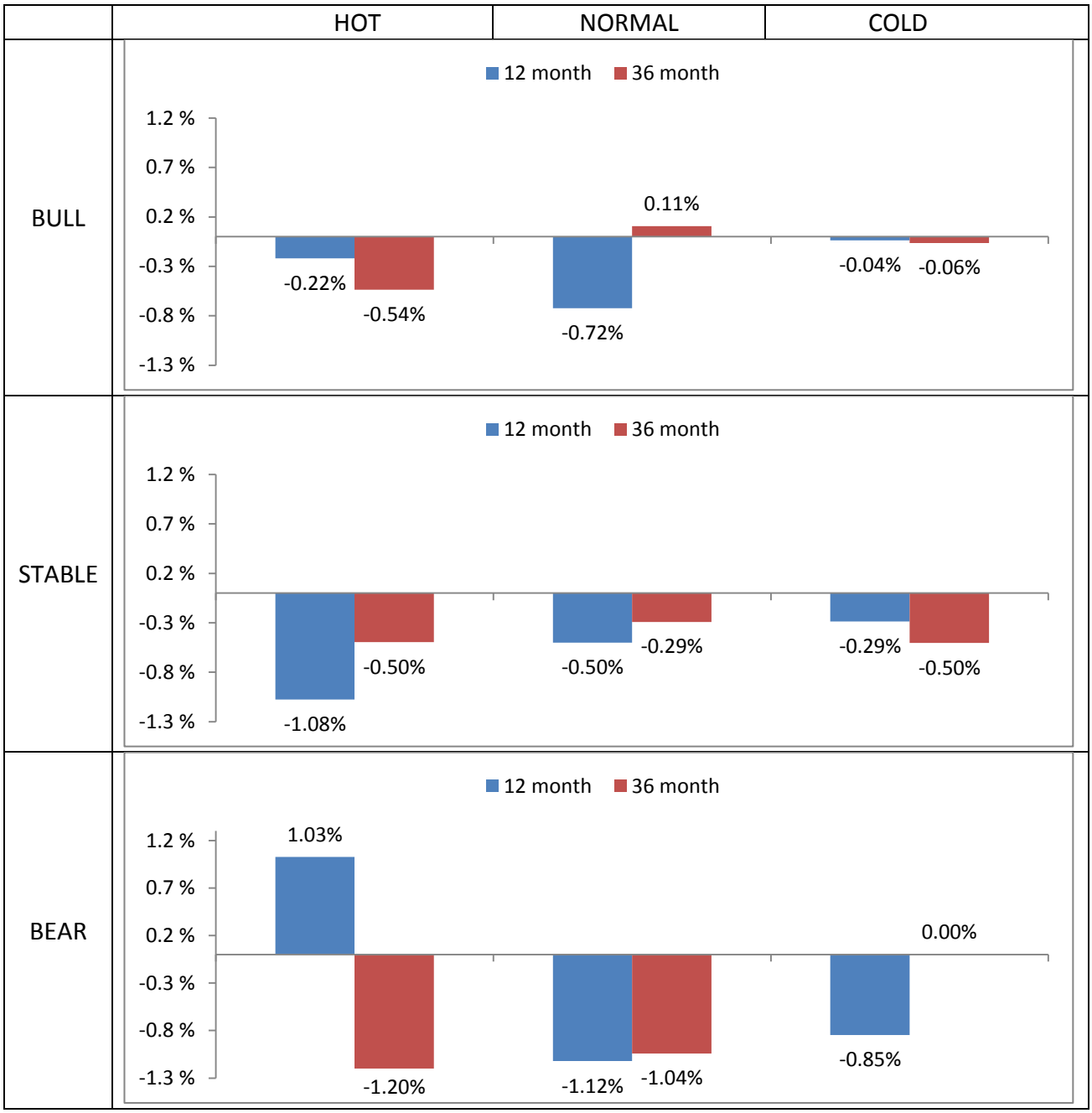

Figure 10 – Results presented along two dimensions

Next, the interaction between the two dimensions is commented. Given the previous results, one would expect that when moving from HOT subsamples towards COLD subsamples, the stock price underperformance would decrease. This generally seems to be the case within the

STABLE and BEAR rows. In the BULL row however, this trend is less clear. Interestingly, with more than 100 offerings in each subsample, the 12-month performance is much worse in the NORMAL/BULL subsample than in the HOT/BULL subsample (remember that the COLD/BULL subsample has a very low number of observations). This could indicate that in good stock market conditions, windows of opportunities could be a less important market timing factor than in bad stock market conditions.

Given the previous results, one would also expect that when moving from BULL subsamples towards BEAR subsamples, the stock price underperformance would increase. Generally, this holds within all columns. This would suggest that no matter whether an issue takes place within or outside windows with high issuing activity, market conditions are always an important factor.

In table 9 below, only the subsamples HOT/STABLE, COLD/STABLE, BULL/NORMAL and BEAR/NORMAL are included. The purpose of this analysis is to compare the effect of the two dimensions when occurring alone. These four subsamples also have a reasonably high number of observations, improving the quality of the results.

	HOT			NORMAL			COLD		
BULL									
					#	Abnormal return	**P-value (mean ≠ opposite)**		
				12 month	107	-0.722 %	**32 %**		
				36 month	85	0.107 %	**2.3 %**		
STABLE		#	Abnormal return	**P-value (mean ≠ opposite)**				#	Abnormal return
	12 month	180	-1.076 %	**14 %**			12 month	90	-0.287 %
	36 month	111	-0.495 %	**49 %**			36 month	73	-0.505 %
BEAR									
					#	Abnormal return			
				12 month	72	-1.121 %			
				36 month	46	-1.041 %			

Table 9 - Results presented along two dimensions – selected subsamples

Interestingly, the 12-month analysis and the 36-month analysis differ in which dimension that has the highest explanatory power.

In the 36-month analysis, there is almost no effect of moving from HOT to COLD markets within the STABLE sample. This may suggest that in the long run, the effect of windows of opportunities diminish somewhat. On the other hand, given NORMAL markets, the effect of BULL versus BEAR markets is highly significant, with a p-value of 2.3%. Although a positive average abnormal return in the NORMAL/BULL sample is probably too high, a difference of more than 1% to the NORMAL/BEAR sample is convincing.

In the 12-month analysis, windows of opportunities seem to be a more important factor. Given NORMAL markets, the average difference between HOT and COLD is 0.79%, with a p-value of 14%. The effect along the BULL/BEAR dimension remains, but is smaller than in the 36-month analysis, with a p-value of 32%.

That pre-issue market conditions may be a more important factor in the long run, while issuing activity is more important in a shorter time span is perhaps intuitive, but nevertheless an interesting result.

4.6 Time Effect

In addition to testing the abnormal performance following offerings in different market states, the evolvement of the underperformance effect through time is also tested. In finance, anomalies are known to diminish as they become known and investors start trading on them. A similar effect could be possible for the underperformance following equity offers; as the literature has become more convincing, investors could be more skeptical to invest in newly issued equity.

4.6.1 Months

The number of equity offers per months is generally below 10, although there have been months with as many as 25 offerings. In the figure below, a five-month moving average of average returns is therefore dominated by noise. However, there are indications of the underperformance effect being largest between 1999 and 2004, and smaller in recent years.

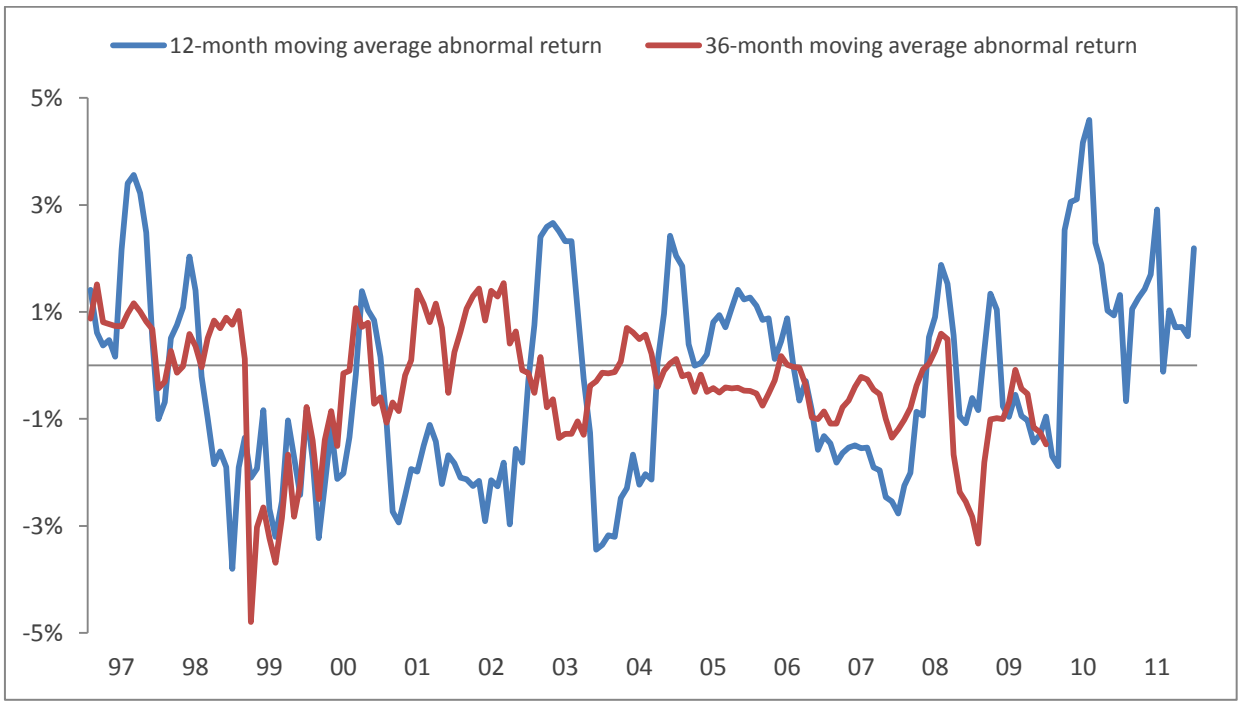

Figure 11 – 5-month moving average of monthly average abnormal returns

4.6.1 Years

The number of equity offers per year can be seen in the table below.

	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11
12 month	49	36	28	46	56	48	46	61	139	116	149	74	96	55	34
36 month	36	22	16	35	36	40	43	52	119	94	125	44	57		

Table 10 – Number of offerings per year

Note that the number of offers is always higher for the 12-month analysis, as a number of companies were delisted between the first and third year following the offering. I decided to end my analysis with stock prices as of the end of 2012. Therefore, the 12-month analysis contains offers up to 2011, and the 36-month analysis contains offers up to 2009.

Despite the small number of offers and the high degree of overlap, some trends can be seen in the data. Below I present the average abnormal return for each year.

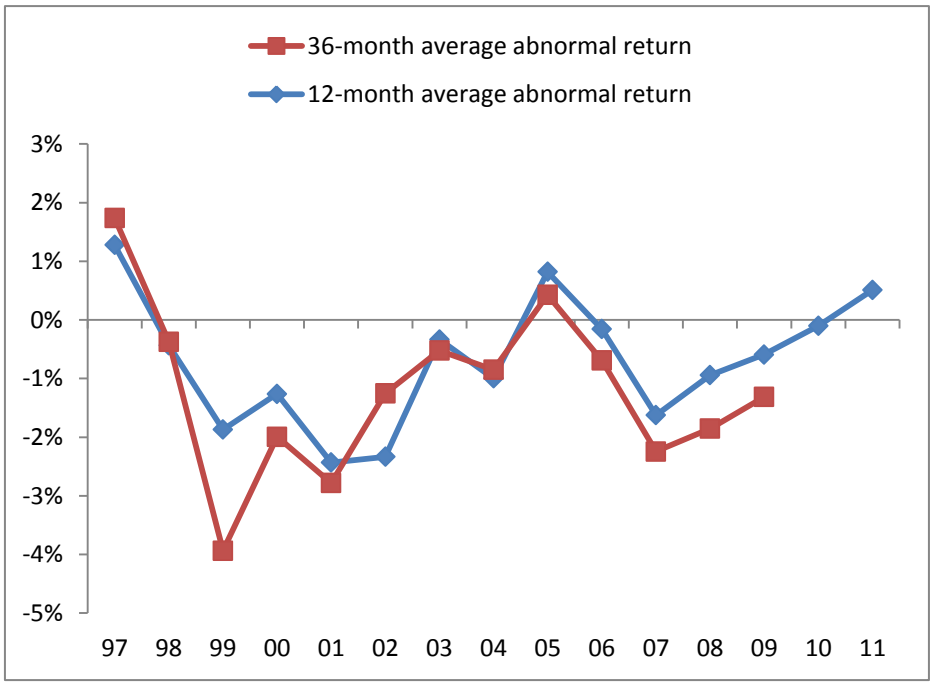

Figure 12 – Yearly average abnormal return

As expected, there are fluctuations from year to year. For two years in the 36-month analysis and three years in the 12-month analysis the average abnormal return is actually positive for the companies issuing equity.

In the figure, a slight trend towards a smaller effect of stock price underperformance can be seen. From 1999 to 2005 the effect is diminishing, but it later increases for the next two years. However, since 2007 there is a clear trend towards a smaller effect of abnormal stock price underperformance. It will be interesting to follow this development in the next couple of years.

4.7 Type of Issue

As a complete data set of SEOs and IPOs on OSE in the period 1997-2011 was obtained, the difference between SEOs and IPOs was also tested, even if this is not related to market timing effects. The results, presented in the table below, show that the effect of negative abnormal returns is around halved for IPOs compared to SEOs. As the number of SEOs is much higher than IPOs, the analysis in this study is dominated by SEOs.

	12 month	36 month
Number of SEOs	927	661
Number of IPOs	78	58
Mean abnormal return SEOs	-0.634 %	-0.390 %
Mean abnormal return IPOs	-0.379 %	-0.147 %
P-value (SEO ≠ IPO)	0.35	0.38

Table 11 – Separate results for SEOs and IPOs

4.8 Risk Factors

For completeness, the aggregate results for the three risk factors used in the analysis are provided below.

Market risk	1.017
Size risk	0.266
Liquidity risk	-0.126

Table 12 – Average risk factor results

As can be seen, companies issuing equity have an average market risk, or market beta, of just over 1. This would indicate that companies issuing equity are slightly more sensitive to market movements and have a higher expected return than non-issuers, but the result is clearly not significant.

As for size risk, my result is close to Smith-Sivertsen and Sjaastad (2012) and Grieg (2012), who found a size risk factor of 0.28 for SEO companies on OSE. This seems to strengthen the result of Næs, Skjeltorp and Ødegaard (2009), who argued that size risk is an important risk factor on OSE.

The liquidity risk is found to be slightly negative, roughly half the size of the result of Smith-Sivertsen and Sjaastad and Grieg, who found a liquidity factor of -0.23. This could suggest that liquidity risk may not be that important for issuing firms on OSE.

4.9 Effect of Offer Size

Finally, the effect of the offer size is tested. As discussed before, ideally I would have used the companies' market capitalization at the time of the offer. If I had, I could compare the offer size

as a fraction of the market capitalization to the abnormal post-issue stock performance. Instead, I tested whether the absolute value of the offering is related to the abnormal post-issue stock performance.

A linear regression is applied, with offer size as the independent variable and abnormal stock performance as the dependent variable. The results, summarized in the table below, show no effect of the offer size on the abnormal stock price performance.

	12 month	36 month
Intercept	-0.576 %	-0.387 %
X-variable (size)	-1.17E-12	5.47E-13
R-squared	0.0006	0.0003

Table 13 – Linear regression, test of the effect of offer size

This is consistent with the findings of Masulis and Korwar (1986) and Baghat and Frost (1986), neither finding a relation between performance and offer size.

5 Discussion of Results

In this study, a negative abnormal risk-adjusted performance on average following equity issues on OSE between 1997 and 2011 is shown. To this date, no one has been able to specify a risk model that removes this underperformance effect. This suggests a behavioral explanation, where companies on average are successful in convincing the market of their promising growth opportunities, leading to an overvaluation of the share. Investors, on the other hand, underestimate this practice and seem to be overconfident in their abilities to pick winners among issuers. As a result, they underreact on average to the announcement of an issue. This is an apparent breach with market efficiency and with the well-known trade-off theory for capital structure. However, the underperformance effect seems to diminish somewhat, possibly as a result of the empirical research within the field. The effect is around twice as large for SEOs compared to IPOs.

My results, an average abnormal performance of -0.615% per month over 12 months and -0.370% per month over 36 months, are high compared to the list of nine international studies compiled by Grieg (see chapter 2.2). However, the underperformance is much smaller than found by Grieg (2012) as well as Sjaastad and Smith-Sivertsen (2012), who found a three-year average monthly abnormal performance of -1.22% for 895 SEO issues on OSE between 2000 and 2007. One notable distinction is that they included as many months as possible for companies being delisted within the time period, while such companies are excluded in this analysis. Including companies that were eventually delisted seems to have increased the underperformance notably. In addition, this study uses a much longer data set also including IPOs, which could also contribute to differing results.

While there is clear evidence for the underperformance effect itself, patterns of time-varying underperformance are certainly less conclusive. A possible explanation could be that as the underperformance effect gets smaller, the time-variation is diminishing as well. The ability to detect time-varying underperformances will also rely heavily on the definitions of market states. Alternatively, one could argue that the relatively small number of offerings, leading to inconclusive results, is the reason for why the anomalies still exist, as investors have yet to revise their models and beliefs. Anyway, there are patterns in the data that needs discussion.

This study shows that companies issuing equity in periods of high activity in the equity capital market (HOT markets) on average have a worse risk-adjusted abnormal stock price performance during the first 12 and 36 months following the offering. This strengthens the hypothesis of the clustering being a result of market timing effects, where companies are taking advantage of an over-optimism in the prospects of issuing companies among investors. While investors seem to believe that these are time periods when companies are pursuing growth opportunities, many companies with other reasons to issue equity are just taking advantage of the window itself.

It seems like investors share a misconception that the window exists as a result of lower information costs, in a way partly compatible with the pecking-order theory and discussed by Myers and Majluf (1984) and Korajczyk, Lucas and McDonald (1992). As a result, they underreact to the announcement of the equity issue and invest in shares that are overvalued on average. As Loughran and Ritter (1995) discussed, it may very well be true that the announcement effect is smaller in these time periods, and that a small gain is obtained from this (as shown by Bayless and Chaplinsky (1996)). However, it seems like the real gain is a result of companies exploiting the sense of optimism to raise a high amount of capital over a longer business cycle, as discussed by Loughran and Ritter (1995).

Further, the relative number of offers were higher in periods characterized by high pre-issue growth in the stock market (BULL markets) and lower in periods of lower market growth or market decline (BEAR markets). Perhaps unexpectedly, the results showed that companies issuing equity within BULL markets on average had a better post-issue abnormal stock performance. In other words, issuing companies are more sensitive to pre-issue market conditions than what is captured by the three factors of Næs, Skjeltorp and Ødegaard (2009).

It is known that liquidity issues may be a more prominent reason for issuing equity during bad stock market conditions, while investments in growth projects are more dominant within good market conditions. To reduce the announcement price drop, companies are always trying to convince the market that their issues are motivated by growth opportunities (Choe, Masulis and Nanda 1993). It seems like investors and their models are underestimating this systematic difference and the marketing efforts by the companies, which are probably more often wrongful in BEAR markets. This leads to an overvaluation that is higher on average in BEAR markets.

As companies tend to issue equity in BULL markets, the apparent implication of this result is that companies should not be as averse to issue equity during bad market conditions as they are. The study shows that companies that are able to raise new equity capital during BEAR markets do so at conditions that are highly favourable to existing shareholders.

However, it may be worth noting the obvious; existing shareholders do not benefit from a negative long-term abnormal risk-adjusted return. Although this implies that they received a good price for their reduced ownership in the first place, all shareholders will of course want to see their share value as high as possible in the long term. It is likely that companies will continue to cluster their issues to BULL markets, as more growth opportunities are prominent in these market conditions. The interesting result is that the companies' marketing efforts in BEAR markets seem to be successful on average.

Another possible explanation for the difference between BULL and BEAR markets could be that models are failing to specify the relation between absolute and relative valuation. Remembering

that the definitions of the market states rely on the OSEAX performance for the previous 10 months, it is probably safe to assume that issues in BULL markets on average are overvalued in *absolute* terms, while offers in BEAR markets are undervalued in absolute terms. If there does exist some mean-reversion that is known in the market but models are unable to predict, the results would suggest that investors in BULL markets are compensated somewhat with a lower subscription price, giving a less negative abnormal return on average. Similarly, investors investing in stocks during BEAR markets knowingly accept a slightly higher subscription price, giving a worse abnormal performance following the issue, knowing that the probability of a market rally might be slightly higher.

Even though subsamples were small, the two-dimensional analysis also provides some insight. First, it showed that the Windows of Opportunities dimension could be a less important market timing factor in good pre-issue market conditions (BULL markets) than during stable and bad pre-issue market conditions. This is somewhat intuitive; in times of general stock market optimism (and a higher relative number of offerings), the importance of timing the issue to certain windows is smaller. In more turbulent market conditions, timing the offer to windows of high issuing activity is more important. On the other hand, pre-issue market conditions turned out to be an important factor regardless of the Windows of Opportunities dimension.

In addition, there was a slight tendency of short-term equity capital market activity being a more important factor in the 12-month span, while the pre-issue market conditions prevailed in the 36-month span. This strengthens the belief that Windows of Opportunities generally do not rely on fundamentals, but are created in the behavioural space. However, I would once again note that the number of observations were too small to draw any significant conclusions from the two-dimensional analysis.

It is crucial to realise that companies cannot always choose the time of their equity issues freely. In order to be able to raise the desired amount of capital, it may be required to wait until a window with high equity issuing activity or to a period with general stock market growth, as suggested by the clustering of issues in HOT and BULL markets. This study shows that companies that are able to issue shares during BEAR markets do so at favourable terms to the company, while companies that are able to issue shares during COLD markets do so at terms that is more favourable to the buyers of the new shares.

Regarding the risk-adjustment, the three-factor Fama-French model with the risk factors found by Næs, Skjeltorp and Ødegaard (2008) is judged to be an appropriate tool for modelling the risk of equities on OSE. A small size effect for issuing companies within the time period was found. The liquidity effect was even smaller, consistent with the studies by Grieg (2012) and Sjaastad and Smith-Sivertsen (2012). It could be the case that companies issuing equity in most cases

have a decent level of liquidity, at least following the issue. Other risk factors could be more prominent for the special case of issuing companies.

A number of potential biases both regarding the model and the data set have been mentioned. In a future study of post-issue performances, obtaining the market capitalizations at the time of the offer and using the offer-to-market capitalization ratio as a cut-off criterion would probably be desirable.

The key finding of the study is that there does exist a long-term risk-adjusted abnormal underperformance following equity issues on OSE. Furthermore, the underperformance tends to vary through time. The underperformance is highest in periods of high activity in the equity capital market and in periods of bad pre-issue stock market conditions.

For companies looking to issue equity, this study implies that Windows of Opportunities is a factor that should be considered when timing an equity offering. In addition, while most companies look to issue equity in times of economic growth, this study shows that companies that are able to raise capital in times of bad economic growth have a worse abnormal performance thereafter. Isolated, this implies that the offer takes place at favorable terms for the existing shareholders, although they too will suffer from the severe underperformance.

For investors considering buying newly issued shares, the result that there does exist an abnormal underperformance for such shares should be noted. As this effect is varying through time, investors should be careful in jumping on the bandwagon in times of high issuing activity, as the average performance is worse following issues within these windows. The study also shows that current models may not capture the high sensitivity of pre-issue market conditions on the post-issue performance, implying that investors should be extra careful when considering why companies are issuing equity in times of bad market conditions.

6 Conclusion

This study has shown that there does exist market timing effects on the long-term abnormal underperformance following issues of equity on Oslo Stock Exchange. This can probably be explained by a combination of behavioural theory, market timing factors and model misspecification.

Using a sample of all offerings from 1997 to 2011, a significant abnormal underperformance following equity issues on OSE was found. The underperformance suggests that companies on average are successful on issuing equity when their stock is overvalued. This is an apparent breach of market efficiency. However, the long-term trend is that the underperformance effect is diminishing.

The study shows that the post-issue abnormal stock price performance on average is worse for offerings taking place within periods of especially high activity in the equity capital market, labelled Windows of Opportunities. This is explained by companies exploiting an over-optimism in issuing companies among investors.

Companies also tend to issue equity following periods of rising stock markets. The study shows that these issues are followed by a smaller long-term underperformance. This is believed to be a result of a systematic difference between the companies' motivations for issuing equity, and a subsequent under-reaction among investors to this difference.

A two-dimensional analysis revealed a couple of trends, although statistically insignificant. However, the framework developed in this study is one that reflects the two major factors identified to influence timing of equity offers and long-term post-issue abnormal stock price performances, the pre-issue stock market performance and the short-term activity level in the equity capital market. This approach should therefore be applied when testing for market timing effects on larger markets to shed more light on these important relations.

In addition to testing for market timing effects on larger markets, other questions also remain unsolved. This includes the hypothesis that there does exist systematic differences between the motivations for issuing equity in periods of good and bad stock market performance. Identifying suitable risk factors for the special case of issuing companies and testing the relation between the announcement effect and long-term abnormal performance under different market states are other important tasks. Further work within this topic is encouraged.

7 Litterature

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