LUND UNIVERSITY

SCHOOL OF ECONOMICS AND MANAGEMENT

# Is it cash o'clock?

*Market timing, cash need rationale, and the long-term stock performance following seasoned equity offerings*

Master Thesis in Accounting and Finance
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**Purpose:** The purpose of this study is to further investigate how market timing and cash need rationale affects stock performance subsequent to a seasoned equity offering and, by doing so, to expand on previous literature on the subject of seasoned equity offerings and stock performance.

**Methodology:** In this thesis a quantitative approach taken by estimating buy-and-hold abnormal returns subsequent to a seasoned equity offering by the means of an event study. Further, buy-and-hold abnormal return categorized group returns are assessed. Lastly, multiple multivariate regressions are run to assess the effect of different factors on abnormal returns.

**Theoretical perspectives:** We analyze long-run abnormal returns subsequent to SEOs primarily in the context of market timing theory and the pecking-order theory. The explanatory power of various other theories on capital structure are also reviewed.

**Empirical foundation:** The empirical analysis is based upon a sample of 658 offerings, conducted by firms located in the United States. The firms are listed on New York Stock Exchange, Nasdaq, or American Stock Exchange, and the offering was conducted between 1998-2015.

**Conclusions:** We conclude that market timing and, to some extent, cash need rationale affect stock performance following seasoned equity offerings. Firms that time the market and firms under financial distress experience more negative long-run abnormal returns subsequent to seasoned equity offerings. Further, firms with sufficient financial strength experience more negative long-run abnormal returns subsequent to seasoned equity offerings.

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# 1. Introduction

This introductory section provides a background on the subject of seasoned equity offerings and subsequent stock performance, research motivation, a research question, the contributions made, and an outline for the thesis.

## 1.1 Background

A seasoned equity offering (SEO) is a financing alternative, where an already listed company issues more equity to raise funds. The intended use of SEO proceeds is to provide liquidity to finance investments, recapitalizations or, more vaguely, general corporate purposes (Autore, Bray & Peterson, 2009; Walker & Yost, 2008). Looking at the sample collected by Barclay, Fu and Smith (2021) seasoned equity issues, although fluctuating, are trending upwards. The rationale behind SEOs and the performance of SEOs have received a lot of attention from researchers.

A rather broad agreement has been reached about the stock underperformance subsequent to SEOs (Spiess and Affleck-Graves, 1995; Teoh, Welch and Wong, 1998; McLaughlin, Safieddine and Vasudevan, 1996; Hertzel and Li, 2012; Chen, Chou, and Lin, 2019; Loughran & Ritter, 1995; 1997). For example, Spiess and Affleck-Graves (1995) document the average long-term underperformance of SEO issuing firms' stock. As a result of their research, they find that investing in SEOs is not a particularly lucrative trading strategy. Following this strategy, the investment would have yielded an investor 85,4 cents on the dollar over three years relative to investing in comparable firms who do not issue a SEO. More contemporary research takes factors such as the timing of the SEO into account. Chen, Choe and Lin (2019), for example, find evidence in support that firms who issue during a period of high investor sentiment tend to experience more severe long-term underperformance.

The results of Chen, Choe and Lin (2019), although aligned with the aforementioned agreement of SEO underperformance, provide further understanding of SEOs by using investor sentiment. Studies of intended use of SEO proceeds have also brought a discussion of the relation between vague statements and agency costs reflected in stock performance (Autore, Bray & Peterson, 2009; Walker & Yost, 2008). Therefore, even though the area of seasoned equity and stock performance are rather well-documented, more recent research has contributed with interesting results and discussions.

## 1.2 Motivation

Both market- and firm-specific factors can affect the decision of issuing seasoned equity. In regard to market-specific factors, firms appear to be more prone to issue equity during times when market valuations of equity are high (Choe, Chen & Lin, 2019; Loughran & Ritter, 1997; Baker and Wurgler, 2002). Thus, firms and managers exploit certain "windows of opportunity" when they conduct SEOs, which potentially affects subsequent stock performance. However, in combination with exploiting equity markets, firms are also required to explain how they will use the proceeds. Hence, they are required to have a cash need rationale.

Previous research has found that firms conducting a SEO are in need of cash (DeAngelo, DeAngelo & Stulz, 2010). The cash infusion from SEOs has two important implications on the firm. First, the infusion of equity capital decreases leverage and any associated potential for financial distress. Second, the proceeds finance expansions of capital expenditure and investments (Masulis & Korwar, 1985). Distinguishing between using SEO proceeds for investments or recapitalization, cash need rationale has the potential to impact subsequent stock performance (Masulis & Korwar, 1985).

Prior research has not studied market timing and cash need rationale together. Because of the importance of both market timing and cash need rationale relative to SEOs, studying them together provides a more complete understanding of stock performance following SEOs. Further, the relation between stock performance and the intended use of SEO proceeds has been studied (Autore, Bray & Peterson, 2009; Walker & Yost, 2008). However, these studies have looked upon the intended use stated by the firm. By basing the cash need rationale on firm financials, this study expands on previous literature by accounting for financial proxies for financial distress.

Studying market timing in combination with cash need rationale is relevant from both an investor and firm management point of view. Accounting for both market timing and cash needs furthers the understanding of stock performance subsequent to a seasoned equity issue. As a result, investors can make more informed decisions. From a managerial point of view our research is relevant because it relates the firm's financial situation and financing strategy to the market value of the firm.

## 1.3 Research question

The purpose of this study is to investigate determinants affecting stock performance subsequent to an SEO and to expand on previous literature on the subject of SEOs and stock performance. Further, abnormal returns are analyzed within the scope of market timing and cash need rationale to assess the effect on variation in stock returns.

*RQ: How does market timing and cash need rationale affect long-term stock performance following a seasoned equity offering?*

To answer the research question, we first assess the stock performance of firms subsequent to issuing seasoned equity. Second, we analyze how market timing affects the stock performance. Third, study how different cash need rationales affect the stock performance, distinguishing between growth opportunities and financial distress. Last, we assess how market timing and cash need rationale together affect the stock performance.

## 1.4 Findings and Contributions

Our analysis uses a sample of 658 SEOs, conducted by U.S. firms listed on the NYSE, Nasdaq or AMEX during the period 1998-2015. We find evidence which suggests that market timing has an effect on subsequent stock performance. Firms that time the market when issuing equity have a worse buy-and-hold abnormal return compared to firms that do not time the market. The effect of market timing appears to be both economically and statistically significant over a holding period of 12 months.

In regard to cash need rationales, our findings suggest that the stock performance subsequent to a SEO of financially distressed firms tend to be worse. These findings are aligned with previous research on the anomalous stock performance patterns of distressed stock (Campbell, Hilscher & Szilagyi, 2008; Griffin & Lemmon, 2002; Dichev, 1998). However, based on further analysis we find evidence that suggests a negative relation between increased financial strength and abnormal returns following SEOs. The latter results are found to be aligned with the pecking-order theory. Further, we find that market timing and the financial distress level have both an economically and statistically significant effect on stock performance.

This paper provides both practical and empirical contributions. From a practical perspective, the paper produces valuable insights to investors and firm management. Our study's documented abnormal return on financial distress level and market timing shows that investors

should be cautious of both these factors when investing in seasoned equity issuing firms. In addition, our results provide firm management with insight regarding windows of opportunity, as they can exploit fluctuations in market values and issue seasoned equity when the equity is overvalued. In regard to previous literature this study expands on Chen, Choe and Lin's (2019) model by also including the effect of cash need rationale. Further, relative to Autore, Bray and Peterson (2009) and Walker and Yost (2008) we contribute by putting cash need rationales in the context of fundamentals rather than stated intentions.

## 1.5 Outline

The remainder of the paper is structured as follows. Section 2, provides a presentation of relevant theory and previous empirical research on seasoned equity. In section 3, hypotheses are stated and developed. In section 4, the research methodology of the study is presented. In section 5, data collection, variable descriptions and summary statistics are provided. In section 6, empirical results and analysis is presented. Lastly, section 7 provides a conclusion and remarks for future research.

# 2. Literature Review and Theoretical Background

In this section we first present relevant theoretical frameworks and concepts in regard to firm financing choices. Second, a theoretical discussion including market timing, cash need rationales, and SEO performance is provided.

## 2.1 The implications of financing on SEO decisions

A relevant topic in regard to SEOs is capital structure, as issuing equity effectively has an impact on firm capital structure. Seasoned equity is a financing decision, and the theoretical predictions vary among different frameworks. For example, in regard to three prominent capital structure theories, reviewed by Myers (2001), the rationale for conducting an SEO could be explained by different factors. The pecking-order theory bases financing decisions on information asymmetry and financial distress costs (Myers, 1984; Myers & Majluf, 1984). Due to the costs arising from information asymmetry, issuing equity is the least attractive financing option for firms. Rather, according to the prediction of pecking-order theory, firms primarily rely on internally generated funds for investment financing. Further, investment opportunities might not be a rationale for an SEO issuance. Due to information asymmetry, firms could forgo an investment if equity financing is the only financing option.

The trade-off theory, on the other hand, implies that firms aim for optimal debt levels by balancing the benefits of debt and financial distress costs (Myers, 2001). In regard to SEOs, an equity issue would thus be justified if leverage is on a suboptimal level which has caused financial distress costs to rise. Although changes in weights of the respective capital sources should not affect firm cost of capital as low-cost debt is offset by the increased risk (Modigliani & Miller, 1985), tax benefits can mechanically increase firm value. From a trade-off theory point of view, a firm would choose debt financing as long as the marginal value of the tax benefits is not offset by the present value of financial distress in order to maximize the market value of the firm (Myers, 2001). However, financial distress costs do not only refer to leverage level and interest coverage, and by that, the probability of bankruptcy. Financial distress does also refer to the cost of default or restructuring and agency costs arising from the firm's credit worthiness being questioned. As an equity issue would be justified only when the benefits of further debt are offset by financial distress costs, the trade-off theory provides a somewhat vague prediction in regard to SEOs. In regard to investment opportunities, on the other hand, firms would opt for debt as long as the benefits outweigh the costs of distress. Therefore, low-levered firms have less reasons to conduct an SEO according to the trade-off theory.

Drawing on the theory of the firm and agency costs, discussed by Jensen and Meckling (1976), the free cash flow theory suggests that increased debt levels can have a positive effect on agency cost of free cash flows (Jensen, 1986). Value arises due to debt limiting managerial discretion by limiting free cash flow. In a SEO perspective, a firm could potentially be expected to issue equity due to investment opportunities which could not be financed by other means. As the free cash flow hypothesis predicts high levels of leverage in order to limit free cash flow, both debt capacity and free cash for investment would be limited. However, the hypothesis differentiates firms dependent on maturity as free cash flow is cash flow in excess to what is needed for funding of value adding activities. Therefore, those firms who adopt high levels of leverage in order to control agency costs of free cash flows are predicted to have accounted for financing needed for value adding investments. The hypothesis does not predict unrestricted debt but recognizes the costs of increased debt. As agency costs of debt rise with increased leverage, the optimal debt-to-equity ratio is at a level where the marginal cost of debt is just offset by the marginal benefits.

As the free cash flow hypothesis differentiates firms, control values arising from debt are not as prominent in regard to rapidly growing firms (Jensen, 1986). As rapidly growing firms have large and profitable investments but lack free cash flow, these firms turn to financial markets to ensure funds. Therefore, these firms are continuously evaluated, and the control aspect of debt is not needed to the same extent. Thus, according to the cash flow hypothesis, conducting an SEO is more likely for rapidly growing firms facing profitable investment opportunities.

The theoretical frameworks presented above provide predictions on firms' choice of financing and are, thus, relevant in regard to SEOs. In general, conducting an SEO is justified if related to a value adding activity and thus increases the value of the firm. However, the theories differ in regard to investment opportunities and distress. In regard to financial distress an SEO would be expected according to both the pecking-order (Myers, 1984; Myers & Majluf, 1984) and the trade-off theory (Myers, 2001). Especially from a pecking-order perspective as all other financing sources are preferred over equity. The cash flow hypothesis (Jensen, 1986), on the other hand, argues for increased leverage as a control of managerial discretion while balancing marginal costs and benefits of debt. If the balance becomes skewed towards marginal costs of debt, firm value would not be maximized.

## 2.2 Theoretical discussion on market timing and cash need rationale

### 2.2.1 Market Timing and SEOs

An alternative perspective of capital structure and financing decisions is that of market timing (Baker & Wurgler, 2002). In a search of empirical regularities related to corporate financing decisions, Taggart (1977) found evidence suggesting that market timing has an effect on the speed at which firms adjust their finances. Again, in an efficient market the timing of a SEO would have no impact on the cost of capital as the cost of equity and debt are interrelated (Modigliani & Miller, 1985). However, as discussed by Baker & Wurgler (2002), by timing the market and exploiting variations in the cost of equity, managers can benefit ongoing shareholders by issuing equity at low costs at the expense of exiting or entering shareholders. Under the assumption that managers act in the interest of current and ongoing shareholders, firms would conduct an SEO under periods of high market valuations and upwards mispricing.

The practice of equity market timing within corporate financing is to issue shares when firm shares are valued high and repurchasing when the same shares are valued low. The managerial intention is to utilize short-term variations in the cost of equity relative to other types of capital (Baker & Wurgler, 2002; Bayless & Chaplinsky, 1996; DeAngelo, DeAngelo & Stulz, 2010). Further, the market-timing theory have been found fitting and bearing explanatory power in regard to SEO probability and subsequent performance (DeAngelo, DeAngelo & Stulz, 2010; Chen, Chou & Lin, 2019; Loughran & Ritter, 1997; Kahn, Kogan & Serafeim, 2012).

Looking at deal-related literature, Martynova and Renneboog (2009) document that in regard to M&A financing and payments, cash-poor firms tend to issue equity during high periods of the boom/bust-cycle. Although drawing on the conclusion that M&A financing is somewhat explained by the pecking-order guided preferences, the likelihood of equity issuance is higher during periods in which market values are high, suggesting that market timing might be applicable as well (Martynova & Renneboog, 2009). Such conclusions would be aligned with Kahn, Kogan and Serafeim (2012) which find evidence that suggests that managers do have an ability to understand and time overvaluations to sell equity, as the probability of an SEO increases following a buying pressure run-up in stock price.

### 2.2.2 Market timing and SEO performance

The area of market timing and SEO performance is rather well researched and was of much interest during the 1990's, as suggested by the large amount of empirical work published during

that period. A prime example is the work of Loughran and Ritter (1995), who studied the stock market return for firms issuing equity, both through IPOs and seasoned equity offerings. By looking at 3,702 offerings conducted between 1970-1990, they found that firms that issue seasoned equity only have an average return of 7 percent per year during the following five-year period. Further, an investor would need to invest 44 percent more capital in firms that issue equity to receive the same amount of wealth after five years vis á vis a non-issuing firm. The pattern of stock underperformance found by Loughran and Ritter (1997) is recurring in the seasoned equity literature (Spiess and Affleck-Graves, 1995; Teoh, Welch and Wong, 1998; McLaughlin, Safieddine and Vasudevan, 1996; Hertzel and Li, 2012; Chen, Chou, and Lin, 2019).

Previous research has found that SEOs are commonly issued during periods when market-to-book ratios are trading at high values and that subsequent stock performance is poor (Loughran & Ritter, 1995; 1997). Likewise, researchers have chosen to proxy market timing by investors sentiment and found it common that firms issue in times of high sentiment and that the long-term stock performance of high-sentiment issuing firms is poor (Baker & Wurgler, 2002; Chen, Choe & Lin, 2019). The distinction between using investor sentiment or market-to-book ratio as a proxy of market timing builds upon findings that market-to-book ratios reflect both market mispricing and firm growth options (Hertzel & Lee, 2010). Investor sentiment correlates with market-to-book ratios and both proxies have indicated similar results in regard to long-term stock performance (Chen, Choe & Lin, 2019).

The stock price of firms issuing SEOs in high-volume periods tends to dramatically underperform relative to non-issuers of the same size (Loughran & Ritter, 1995). However, firms issuing new equity during low-volume periods do not tend to underperform much at all. Based on a sample of 7,195 SEOs conducted by U.S. firms between 1970-2010, Chen, Choe and Lin (2019) find that the long-term underperformance of young and small firms, that are more subjective in terms of value and hard to arbitrage, is more severe. In general, however, employing an investment strategy based on holding SEO issuing firms' stock long-term is not particularly effective according to Spiess and Affleck-Graves (1995). Based on a sample of 1,247 U.S. firms during 1975-1989, their results show that an investment strategy, based upon investing in a seasoned equity offer at issue day close and holding for three years, would result in having 85,4 cents on the dollar relative to investing in comparable firms. They also conclude that over five years the gap would increase. The pattern of stock underperformance is,

according to Loughran and Ritter (1995), not due to differences in beta or market-to-book ratios. Rather, these findings are consistent with a market where firms and managers take advantage of situations where they are grossly overvalued. Similarly, Baker and Wurgler (2002) discuss how capital structure is the result of continuous managerial attempts to time the market in their equity issue and repurchase strategy.

The stock price performance of issuing firms is linked to operating performance by some research (Loughran & Ritter, 1997; Teoh, Welch & Wong, 1998; McLaughlin, Safieddine & Vasudevan, 1996). Empirical studies find that SEO issuing firms' operating performance tends to peak at approximately the time of the offering. Later, the profit margin of issuing firms tends to decrease over the following four years, and both return on assets and operating income to assets decrease (Loughran & Ritter, 1997; McLaughlin, Safieddine and Vasudevan, 1996). In regard to SEO issuing firms operating performance, Teoh, Welch and Wong (1998) find evidence that suggests that firms engage in earnings management ex-ante SEOs. By decomposing net income, the authors find that accounting adjustments cause the income growth peak and later underperformance. Further, their results suggest that discretionary current accruals are related to post-issue stock underperformance. Their findings are consistent with a semi-strong form of efficient market.

Increased firm valuations and high market-to-book ratios of issuing firms suggest that the market expects recent performance improvements prior to the SEO to be permanent (Loughran & Ritter, 1997). Drawing on the results of Teoh, Welch and Wong (1998) the one-time effect of accounting adjustments suggests high pre-issue valuations to be quite irrational as the performance improvements are unlikely to be continuous. However, seasoned equity issuing firms tend to experience a sharp decrease in profitability ex-post (McLaughlin, Safieddine and Vasudevan, 1996). Further, markets are in general too optimistic relative to issuing firm prospects. Loughran and Ritter (1997) find that firms who hastily increase either sales or capital expenditures have lower stock returns than other firms following an offering.

### 2.2.3 Cash need rationale and SEOs

DeAngelo, DeAngelo and Stulz (2010) conclude that both timing and growth options affect the SEO decision, but that the fundamental reason is cash needs. Looking at the probability of conducting a SEO, both timing and lifecycle theories have an effect, where lifecycle explanations have a stronger impact of the two. However, according to their evidence it is not

only young firms with multiple growth options that issue SEOs but also mature firms. Overall, the evidence suggests that cash balances and firm economic fundamentals are the primary drivers of SEOs (DeAngelo, DeAngelo & Stulz, 2010). Further, of their sample of 2,977 observations, a majority of issuing firms would run out of cash or need to change either their operational or financial decision in the following year. Furthermore, for most of the issuing firms the SEO proceeds were used to fund capital expenditure expansions. However, even if the capital expenditure would have remained at ex-ante levels, 40,3% of issuers would run out of cash and 59,6% would have below normal cash balances in the year following the SEO. SEO proceeds have two primary impacts on a firm (Masulis & Korwar, 1986). First, it lowers the leverage ratio, which results in a decrease of potential financial distress. Second, the cash infusion is used to finance capital expenditures, which allows pursuing growth opportunities.

### 2.2.4 Cash need rationale and SEO performance

By categorizing the intended use of SEO capital into investments, recapitalization and general corporate purposes, the relation between SEO proceeds and the long- and short-term stock performance subsequent to SEOs has been studied (Autore, Bray & Peterson, 2009; Walker & Yost, 2008). In regard to long-term stock performance, firms who intend to use SEO proceeds for recapitalization or general corporate purposes tend to experience significant stock underperformance (Autore, Bray & Peterson, 2009). There is no significantly negative relation between stock performance and investments, which suggests that proceeds can be seen to provide the means to pursue value adding projects. In a short-term perspective, Walker and Yost (2008) find that firms that specify that the intention is to pursue investment experience increased valuations. Ambiguity, i.e., firms that vaguely put general corporate purposes, on the other hand, tend to experience a decrease in valuation at announcement.

Financial distress is one particular line of research within the overarching subject of stock performance. What makes this line of research somewhat distinct is that the result of empirical studies suggests anomalous patterns of security underperformance (Campbell, Hilscher & Szilagyi, 2008; Griffin & Lemmon, 2002; Dichev, 1998). Further, Campbell, Hilscher and Szilgayi (2008) suggest that a portfolio of distressed stocks have low average returns, but high market betas, standard deviations, and loading factors on Fama and French’s small-cap and value risk factors.

Based on their, quite comprehensively, constructed model Campbell, Hilscher and Szilagyi (2008) find evidence in support that distressed stock tends to underperform. These results are similar to the results of other studies using different proxies. For example, Dichev (1998) finds that bankruptcy risk proxied by both Altman Z-score and Ohlson O-score is not followed by higher returns. Further, research suggests that the underperformance is particularly severe for growth stocks (Griffin & Lemmon, 2002; Campbell, Hilscher & Szilagyi, 2008). In terms of industry downturns, Opler & Titman (1994) find that heavily levered firms are more inclined to lose a substantial part of their market share and experience declining operating profits relative to less levered competitors.

# 3. Hypotheses

In this section hypotheses are developed. These are constructed with the purpose of answering the stated research question. The hypotheses are developed in accordance with theoretical arguments and empirical literature discussed in the previous section.

## 3.1 Hypotheses development

First, we examine the subsequent abnormal return after firms issue seasoned equity. We expect the abnormal return to be in line with previous research (Loughran & Ritter, 1997; Spiess and Affleck-Graves, 1995; Teoh, Welch and Wong, 1998; McLaughlin, Safieddine and Vasudevan, 1996; Hertzel and Li, 2012; Chen, Chou, and Lin, 2019). Consequently, firms issuing SEOs are expected to experience negative subsequent stock performance.

**H1.** Firms issuing SEOs experience abnormal subsequent stock performance.

Second, we are examining the effect of market timing on abnormal stock performance subsequent to a SEO. The market timing theory builds upon managerial attempts to time fluctuations in the market value of the firm (Baker & Wurgler, 2002). Managers issue equity during periods of upwards market mispricing and repurchase during periods of downwards mispricing. Previous research has found evidence which suggests that managers are quite successful in exploiting variations in market values (Kahn, Kogel & Serafeim, 2012). More so, according to Baker and Wurgler (2002) it is commonly known that firms issue equity during periods of high market valuations.

Operating performance has been found to peak approximately at the time of a seasoned equity issue (Loughran & Ritter, 1997; Theo, Welch & Wong, 1998). However, evidence suggests that operating performance peaks are driven by accounting adjustments (Theo, Welch & Wong, 1998). The one-time effects of accounting adjustments on operational performance should have no effect on the fundamental value of the firm, especially as such adjustments occur ex-ante and therefore have no effect on future cash flows. High pre-issue valuations suggest that changes in operational performance quite irrationally have been incorporated, while such performance improvements are unlikely to be continuous. However, as the one-time effects do not withstand over time any upwards mispricing should decline towards fundamental values as investors incorporate non-skewed operational performance. Managerial exploitations of such "windows of opportunity" (Loughran & Ritter, 1997) are thus expected to have an effect on stock performance subsequent to an SEO. As managers are more inclined to issue seasoned

equity during periods of upwards mispricing, market timing is expected to have a negative effect on the subsequent stock performance.

**H2.** Market timing has an effect on subsequent SEO abnormal stock performance.

Third, we are examining the effect of cash need rationale on abnormal stock performance subsequent to SEOs. A fundamental reason for conducting an SEO is that the firm needs cash (DeAngelo, DeAngelo & Stulz, 2010). In addition, information in regard to the intended use of SEO proceeds has an effect on stock performance (Walker & Yost, 2008; Autore, Bray & Peterson, 2009). Therefore, we believe that the cash need rationale has an effect on subsequent SEO abnormal performance. Depending on their fundamentals and opportunities, firms can deploy proceeds from SEOs differently. Either they can use the proceeds to pursue growth opportunities or to decrease financial distress.

Firms with growth opportunities that have large and profitable investments, but lack free cash flow, can turn to financial markets to ensure funds (Jensen, 1986). Mature firms are, according to the free cash flow hypothesis, expected to limit free cash flow by using dividends and leverage to decrease the risk of managerial discretion. As a result, mature firms could need to issue seasoned equity to pursue a profitable growth opportunity for which they lack financing. Therefore, on the basis of the free cash flow hypothesis, we expect growth opportunities to have a positive effect on subsequent SEO abnormal performance.

The pecking-order theory predicts that firms opt for equity as a last source of financing due to the costs of information asymmetry (Myers & Majluf, 1984, Myers, 1984). Investments could justify a seasoned equity issue, but that would require the project value to be sufficiently high and that other financing options are unavailable. Issuing seasoned equity could therefore have a negative effect on financially strong firms with alternative financing options. However, if financial distress costs increase, using debt or mezzanine financing might not be an alternative. For a firm in financial distress, a seasoned equity issue is an action which should improve the value of the firm as the distress costs outweigh the information asymmetry costs. Thus, an SEO would improve the value of the firm by either profitable investments or decreasing distress costs. Both reasons would align with a fundamental need of cash (DeAngelo, DeAngelo, 2010).

Opler and Titman (1994) suggest that more highly levered firms suffer more severe consequences during industry downturns. For example, more highly levered firms tend to lose more market share and suffer worse operating performance. The infusion of cash to decrease the cost of financial distress might not suffice if there are long-term industrial changes or shifts in operational performance. Although asset pricing models incorporate risk, distressed stocks tend to anomalously underperform (Campbell, Hilscher & Szilagyi, 2008; Griffin & Lemmon, 2002; Dichev, 1998). Therefore, financial distress is expected to have a negative effect on stock performance subsequent to the SEO.

**H3**. Cash need rationale has an effect on subsequent SEO abnormal stock performance.

**H3a**. Growth opportunities have an effect on subsequent SEO abnormal stock performance.

**H3b.** The level of financial distress has an effect on subsequent SEO abnormal stock performance.

Last, as discussed, market timing and cash need rationale are two of the most fundamental reasons behind SEOs (Spiess & Affleck-Graves, 1995; Loughran & Ritter, 1995; DeAngelo, DeAngelo & Stulz, 2010). By examining market timing and cash need rationale together we can provide a more complete understanding of stock performance following SEOs. Together they form a basis for both current valuations compared to the firm's intrinsic value and the rationale behind the announcement of an SEO. As such, on the basis of market timing theory, the free cash flow hypothesis and the pecking-order theory, market timing in combination with cash need rationale have an effect on subsequent SEO abnormal performance. We expect that market timing in combination with low growth opportunities has a negative effect on subsequent SEO abnormal performance. Also, we expect that market timing in combination with financial distress has a negative effect on subsequent SEO abnormal performance.

**H4.** Market timing in combination with cash need rationale have an effect on subsequent SEO abnormal stock performance.

**H4a**. Market timing in combination with growth opportunities have an effect on subsequent SEO abnormal stock performance.

**H4b**. Market timing in combination with the level of financial distress have an effect on subsequent SEO abnormal stock performance.

# 4. Methodology

This section presents the methodological approach. The different parts: the event study and the regression are described. Rationales and arguments for the choices made for the different parts are outlined respectively.

## 4.1 Approach

As an initial step, an event study was conducted in order to investigate abnormal returns following SEOs. Following the event study, we performed a univariate analysis by performing mean difference tests. We did this by categorizing data by market timing and cash need rationales. Last, we used abnormal return as the dependent variable in a model where the explanatory variables were market timing and cash need rationales. For this model we used OLS.

## 4.2 Event study

### 4.2.1 Event definition and window

As an initial step of the event study, the event and event window were defined. The event date used in this study is based on the SEO announcement. As the information of an SEO is available to market participants at the day of the announcement, potential effects of the event could be priced prior to execution and first effective trading day. Based on the same reasoning, the start of the event window was set to the day prior to the announcement to ensure initial day market reactions were accounted for. Therefore, the event date is denoted as $t = -1$ and the examined event windows are defined as [-1, $T$]. Two event windows were used and examined, 12 and 36 months. Following Chen, Chou and Lin (2019) and Loughran and Ritter (1995) a year was defined as containing twelve periods of 21 trading days, which equates to 252 days. Subsequently, the two event windows examined were: [-1, 251] and [-1, 755].

Calculating normal return requires two choices, the estimation window and the appropriate benchmark. In regard to the estimation window, it is common to place the estimation window in time so that it does not overlap with the event window, in order to ensure that computed normal returns are not influenced by the event (MacKinley, 1997). The estimation window should be relevant in regard to both stock price variability and the time of the event window. Previous research has used a 6-month estimation period (Chen, Chou & Lin, 2019; Autore, Bray & Peterson, 2009), which is 126 trading days in length. Therefore, the estimation window was set to 126 days, with a one-month gap relative to the start of the event window. A one-

month gap was used in order to avoid that the estimation window and the event window affect each other (MacKinley, 1997). The second choice is that of a benchmark, where both a stock index or a matched set of comparable control firms can be used (Barberis & Lyon, 1997). Within previous SEO and equity issue research both benchmark methods have been used (see Loughran & Ritter, 1997; Brav, Geczy & Gompers, 2000). For this study the Center for Research in Security Prices (CRSP) value weighted index was used as a benchmark to calculate the normal return.

When researching long-term performance of new equity issues the choice of window involves a trade-off according to Loughran and Ritter (1995). The trade-off is between underperformance and variability of returns, as the interval increases so does the total underperformance and variability. In regard to SEOs, Loughran and Ritter (1997) and Chen, Chou and Lins (2019) results both show that issuing firms still underperform, why the new equity issue period might not be a best fit. However, another aspect to take into consideration is comparability to previous research. Including 12 and 36 months enabled comparison of results with a span of previous research, contemporary (e.g., Chen, Chou & Lin, 2019) as well as earlier work within the field of SEOs (e.g., Loughran & Ritter, 1997; Autore, Bray & Peterson, 2009). On the basis of comparability, 12 and 36 months have been chosen as the event windows examined.

### 4.2.3 Normal return calculation

Normal returns regard what share prices would have been expected in the absence of the event. There are multiple measures for a securities normal return. According to MacKinlay, (1997) the approaches generalized into two categories: statistical and economic. In regard to previous research, the method for normalizing returns tends to vary. Further, the variance in normal returns calculation vary between MacKinley's (1997) two categories, economic and statistical, and between the methods included within these two categories (For this, examine chosen method in, e.g., Chen, Choe & Lin, 2019; Loughran & Ritter, 1997; Denis, 1994; Opler & Titman, 1994; Autore, Bray & Peterson, 2009).

In event studies two statistical models are commonly used: the constant mean return model and the market model (MacKinley, 1997). Further, the latter of the two models represents some improvements to the constant mean return model. As the market model assumes a linear relation between the return of the market portfolio and the security, it removes returns related

to variation in the market's return. Furthermore, Brav, Geczy and Gompers (2000) argue that the return pattern of equity issuers is not distinct but part of systematic price movements. The advantage of the market model removing return related to market's returns, is that it reduces variance in abnormal returns (MacKinley, 1997). On the basis of these arguments, the market model was chosen to calculate normal returns.

Normal return estimated by the market model is defined as:

$$R_{it} = a_a + \beta_i R_{mt} + \varepsilon_{it}$$
$$E(\varepsilon_{it} = 0) \qquad var(\varepsilon_{it}) = \sigma_\varepsilon^2$$

**Equation 1, Market model estimation of normal returns**

Where $R_{i,t}$ is the returns for security $i$ for the period $t$, $R_{m,t}$ are the equivalent data for the market portfolio and $\varepsilon$ is the zero mean disturbance term. Further, the parameter $\alpha_i$ represents the intercept and $\beta_i$ is the slope coefficient of security $i$.

### 4.2.4 Abnormal return calculation

Abnormal return is defined as actual security return less expected return. Similar to the normal return calculation there are different methods for calculating the abnormal return. Both cumulative abnormal return (CAR) and buy-and-hold abnormal return (BHAR) are common. For long-term performance tests BHAR are advocated to be preferable to CAR (Barberis and Lyon, 1998). Further, CAR carries a problem of compounding effects (Brav, Geczy & Gompers, 2000) and by using BHAR the problem of frequent transactions is avoided (Barberis & Lyon, 1998). Therefore, BHAR was utilized to calculate abnormal returns for this study. This option was also aligned with previous research within SEOs and subsequent long-term stock performance (Loughran & Ritter, 1997; Chen, Chou & Lin, 2019; Autore, Bray & Peterson, 2009; Spiess & Affleck-Graves, 1995).

Buy-and-hold abnormal return is defined as:

$$BHAR_{i,t} = \prod_{t=1}^{\tau}(1 + r_{it}) - \prod_{t=1}^{\tau}[1 + E(R_{it})]$$

**Equation 2, Buy-and-Hold Abnormal return**

Where $BHAR_{i,t}$ is the buy-and-hold return for security $i$ during period $t$. $\tau$is the holding period after the event occurs. $r_{it}$ is the return of security $i$ on day $t$ and $E(R_{it})$ is the normal return estimated by the market model.

### 4.2.5 Statistical testing of abnormal return

In regard to the event study t-tests were carried out in order to evaluate the statistical significance of the calculated holding period returns. A parametric test statistic tests whether calculated abnormal returns are statistically different from zero (Barber & Lyon, 1997). As it was BHAR that was of interest for this study, the test formula is as follows:

$$t_{BHAR} = \frac{\overline{BHAR}}{\left(\frac{\sigma(BHAR_{it})}{\sqrt{n}}\right)}$$

**Equation 3, Parametric t-test of BHAR**

Where $\overline{BHAR}$ is the sample average buy-and-hold return, $\sigma(BHAR_{it})$ is the cross-sectional standard deviation of buy-and-hold abnormal return of a $n$ firm sample (Barberis & Lyon, 1997). Thus, this tests sample average BHAR relative to a null hypothesis with a hypothesized mean value of 0. This measure was taken relative to the two calculated holding periods, i.e., 12 and 36 months.

Further, as one measure to assess stated hypotheses, the difference in mean BHAR grouped by proxies for *Market Timing*, *Growth Opportunities*, and *Financial Distress* were assessed. To evaluate these results, a two-sample t-test was employed, which tests the group mean BHAR difference relative to a null hypothesis equal to zero. This tests whether the group mean difference is statistically different from zero. The test formula follows as:

$$t = \frac{(\overline{X_2} - \overline{X_2}) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

**Equation 4, Two-sample t-test of grouped mean difference**

Where $\underline{X}$is the buy-and-hold abnormal returns, $\mu$is the hypothesized value for buy-and-hold abnormal return, $s^2$ is the variance of buy-and-hold returns, and $n$ the number of observations in the sample.

## 4.3 Regression

### 4.3.1 Regression model

After calculating abnormal returns, a regression analysis was conducted using multivariate OLS. Assumptions related to OLS are further discussed in section 4.4. The regression analysis was carried out to assess the effect *Market Timing* of the SEO, *Growth Opportunities*, and *Financial Distress* have on subsequent long-term stock performance. The base model (Regression Model 1) is the following:

$$BHAR_{i,t} = \beta_0 + \beta_1\, Market\ Timing + \beta_2\, Growth\ Opportunities + \beta_3\, Financial\ Distress + \sum_{i=1}^{k} \beta_k Control\ variables + u_{i,t}$$

**Equation 5, Regression model**

where the dependent variable is BHAR for firm *i* at time *t*. As this study examined stock performance over 12 and 36 months, BHAR is the buy-and-hold abnormal return of firm *i* over those periods. The three main independent variables were *Market Timing, Growth Opportunities,* and *Financial Distress*.

Following Chen, Choe and Lin (2019) the investor sentiment index, created and provided by Baker and Wurgler (2006), is used to proxy *Market Timing* rather than market-to-book ratios, as market-to-book is noisy and integrates multiple factors (Hertzel & Lee, 2010).The investor sentiment index is based on value-weighted dividend premium, first-day returns on IPOs, IPO volume, closed-end fund discount and equity share in new issues (Baker & Wurgler, 2006).

*Financial Distress* is proxied by calculating an Altman Z-score for each individual firm; such a proxy is also aligned with previous seasoned equity and distressed stock literature (DeAngelo, DeAngelo & Stulz, 2010; Dichev, 1998). This metric is designed to evaluate a firm financial position and distinguish firms which are risking bankruptcy (Altman, 1968), and is calculated as follows:

$$Z = 0.012X_1 + 0.014X_2 + 0.033X_3 + 0.006X_4 + 0.999X_5$$

**Equation 6, Calculation of Altman Z**

Where $X_1$ is Working Capital to Total Assets, $X_2$ is Retained Earning to Total Assets, $X_3$ is Earnings before Interest and Taxes to Total Assets, $X_4$ is Market Value of Equity to Book Value

of Debt, $X_5$ is Sales to Total Assets, and *Z* is the overall index which indicates firm financial strength. A higher Z-value indicates higher financial strength and vice versa (Altman, 1968).

*Growth Opportunities* were proxied by R&D plus capital expenditures-to-assets. Incorporating R&D and capital expenditures as a proxy for *Growth Opportunities* is based upon previous studies such as Loughran and Ritter (1997) and Walker and Yost (2008). As part of the analysis the three main independent variables were estimated on a singular basis together with the control variables and later as a full model. In addition to the main independent variables multiple control variables were included. A more comprehensive description of the variables included in the model, including control variables, are provided in section 5.

### 4.3.2 Pre-estimation diagnostic tests

Using the calculated BHAR, a regression analysis was conducted using multivariate OLS. OLS provides estimates with the smallest variance given that certain assumptions hold. Therefore, tests were carried out to ensure that the assumptions, stated under the Gauss-Markov theorem (Wooldridge, 2016), hold and that the empirical results produced were robust. To assess sample distribution, we conducted a Jarque-Bera (see Table 9) test and plotted histograms. If substantial outliers were present, variables were winsorized. Further, the natural logarithm of Altman Z-score was used to see how a percentage change affects the dependent variables. Using the natural logarithm can also reduce skewness. Any potential use of natural logarithms is denoted in tables as Log.

One of the OLS assumptions is in regard to homoscedasticity and the constant variance of the error term across all observed values for an independent variable. If heteroscedasticity is present the OLS estimator is no longer the best linear unbiased estimator (BLUE). However, if the rest of the OLS assumptions are met, heteroscedasticity does not cause bias and OLS can therefore be used even in the presence of heteroscedasticity (Bailey, 2019). In order to test for homoscedasticity, a White test was performed. Results for the White test are shown in Table 7 and as displayed by the tables there is clear evidence of heteroscedasticity. Based on the results robust standard errors were used for all regression models.

Lastly, one of the OLS assumptions builds upon perfect collinearity (Woolridge, 2012). To assess the relationship between independent variables included in the regression models, a correlation matrix is presented (see Table 8). Although not causing incorrect standard errors,

multicollinearity inflates the estimated standard errors which might decrease the possibility to make reasonable inferences (Bailey, 2019). Based on assessing the correlation matrix, none of the included variables were perfectly correlated. However, *Market Capitalization* correlated to both *Revenue* and *Total Assets* to a high degree, 0.74 and 0.91 respectively. This was not, however, all that remarkable as both *Revenue* and *Total Assets* are expected to increase with a higher *Market Capitalization*.

# 5. Data

This section provides a description of aspects related to the data used for this study. First, the method of data collection and sample criteria is described respectively. Second, follows a description of the included variables, including both variable definition as well as summary statistics.

## 5.1 Data Collection

The study is based on SEOs conducted in the United States between 1998 and 2015. The firms conducting SEOs during the period are collected from Bloomberg. Data on BHAR is gathered from CRSP.

Data on *Market Timing* is based on Baker and Wurgler's (2006) investor sentiment index and is collected from Stern University[1]. Monthly data on the investor sentiment index is used in the study. The data is taken directly from the database and matched to the month of the SEO.

Fundamental company data is collected from COMPUSTAT. Similar to Loughran and Ritter (1997) and Denis (1994) R&D and capital expenditures are used as proxies for *Growth Opportunities*. More precisely, in order to incorporate both R&D and capital expenditures, this study uses R&D plus capital expenditures to total assets. The data is yearly and matched to the end of year that the company issued seasoned equity. *Financial Distress* is measured through the Altman Z-score. In order to compile each firm's Altman Z-score at the time of the SEO, data is collected on working capital, total assets, retained earnings, earnings before interest and taxes, market value of equity, total liabilities and sales. The Altman Z-score is composed of yearly data which is matched to the year when the firm conducted the SEO. All control variables are also collected from COMPUSTAT.

## 5.2 Sample Criteria

Our sample selection criteria are: (1) The issuing firm is incorporated in the United States according to Bloomberg and COMPUSTAT. (2) The firms are listed at the NYSE, AMEX or NASDAQ (see Chen, Choe & Lin, 2019; DeAngelo, DeAngelo & Stulz, 2010), while firms listed on other exchanges are disregarded. (3) The securities issued are common stock. Similar to Brav, Geczy and Gompers (2000) both primary and secondary offerings are accounted for as SEO issues. (4) The data collected does not have missing values for independent and/or

[1] The Investor sentiment is kindly provided by Jeffery Wurgler at the Stern University catalogue. Jeffery Wurgler's contact page and the investor sentiment data can be found at: http://people.stern.nyu.edu/jwurgler/

control variables on COMPUSTAT. (5) The SEO took place between the years 1998-2015. The reason for this is partly due to data availability regarding firm fundamentals, and partly to be able to gather stock performance data according to the 36-month holding period needed for the computation of BHAR. (6) To avoid double counting in the BHAR, SEOs from the same firm within a period of 60 months from the first SEO are disregarded. Based on the presented sample criteria, the final sample consists of 658 SEOs over the years 1998-2015.

**Table 1. Summary Statistics**

| Variables: | BHAR, 12 M | BHAR, 36 M | Investor Sentiment | Growth Opportunities | Altman Z-Score | Market-to-book | Size | Leverage | Revenue | Total Assets |
|---|---|---|---|---|---|---|---|---|---|---|
| **Panel A** | | | | | | | | | | |
| ***Non-Market Timing*** | | | | | | | | | | |
| *N* | 581 | 581 | 581 | 581 | 581 | 581 | 581 | 581 | 581 | 581 |
| *Mean* | -0,806 | -1,516 | 0,005 | 16,382 | 366,260 | 3,855 | 3467,250 | 21,150 | 2045,053 | 3612,227 |
| *Median* | -8,271 | -17,767 | 0,031 | 10,364 | 7,855 | 2,251 | 733,213 | 15,992 | 202,203 | 346,726 |
| *Max* | 156,372 | 290,329 | 0,866 | 286,520 | 7650,476 | 91,310 | 386402,100 | 116,582 | 155427,000 | 750507,000 |
| *Min* | -96,615 | -155,220 | -0,894 | 0,509 | -19,757 | -9,923 | 8,213 | 0,001 | 0,049 | 0,979 |
| *STD.DEV* | 52,788 | 87,535 | 0,376 | 20,486 | 1270,948 | 6,977 | 18358,980 | 20,675 | 10010,170 | 32596,970 |
| ***Market Timing*** | | | | | | | | | | |
| *N* | 77 | 77 | 77 | 77 | 77 | 77 | 77 | 77 | 77 | 77 |
| *Mean* | -19,098 | -21,120 | 1,702 | 18,019 | 750,840 | 4,403 | 3180,914 | 16,971 | 1264,815 | 1456,803 |
| *Median* | -27,467 | -31,972 | 1,444 | 11,718 | 15,164 | 3,346 | 960,539 | 12,484 | 135,575 | 350,983 |
| *Max* | 127,768 | 141,146 | 3,197 | 137,583 | 7650,476 | 24,648 | 85499,640 | 75,760 | 26935,000 | 21695,000 |
| *Min* | -76,068 | -89,039 | 0,919 | 0,825 | -1,543 | 0,074 | 49,571 | 0,002 | 0,533 | 16,130 |
| *STD.DEV* | 38,970 | 54,213 | 0,663 | 21,696 | 1963,167 | 4,459 | 10142,160 | 17,589 | 4102,794 | 3666,700 |
| **Panel B** | | | | | | | | | | |
| ***Low Growth Opportunities*** | | | | | | | | | | |
| *N* | 566 | 566 | 566 | 566 | 566 | 566 | 566 | 566 | 566 | 566 |
| *Mean* | -2,071 | -2,485 | 0,212 | 10,509 | 395,840 | 3,432 | 3893,688 | 20,797 | 2251,614 | 3873,120 |
| *Median* | -8,355 | -17,592 | 0,084 | 9,117 | 7,466 | 2,133 | 827,300 | 16,325 | 271,856 | 439,278 |
| *Max* | 156,372 | 290,329 | 3,197 | 30,632 | 7650,476 | 91,310 | 386402,100 | 95,062 | 155427,000 | 750507,000 |
| *Min* | -96,615 | -135,012 | -0,894 | 0,509 | -7,864 | 0,074 | 8,213 | 0,001 | 0,049 | 16,130 |
| *STD.DEV* | 49,873 | 79,325 | 0,689 | 7,229 | 1358,644 | 6,001 | 18924,940 | 19,624 | 10221,830 | 33033,430 |
| ***High Growth Opportunities*** | | | | | | | | | | |
| *N* | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| *Mean* | -8,334 | -11,960 | 0,150 | 53,885 | 506,151 | 6,918 | 604,077 | 19,829 | 121,230 | 203,173 |
| *Median* | -26,414 | -43,233 | 0,071 | 43,146 | 15,862 | 4,106 | 282,428 | 9,340 | 16,208 | 82,642 |
| *Max* | 156,372 | 290,329 | 3,197 | 286,520 | 7650,476 | 66,648 | 7746,056 | 116,582 | 6486,000 | 3824,887 |
| *Min* | -87,293 | -155,220 | -0,894 | 30,985 | -19,757 | -9,923 | 27,870 | 0,012 | 0,067 | 0,979 |
| *STD.DEV* | 61,654 | 111,502 | 0,685 | 33,305 | 1467,359 | 9,637 | 1050,009 | 24,580 | 703,555 | 534,581 |
| **Panel C** | | | | | | | | | | |
| ***Distressed*** | | | | | | | | | | |
| *N* | 142 | 142 | 142 | 142 | 142 | 142 | 142 | 142 | 142 | 142 |
| *Mean* | -12,430 | -4,844 | 0,103 | 16,202 | 0,463 | 3,552 | 5128,648 | 44,869 | 3538,783 | 9331,990 |
| *Median* | -17,113 | -17,946 | 0,062 | 7,539 | 1,471 | 1,310 | 730,936 | 43,832 | 548,168 | 1131,462 |
| *Max* | 156,372 | 290,329 | 3,197 | 122,536 | 2,667 | 40,556 | 386402,100 | 116,582 | 151802,000 | 750507,000 |
| *Min* | -96,615 | -150,005 | -0,887 | 0,613 | -19,757 | -9,923 | 8,213 | 8,151 | 0,067 | 8,037 |
| *STD.DEV* | 50,541 | 85,783 | 0,614 | 20,418 | 3,091 | 6,674 | 33262,180 | 19,566 | 13633,860 | 63951,520 |
| ***Non-Distressed*** | | | | | | | | | | |
| *N* | 516 | 516 | 516 | 516 | 516 | 516 | 516 | 516 | 516 | 516 |
| *Mean* | -0,337 | -3,525 | 0,231 | 16,676 | 524,314 | 4,020 | 2967,315 | 14,000 | 1517,557 | 1716,541 |
| *Median* | -8,746 | -21,113 | 0,086 | 10,887 | 15,101 | 2,518 | 741,941 | 9,239 | 171,287 | 308,484 |
| *Max* | 156,372 | 290,329 | 3,197 | 286,520 | 7650,476 | 91,310 | 139191,000 | 91,166 | 155427,000 | 166344,000 |
| *Min* | -92,568 | -155,220 | -0,894 | 0,509 | 2,681 | 0,132 | 18,640 | 0,001 | 0,049 | 0,979 |
| *STD.DEV* | 51,726 | 84,255 | 0,705 | 20,695 | 1532,357 | 6,749 | 9532,230 | 14,782 | 7977,441 | 8185,309 |
| **Panel D** | | | | | | | | | | |
| **Total** | | | | | | | | | | |
| *N* | 658 | 658 | 658 | 658 | 658 | 658 | 658 | 658 | 658 | 658 |
| *Mean* | -2,947 | -3,810 | 0,203 | 16,574 | 411,264 | 3,919 | 3433,742 | 20,661 | 1953,749 | 3359,997 |
| *Median* | -10,312 | -20,884 | 0,083 | 10,489 | 8,123 | 2,335 | 739,638 | 15,197 | 189,955 | 349,489 |
| *Max* | 156,372 | 290,329 | 3,197 | 286,520 | 7650,476 | 91,310 | 386402,100 | 116,582 | 155427,000 | 750507,000 |
| *Min* | -96,615 | -155,220 | -0,894 | 0,509 | -19,757 | -9,923 | 8,213 | 0,001 | 0,049 | 0,979 |
| *STD.DEV* | 51,675 | 84,523 | 0,688 | 20,621 | 1373,726 | 6,731 | 17591,400 | 20,371 | 9511,564 | 30660,510 |

**Table 1 - Summary statistics:** The table contains summary statistics for the variables buy-and-hold abnormal return (BHAR) 12 months, BHAR 36 months, investor sentiment, growth opportunities, Altman Z-score, market-to-book, size, leverage, revenue and total assets. Investor sentiment is Baker and Wurgler's (2006) investor sentiment index. Growth opportunities is R&D plus CAPEX as a percent of total assets. Market-to-book is the market capitalization divided by book value. Size is market capitalization. Leverage is debt divided by total assets. BHAR, growth opportunities and leverage are measured in percent. Size, revenue and total assets are measured in million USD. Panel A, Panel B and Panel C show summary statistics categorized by market timing and non-market timing firms, firms with high and low growth opportunities and distressed and non-distressed firms respectively. Panel D shows total summary statistics. The variables are summarized in terms of number of observations, mean, median, maximum, minimum and standard deviation.

## 5.3 Description of Variables

### 5.3.1 Dependent Variable

BHAR is a measure of to what degree the ex-post returns deviate from expected returns. BHAR is calculated on a firm level, yielding 658 observations. BHAR is measured over 12 and 36 months and the data are presented in Table 1. There are substantial outliers on the right tail of the BHAR variable (see Figure 1 and 2) and the Jarque-Bera test suggests that the distribution is skewed (see Table 9). Therefore, the sample is winsorized on the right tail at the 97.5th percentile. Looking to mean BHAR the negative performance seems to increase as the mean abnormal return is lower over 36 months compared to 12 months. Further, a similar pattern is seen for sample median BHAR. Median abnormal return is substantially lower over 36 months than over 12 months. Although the results indicate that both 12 and 36 months BHAR sample distribution is right skewed, the statistics suggest that the 36-month distribution is more skewed than the 12 months. Further, the 36 months standard deviation is substantially higher. The maximum and minimum values, together with the standard deviation, suggest that there is a large variability in the variables. The variability increases over 36 compared to 12 months. The summary values do not point to any obvious mistakes in the data collection.

### 5.3.2 Independent Variables

Following Chen, Choe and Lin (2019), we use the Baker and Wurgler (2006) investor sentiment index to proxy for mispricing in the market rather than market-to-book ratios. We prefer this measure to the market-to-book ratio, which has been used in the literature but suffers from more noise (Hertzel & Lee, 2010). The data is matched to the month of the SEO. During the sample period the mean investor sentiment is 0.203. The median investor sentiment is somewhat lower than the mean, suggesting that the variable is right-skewed. The minimum and maximum values display that the investor sentiment has been both negative and positive during the study period, while positive sentiment has been more prominent. In addition, Panel A in

Table 1 shows that mean and median BHAR is substantially lower for market timing firms. Market timing firms are defined as firms issuing seasoned equity when the investor sentiment index is one standard deviation (0.688) above the mean (0.203).

Incorporating R&D and capital expenditures as a proxy for *Growth Opportunities* is based upon previous studies such as Loughran and Ritter (1997) and Walker and Yost (2008). Because the mean *Growth Opportunities* are larger than the median, the variable is suggested to be right-skewed. In addition, outliers in the sample (see Figure 3) and the Jarque-Bera test suggest skewness (see Table 9). Therefore, the variable is right tail winsorized at the 97.5th percentile. Panel B in Table 1 shows that while the minimum and maximum BHAR are similar for firms with high and low *Growth Opportunities*, both the mean and median BHAR is lower for firms with high growth opportunities. Firms with high *Growth Opportunities* at the time of the seasoned equity issue are defined as those with a R&D plus capital expenditures-to-total assets ratio equal to mean (16.574) plus one standard deviation (20.621).

As a proxy for *Financial Distress* Altman Z-score is used, which is a measure of financial strength (Altman, 1968). In Panel D of Table 1 summary statistics are provided and categorized by distressed and non-distressed observations. The distinction of distressed or not is based upon Altman's (1968) critical value of 2.675. Firms above that threshold have a good financial position while those below risk bankruptcy. As seen by the number of observations categorized, the majority of the sample is categorized as non-distressed. Further, looking to mean 12 months BHAR, distressed firms show more negative abnormal return than non-distressed firms. However, over the 36-month holding period the difference in mean abnormal return diminishes between distressed and non-distressed. Looking at Panel D of Table 1, the full sample of Altman Z observations show quite significant sample variation as of the difference in minimum and maximum observed values. Further, Panel D of Table 1 shows that the Altman Z mean value is substantially higher than the median, which indicates a right-skewed sample distribution. Skewness is also indicated by Figure 4 and the Jarque-Bera test (Table 9). Therefore, the variable is winsorized at the 97.5th percentile.

### 5.3.3 Control Variables

In addition to the independent variables multiple firm characteristic control variables are included in the regressions. The various control variables are included in order to minimize

omitted variable bias in estimation, which could potentially affect our estimation results and inferences.

Chen, Choe and Lin, (2019) find evidence suggesting that firms that are smaller and harder to evaluate can be mispriced to a bigger extent resulting in effects on subsequent stock performance. We control for firm size which is measured as the *Market Capitalization* of the firm. The sample mean is 3,433.74 MUSD while the median is 739.64 MUSD, which implies that the sample distribution is right skewed. The maximum and minimum observed *Market Capitalization*, together with the standard deviation, suggests a large variability in the data.

*Market-to-Book* ratios have been used as an indicator for changes in market valuations and mispricing (DeAngelo, DeAngelo & Stulz, 2010; Loughran & Ritter, 1997) and are controlled for by Chen, Choe and Lin (2019). However, Hertzel and Lee (2010) find that *Market-to-Book* comprises both mispricing and growth options. Further, following Lowry's (2003) discussion, *Market-to-Book* could factor in macroeconomic aspects such as a change in the risk-free rate but also hide true significance. On the basis of these arguments, we control for firm *Market-to-Book* ratio. However, as a robustness measure, we also omit *Market-to-Book*, which is further discussed in section 6.3. The sample mean *Market-to-Book* value is 3.92 while the median is 2.34, implying a right skewed sample distribution. The maximum and minimum variable values, together with the standard deviation, suggests a large variability in the data.

For industries where the valuation is more subjective, investor sentiment has a more significant effect on mispricing (Baker & Wurgler, 2006). Therefore, an industry dummy is included. As the value of high-technology firms consists of expected profits far into the future, they are often more difficult to value. As an example, in their study of IPO underpricing Loughran and Ritter (2004) control and differentiate tech and non-tech firm returns, where tech-firms tend to have substantially higher first-day returns. The dummy equals 1 if the observed firm is a high-technology firm according to their SIC categorization. The definition of a high-technology firm SIC category follows Kile and Phillips (2009) categorization (see Appendix 2).

There are multiple theories discussing capital structure and financing, as presented in previous chapters. On the basis of these theories there are different rationales which could motivate a SEO issue. These rationales can often be related to the degree of *Leverage*. Further, Opler and Titman (1994) find that during industry downturns highly levered firms tend to experience

more severe decreases in market share and operating profits relative to less levered firms. Therefore, *Leverage* is controlled for and defined as the percentage of debt relative total capital. The sample mean is 20.66 and median is 15.2, implying a right skewed sample distribution. The maximum and minimum variable values, together with the standard deviation, suggests a large variability in the data.

Similar to Chen, Choe and Lin (2019) we control for *Revenue*. The sample mean is 1,953.75 MUSD and the median is 189.95 MUSD, implying a right skewed sample distribution. The maximum and minimum variable values, together with the standard deviation, suggests a large variability in the data.

Following Chen, Choe and Lin (2019) we control for *Total Assets*. The mean *Total Assets* in the sample is 3,359.998 MUSD, with a standard deviation of 30,660.510 MUSD. The median *Total Assets* is 349.486 MUSD, suggesting that the variable is right-skewed. The maximum and minimum variable values, together with the standard deviation, suggests a large variability in the data.

# 6. Empirical Results and Analysis

In this section the empirical results and analysis are presented. The first part of the section presents the results and analysis of the event study. The second part of the section provides the regression results and analysis.

## 6.1 Event Study Results

### 6.1.1 Abnormal Returns

The results from the event study are presented in Table 2, which presents mean BHAR over the different holding periods; 12 and 36 months. Further, to test the output of the event study a t-test is conducted to evaluate whether the results are significantly different from 0. The result of the t-test is denoted as t-statistic in Table 2.

**Table 2. Buy-and-Hold Abnormal Return**

| **Buy-and-hold period** | **12 Months** | **36 Months** |
|---|---|---|
| *Mean BHAR* | *-2.946754* | *-8.810008* |
| *t-statistic* | *-1.4628* | *-1.1563* |
| *N* | *658* | *658* |

*** p<0.01, ** p<0.05, * p<0.1

**Table 2 – Buy-and-Hold Abnormal Returns:** The table illustrates the mean buy-and-hold abnormal return (BHAR) over 12 and 36 months. The table also displays the results from a one-sample t-test (mean comparison test). The t-test shows the t-statistic and significance level for mean BHAR being different from 0 over the different time periods.

As displayed by Table 2, the long-term stock performance following an SEO tends to underperform expected returns for both holding periods, with an underperformance for 12 and 36 months of -2.947 and -8.810 percent respectively. Especially, over a 36-month holding period the calculated abnormal return of -8.810 percent indicates a quite significant economic impact. However, the mean abnormal return for none of the examined holding periods are statistically significant, although the p-value for the 12-month period is close to 0.1. The lack of statistically significant results is likely due to outliers with positive BHAR in the sample, which exist even after winsorizing (see Appendix 1). These outliers increase the variability in the results, which decreases the statistical significance.

### 6.1.2 Analysis of Abnormal Return

Our results from Table 2 are in line with previous empirical work. For example, Loughran and Ritter (1997) document the performance subsequent to SEOs normalized by both matching

firms and the CRSP value weighted index. Their market-adjusted results indicate a stock performance of 1.1% over 12 months and -5.4% over 36 months. Although Loughran and Ritter's (1997) results are positive for 12 months, the magnitude of abnormal return is not far from our results. Further, like our result, the magnitude increases as the holding period extends. Overall, our results add to the existing empirical evidence which suggests that stocks underperform subsequent to an SEO (Loughran and Ritter, 1997; Spiess and Affleck-Graves, 1995; Teoh, Welch and Wong, 1998; McLaughlin, Safieddine and Vasudevan, 1996; Hertzel and Li, 2012; Chen, Chou, and Lin, 2019).

Aligned with, for example, Fama and French (2005) the result of this study is somewhat contrary to the pecking-order prediction as it is noted in Panel D of Table 1 that a clear majority of SEO issuing firms are not in financial distress. However, negative stock performance following an SEO could potentially be expected, given the results, from a pecking-order point of view. If firms issue seasoned equity although not in distress, there are no distress costs that offset the costs that arise from information asymmetry. Therefore, any investments would need to be sufficiently profitable to actually add value to the firm as the cost of equity capital would be high.

However, the results on BHAR presented in Table 2 are not statistically significant. Therefore, we do not find statistical support for **H1**. Although, the results show indications which are in line with the hypothesis. The lack of statistically significant results is likely due to outliers with positive BHAR in the sample, which exist even after winsorizing (see Figure 1 & 2). The outliers become more prominent in the 36 month buy-and-hold period, which is evident from the difference in mean and median BHAR presented in section 5.4.

### 6.2.1 Market timing, Cash need rationale and Abnormal Return

**Table 3. Categorized Buy-and-Hold Abnormal Return**

| **Buy-and-hold period** | **12 Months** | **36 Months** |
|---|---|---|
| ***Panel A*** | ***Market Timing*** | |
| *High Sentiment* | | |
| *Mean BHAR* | *-19.09812* | *-33.42506* |
| *N* | *77* | *77* |
| | | |
| *Low Sentiment* | | |
| *Mean BHAR* | *-0.8062115* | *-8.648528* |
| *N* | *581* | *581* |
| | | |
| *Difference* | *18.2919*** | *19.60423** |
| *t-statistic* | *2.9357* | *1.9164* |
| | | |
| ***Panel B*** | ***Growth Opportunities*** | |
| *High Growth* | | |
| *Mean BHAR* | *-8.333922* | *-11.96029* |
| *N* | *92* | *92* |
| | | |
| *Low Growth* | | |
| *Mean BHAR* | *-2.071101* | *-2.485227* |
| *N* | *566* | *566* |
| | | |
| *Difference* | *6.262821* | *9.475068* |
| *t-statistic* | *1.078* | *0.997* |
| | | |
| ***Panel C*** | ***Financial Distress*** | |
| *Distressed* | | |
| *Mean BHAR* | *-12.43026* | *-4.844059* |
| *N* | *142* | *142* |
| | | |
| *Non-Distressed* | | |
| *Mean BHAR* | *-0.3369526* | *-3.525444* |
| *N* | *516* | *516* |
| | | |
| *Difference* | *-12.0933*** | *-1.318616* |
| *t-statistic* | *-2.515* | *-0.165* |

** p < .1; ** p < .05; *** p < .01*

**Table 3 – Categorized Buy-and-Hold Abnormal Returns:** The table shows three different two-sample t-tests using groups. All panels display mean buy-and-hold abnormal return (BHAR) over 12 and 36 months. Panel A groups BHAR by Baker and Wurgler's (2006) investor sentiment. A distinction is made between high sentiment and low sentiment. Panel B groups BHAR by growth opportunities. A distinction is made between high growth opportunities and low growth opportunities. Panel C groups BHAR by financial distress. A distinction is made between distressed and non-distressed firms. All panels show the mean difference between the groups. It also shows the t-statistic and significance level that the difference is not 0.

The results for the categorized BHAR analysis are presented in Table 3. The table shows BHAR over the periods 12 months and 36 months. Further, the table illustrates BHAR categorized by *Market Timing*, *Growth Opportunities* and *Financial Distress*.

Panel A displays BHAR based on *Market Timing*. It distinguishes between market timing firms and non-market timing firms. The result is 77 SEOs by market timing firms and 581 SEOs by non-market timing firms. The mean BHAR is negative for both market timing and non-market timing firms for both holding periods. However, the mean BHAR is more negative for market timing firms over both 12 and 36 months. The calculated difference in BHAR between high and low sentiment periods is statistically significant at 0.05 level over 12 months and at 0.1 level over 36 months.

Panel B illustrates the BHAR over 12 months and 36 months categorized by *Growth Opportunities*. This results in 92 SEOs conducted by firms with high *Growth Opportunities* and 566 SEOs conducted by firms with low *Growth Opportunities*. The mean BHAR is negative for both firms with high and low *Growth Opportunities* over both 12 and 36 months. The difference in BHAR between firms with high *Growth Opportunities* and firms with low *Growth Opportunities* is not statistically significant over 12 months or 36 months.

Panel C displays the BHAR over 12 and 36 months, categorized by *Financial Distress*. This results in 142 SEOs issued by firms under *Financial Distress* and 516 SEOs issued by firms that are not under *Financial Distress*. Both distressed and non-distressed firms have negative BHAR over both holding periods. Over 12 months the difference between distressed and non-distress firms in BHAR is statistically significant at 0.05 level, as distressed firms underperform to a larger extent. The difference is not statistically significant over 36 months.

### 6.2.2 Analysis of market timing, cash need rationale and abnormal return

The effect of *Market Timing* on subsequent stock performance is evident from the results presented in Table 3 in Panel A. The statistically significant difference in stock performance over 12 month and 36 month holding periods, between market timing and non-market timing firms, provide additional support for market timing theory. In regard to Chen, Choe and Lin (2019), the threshold used for high and low investor sentiment differs slightly. Therefore, the 12 and 36 months holding period abnormal returns are not directly comparable. However, as for Chen, Choe and Lin (2019), our results suggest that market-timing firms tend to experience

more severe underperformance than non-timing firms for both holding periods. Similarly, our results indicate that the magnitude of the underperformance increases with the holding period.

The results shown in Panel B of Table 3 do not provide any definitive answers about the effect of *Growth Opportunities* on BHAR. Furthermore, the results do not indicate any statistically significant differences between firms with high *Growth Opportunities* and firms with low *Growth Opportunities*. However, the magnitude of abnormal return difference between high and low growth opportunity firms is rather economically significant. Previous research has found that firms conducting a SEO tend to increase their capital expenditure spending subsequent to the SEO (DeAnglo, DeAnglo & Stulz, 2010; Walker & Yost, 2008). As our distinction is based on capital expenditures the high growth firms already are spending more than average on investments. One potential explanation for the more substantial underperformance of high growth firms could be agency costs. As seasoned equity issuing firms have a tendency to increase investments and the high growth firms already have above average investment spending's, a further increase in investment could be related to managerial discretion or empire building (Jensen, 1986).

The results presented in Panel C of Table 3 show that distressed firms, in comparison to non-distressed firms, significantly underperform over 12 months. Both the economical and statistical significance diminishes as the holding period extends. Further, the magnitude of the abnormal return for both distressed and non-distressed is rather similar over a 36-month holding period. These results are in line with previous literature on distressed stock in documenting an anomalous pattern of underperformance (Campbell, Hilscher & Szilagyi, 2008; Griffin & Lemmon, 2002; Dichev, 1998). However, it is contrary to the expectations of the pecking-order theory (Myers & Majluf, 1984). First, a majority of firms are not distressed. Second, conducting the SEO would decrease distress costs and increase the value of the firm. Contrary to the pecking-order theory, our results show that non-distressed firms tend to have better stock performance although choosing expensive financing.

## 6.2 Regressions

## 6.2.1 Empirical regression results

**Table 4. Regression results for 12 Months buy-and-hold abnormal return**

| Model: | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| VARIABLES | *BHAR, 1 Year* | *BHAR, 1 Year* | *BHAR, 1 Year* | *BHAR, 1 Year* |
| *Investor sentiment* | -9.066*** | | | -8.703*** |
| | (2.562) | | | (2.570) |
| *Growth Opportunities* | | 0.126 | | 0.077 |
| | | (0.186) | | (0.190) |
| *Altman Z(Log)* | | | -2.430* | -2.308* |
| | | | (1.358) | (1.337) |
| *M/B* | -0.495 | -0.472 | -0.451 | -0.513 |
| | (0.458) | (0.442) | (0.524) | (0.520) |
| *Size (Log)* | 22.884*** | 22.112*** | 25.412*** | 25.802*** |
| | (3.515) | (3.534) | (4.073) | (4.116) |
| *Leverage (%)* | 0.102 | 0.095 | -0.014 | -0.002 |
| | (0.126) | (0.126) | (0.157) | (0.157) |
| *Revenue (Log)* | 6.398*** | 7.022*** | 7.874*** | 7.798*** |
| | (1.530) | (1.523) | (1.427) | (1.558) |
| *TA(Log)* | -22.541*** | -22.180*** | -26.965*** | -26.931*** |
| | (3.902) | (3.863) | (4.438) | (4.477) |
| Constant | -49.498*** | -52.745*** | -39.525*** | -41.942*** |
| | (9.144) | (9.326) | (11.488) | (11.789) |
| Industry Control | Yes | Yes | Yes | Yes |
| Robust Standard Errors | Yes | Yes | Yes | Yes |
| Observations | 651 | 651 | 619 | 619 |
| R-squared | 0.139 | 0.125 | 0.129 | 0.143 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

**Table 4 - Buy-and-hold abnormal return 12 months:** The table shows the regression results for five different models. For all models, the dependent variable is buy-and-hold abnormal return (BHAR) over 12 months, measured in percent. Investor sentiment is Baker and Wurgler's (2006) investor sentiment index. Growth opportunities is R&D plus CAPEX as a percent of total assets. Altman Z (Log) is the logarithm of the Altman Z-score. Market-to-book is the market capitalization divided by book value. Size (Log) is the logarithm of market capitalization. Leverage is debt divided by total assets. Revenue (Log) is the logarithm of revenue. TA (Log) is the logarithm of total assets. Industry control shows whether high technology firms have been controlled for.

The regression results for BHAR over 12 months are presented in Table 4. On average *Market Timing* seems to have an effect on abnormal returns. The coefficient of the *Market Timing* proxy is both statistically and economically significant. Column (1) shows that the coefficient for investor sentiment is -9.066, meaning a negative correlation with BHAR. The magnitude

of the coefficient means that, on average, if investor sentiment increases by one point the BHAR decreases by 9.066 percentage points.

Column (2) of Table 4 shows the regression results using *Growth Opportunities* as the main independent variable. The column displays that the coefficient for *Growth Opportunities* is 0.126. Hence, the coefficient is positively correlated with BHAR over 12 months. The magnitude of the coefficient means that, on average, if *Growth Opportunities* increase by one percentage point the BHAR increases by 0.126 percentage points. However, the *Growth Opportunity* proxy is not statistically significant.

Column (3) in Table 4 shows the regression results using the logarithm of Altman Z-score as the main independent variable as a proxy for *Financial Distress*. The coefficient magnitude of -2.430 implies an economical significant effect. Further, the distress proxy is statistically significant on the 0.1 level. As there is a level-log relationship between the dependent and the main independent variable it means that, on average, if the Altman Z-score increases by one percent BHAR decreases by approximately 2.430 percentage points.

Column (4) in Table 4 shows the regression results using all three main independent variables. The results show that both the economic magnitude and the statistical significance for *Market Timing* and *Financial Distress* proxies are preserved. Compared to Column (2) the coefficient for growth opportunities decreases from 0.126 to 0.077. The coefficient still has no statistical significance.

Control variables for *Market-to-Book*, the logarithm of *Market Capitalization*, *Leverage*, the logarithm of *Revenue*, the logarithm of *Total Assets* and *Industry* are used in all regression results in Table 4. All columns show that the natural logarithm of *Market Capitalization*, *Revenue* and *Total Assets* are statistically significant at the 0.01 level. The other control variables have no statistical significance.

**Table 6 - Regression results for 36 Months buy-and-hold abnormal return**

| Model: | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| VARIABLES | *BHAR* | *BHAR* | *BHAR* | *BHAR* |
| *Investor Sentiment* | -4.809 | | | -4.138 |
| | (3.881) | | | (3.981) |
| *Growth Opportunities* | | 0.254 | | 0.315 |
| | | (0.333) | | (0.370) |
| *Altman Z(Log)* | | | -1.307 | -1.093 |
| | | | (2.641) | (2.629) |
| *M/B* | 0.132 | 0.125 | 0.375 | 0.322 |
| | (1.115) | (1.090) | (1.343) | (1.321) |
| *Size (Log)* | 11.693* | 10.852* | 11.537 | 11.063 |
| | (6.019) | (5.998) | (7.166) | (7.188) |
| *Leverage (%)* | 0.183 | 0.166 | 0.035 | 0.052 |
| | (0.233) | (0.234) | (0.293) | (0.289) |
| *Revenue (Log)* | 6.466** | 7.271*** | 8.800*** | 9.440*** |
| | (2.569) | (2.501) | (2.553) | (2.594) |
| *TA(Log)* | -10.721* | -9.973 | -13.913* | -13.160* |
| | (6.359) | (6.416) | (7.620) | (7.737) |
| Constant | -53.664*** | -60.451*** | -39.701* | -48.634** |
| | (17.571) | (18.460) | (21.976) | (22.447) |
| Industry Control | Yes | Yes | Yes | Yes |
| Robust Standard Errors | Yes | Yes | Yes | Yes |
| Observations | 651 | 651 | 619 | 619 |
| R-squared | 0.038 | 0.038 | 0.040 | 0.043 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

**Table 5 - Buy-and-hold abnormal return 36 months:** The table shows the regression results for five different models. For all models the dependent variable is buy-and-hold abnormal return (BHAR) over 36 months, measured in percent. Investor sentiment is Baker and Wurgler's (2006) investor sentiment index. Growth opportunities is R&D plus CAPEX as a percent of total assets. Altman Z (Log) is the logarithm of the Altman Z-score. Market-to-book is the market capitalization divided by book value. Size (Log) is the logarithm of market capitalization. Leverage is debt divided by total assets. Revenue (Log) is the logarithm of revenue. TA (Log) is the logarithm of total assets. Industry control shows whether high technology firms have been controlled for.

Table 5 presents the regression results using the 36 months holding period abnormal return as dependent variable. In comparison with the 12-month abnormal return regressions, presented in Table 4, there are changes in both economical and statistical significance for the main independent variables. The magnitude of the proxied estimates for *Market Timing* and *Financial Distress* diminishes relative to the 12-month results. Further, they are no longer statistically significant. The coefficient for *Growth Opportunities* increases in economic magnitude but maintains statistically insignificant.

### 6.2.2 Analysis of Regression Results

The regression results in Table 4 indicate that *Market Timing* has both an economically and statistically significant effect on BHAR over 12 months. Similar to Chen, Choe and Lin (2019), we find that *Market Timing* has a negative effect on abnormal return. Their results show that the timing of seasoned equity issues have a major negative effect on abnormal returns over a 36-month holding period. Likewise, our results indicate that the timing has the biggest effect on 12 months abnormal return out of the included main independent variables. However, in contrast to Chen, Choe and Lin (2019), we do not find statistical significance for *Market Timing* over 36 months (Table 5). The lack of statistically significant results over 36 months is likely due to outliers (see Figure 2). Because of the long time horizon, other factors explaining substantial variation in abnormal return for certain firms could occur.

One potential framework which could explain our results is the market timing theory. As market timing theory suggests that firms and managers issue equity more frequently during times when the equity market is valued high (Baker & Wurgler, 2002), our data indicates that they are rather successful in exploiting fluctuating market valuations. Hence, firms exploit variations in market values, issue seasoned equity during periods of upwards mispricing, and therefore have a lower long-run abnormal return subsequent to the SEO. The 12 months regression results support **H2** and are in line with previous research (Chen, Choe & Lin, 2019; Loughran & Ritter, 1995; 1997; Spiess & Affleck-Graves, 1995).

The regression results in Table 4 and Table 5 do not show any indications that *Growth Opportunities* have an effect on abnormal return. Firms with *Growth Opportunities* have large and profitable investments but lack free cash flow, these firms turn to financial markets to ensure funds (Jensen, 1986). However, our results only indicate a limited effect of *Growth Opportunities* on long-term abnormal return following a seasoned equity issue. The results are neither economically nor statistically significant. Therefore, we do not find support for **H3a**. The rather limited effect could suggest that the *Growth Opportunities* are already anticipated by the market. These results are similar to what is discussed by Denis (1994), who finds evidence suggesting that investment opportunities only play a minor role in market reactions to equity offerings. Similarly, Autore, Bray and Peterson (2009) find that there is no significantly negative relationship between stock performance and investments, in regard to SEOs.

The regression results also suggest that the proxy for *Financial Distress* has an effect on abnormal return. The results indicate that as firm financial strength increases the abnormal return becomes more negative. From a pecking-order perspective, any potential distress costs should decrease as the financial strength of the firm increases (Myers & Majluf, 1984). Issuing expensive equity for financing could then have a negative impact on firm value if the intended use of proceeds does not add a sufficient amount of value. Therefore, a negative market reaction could be expected if a financially strong firm issues equity without an investment opportunity with sufficient profitability.

In the discussion in section 6.2.2, the results on financially distressed firms are somewhat contrary to the pecking-order. According to the pecking-order prediction, a firm would issue seasoned equity in a situation where the distress costs outweigh the information asymmetry costs; only distressed firms should conduct a SEO which would improve the value of the firm. However, if the market is not aware of the financial distress that the firm is under, a negative market reaction could be explained due to increased free cash flow in line with agency explanations and the predictions of the free cash flow hypothesis. This type of efficient market discussion would be aligned with the findings of Theo, Welch and Wong (1998), who find that the market does not incorporate all publicly available information in regard to SEO issues.

The results of the categorized BHAR analysis and the regression analysis jointly, suggest that there is a threshold, under which stocks tend to anomalously underperform because they are distressed. However, over the threshold the cost of capital outweighs the value added, decreasing the value of the firm, with stock underperformance as a result. Overall, some results are found in support of **H3b** in the shorter range of the examined holding periods.

The results from our full model, displayed in Table 4 in Column (4), suggest that *Market Timing* in combination with *Financial Distres*s level has an effect on BHAR over a 12-month period. Both the proxy for market timing and financial distress is economically and statistically significant. The regression results indicate that financially strong firms, who also time the market, experience more negative abnormal returns subsequent to issuing seasoned equity. However, the regression results in combination with categorized BHAR analysis also indicate that firms below the threshold for *Financial Distress*, who time the market, experience more negative abnormal returns. Therefore, over a holding period of 12 months, the results provide support for **H4b**. As our results do not suggest that *Growth Opportunities* have an effect on

abnormal return, we cannot conclude that *Market Timing* in combination with *Growth Opportunities* has an effect on abnormal return. Therefore, the results do not provide any support for **H4a**.

## 6.3 Regression robustness checks

**Table 6 - Robustness Checks, 12 Months Buy-and-Hold Abnormal Return**

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| VARIABLES | *BHAR* | *BHAR* | *BHAR* | *BHAR* | *BHAR* | *BHAR* |
| *Investor Sentiment* | -8.703*** | -8.555*** | -8.969*** | -8.729*** | -13.677*** | -8.323 |
| | (2.570) | (2.561) | (2.592) | (2.564) | (3.854) | (6.691) |
| *Growth Opportunities* | 0.077 | 0.071 | 0.075 | | | 0.095 |
| | (0.190) | (0.190) | (0.191) | | | (0.177) |
| *Growth Opportunities* | | | | 0.072 | | |
| | | | | (0.190) | | |
| *Growth Opportunities* | | | | | -0.115 | |
| | | | | | (0.209) | |
| *Altman Z (Log)* | -2.308* | -2.433* | -2.24* | | | -2.085 |
| | (1.337) | (1.339) | (1.348) | | | (1.310) |
| *Altman Z (Log)* | | | | -2.253* | | |
| | | | | (1.323) | | |
| *Altman Z (Log)* | | | | | -3.465* | |
| | | | | | (1.839) | |
| *Market-to-Book* | -0.513 | | -0.514 | -0.484 | | -0.676 |
| | (0.520) | | (0.524) | (0.524) | | (0.544) |
| *Size (Log)* | 25.802*** | 23.270*** | 25.956*** | 25.275*** | 36.030*** | 24.457*** |
| | (4.116) | (3.527) | (4.199) | (4.082) | (7.405) | (4.109) |
| *Leverage* | -0.002 | -0.077 | 0.001 | -0.009 | -0.239 | -0.027 |
| | (0.157) | (0.145) | (0.157) | (0.155) | (0.178) | (0.166) |
| *Revenue (Log)* | 7.798*** | 7.766*** | 7.842*** | 7.737*** | 9.456*** | 6.402*** |
| | (1.558) | (1.560) | (1.569) | (1.551) | (2.324) | (1.511) |
| *TA (Log)* | -26.931*** | -24.281*** | -27.096*** | -26.407*** | -37.214*** | -24.421*** |
| | (4.477) | (3.879) | (4.628) | (4.447) | (6.968) | (4.389) |
| Constant | -41.942*** | -41.651*** | -42.415** | -41.326*** | -44.317** | -80.754*** |
| | (11.789) | (11.869) | (11.864) | (11.715) | (18.354) | (10.146) |
| Winsorized (Percentiles) | (97.5) | (97.5) | (97.5) | (2.5 / 97.5) | No | (97.5) |
| Year Control | No | No | No | No | No | Yes |
| Ex. Utility and Finance | No | No | Yes | No | No | No |
| Industry Control | Yes | Yes | Yes | Yes | Yes | Yes |
| Robust Standard Errors | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 619 | 619 | 610 | 619 | 619 | 619 |
| R-squared | 0.143 | 0.141 | 0.144 | 0.141 | 0.103 | 0.235 |

Robust standard errors in parentheses
*** p<0.01. ** p<0.05. * p<0.1

**Table 6 - Robustness checks:** The table shows the regression results for five different models. For all models the dependent variable is buy-and-hold abnormal return (BHAR) over 12 months, measured in percent. Investor sentiment is Baker and Wurgler's (2006) investor sentiment index. Growth opportunities is R&D plus CAPEX as a percent of total assets. Altman Z (Log) is the logarithm of the Altman Z-score. Market-to-book is the market capitalization divided by book value. Size (Log) is the logarithm of market capitalization. Leverage is debt divided by total assets. Revenue (Log) is the logarithm of revenue. TA (Log) is the logarithm of total assets. Winsorized

(Percentiles) displays at which percentiles BHAR, growth opportunities and Altman Z (Log) are winsorized. Industry control shows whether high technology firms have been controlled for.

As the regression model presented in Table 3 in Column (4) carries the most explanatory power and the most interesting results, checking the robustness of those results are necessary. Therefore, Table 6 provides various robustness checks to verify the results. Column (1) provides the full regression model from Table 3. As an initial check, the *Market-to-Book* variable is excluded from the model as that measure can incorporate mispricing, growth opportunities and potentially macroeconomic effects. The result from excluding *Market-to-Book* is presented in Column (2). The effect of the omission is limited in regard to both coefficient magnitude and statistical significance.

As a second robustness check, utility and financial firms are excluded. This is based on previous literature which has omitted firms with an SIC industrial classification code of 4900-4949 (utility) and 6000-6999 (finance) (Chen, Chou & Lin, 2019; Loughran & Ritter, 1997; DeAngelo, DeAngelo & Stulz, 2010). Like Brav, Geczy and Gompers (2000), we find a limited effect of the omission of these observations. However, out of our sample only nine observations are classified as either utility or financial firms.

In the main regression both dependent and the independent variables for *Growth Opportunities* and *Financial Distress* are winsorized at the 97.5 percentile, due to right-skewed distribution. Therefore, as a robustness test, we run regressions both without winsorizing and winsorizing at both 2.5th and 97.5th percentiles. Columns (4) and (5) show that the winsorizing has a limited effect on statistical significance. However, some effect on coefficient magnitude is noted when no variables are winsorized. This is likely due to large positive outliers.

Lastly, a control for year effects is included in the regression model. The results are presented in Column (6), as shown, the change in magnitude of coefficients is limited. Further, all independent and control variables have the same sign as before. As shown by Table 6 Column (6), the *Financial Distress* proxy loses its statistical significance. This is due to a slight decrease in coefficient magnitude and the statistical significance is close to the 0.1 threshold at a p-value of 0.112. The main effect by including the year control is noted in the *Market Timing* proxy, as it is no longer statistically significant. However, because the year effects control could capture similar factors and correlate rather substantially with the proxy for *Market Timing*, this is not

unexpected. As a result, the variance could be inflated, which would explain the lack of statistical significance.

# 7. Conclusion and Further remarks

This section presents the conclusions drawn as a result of this study. First, conclusions are provided. Second, limitations of the study and further research are addressed.

## 7.1 Conclusion

This study employs a quantitative approach to examine SEOs conducted by U.S. firms between the years 1998-2015 in order to answer the question: *How does market timing and cash need rationale affect long-term stock performance following a seasoned equity offering?* Previous research has found that SEO issuing firms tend to experience subsequent stock underperformance (Loughran & Ritter, 1997; Chen, Choe & Lin, 2019; Khan, Kogan & Serafeim, 2012; Spiess & Affleck-Graves, 1995). Further, market timing firms tend to experience more severe underperformance (Chen, Choe & Lin, 2019). Moreover, growth opportunities have been discussed as a relevant factor (Denis, 1994; Masulis & Korwar, 1986) as well as the intended use of proceeds (Walker & Yost, 2008; Bary & Peterson, 2009).

Consistent with both previous research and our hypothesis we find indications that market timing has both an economically and statistically significant effect on 12-month BHAR following an SEO. Using investor sentiment as a proxy for market timing, SEOs during high sentiment periods provide inferior results vis á vis low sentiment period SEOs. These results provide support for market timing theory. The results are also in line with previous research (Chen, Chou & Lin, 2019; Loughran & Ritter, 1997; Kahn, Kogan & Serafeim, 2012).

Further, in line with our hypothesis, we find evidence which suggests that the level of financial distress has both an economically and statistically significant effect on abnormal return subsequent to an SEO. First, our findings indicate that there is a statistically significant difference in 12-month stock performance between firms that are in financial distress and firms that are not in financial distress. Second, our results suggest that as financial strength increases abnormal return subsequent to issuing seasoned equity decreases. These results provide support for the pecking-order theory as firms with low levels of financial distress could opt for less expensive financing options. The results are also in line with previous research, which suggests that there exists an anomalous pattern of security underperformance for firms in financial distress (Campbell, Hilscher & Szilagyi, 2008; Griffin & Lemmon, 2002; Dichev, 1998). Further, we expand on previous research by finding evidence which suggests a relationship between firms' fundamental distress levels and abnormal return subsequent to SEOs. Previous

research is restricted to studying firms who prior to the SEO state that the intended use of the proceeds is recapitalisation (Walker & Yost, 2008; Autore, Bray & Peterson, 2009). However, our results do not suggest that growth opportunities have an effect on stock performance subsequent to SEOs.

Our results also indicate that market timing, together with either very low or very high levels of financial distress, affect stock performance negatively following a seasoned equity offering. These results are in line with market timing theory, the pecking-order theory and the anomalous return of distressed stock. However, our results find no significant relationship between how market timing in combination with growth opportunities affect stock performance subsequent to an SEO.

## 7.2 Limitations

This study has several limitations. One limitation is the sample, which the results are based on. Due to large outliers in the sample, the statistical significance of our results is reduced. We have attempted to limit the outliers through winsorizing, but large outliers still exist. The limitation could potentially be solved by an increased sample size, thus decreasing the standard deviation.

In order to quantify our main independent variables, we have used proxies. However, the proxies do not perfectly capture the variables. In order to reduce this limitation, we have carefully chosen the proxies based on previous research. However, our proxy for growth opportunities, R&D plus capital expenditures-to-assets, does not always reflect a company's actual growth opportunities.

The abnormal return calculation is based on the value weighted CRSP index. The calculations have not been benchmarked relative to another index, which might yield different results. Using a different index, as well, to ensure robustness would have been preferable. However, due to time constraints such a measure was not taken.

## 7.3 Future research

For future research further refinement of the used model, using both market timing and cash need rationales as determinants of stock performance subsequent to an SEO, could yield more precise conclusions. As discussed in the previous section, growth opportunity proxies have had a limiting effect. The approximation of growth and investment opportunities have previously

been discussed, by for example Denis (1994). Using other proxies might result in a more fit model and resulting in the ability to make better inferences. Further, on the same subject, expanding the approximation of financial distress could be beneficial. The literature on financially distressed stocks provides multiple potential proxies. Using elaborate models, such as that constructed by Campbell, Hilscher and Szilagyi (2008), or include credit ratings as an additional distress proxy could be beneficial.

A more general remark, the distribution of abnormal return is wide, and the possibility of an outlier problem seems to be prominent, based on the data and results gathered for this study. Looking at the dispersion of results in Spiess and Affleck-Graves (1995) also informs the reader of that there are substantial differences in stock returns following an SEO. Still, the result of this study indicates that cash need rationale has an effect on stock performance following an SEO. Future research could make interesting inferences using a similar model but a more comprehensive sample.

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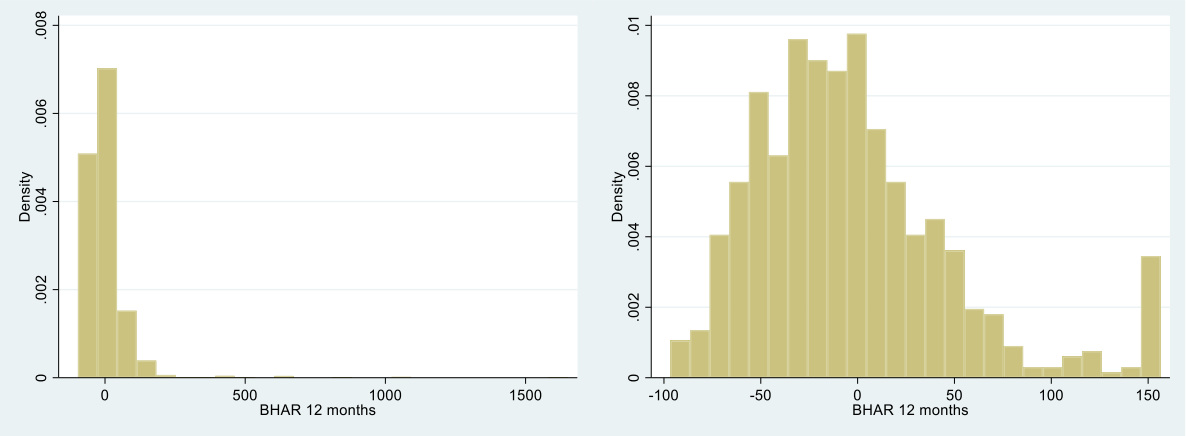
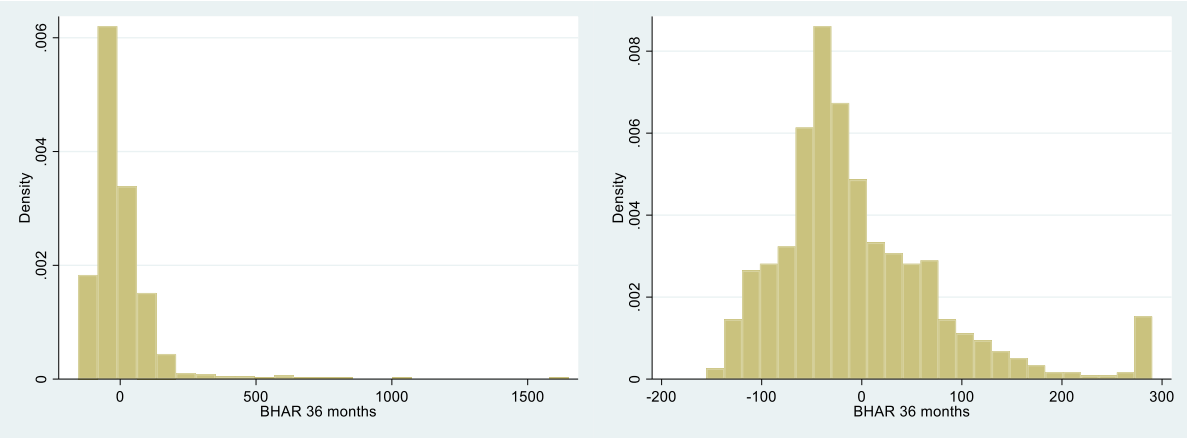
# Figures

## Figure 1. 12 Months buy-and-hold abnormal return distribution



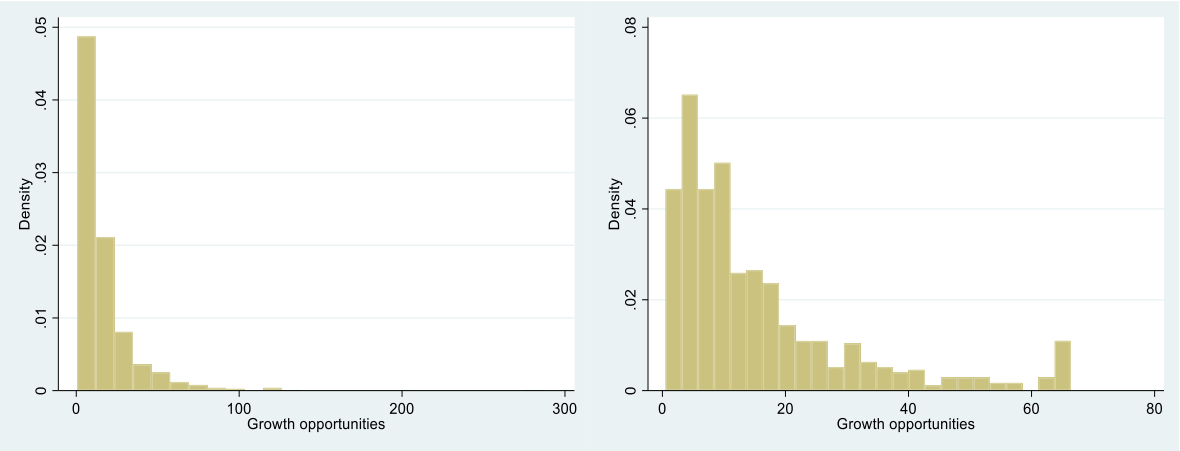

The figures display 12-month BHAR, non-winsorized to the left and winsorized to the right at the 97.5$^{th}$ percentile.

## Figure 2. 36 Months buy-and-hold abnormal return distribution



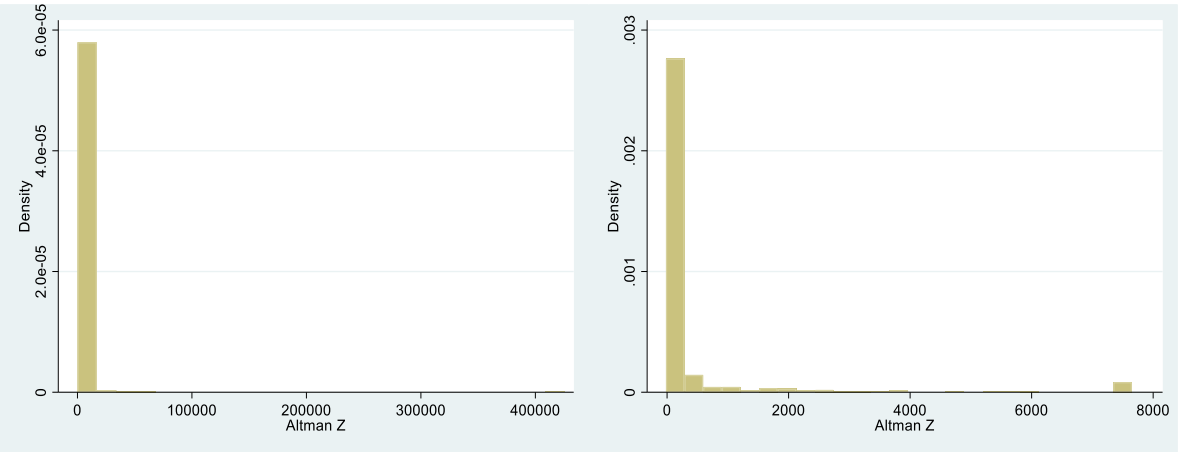

The figures display 36-month BHAR, non-winsorized to the left and winsorized to the right at the 97.5$^{th}$ percentile.

## Figure 3. Growth Opportunities distribution

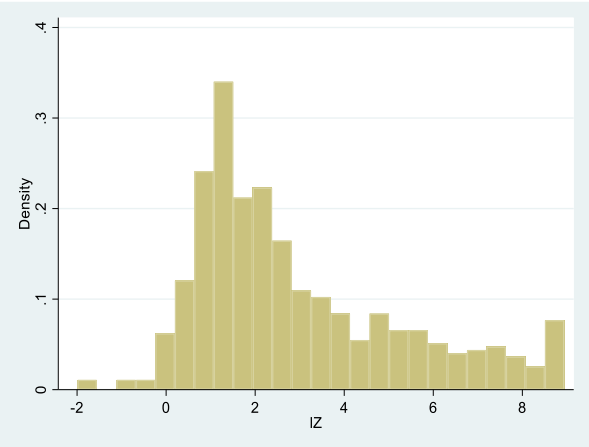



The figures display the Growth Opportunities proxy, non-winsorized to the left and winsorized at the 97.5$^{th}$ percentile to the right.

## Figure 4. Altman Z-Score distribution




The figures display the Financial Distress proxy, Altman Z-Score, non-winsorized to the left and winsorized at the 97.5$^{th}$ percentile to the right.




The figure display the Financial Distress proxy, Altman Z-Score, winsorized at the 97.5$^{th}$ percentile and as a natural logarithm.

# Tables

## Table 7. Whites test for homoscedasticity

White test for Homoscedasticity

| H0: Homoscedasticity | Market Timing | Growth Opportunities | Financial Distress | Full model | Full modell, ex. M/B |
|---|---|---|---|---|---|
| BHAR, 12 Months | 0.0004 *(Reject)* | 0.0000 *(Reject)* | 0.0004 *(Reject)* | 0.0019 *(Reject)* | 0.0015 *(Reject)* |
| BHAR, 36 Months | 0.0060 *(Reject)* | 0.0196 *(Reject)* | 0.0043 *(Reject)* | 0.0005 *(Reject)* | 0.0017 *(Reject)* |

The table display the output of White's test for Homoscedasticity, the numeric values is the Prob>Chi. Whether the null hypothesis, homoscedasticity, is rejected or not is denoted within parathesis.

## Table 8. Correlation matrix

**Correlation table**

| Variables | *BHAR, 12 Months* | *BHAR, 36 Months* | *Investor Sentiment* | *Growth Opportunities* | *Altman Z-Score* | *Market-to-book* | *Market Cap* | *Leverage* | *Revenue* | *Total Assets* |
|---|---|---|---|---|---|---|---|---|---|---|
| *BHAR. 12 Months* | 1.0000 | | | | | | | | | |
| *BHAR. 36 Months* | 0.5108 | 1.0000 | | | | | | | | |
| *Investor Sentiment* | -0.1086 | -0.0459 | 1.0000 | | | | | | | |
| *Growth Opportunities* | -0.0451 | -0.0290 | -0.0016 | 1.0000 | | | | | | |
| *Altman Z-Score* | -0.0199 | -0.0280 | 0.0718 | 0.1552 | 1.0000 | | | | | |
| *Market-to-book* | 0.1019 | 0.0484 | -0.0007 | 0.2356 | 0.0923 | 1.0000 | | | | |
| *Market Cap* | 0.0523 | 0.0399 | 0.0023 | -0.0692 | -0.0294 | 0.0175 | 1.0000 | | | |
| *Leverage* | -0.0220 | 0.0647 | -0.0429 | -0.0985 | -0.2985 | 0.1772 | 0.0343 | 1.0000 | | |
| *Revenue* | 0.0295 | 0.0211 | -0.0222 | -0.0979 | -0.0566 | -0.0640 | 0.7405 | 0.0677 | 1.0000 | |
| *Total Assets* | 0.0130 | 0.0064 | -0.0328 | -0.0572 | -0.0301 | -0.0392 | 0.9133 | 0.0470 | 0.7983 | 1.0000 |

The table displays the correlation between variables, the same variables are located on both the Y and X axis. As is displayed by the table, the correlation between main independent variables is limited. However, as also displayed, total assets correlate quite substantially to market capitalization and revenue.

## Table 9. Jarque-Bera test for normality

**Skewness and kurtosis tests for normality**

| Variable | Obs | Skewness | Kurtosis | Adj | Joint chi2(2) | Prob>chi2 |
|---|---|---|---|---|---|---|
| *BHAR, 12 Months* | 658 | 0.0000 | 0.0000 | | 729.06 | 0.0000 |
| *BHAR, 36 Months* | 658 | 0.0000 | 0.0000 | | 564.82 | 0.0000 |
| *Investor Sentiment* | 658 | 0.0000 | 0.0000 | | 170.90 | 0.0000 |
| *Growth Opportunities* | 658 | 0.0000 | 0.0000 | | 544.43 | 0.0000 |
| *Altman Z-Score* | 658 | 0.0000 | 0.0000 | | . | . |

The table displays the results of a Jarque-Bera test. The test tests whether the sample has a skewness and kurtosis matching a normal distribution.

# Appendices

## Appendix 1. Variable description

| Variable | Label | Definition |
|---|---|---|
| Buy-and-hold abnormal return | BHAR | The actual return minus the normal return of holding a stock during the period |
| Investor sentiment | Investor sentiment | Baker and Wurgler's investor sentiment index |
| Growth opportunities | Growth opportunities | Research & Development expenses plus capital expenditures to total assets |
| Altman Z-score | Altman Z | A proxy for firms' financial strength |
| Market-to-book | M/B | Market capitalization divided by the book value of equity |
| Leverage | Leverage | Total debt divided by total assets |
| Revenue | Revenue | Year-end revenue |
| Total assets | TA | The book value of total assets |
| Industry | Industry control | A dummy variable which controls for the effect of high-technology firms |

# Appendix 2. SIC classification

**SIC codes for high-technology firms:**

| SIC code | Description |
|---|---|
| 283 | Drugs |
| 357 | Computer and office equipment |
| 366 | Communication equipment |
| 367 | Electronic components and accessories |
| 382 | Laboratory, optic, measure, control instruments |
| 384 | Surgical, medical, dental instruments |
| 481 | Telephone communications |
| 482 | Miscellaneous communication services |
| 489 | Communication services, NEC |
| 737 | Computer programming, data processing, etc |
| 873 | Research, development, testing services |

Definition of "high-technology" firms as categorized by the first three numbers of their SIC industry code. The definition follows the result of Kile and Philips (2009).