**Erasmus University Rotterdam**

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Master Thesis: Financial Economics

# The Long-Run Underperformance of Seasoned Equity Offerings and the Role of Investment

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# Abstract

This paper presents the results of a long-run performance study of firms that issue seasoned equity in the United States. More specifically, it aims to validate the investment framework of Carlson et al. (2006) by looking at firms that issue bonds with the purpose of investment. If the framework holds true, a long-run underperformance of bond issues is expected since risky real options are converted into assets in place. This paper finds a long-run underperformance relative to matched portfolios of -12.34% and -5.05% in the 36 months subsequent to issuance for SEOs and bond issues respectively, using the cumulative average abnormal returns method. The buy-and-hold abnormal returns categorized by investment level show that solely for bond issues, firms with high investment levels perform worse than firms with low investment levels, supporting the investment explanation. The buy-and-hold abnormal returns show that for SEOs, underperformance tends to be present in most of the industries whereas for bond issues, underperformance is driven by only a few. Moreover, it seems that the underperformance tends to decay over time. The buy-and-hold abnormal returns categorized by size of the issue show that the larger the issue size, the greater underperformance in the subsequent year. The calendar time abnormal returns provide a robustness check for the underperformance of SEOs as significant negative alphas are presented. For the bond issue sample, the results are not entirely conclusive since most alphas remain insignificant. The investment explanation remains questionable since the long-run underperformance of firms which issue bonds with the purpose of investment is not as substantial as SEO underperformance.



Keywords: Seasoned equity offerings, Bond issues, Long-run performance, Long-run event study, Investment, Growth options

# Table of Contents

# List of Tables



Appendix



# List of Figures



Appendix

# 1. Introduction

The abnormal stock market performance of firms that issue seasoned equity remains a remarkable challenge for financial theory. The motives for financing with external capital are multifarious including a rearrangement of the capital structure, an aim to execute investment possibilities or a reduction of debt obligations. Several key fields in financial economics, for instance the capital structure theory or corporate governance, can be ascribed to the decision to issue equity. On the short run, there seems to be a consensus that issuing equity is considered as bad new by the market, which takes the form of negative abnormal returns (e.g. Asquith & Mullins, 1986; Heron & Lie, 2004; Masulis & Korwar, 1986; Schipper & Smith, 1986). According to Myers and Majluf (1984), management will solely issue equity when a firm's stock is overvalued, to transfer wealth from new to existing shareholders. Hence, when the equity is issued and information asymmetry is diminished, investors lower expectations about firm value and negative abnormal returns immediately follow the seasoned equity offering (SEO) announcement. Research focusing on long-run post-issue stock performance documents that seasoned equity issuers experience poor stock performance compared to matched non-issuers for up to five years after the offering date. Early research states that investors are slow to react to the misvaluation (e.g. Loughran & Ritter, 1995; Spiess & Affleck-Graves 1995). More recent studies on long run performance provide other insights regarding new markets, other control variables and correctness of the benchmark choice. An absence of consensus remains in the academic literature on the core determinants of the SEO decision and its effects on firm performance after issuance.

This paper focuses on issuances used to execute investment possibilities. Carlson et al. (2006) present a rational theory of SEOs and give an explanation for the long-run post-issuance underperformance. The theory suggests that when SEOs finance investments in a real options framework, expected returns diminish endogenously. The intuition is as follows: firms expand through equity issuance, and while they grow, real options are converted into assets in place. Although the acquired assets are risky, they are less risky than the options they replace. A more recent paper of Lyandres et al. (2008) supports this argument by using an investment factor that helps explain the underperformance. The theory of Carlson et al. (2006) is in contrast with other studies which highlight the correlation between investments and subsequent stock underperformance (e.g. Polk & Sapienza, 2009; Titman et al., 2004). These studies claim that overinvestment is rather due to either shareholder or managerial over optimism. Specifically, Polk and Sapienza (2009) argue if investors have short horizons, managers will choose to invest in overpriced projects and avoid projects that are underpriced. Here, the firms's management cater investor sentiment with the aim of maximizing near-term stock prices. Carlson et al (2006) proposes that a decline in returns subsequent to investments is a logical consequence of growth option exercise.

This paper aims to validate Carlson et al.'s (2006) findings by examining the long-run performance of SEOs as well as bond issues with the purpose of investment. If the framework holds true, one would expect to find the same underperformance pattern for bond issues since also here, risky real options are converted into assets in place. Given that the SEOs and bond issues were undertaken in the United States between 2007 and 2017, I form the following reasearch question: Do firms that issue bonds with the purpose of investment exhibit a similar underperformance pattern as seasoned equity offerings? The investigation of bond offerings to the public is an upcoming area of academic research since bonds are increasingly becoming an important corporate financing alternative. The total outstanding debt through corporate bonds reached USD 13 trillion in the end of 2018 (twice as much as in 2008) with the United States being the largest corporate bond market (Çelik et al., 2019). The growth of corporate bond usage has been partially backed by regulatory initiatives aiming to support the use of corporate bonds as a viable source of long term funding for non-financial companies, besides being an attractive asset class for investors. Moreover, the increased use of corporate bonds adheres to the objectives of expansionary monetary policies and the connected unconventional measures by central banks through quantitative easing (Çelik et al., 2019).

The results of this paper provide clear evidence for a long-run underperformance of SEOs which are issued with the purpose of investment in the United States, supporting existing studies. More importantly, the findings for the long-run underperformance of bond issues also indicate an underperformance pattern. However, the underperformance is less pronounced than for SEOs and therefore, results are not entirely conclusive. A strategy of investing in US-traded SEOs at the month following the issuance and a holding period of 36 months would have left an investor with only 88 cents relative to a dollar invested in matching portfolios, using buy-and-hold abnormal returns. For bonds issued with the purpose of investment, this is 96 cents relative to a dollar invested in matching portfolios. The cumulative average abnormal return matched on size and book-to-market over 36 months for the SEO and bond sample are -12.23% and -5.05% respectively, indicating an underperformance. The calendar-time-abnormal returns provide a robustness check since a significant negative alpha is presented for the SEO sample. For the bond sample, only a negative alpha is found in the five factor model.

The structure of this paper is as follows. First, the two streams of existing literature are reviewed, focusing on immediate market reactions to SEO announcements and the long-run post issue stock performance up to five years, followed by the development of the hypotheses. Second, the data collection and methodolgy are described. Third, the results are presented and discussed together with limitatios and future research direction. Finally, the last section concludes this paper.

# 2. Literature Review

## 2.1 Immediate Market Reactions

Modigliani and Miller (1958) postulate that capital structure is irrelevant for firm value given a set of circumstances including efficient capital markets, no asymmetric information and an absence of taxes. In response, Donaldson (1961) is the first to suggest firms' preferences for internal funds over external funds and for issuing debt over issuing equity. The Pecking Order Theory obtained its real foundation by the work of Myjers and Majluf (1984), who modify and explain these preferences in a theoretical model. The theory attributes the selection order in financing to the degrees of information asymmetry ingrained in the sources of finance. External equity is only used as a last resort financing component since it discloses adverse signaling effects. Therefore, the market reaction of the raise of external equity is likely to be negative and issuers should experience negative abnormal returns upon the announcement as the asymmetric information is decreased. Brav et al. (2000) suggest similar implications and conclude that firms are in a tight financial situation and therefore, decide to issue equity. Other studies supporting the pecking other theory include Dierkens (1991), Bayless and Chaplinsky (1996), and Heron & Lie (2004). The Pecking Order Theory is criticized by Fama and French (2005) because of its inability to explain why a substantial share of firms choose to issue equity.

The Trade-off Theory forms an alternative theory of capital structure and is based on the work of Modigliani and Miller (1958). It explains a firm's decision for an optimal structure that relates to the trade-off between the tax advantage of debt and related leverage costs. The tradeoff theory contrasts earlier theories since it suggests that capital structure is directed towards an optimum because of its capital issue decision being balanced between marginal costs and benefits. By the trade-off theory, a decrease in stock price subsequently leads to a higher leverage ratio. Hence, a company is guided into equity issuance when raising external capital. If the trade-off theory holds, a seasoned equity offering (SEO) announcement follows a period of lower returns due to the higher leverage ratio, which is in contrast with the pecking order theory. The trade-off theory has been criticized in the literature by, among others, Shayam-Sunder and Myers (1999) who demonstrate that a significant amount of firms abstain from valuable debt tax shields.

Baker and Wurgler (2002) suggest that market timing is the first order determinant of a firm's capital structure, meaning that firms do not generally care if they finance with equity or debt. The decision is based on the form of financing which seems to be more valued by financial markets at that specific point in time. Despite the fact that the justification for the choice of capital structure is in contrast with the pecking order theory, the implications are related. If the market timing theory holds, a SEO is expected after periods of high returns since the costs of issuing equity are relatively low. Given a successful market timing, lower returns can be expected after the SEO as the firms' value is corrected downwards. The evidence for the market timing hypothesis is mixed.

Leland and Pyle (1977) analyze the role of signals within the initial public offering (IPO) process and show how companies with favorable prospects and a higher possibility of success should send signals to the market when going public to distinguish themselves from "bad" companies. A manager owning shares of a firm is unintentionally signaling that the firm has a high value, which is called the signaling hypothesis. As founders of the firm are more informed about the future cash flows in comparison to outside investors, retention of shares acts like a signal of a high quality firm. This assumption on the presence of private information for the advantage of the shareholders advocates a positive relation between the IPO firm value and equity retention. Downes and Heinkel (1982) test the signaling model of Leland and Pyle (1977) and find that initial market valuation increases with a higher percentage of ownership retained by the entrepreneur, with a sample of 297 U.S IPO firms. Since SEOs also include issuing shares to the public, it can be argued that it closely resembles IPOs in terms of signaling. When shares are not purchased by management in a SEO, negative signals are send as their ownership will dilute. Nonetheless, if issued shares are bought by management, their holdings are stable or increasing with a positive signal. Therefore a positive and negative announcement effect can be experienced following a SEO, implied by the signaling theory.

## 2.2 Long-Run Post-Issue Stock Performance

In the academic literature, a variety of methods for evaluating the long-run post-issue stock performance is used. Two approaches have commonly been employed: the buy-and-hold-abnormal-returns (BHAR) and the calendar time tortfolio approach (CTP). The BHAR is defined as the difference between the long-run holding period return of a sample firm issuing equity and a paired benchmark portfolio or firm. These matched benchmarks replicate the returns of the event firms if the event would not have occured. Therefore, one can conclude whether or not the long-run returns of the firms issuing equity are abnormal. The CTP approach determines the abnormal return of a portfolio consisting of all firms for which the event of interest occurred. The abnormal return is identified as the excess return that cannot be explained by the chosen expected return models, for instance CAPM or other factor models.

Although the underperformance of IPOs has been studied substantially for decades, the finding that SEOs have similar long-run underperformance is relatively new. Masulis and Korwar, (1986) and Asquith and Mullins (1986), were among the first to critically revisit SEOs. Both documented a substantial underperformance of issuing firms. Masulis and Korwar (1986) observed negative returns of 32% of public utility stocks and 50% of industrial stocks while the market documented sigificant positive returns. The first groundbreaking study with a more comprehensive explanation into the performance of issuing companies was conducted by Loughran and Ritter (1995). In their paper "The New Issues Puzzle", they observe poor long-run returns for firms issuing stock between 1970 and 1990 for both IPOs and SEOs. During the five years following the issue, investors have received average returns of 5 percent per year for firms going public and 7 percent per year for firms conducting a SEO. To put this in perspective, an investors would have had to invest an additional 44 percent of funds in the issuers than in non-issuers of a similar size to have equivalent wealth five years after the issue. Both size and book-to-market ratios were hold constant and poor performance of firms conducting SEOs is observed not to be a manifestation of long-term return reversals, nor can it be attributed to a difference in betas. However, the evidence of Loughran and Ritter (1995) is consistent with a market where firms take advantage of windows of opportunity by issuing equity when stocks are substantially overvalued.

The findings of Spiess and Affleck-Graves (1995) support the results of Loughran and Ritter (1995). They observe a median return for SEO firms of 10%, compared with a median five-year holding return of 42.3% for non issuers. An identical underperformance is found when the firms are matched on the basis of book-to-market ratio and size. With a strategy of investing in SEO firms over a period of three years after the day of the offering, an investor would have been left with 85.4 cents to each dollar from investing in size and industry matched firms that did not issue equity. Whereas Loughran and Ritter (1995) only matched on size, Spiess and Affleck-Graves

(1995) also used industry classification. Although every subgroup shows underperformance, severe underperformance is seen in firms which are smaller, younger, have lower book-to-market ratios or are NASDAQ-traded.

The evidence of Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995) is consisent with a market in which firms issue equity when their stock is extremely overvalued. The stock is still significantly overvalued when the issue occurs as the market does not revalue the stock accordingly. Managers can exploit this asymmetrical distribution of information about the value of a firm through a SEO in times of overvaluation. Loughran and Ritter (1997) are the first to label this phenomenon as "windows of opportunity". The framework clarifies two patterns that the pecking order theory failed to explain, namely the low post-issue stock returns and the fact that a substantial amount of firms issue equity when they are not necessarily constrained.

A number of studies show further evidence for this phenomenon with the use of novel control variables or by examining new markets. Teoh et al. (1998) analyze the relation of IPO underperformance with IPO firms' earnings management. The findings are consistent with an inability of investors to completely understand managements' earnings choices, because they behave as if they are fixated on high earnings. They assert that there is a relationship between SEOs and earnings management, which indicates that managers may create windows of opportunity. Eberhart and Siddique (2002) analyze long-term bond returns of issuers and compare these to the stock returns and document a five-year delayed response to SEOs in the corporate bond market. Burch et al. (2004) examine issuers in 1930s and 1940s with out-of-sample tests and find that firms electing the firm commitment method had siginificant negative abnormal returns over the year following the offer while those for firms using rights were not. This suggests that firms commitments were timed as suggested in the windows of opportunity framework wheareas right offerings were not.

In contrast with the results of papers challenging the efficient market hypothesis, some studies argue that SEOs appear to underperform because the applied benchmark is misspecified. Bessembinder and Zhang (2013) claim that long-run buy-and-hold returns to firms issuing equity in SEOs can be attributed to imperfect control-firm matching. Event firms seem to differ from matched firms in terms of liquidity, idiosyncratic volatility, capital investment and return momentum, each explaining returns. When controlling for differenes in firm characteristics across the matched and event firms, their results show that long-run abnormal returns do not differ significanttly from zero from 1980 to 2005. This highlights that the retun patterns to issuing firms seem to reflect characteristics of the firms enganging in the event. Eckbo et al. (2000) demonstrate that SEO underperformance reflects lower systematic risk exposure for issuing firms in comparison with matched firms. Since equity issuers lower leverage, exposure to unexpected default risks and inflation decrease which results in diminishing expected returns relative to non-issuers. Moreover, they argue that equity issuance increase stock liquidity, further lowering expected returns relative to the matched equivalents. Therefore, they explain the new issues puzzle by a failure of the matched firm technique to properly control for risk. Billett et al. (2011) suggest that instead of external finance per se, underperformance is more a function of variety and frequency of firms' issuance activities. The approximated underperformance following issuances of single claim types is highly conditional to whether other financing events are accounted for by the same issuer. Multiple financing patterns generate much poorer performance than single events that have been assessed in previous literature.

Fama (1998) also questions the BHAR method together with the long-run post issue performance. He argues that long-term anomalies are extremely fragile and tend to disappear with changes in the methodology. Fama (1998) suggests that a pre-issue stock price run-up reflects strong earnings and he claims that if the market does not fully understand that earnings growth tends to mean revert, the market will slowly correct the overraction to past earnings growth over the long-run. As a result, issuing firms will underperform in the years following the issue, it could be from earnings that mean-revert rather than a market anomaly. Brav et al. (2000) also praise the CTP approach since factor models can provide insights into abnormal performance that characteristics-based approaches miss, for instance changes in riskiness that are not correlated with changes in characteristics. Their results suggest that SEO underperformance is mainly concentrated in small firms. This indicates that the underperfomance may be explained purely by the size-effect, instead of a unique issuer effect. The findings are in line with Loughran and Ritter (1997) who find that stock returns after a SEO are lowest for the smallest issuers. Another study worth mentioning is Mitchell and Stafford (2000), who show that event-firm abnormal returns are positively cross-correlated when overlapping in calendar time, providing valid criticism for the BHAR since it assumes independence of multiyear event-firm abnormal returns. More recent literature of Pontiff and Woodgate (2008) states that that the long-run post-issue underperformance is part of a broader share issuance effect. They find that their issuance measures have more statistical significance than previously documented predictability attributed to size, book-to-market and momentum.

In the leading theories, persistent mispricing and cognitive bias play a critical role. Carlson et al. (2006) develop a rational theory and claim that when SEOs finance investments in a real options framework, expected returns decrease endogenously. Equity issuance is associated with firm expansion and subsequently, real options are converted into assets in place. The new assets carry risk, however they are less risky than the options that are replaced. The authors model an all-equity firm, and hence do not rely on changes in financial leverage. The real options theory contradicts the intuition that investment in risky projects should increase asset risk. Ritter (2003) states that it is reasonable to believe that lower leverage is more than offset by increased operating risk when issuing companies engage in aggressive expansion plans with the funds raised in an SEO. Carlson et al. (2006) show that the riskier the expansion opportunity of the firm, the larger decrease in risk upon optimally timed option exercise. The investment unlevers the growth option, and when the underlying cash flows are riskier, the reduction in exposure from de-levering is larger. The literature on long-run SEO underperformance often controls for risk by matching on firm characteristics. Carlson et al. (2006) show that when quantifying the effects in their calibration, standard-matching procedures fail to fully capture risk. Lyandres et al. (2008) support the investment-based explanation by adding a new investment factor, long in low investment-to-assets stocks and short in high investment-to-assets stocks, which is able to explain a substantial part of the new issues puzzle.

Real options intuition can also account for the previously mentioned pre-issuance price run-up. Since growth options are exercised solely when being sufficiently into the money, above average returns typically precede issuing announcements. Managers are in possession of superior knowledge concerning the characteristics of their growth options, and optimal SEO timing discloses this to the market. Carlson et al. (2006) demonstrate that the announcement of a SEO is bad news to the market.

## 3. Hypotheses

The previous subsections discussed existing theory and empirical results concerning the performance of SEOs. This paper focuses primarily on the growth option framework developed by Carlson et al. (2006). If their framework holds true and expected returns do decrease endogenously because of the transfer from risky real options to less risky assets in place, one would expect the same to hold for bond issuances with the purpose of investment. In line with the findings by Carlson et al. (2006), I therefore state the following hypotheses:

1a. Firms issuing seasoned equity with the purpose of investment generate abnormal negative returns up to 3 years after the issuance.

1b. Firms issuing bonds with the purpose of investment generate abnormal negative returns up to 3 years after the issuance.

If the investment explanation of Carlson et al. (2006) and Lyandres et al. (2008) is relevant, this would also imply that firms with high investment levels potentially show a higher underperformance than firms with low investment levels since the transfer from real options is higher. Thus:

2. Issuing firms with high investment levels have a higher underperformance than firms with low investment levels.

Ritter (1991) shows that although the long-run performance of IPOs varies widely in different industries, the long-run underperformance of IPOs is present in most industries. Spiess and Affleck-Graves (1995) confirm these findings as they demonstrate negative post-offering performance of SEOs in most industries. Since the pervasiveness of underperformance is not the result of severe underperformance in a few distinct industries, the "fads" explanation is suggested to be related. It implies that the negative aftermarket performance is due to irrationally overoptimistic forecasts. In line with these arguments, I argue:

3. Issuing firms long-run under-performance is persistent across industries.

Ritter (1991) highlights that the long-run underperformance of IPOs is not yearly available, suggesting that the underperformance varies over time. Loughran and Ritter (1995) support these findings and state that firms which issue during years when there is little issuing activity do not underperform commonly, whereas firms which sell stock during high-volume periods have critical underperformance. This leads to the following hypothesis:

4. The year of issuance affects the abnormal returns of issuing firms.

A recent study from Huang and Ritter (2020) discovers that more recent issues are followed by lower average stock returns than issues from several years ago, suggesting that abnormal returns decay over time. Their sample period ends in 2017, which is roughly comparable to the end of the sample period of this paper. Therefore, I expect to find a similar pattern:

5. More recent issues are followed by lower abnormal returns than less recent issues.

Agency theory models, such as the signalling theory developed by Jensen and Meckling (1976), predict that a larger percentage shareholdings by management diminishes the potential conflicts of interest between managers wanting to maximize their own utility and outside shareholders seeking maximalization of the share value. Therefore, the larger the relative size of the equity offering which declines the management proportion of shareholdings, the larger the negative effect on the firm value and stock price since investors view the issuance as a negative signal (Masulis & Korwar, 1986). Huang and Ritter (2020) also show that large issues are followed by lower stock returns in the subsequent year than small issues, for both debt and equity issues. Therefore:

6. The size of the issue is negatively related to the abnormal returns of issuing firms.

# 4. Data and Methodology

The section data and methodology describes the data and methods applied to draw conclusions about the long-run performance of SEOs and bond issues and the fit of the growth option framework of Carlson et al. (2006).

## 4.1 Sample collection

I use two samples: a sample of SEOs and a sample of bond issues in the United States. An SEO firm needs to meet the following criteria to be included in the sample. First, the equity needs to be issued in the United States. Second, the equity issue data is between the 1st of January 2007 and the 1st of January 2017. The 1st of January 2017 is selected as an end date of the sample due to the long-run performance nature of the study. I require 36 months of data after the issue (up to the 1st of January 2020) since I aim to measure the 3-year performance following the issue. This is in line with among others Loughran and Ritter (1995), and Spiess and Affleck-Graves (1995). Third, the use of proceeds does not include one of the following terms: reducing indebtedness, recapitalization or share repurchases. The framework of Carlson et al. (2006) is based on the intuition that equity issuance is associated with firm expansion. Real options are converted into assets in place as firms grow. Their explanation does not rely on changes in financial leverage, as an all-equity firm is modeled. Therefore, any issue that has a use of proceeds related to a change in leverage or recapitalization is excluded to be able to test the hypothesis accordingly. Additionally, the data on the issuing firms needs to be available in both SDC and CRSP. I use SDC to obtain the SEO data and CRSP is used to obtain stock price data. If no data was available for all 36 months following the issuance, the SEO is excluded from the sample. If there is data available for at least one month following the issuance, the SEO is included in the sample. Moreover, private placements and right offerings are excluded from the sample to focus solely on underwritten offers. Finally, financial firms (SIC code 6000-6999) and utilities (SIC code 4900-4999) are excluded since they regularly have specific motives for issuing equity or bonds. Banks frequently issue equity to meet regulatory capital requirements, whereas for utilities, issuing equity may be part of a bargaining process with regulators.

The bond issues match the following criteria: the bonds are issued in the United States and the issue date is between the 1st of January 2007 and 1st of January 2017. Furthermore, the issues included are either high yield corporate bonds or investment grade bonds. Moreover, the use of proceeds does not include one of the following terms: reducing indebtedness, recapitalization, share repurchases or anything relating to refinancing. This is in line with the equity sample and serves the purpose of testing the hypothesis of Carlson et al. (2006). Additionally, data of the issuing firms needs to be available in both SDC and CRSP and private placements are excluded. Lastly, financial firms and utilities are excluded as indicated previously.

As shown in Figure 1, this leads to a sample of 2564 SEOs and 1578 bond issues during the period 1st of January 2007 and the 1st of January 2017.

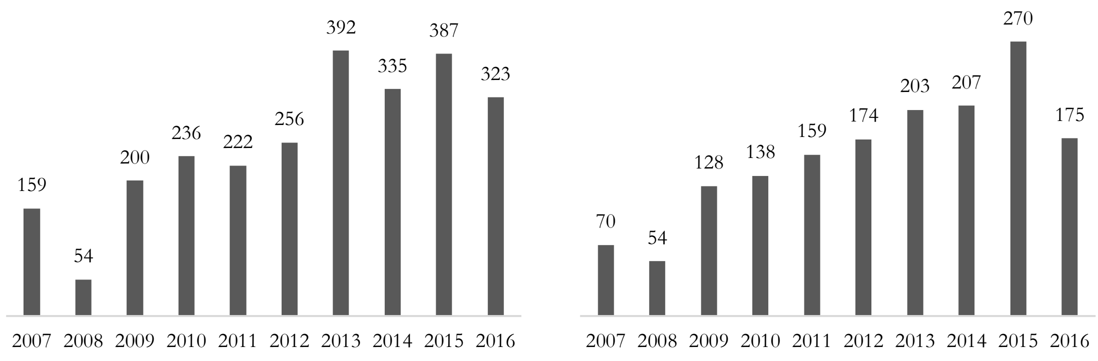



**Figure 1: Number of SEOs by year & Number of bond issues by year**

To analyze the long-run performance of SEOs and bond issues in the two samples, three measures are used: (1) 3-year cumulative average abnormal returns (CAAR) with a benchmark of matched portfolio returns. The matching procedure is explained in the succeeding section, (2) 3-year buy-and-hold returns (BHAR) for issuing firms and matched portfolios and (3) a calendar-time-portfolio approach (CTP) which tracks the performance of an event portfolio relative to several asset-pricing models.

I examine the aftermarket period of the issues. The aftermarket period defines the 3 years following the issuance, indicating an event-study of 36 months relative to the issue date. Since I use monthly data on returns, I set every event date at the end of the following month to assure that a potential immediate market reaction is excluded in the long-run analysis.  Returns are monthly, used from CRSP and are calculated as in equation 1:

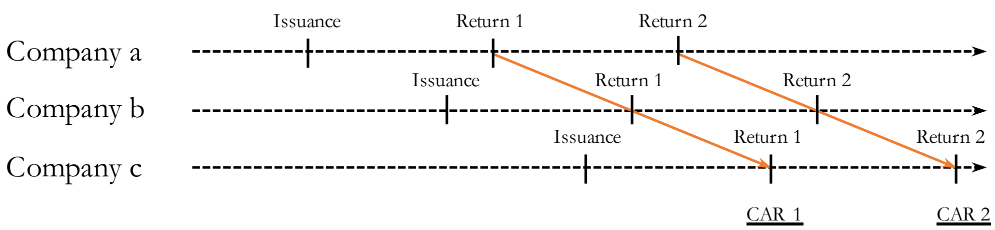
$$r = \frac{p(t)f(t)+d(t')}{p(t')} - 1 \qquad (1)$$

Where p(t) is the sale price at time t, f(t) is the price adjustment factor, d(t) is the cash adjustment factor which is usually 0 since ordinary dividends and other regularly taxable dividends are excluded and p(t') is the last sale price available.

## 4.2 Event-time long-run performance

### 4.2.1 Cumulative average abnormal return (CAAR)

The CAAR method uses company returns which occur at a definite time after an issuance. Consequently, returns are obtained from various point in time as demonstrated below:



The cumulative monthly abnormal returns are required in order to calculate the cumulative average abnormal returns. I adjust the raw returns of the SEO and bond issue firms with matching portfolios on the 36 months period. The matched portfolio- adjusted abnormal return is determined as follows:

$$ar_{i,t} = r_{i,t} - r_{matched\ portolio,t} \quad (2)$$

Where $r_{i,t}$ is the return of the event firm $i$ on day $t$ and $r_{m,t}$ is the corresponding return of the matching firm or portfolio $m$ on day $t$. The equally weighted average matched portfolio-adjusted abnormal return on a portfolio of traded SEO or bond issue stocks (n) is computed with the following formula:

$$\text{AR}_t = \frac{1}{n}\sum_{i=1}^{n} ar_{i,t} \quad (3)$$

The average matched portfolio- adjusted abnormal return can be aggregated over the event period [k;p] to receive the cumulative average abnormal return:

$$\text{CAAR}_{k,p} = \sum_{t=k}^{p} \text{AR}_t \quad (4)$$

The event period for the CAAR is month 1 to 36. If an issuing firm delists before its 3 year anniversary, the firm is excluded from the analysis for the succeeding months.

**Matching procedure**

Several studies including Barber and Lyon (1997), and Lyon et al. (1999), evidently demonstrate the sensitivity to the chosen benchmark. Either a single matched firm or a matched reference portfolio is used as a benchmark in existing studies. A single control firm approach eliminates the rebalancing bias, the new listing bias and the skewness problem (Barber & Lyon, 1997). Lyon et al. (1999) support a reference portfolio of firms matching on size and BE/ME. Fama and French (1992) justify this practice since size and BE/ME combined capture the cross-sectional variation in average monthly stock returns and market beta does not have increased power in explaining cross-sectional return differences. Since a single control firm approach can lead to noisy results, a portfolio benchmark approach is applied in this paper.

The SEO and bond issue firms are matched based on size and BE/ME, as well as industry to see if this leads to diverging results. Every firm is matched to a benchmark portfolio that is selected from the 100 portfolios formed on size and BE/ME (10 x 10), obtained from the Kenneth R. French Data Library. Book values from the event firms are obtained from COMPUSTAT. The selected benchmark portfolio is the one with the closest size along with the closest BE/ME value. Additionally, the event firms are matched with industry portfolios obtained from the Kenneth R. French Data Library. The match is made based on the four-digit SIC code which belongs to one of the 30 industry portfolios.

### 4.2.2 Buy-and-hold abnormal returns (BHAR)

The BHAR approach is the average multiyear return from a strategy of a pre-specified holding period versus a comparable strategy using otherwise similar non-event firms. (Mitchell & Stafford, 2000). In the same matter as CAAR, returns are obtained from various point in time. The T-month BHAR of event firm *i* is calculated as:

$$BHAR_i(t,T) = \prod_{t=1 \text{ to } T}\left(1 + R_{i,t}\right) - \prod_{t=1 \text{ to } T}\left(1 + R_{\mathrm{B},t}\right) \quad (5)$$

where $R_{i;t}$ is the return of the event firm in month t, and $R_{\mathrm{B};t}$ is the return of a selected benchmark. The benchmark return estimates the return that an event firm would have had if the event had not happened. If an issuing firm is delisted over the examined three-year period, the BHAR ends with the final listing date.

The equally weighted average for the BHAR over all firms is the total BHAR for all firms over the stated period divided by the number of firms N:

$$ABHAR(t,T) = \frac{1}{N}\sum_{i=1}^{N} BHAR_i(t,T) \quad (6)$$

**Statistical Testing**

A modification of the common t-test, the skewness-adjusted t-test (Johnson, 1978) will be applied to test the statistical significance in het long run. Johnson's skewness-adjusted t-statistic was developed by Johnson (1978) in order to resolve the skewness-related misspecification error in the Student's t-test. Findings of Ang and Zhang (2015) show that for long-horizon event studies with a large sample, it is likely to be more fruitful to look at the characteristics of the sample than implementing diverse sophisticated testing procedures as commonly used tests seem to perform reasonably well. Since the sample size of this study is substantially large, I abstain from the use of more advanced random sampling tests, as this will lower the replicability of this study. The skewness-adjusted t-test corrects the cross-sectional t-test for potential skewed abnormal return distribution and is calculated as follows:

$$J = t + \frac{gt^2}{3\sqrt{n}} + \frac{g}{6\sqrt{n}} \tag{7}$$

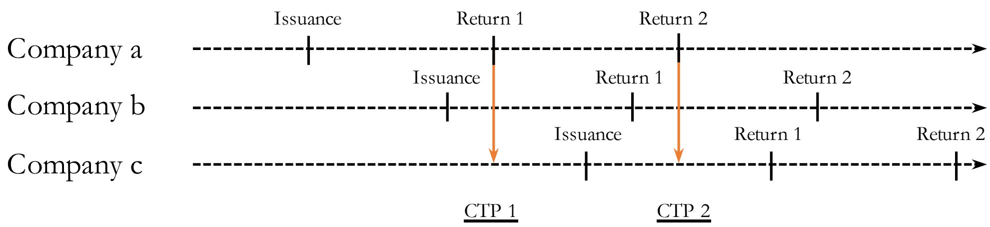
And with the following skewness estimation

$$g = \frac{\sum_{i=1}^{N}(CAR - CAAR)^3}{n\sigma(CAR)^3} \tag{8}$$

Where $t$ is the conventional Student's t-statistic, $n$ equals the number of observations and $g$ is the skewness estimate. Furthermore $CAAR$ is the average CAR over a specified period of time and $CAR_i$ is the cumulative abnormal return over an identical time period for company $i$.

## 4.3 Calendar-time long-run performance

In the calendar-time portfolio approach, an event portfolio is formed for each calendar month, consisting of all firms that have experienced the event of interest within the $\tau$ months prior to the given month.




For each calendar month, I form both equally- and value-weighted event portfolios consisting of all firms for which the event of interest occurred. The abnormal return is described as the portfolio's excess return that cannot be explained by a selected risk-factor model used to forecast expected returns. This indicates that an event portfolio that generates statistically significant alphas in a time-series regression, experienced abnormal returns over the holding period. The portfolio rebalances monthly as follows: issuing firms are included in the portfolio starting from the month following the issue date and returns are held for 36 months after which the firm is removed from the portfolio. The CTP approach is able to resolve the issue of cross-sectional dependence of the abnormal returns. The portfolio excess returns are regressed on the three factor model developed by Fama and French (1993), the Carhart (1997) four factor model and the five factor model of Fama and French (2015). The Fama-French Three Factor model (1993) controls for market risk, company size and book-to-market ratio and is calculated as follows:

$$r_{p,t} - r_{f,t} = \alpha_p + \beta_1 (r_{m,t} - r_{f,t}) + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_{p,t} \quad (9)$$

Where $r_{p,t}$ is the monthly portfolio return, $r_{f,t}$ presents the risk free rate and $r_{m,t}$ is the monthly market portfolio return. The variable of interest is the intercept $\alpha_p$, which captures the average monthly abnormal return of portfolio. The size factor, SMB, includes risk factors linked to company size, while the book-to-market factor, HML, incorporates the risk fundamental in firm value. Additionally, the $\beta$ factors present the individual factor loadings and $\varepsilon_{p,t}$ denotes as a random disturbance term.

The model of Carhart (1997) is an extension of the Fama-French Three Factor model. The Four-Factor model includes a cross-sectional momentum-factor (UMD) which depicts the monthly premium on 'winners' minus 'losers':

$$r_{p,t} - r_{f,t} = \alpha_p + \beta_1 (r_{m,t} - r_{f,t}) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 UMD_t + \varepsilon_{p,t} \quad (10)$$

Fama and French (2015) extended the Three-Factor model after conforming with findings of Titman et al. (2004) and Novy-Marx (2013), including the fluctuation in average returns regarding profitability and investment. Both an investment factor as well as a profitability factor are added to the three-factor model to raise the explanatory power:

$$r_{p,t} - r_{f,t} = \alpha_p + \beta_1 (r_{m,t} - r_{f,t}) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 RMW_t + \beta_4 CMA_t + \varepsilon_{p,t} \quad (11)$$

Where RMW refers to the variation of stock returns of diversified portfolios with robust and weak profitability. CMA presents investment which specifies the variation of returns on diversified stock portfolios from low and high investment firms. The Carhart (1997) momentum factor is excluded when regressing the Five-Factor model.

# 5. Results

This section reports the results of the research methodology described in the previous section. First, the CAAR is analyzed and followed by the BHAR. To check the robustness of the results, the calendar-time abnormal returns are examined in the final part of the results section.

## 5.1 Cumulative Average Abnormal Returns (CAAR)

Figure 2 plots the cumulative average abnormal returns for the 36 months following the SEO issuing date in the United States for 2564 SEOs issued from 2017-2017. In the first months after issuance, the CAAR remains close to zero after controlling for the size and BE/ME, suggesting that issuing companies seem to neither benefit nor lose in the very beginning. Nonetheless, they experience lower returns as time after the issuance passes. In month 36, the lowest point is reached with a CAAR of -12.34%, indicating a clear underperformance. The industry adjusted CAAR shows a similar pattern and is slightly lower from months 6 until month 31 in comparison to the size and BE/ME adjusted abnormal returns. The lowest point is reached in month 36 with a CAAR of -12.09%. S&P500 adjusted abnormal returns show a slightly higher CAAR, with its lowest point of -10.3% in month 36. Table 1 reports the CAAR per 6 months with significance levels. The full table can be found in Appendix A.

**Figure 2: Cumulative average abnormal returns (CAAR) for an equally weighted portfolio of SEOs in the United States, 2007-2017**

Three CAAR series are plotted for the 36 months after the SEO issue date: 1) size and BE/ME adjusted abnormal returns, 2) industry adjusted abnormal returns, 3) S&P 500 adjusted abnormal returns.

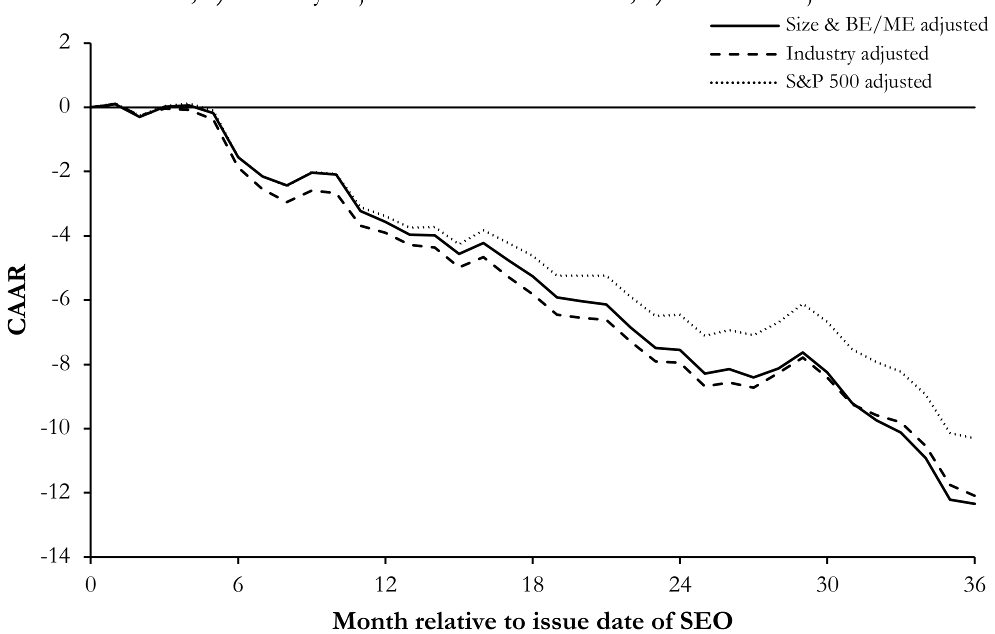


**Table 1: Cumulative average abnormal returns (CAAR) for SEOs in the United States, 2007-2017**

Cumulative average abnormal returns ($CAAR_{1,t}$), matched on size and BE/ME, in percent and Johnson's skewness adjusted *t*-statistics for the 36 months after the issuance are presented.

| Month of seasoning | Number of firms trading | CAAR1,t | t-stat |
|---|---|---|---|
| 6 | 2497 | -1.55 | -1.715 |
| 12 | 2420 | -3.56 | -2.848 |
| 18 | 2323 | -5.25 | -3.539 |
| 24 | 2223 | -7.56 | -4.422 |
| 30 | 2113 | -8.25 | -4.226 |
| 36 | 2014 | -12.34 | -5.791 |

Referring to the bond issue sample, a similar development of holding returns is presented in Figure 3. The abnormal holding returns follow a moderate decline in the three years after issuance and reach their lowest point in month 35 with a CAAR of -5.74%. The CAAR goes slightly up and reaches a point of -5.05% in month 36. The industry adjusted abnormal returns are overall slightly higher with their lowest abnormal holding return of -4.45% in month 35 and arriving at -3.99% after 3 years. S&P500 adjusted abnormal returns get to the lowest point in month 35 with a CAAR of -5.48%. Table 2 shows the CAAR per 6 months with significance levels for the bond issue sample. The full table can be found in Appendix B.

**Figure 3: Cumulative average abnormal returns (CAAR) for an equally weighted portfolio of bond issues in the United States, 2007-2017**

Three CAAR series are plotted for the 36 months after the bond issue date: 1) size and BE/ME adjusted abnormal returns, 2) industry adjusted abnormal returns, 3) S&P 500 adjusted abnormal returns.

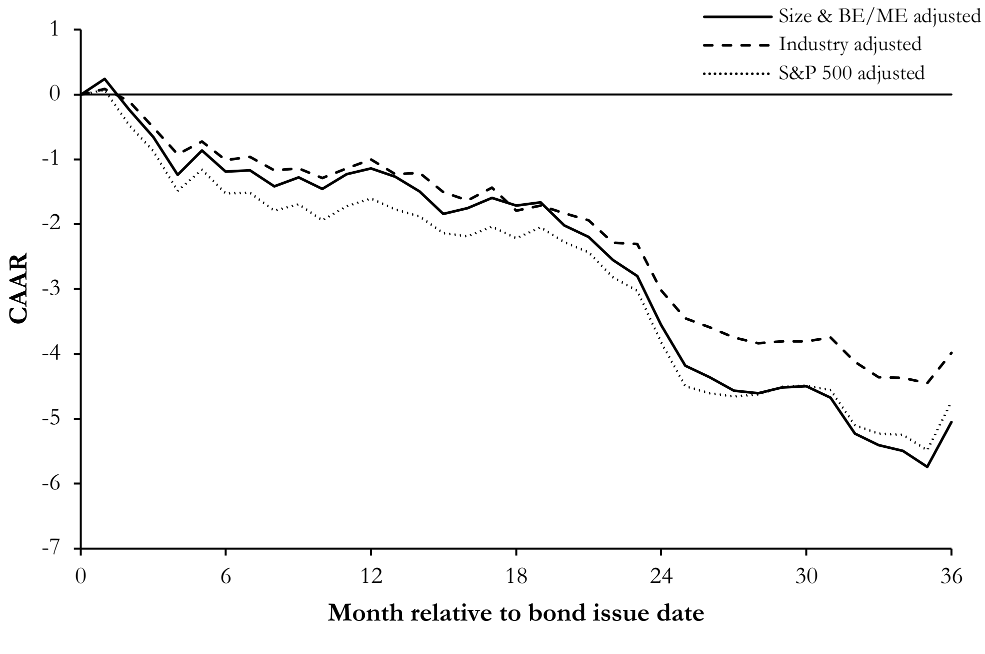


**Table 2: Cumulative average abnormal returns (CAAR) for bond issues in the United States, 2007-2017**

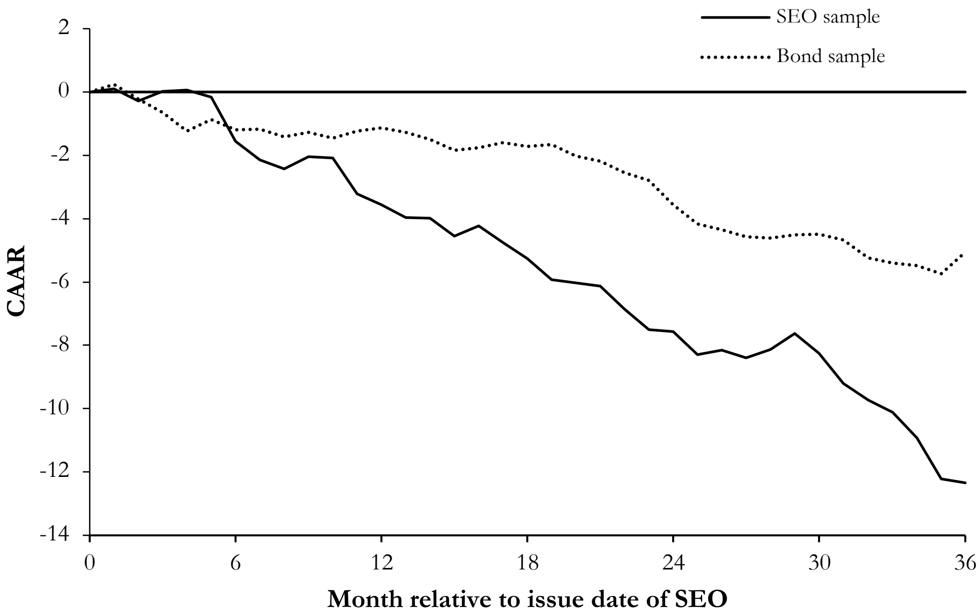
Cumulative average abnormal returns ($CAAR_{1,t}$), matched on size and BE/ME, in percent and Johnson's skewness adjusted *t*-statistics for the 36 months after the issuance are presented.

| Month of seasoning | Number of firms trading | CAAR1,t | t-stat |
|---|---|---|---|
| 6 | 1552 | -1.19 | -2.070 |
| 12 | 1525 | -1.14 | -1.426 |
| 18 | 1498 | -1.72 | -1.693 |
| 24 | 1466 | -3.55 | -3.058 |
| 30 | 1439 | -4.50 | -3.386 |
| 36 | 1402 | -5.05 | -3.605 |

Differences become more clear when comparing both samples. In Figure 4, the CAAR of both samples is presented. Here, the underperformance in the bond sample is clearly lower over the 36 months following the issuance. Only in the first months after issuance, SEO firms tend to perform better on an adjusted base. The biggest CAAR gap between the two samples (7.29%) is shown in month 36 as the cumulative abnormal returns of bonds slightly go upwards in the last month, while the SEO adjusted returns go further downwards.

**Figure 4: Cumulative average abnormal returns (CAAR) for an equally weighted portfolio of SEOs and bond issues in the United States, 2007-2017**

Two CAAR series adjusted for size and BE/ME are plotted for the 36 months after the issue date: 1) SEO sample, 2) Bond sample



## 5.2 Buy-and-hold abnormal returns (BHAR)

This section will outline a depiction of the BHAR results to explore potential explanations for the long-run underperformance of issuing firms.

### 5.2.1 Buy-and-hold returns categorized by industry

Table 3 shows the 36-months buy-and-hold returns categorized by industry. In the SEO sample, all industries show positive unadjusted returns, except for the consumer staples-, materials-, and telecommunications industry. The telecommunication industry displays the worst long-run performance with an average holding period total return of -23% for event firms. The portfolio adjusted buy-and-hold returns exhibit an underperformance of SEO firms in ten of the eleven industries. The consumer staples industry has a wealth relative of 0.76. Therefore, to reach the same wealth after 36 months of public trading, an investor would have had to invest 24% more in each SEO in the consumer staples industry, than in the respective matched portfolios.

With respect to the bond issue sample, all industries show positive holding total returns except the energy and power industry. Accordingly, the matched portfolio-adjusted performance of the energy and power industry is the lowest with a wealth relative of 0.70. Overall, four out of eleven industries display an underperformance which is less frequent in comparison to the SEO sample.

**Table 3: Performance categorized by industry, 2007-2017, using matching on size and BE/ME**

Panel A reports the 36-months buy-and-hold returns of the 2564 SEOs, Panel B includes the 36-months buy-and-hold returns of the 1578 bond issues. The wealth relative is the ratio of (1+ average issuing firm holding period total return) divided by (1+ average matched portfolio holding period total return) where returns are not in percent. Firms are categorized based on the given macro description by SDC.

| | | Average holding period total returns | | |
|---|---|---|---|---|
| Industry | No. of offerings | Event firms % | Matched portfolios % | *Wealth relative* |
| Panel A: SEO sample buy-and-hold returns | | | | |
| Media and Entertainment | 65 | 5.77 | 25.15 | 0.85 |
| Healthcare | 1049 | 17.45 | 33.48 | 0.88 |
| Consumer Staples | 58 | -2.81 | 27.38 | 0.76 |
| Energy and Power | 256 | 9.49 | 25.14 | 0.87 |
| High Technology | 380 | 22.02 | 29.55 | 0.94 |
| Industrials | 206 | 10.09 | 26.51 | 0.87 |
| Retail | 134 | 25.26 | 34.94 | 0.93 |
| Materials | 167 | -2.55 | 32.62 | 0.73 |
| Telecommunications | 64 | -23.00 | 23.55 | 0.62 |
| Consumer Products and Services | 178 | 24.04 | 34.78 | 0.92 |
| Financials* | 7 | 108.35 | 41.41 | 1.47 |
| All firms | 2564 | 14.79 | 31.04 | 0.88 |
| Panel B: Bond issues samples buy-and-hold returns | | | | |
| Media and Entertainment | 124 | 54.67 | 32.25 | 1.17 |
| Healthcare | 148 | 37.98 | 33.66 | 1.03 |
| Consumer Staples | 180 | 35.53 | 36.12 | 1.00 |
| Energy and Power | 246 | -11.20 | 27.53 | 0.70 |
| High Technology | 159 | 32.41 | 34.62 | 0.98 |
| Industrials | 240 | 43.19 | 30.72 | 1.10 |
| Retail | 136 | 38.62 | 36.01 | 1.02 |
| Materials | 143 | 9.64 | 29.15 | 0.85 |
| Telecommunications | 75 | 6.08 | 32.87 | 0.80 |
| Consumer Products and Services | 120 | 32.90 | 33.34 | 1.00 |
| Financials* | 7 | 55.41 | 49.58 | 1.04 |
| All firms | 1578 | 27.24 | 32.33 | 0.96 |

*Under the SIC classification these are defined as service companies, including business services, financial transactions processing, reserve and clearinghouse activities and internet service providers, therefore these are included in the sample

## 5.2.2 Buy-and-hold returns categorized by year of issuance

As Table 4 shows, seven out of ten matched portfolio-adjusted BHAR display underperformance of the SEOs. Firms issuing in 2008, 2010 and 2012 have positive wealth relatives, indicating that there is no underperformance when comparing the holding period total returns of the event firms and their matched portfolios in these years.

Regarding the bond issues, five out of ten wealth relatives are lower than one, indicating an underperformance. Especially in later issuance years (2011, 2013, 2014, 2015, 2016) event firms have a lower performance than their matched portfolios. These results support the findings of Ritter (1991) who argues that the long-run underperformance of issuing firms is not a general phenomenon, suggesting that the underperformance is not yearly available.

**Table 4: Performance categorized by year of issuance, 2007-2017, using matching on size and BE/ME**

Panel A reports the 36-months buy-and-hold returns of the 2564 SEOs, Panel B includes the 36-months buy-and-hold returns of the 1578 bond issues. The wealth relative is the ratio of (1+ average issuing firm holding period total return) divided by (1+ average matched portfolio holding period total return) where returns are not in percent.

| Year of issuance | Number of offerings | Average holding period total returns: Event firms % | Matched portfolios % | *Wealth relative* |
|---|---|---|---|---|
| **Panel A: SEO sample buy-and-hold returns** | | | | |
| 2007 | 159 | -25.51 | -21.97 | 0.95 |
| 2008 | 54 | 21.88 | -1.00 | 1.23 |
| 2009 | 200 | 24.95 | 39.92 | 0.89 |
| 2010 | 236 | 38.35 | 37.53 | 1.01 |
| 2011 | 222 | 35.04 | 40.37 | 0.96 |
| 2012 | 256 | 47.46 | 42.59 | 1.03 |
| 2013 | 392 | 3.84 | 27.52 | 0.81 |
| 2014 | 335 | 4.03 | 25.28 | 0.83 |
| 2015 | 387 | -7.56 | 34.12 | 0.69 |
| 2016 | 323 | 21.32 | 43.26 | 0.85 |
| All firms | 2564 | 14.79 | 31.04 | 0.88 |
| **Panel B: Bond issues samples buy-and-hold returns** | | | | |
| 2007 | 70 | -10.36 | -20.70 | 1.13 |
| 2008 | 54 | 22.13 | -3.74 | 1.27 |
| 2009 | 128 | 53.42 | 40.98 | 1.09 |
| 2010 | 138 | 64.44 | 42.78 | 1.15 |
| 2011 | 159 | 44.00 | 45.21 | 0.99 |
| 2012 | 174 | 44.50 | 40.09 | 1.03 |
| 2013 | 203 | 12.74 | 24.43 | 0.91 |
| 2014 | 207 | 7.71 | 24.77 | 0.86 |
| 2015 | 270 | 14.84 | 35.32 | 0.85 |
| 2016 | 175 | 22.02 | 44.16 | 0.85 |
| All firms | 1578 | 27.24 | 32.33 | 0.96 |

### 5.2.3 Buy-and-hold returns categorized by investment level

A higher underperformance of firms with high investment levels (high CAPEX scaled by total assets) is expected if the investment explanation of Carlson et al. (2006) and Lyandres et al. (2008) is relevant. Table 5 shows the 36-months buy-and-hold performance classified by investment level for the 1977 SEOs (Panel A) and 1244 bond issues (Panel B)[1]. The SEO wealth relatives do not show support for the investment explanation since the large investment has a higher wealth relative (0.94) than the small investment group (0.91), indicating a higher performance on an adjusted base. For the bond issue sample, the large group performs substantially worse (0.90) than the small investment group (1.05). These findings support the investment explanation.

[1] Issues are included in the SEO and bond sample when both CAPEX and total assets data is available for the year of issuance and the year post issuance in COMPUSTAT, issues for which this data is missing are excluded, leading to a smaller sample size.

**Table 5: Performance categorized by investment level, 2007-2017, using matching on size and BE/ME**

Panel A reports the 36-months buy-and-hold returns of 1977 SEOs, Panel B includes the 36-months buy-and-hold returns of the 1244 bond issues. The wealth relative is the ratio of (1+ average issuing firm holding period total return) divided by (1+ average matched portfolio holding period total return) where returns are not in percent. Investment level is calculated as the average CAPEX/total assets, in the year of issuance and the year post issuance. The sample is split in tertiles based on the investment level.

| | Average holding period total returns | | |
|---|---|---|---|
| | Event firms | Matched portfolios | |
| CAPEX/TA tertile | % | % | *Wealth relative* |
| | Panel A: SEO sample buy-and-hold returns | | |
| Small | 24.34 | 36.77 | 0.91 |
| Medium | 26.43 | 34.30 | 0.94 |
| Large | 22.23 | 30.02 | 0.94 |
| All firms | 24.34 | 33.70 | 0.93 |
| | Panel B: Bond issues samples buy-and-hold returns | | |
| Small | 43.86 | 37.62 | 1.05 |
| Medium | 35.82 | 34.57 | 1.01 |
| Large | 17.64 | 30.08 | 0.90 |
| All firms | 32.34 | 34.06 | 0.99 |

### 5.2.4 Buy-and-hold returns categorized by size of the issue

Brav et al. (2000) and Spiess and Affleck-Graves (1995) find that smaller firms perform worse than larger firms following an equity issue. It is reasonable to argue that larger firms undertake larger equity or debt issues in absolute terms in comparison to smaller firms. Nonetheless, these issues are smaller in relation to the market capitalization. Accordingly, it is interesting to look at the relative size of the issue to illustrate the magnitude of an issue concerning a respective firm. Table 6 displays the 36-months buy-and-hold performance classified by the size of the issue scaled by market capitalization for the 2564 SEOs (Panel A) and 1578 bond issues (Panel B). Regarding the SEO sample, the smaller issues show a lower underperformance than the larger issues. The large issues display a wealth relative of 0.88, while the small issues display a wealth relative of 0.92. These findings support previous results reported in the literature, including Huang and Ritter (2020). The bond issue sample returns show similar findings. The smaller issues display a lower underperformance with a wealth relative of 0.97, whereas the larger issues show a wealth relative of 0.91, indicating a stronger underperformance among larger issues. Appendix F shows the results when looking at the absolute size of the issue.

**Table 6: Performance categorized by relative size of the issue, 2007-2017, using matching on size and BE/ME**

Panel A reports the 36-months buy-and-hold returns of the 2564 SEOs, Panel B includes the 36-months buy-and-hold returns of the 1578 bond issues. The wealth relative is the ratio of (1+ average issuing firm holding period total return) divided by (1+ average matched portfolio holding period total return) where returns are not in percent. Relative size is calculated as: size of the issue / market capitalization. The sample is split in tertiles based on the relative size.

| Relative size of the issue tertile | Average holding period total returns | | |
|---|---|---|---|
| | Event firms % | Matched portfolios % | *Wealth relative* |
| Panel A: SEO sample buy-and-hold returns | | | |
| Small | 24.21 | 35.08 | 0.92 |
| Medium | 15.32 | 31.21 | 0.88 |
| Large | 4.83 | 26.83 | 0.83 |
| All firms | 14.79 | 31.04 | 0.88 |
| Panel B: Bond issues samples buy-and-hold returns | | | |
| Small | 30.59 | 34.96 | 0.97 |
| Medium | 31.57 | 30.82 | 1.01 |
| Large | 19.55 | 31.19 | 0.91 |
| All firms | 27.24 | 32.33 | 0.96 |

## 5.3 Calendar-time portfolio approach

The following section contains the results obtained after a regression of the excess return data with the use of the four different models accordingly.

Table 5 shows the results for the Ordinary Least Squared regressions of the SEO returns excess of risk-free rate for 2565 SEOs issued from January 1, 2007 until January 1, 2017. The results give evidence for a risk-adjusted underperformance of SEOs compared to the market return. For the equally weighted monthly portfolios, the market portfolio factor as well as the size factor show statistical significance (P<0.01) in all factor models. The market beta is ranging from 1.204 to 1.492 indicating that the portfolio is more volatile than the market, which corresponds with higher risk. The book-to-market factor is negative and significant (P<0.05) in the three-factor model and in the 4 and 5 factor models (P<0.01), ranging from -0.210 to 0.319, indicating a growth portfolio. The momentum factor is negative and significant (P<0.01) and in the five-factor model, solely the profitability factor is significant (P<0.01). The CAPM gives a significant excess return of an equally weighted SEO portfolio of -0.631%, on a 10% level. Correspondingly, the 3- and 4-factor model give a substantial excess return of -0.585% and -0.554% respectively, on a 5% level. This result rejects the hypothesis of an excess return being equal to zero. The portfolio of SEOs performed on average 0.554% worse in comparison with the market, after adjusting for size, book-to-market and momentum.

The value-weighted portfolio shows similar results, the market portfolio and size factors are higher than 1 and significant ($P<0.01$). Additionally, the book to market factor is slightly negative and significant in the 4-factor model ($P<0.05$). Moreover, the momentum variable is negative and significant ($P<0.01$). Most notably, the excess return of the SEO portfolio is negative indicating an underperformance. In the CAPM model and the 3-factor model, the excess return is -0.414 and -0.348 respectively and significant on a 10% level. The value-weighted portfolio performs slightly better than the equally weighted portfolio, however a significant negative excess return remains.

**Table 5: Ordinary least squared regressions of SEO returns excess of risk-free rate for 2564 SEOs issued from January 1, 2007 through January 1, 2017**

Panel A: returns calculated using equally weighted monthly portfolios. Panel B: returns calculated using value weighted monthly portfolios. The SEO returns from the month following the issuance until 36 months after the SEO. The dependent variable are the SEO returns excess of risk-free rate. SMB is the coefficient for the excess return. Mkt-RF stands for the market risk. SMB is coefficient for the difference between a portfolio of 'small' and 'big' stocks. HML is the coefficient for the difference between a portfolio of 'high' book to market and 'low' book to market stocks. UMD is the coefficient for the monthly premium on 'winners' minus 'losers'. RMW is the coefficient for the variation of stock returns of a portfolio with robust and weak profitability. CMA is the coefficient which shows the variation of returns between a portfolio of 'low' and 'high' investment firms.

| Variables | (1)<br>CAPM | (2)<br>3-factor model | (3)<br>4-factor model | (4)<br>5-factor model |
|---|---|---|---|---|
| | | Panel A: equally weighted montly portfolios | | |
| **Mkt-RF** | 1.492*** | 1.321*** | 1.236*** | 1.204*** |
| | (0.073) | (0.062) | (0.059) | (0.062) |
| **SMB** | | 1.136*** | 1.127*** | 1.044*** |
| | | (0.115) | (0.106) | (0.109) |
| **HML** | | -0.210** | -0.417*** | -0.319*** |
| | | (0.096) | (0.097) | (0.113) |
| **UMD** | | | -0.301*** | |
| | | | (0.056) | |
| **RMW** | | | | -0.745*** |
| | | | | (0.163) |
| **CMA** | | | | -0.224 |
| | | | | (0.196) |
| **alpha** | -0.631* | -0.585** | -0.554** | -0.316 |
| | (0.319) | (0.252) | (0.232) | (0.241) |
| **Observations** | 155 | 155 | 155 | 155 |
| **Adj. R-Squared** | 0.732 | 0.837 | 0.862 | 0.860 |
| | | Panel B: value weighted monthly portfolios | | |
| **Mkt-RF** | 1.353*** | 1.246*** | 1.169*** | 1.221*** |
| | (0.050) | (0.049) | (0.045) | (0.052) |
| **SMB** | | 0.589*** | 0.578*** | 0.581*** |
| | | (0.090) | (0.081) | (0.092) |
| **HML** | | 0.003 | -0.184** | -0.093 |
| | | (0.075) | (0.074) | (0.095) |
| **UMD** | | | -0.266*** | |
| | | | (0.043) | |
| **RMW** | | | | -0.154 |
| | | | | (0.137) |
| **CMA** | | | | 0.014 |
| | | | | (0.165) |
| **alpha** | -0.414* | -0.348* | -0.250 | -0.308 |
| | (0.220) | (0.198) | (0.177) | (0.203) |
| **Observations** | 155 | 155 | 155 | 155 |
| **Adj. R-Squared** | 0.826 | 0.863 | 0.889 | 0.864 |

Standard error in parentheses, *** 1% significance, ** 5%, * 10%

Table 6 reports the results for the Ordinary Least Squared regressions of the bond issue portfolio returns excess of risk-free rate for 1578 bonds issued from January 1, 2007, until January 1, 2017. The excess returns of the equally weighted monthly portfolios are less negative than the SEO sample, however they do not demonstrate significance. The same holds for the value weighted portfolio aside from the 5-factor model, which gives a significant excess return of -0.187%, on a 10% level. The market portfolio factor is significant ($P<0.01$) for both the equally- and value weighted portfolios. Correspondingly, the market portfolio factor is positive and slightly bigger than 1, implying that the bond portfolio returns are slightly more volatile than the market developments. The opposite is true for the value weighted portfolio, where the market portfolio factor is smaller than 1, indicating the portfolio excess returns to be less volatile than the market. The size factor is statistically significant ($P<0.01$) for both portfolios with a positive coefficient in the equally weighted portfolio and a negative coefficient in the value weighted portfolio. The book to market factor displays significance in the 3-factor model ($P<0.05$) for the equally weighted portfolios with a positive value and for the value weighted portfolios ($P<0.01$) with a negative value. The momentum factor is negative and significant($P<0.01$) for the equally weighted portfolios. Both the profitability as well as the investment factor are positive and significant in the value-weighted portfolios.

**Table 6: Ordinary least squared regressions of bond issue returns excess of risk-free rate for 2564 bond issues issued from January 1, 2007 through January 1, 2017**

Panel A: returns calculated using equally weighted monthly portfolios. Panel B: returns calculated using value weighted monthly portfolios. The bond issues returns from the month following the issuance until 36 months after the bond issue. The dependent variable are the bond issue returns excess of risk-free rate. SMB is the coefficient for the excess return. Mkt-RF stands for the market risk. SMB is coefficient for the difference between a portfolio of 'small' and 'big' stocks. HML is the coefficient for the difference between a portfolio of 'high' book to market and 'low' book to market stocks. UMD is the coefficient for the monthly premium on 'winners' minus 'losers'. RMW is the coefficient for the variation of stock returns of a portfolio with robust and weak profitability. CMA is the coefficient which shows the variation of returns between a portfolio of 'low' and 'high' investment firms

| Variables | (1)<br>CAPM | (2)<br>3-factor model | (3)<br>4-factor model | (4)<br>5-factor model |
|---|---|---|---|---|
| Panel A: equally weighted montly portfolios | | | | |
| **Mkt-RF** | 1.143*** | 1.071*** | 1.035*** | 1.108*** |
| | (0.042) | (0.043) | (0.044) | (0.047) |
| **SMB** | | 0.256*** | 0.252*** | 0.280*** |
| | | (0.081) | (0.078) | (0.082) |
| **HML** | | 0.165** | 0.079 | 0.062 |
| | | (0.067) | (0.072) | (0.084) |
| **UMD** | | | -0.126*** | |
| | | | (0.042) | |
| **RMW** | | | | 0.193 |
| | | | | (0.122) |
| **CMA** | | | | 0.213 |
| | | | | (0.147) |
| **alpha** | -0.207 | -0.116 | -0.103 | -0.220 |
| | (0.183) | (0.176) | (0.172) | (0.180) |
| **Observations** | 155 | 155 | 155 | 155 |
| **Adj. R-Squared** | 0.831 | 0.846 | 0.854 | 0.849 |
| Panel B: value weighted monthly portfolios | | | | |
| **Mkt-RF** | 0.762*** | 0.817*** | 0.813*** | 0.872*** |
| | (0.028) | (0.028) | (0.030) | (0.029) |
| **SMB** | | -0.276*** | -0.277*** | -0.236*** |
| | | (0.053) | (0.053) | (0.051) |
| **HML** | | -0.033*** | -0.043 | -0.060 |
| | | (0.044) | (0.048) | (0.052) |
| **UMD** | | | -0.014 | |
| | | | (0.028) | |
| **RMW** | | | | 0.295*** |
| | | | | (0.076) |
| **CMA** | | | | 0.221** |
| | | | | (0.091) |
| **alpha** | -0.014 | -0.057 | -0.056 | -0.187* |
| | (0.124) | (0.116) | (0.116) | (0.112) |
| **Observations** | 155 | 155 | 155 | 155 |
| **Adj. R-Squared** | 0.826 | 0.852 | 0.851 | 0.871 |

Standard error in parentheses, *** 1% significance, ** 5%, * 10%

# 6. Discussion

The following section takes a closer look at the results and relates the findings to previous studies. The event-time results are discussed, followed by the calendar-time results. Lastly, limitations and a further research direction is presented.

## 6.1 Event-time long-run performance

The CAAR findings indicate that the examined firms in the US on average experience negative returns over a period of 36 months following the issuance of equity and bonds compared to matched portfolios. The findings provide support for hypothesis 1a: Firms issuing seasoned equity with the purpose of investment generate abnormal negative returns up to 3 years after the issuance. Negative CAAR returns of -12.34% for the SEO sample are reported 36 months following issuance. Spiess and Affleck-Graves (1995) and Loughran and Ritter (1995) report significant abnormal returns of -22.8% and -33% respectively for equally weighted portfolios. Other studies have findings with returns of -27.3% (Brav et al., 2000), -34.4% (Jegadeesh, 2000) and -10.2% (Mitchell & Stafford, 2000). The result of -12.34% for the equity sample is in line with previous research, although being less negative. The difference can partly be accounted for by the time horizon of the study. As pointed out by Ritter (1991), long-run underperformance does not seem to be yearly available. Moreover, the divergence can be explained in part by the choice of benchmark. Spiess and Affleck-Graves (1995), and Loughran and Ritter (1995) use single firm matching, whereas Mitchell and Stafford (2000) use a control portfolio. The control-firm or portfolio matching method influences results directly since, among others, matched firms and portfolios can differ in terms of liquidity, idiosyncratic volatility, return momentum or capital investment (Bessembinder & Zhang, 2013). In this paper, matching on size and BE/ME is used as the main matching characteristic, and instead of a single firm match, a matching portfolio is used.

The CAAR findings of the bond sample show support for hypothesis 1b: Firms issuing bonds with the purpose of investment generate abnormal negative returns up to 3 years after the issuance. The bond issue sample reports a CAAR of -5.05% after three years following issuance. Although compared to the equity sample, the degree of underperformance is substantially lower than the degree of SEO underperformance. Thus, one can state that the bond issue sample findings only show weak support for the growth options theory of Carlson et al. (2006). Since the bond sample is selected based on the fact that the use of proceeds is investment related, one can link the bond sample outcomes to the statements of Carlson et al. (2006), indicating that expected returns diminish endogenously as growth options are converted into assets in place. Huang and Ritter (2020) show that equity issues on average are followed by lower raw returns than debt issues. It is important to keep in mind that equity and debt issuers have different characteristics. Even though both invest heavily, Huang and Ritter (2020) highlight that debt issuers are much more likely to be profitable than equity issuers. Therefore, it is not surprising to find a lower underperformance for bond issuers.

The investment hypothesis is tested by the BHAR returns categorized by investment level. Only the bond returns show support for hypothesis 2: Issuing firms with high investment levels have a higher underperformance than firms with low investment levels. The SEO firms with high investment levels do not have a higher underperformance than the small investment firms and do not support previous findings of Carlson et al. (2006) and Lyandres et al. (2008).

The BHAR results classified by industry of the SEO sample support hypothesis 3: Issuing firms long-run under-performance is persistent across industries. The portfolio adjusted buy-and-hold abnormal returns exhibit an underperformance of SEO firms in ten of the eleven industries. Whereas in the bond issue sample, solely four out of the eleven industries exhibit an underperformance. It seems that only a few industries drive the underperformance including telecommunications, materials, energy & power and high technology.

The fourth hypothesis states that the year of issuance affects the abnormal returns of issuing firms. Looking at the SEO sample, the variation of returns is clearly visible since wealth relatives range from 0.69 in 2015 up to 1.23 in 2008. In the bond issue sample, the wealth relatives range from 0.85 in 2016 till 1.27 in 2018. Loughran and Ritter (1995) relate this variation to issuing activity, where equity issuance during high-volume periods shows the highest underperformance. In the equity sample, years with relatively high performance have a low number of offerings in comparison to years with low performance. Years with low performance have a high number of offerings, which is in line with the findings of Loughran and Ritter (1995). The same conclusions can be drawn from the bond samples, where the highest returns are in the years with the lowest number of offerings. In both samples, it seems that former issuance years show less underperformance than more recent years, confirming the findings of Huang and Ritter (2020), who state that performance decays over time. These findings support hypothesis five: more recent issues are followed by lower abnormal returns than less recent issues.

The final hypothesis asserts that the size of the issue is negatively related to the abnormal return of issuing firms. In this paper, conclusions are drawn based on the relative size of the issue. The SEO sample supports previous findings of Huang and Ritter (2020) since larger issues show higher underperformance than smaller issues. The bond issue sample shows similar findings as smaller issues display a smaller underperformance than larger issues. However, medium issuing firms show the least underperformance which is unexpected as according to literature, larger issuing firms perform worse. Therefore, results are mixed and do not fully support hypothesis six. Further, when taking the absolute issuing size into account as a robustness check (Appendix F), contradicting results are shown for the SEO sample, with smaller issues performing worse than larger issues. For the bond issue sample, previous findings are reinforced since larger issuing firms perform worse, providing support for the hypothesis.

## 6.2 Calendar-time long-run performance

The calendar-time portfolio approach is used to test the robustness of the underperformance level with the use of four different models. For the SEO equally-weighted sample, underperformance is present when using the CAPM, three factor model and the Carhart four-factor model. The value-weighted portfolio performs better as it shows a lower underperformance, only for the CAPM and three-factor model. It lends support to hypothesis 1a: Firms issuing seasoned equity with the purpose of investment generate abnormal negative returns up to 3 years after the issuance. The underperformance disappears when the investment and profitability factor are added in the five-factor model. This is expected along with the theory of Carlson et al. (2006) since the disappearance of the negative alpha indicates that excess returns can be explained by investment. In the five factor model, the investment factor represents the return spread of firms that invest conservatively minus aggressively. A negative factor would indicate that part of the excess return can be explained by more aggressive investment firms. One would expect a positive CMA factor if the findings of Carlson et al. (2006) hold true since more conservative investments would have less risky expansion options. Subsequently, there is a lower decrease in risk upon option exercise and the abnormal returns should be less negatively affected. The factor is negative but remains insignificant so no conclusions can be drawn about the effect of investment.

The bond issues sample results differ from the equity sample in several ways. First of all, for the equally weighted portfolios, the alpha is negative but remains insignificant. Therefore it does not support the previous findings and hypothesis 1b: Debt issuing firms with the purpose of investment generate abnormal negative returns up to 3 years after the issuance. Secondly, the five factor model does show a significant negative alpha for the value weighted portfolios while the alphas of the other models remain insignificant. Here, the investment factor has a positive significant value, indicating that conservative investments lead to higher excess returns, which supports the theory of Carlson et al. (2006). Since more conservative investments corresponds to less risky expansion options, there is a lower decrease in risk upon option exercise. Thus, it should have a smaller negative impact on abnormal returns. However, a negative significant alpha is unexpected if the investment factor would be able to explain the variation as stated by Carlson et al. (2006).

## 6.3 Limitations and Future Research Direction

It is plausible that a number of limitations could have influenced the results obtained. To begin with, this work suggests that investments potentially play an important role in the long-term performance of issuing firms. It is important to take into account that the findings have reference to a sample between 2007 and 2017, which influences results since underperformance tends to vary over time. Additional experimental investigations are needed to estimate if this pattern is also present over a longer time horizon. Also, the holding period is limited to three years and can be broadened to five years to see if a longer holding period influences the level of underperformance.

Additionally, a major source of uncertainty is the measure of the purpose of investment. In this work, the inclusion of issues that are used for investments is based on the 'use of proceeds' classification of SDC. It is questionable whether this is an accurate way of defining investment. A further distinction between the type of investments e.g. conservative and aggressive, is needed to test the hypothesis of Carlson et al. (2006) more precisely. This can be either done in a more specific classification approach or a quantification of the degree of investments, which requires further data collection.

Given that the focus of the study was purely based on issues in the United States, it is not inconceivable that dissimilar results would have arisen if the focus had been on other continents. Further research is needed regarding long run performance with the purpose of investment to test the theory of Carlson et al. (2006) in other countries.

Lastly, firms can issue seasoned equity as well as bonds during the 3-year study. If there is an overlap in these two activities, the returns can be biased and are not fully related to a single event. Therefore, taking into consideration if a firms issues seasoned equity and bonds would improve the results obtained. The same holds for the underwriter and the claimed fees that are omitted in this study but can potentially influence returns.

## 7. Conclusion

This paper aims to establish if there are any abnormal returns in the long run for firms that issued seasoned equity or bonds in the United States between 2007-2017. The research question reads: Do firms that issue bonds with the purpose of investment exhibit a similar underperformance pattern as seasoned equity offerings? To answer this question, I set up two samples with SEO firms and bond issue firms. I start by examining the development of the average abnormal returns during the 36 months after the issue date, with the use of a cumulative average abnormal returns. After adjusting with matched porfolios based on size and BE/ME, SEOs show an siginificant long-run underperformance of -12.34% and bonds have an siginificant underperformanc of -5.05%. Different matching characteristics such as industry exhibit a similar underperformance pattern. Thus, bond issues do have a similar underperformance pattern as SEOs, however it seems to be less pronounced. The BHAR methodology is used to examine the possible explanation for the long-run underperformance. The BHAR categorized by investment level of the bond issue sample show support for the investment explanation as high investment firms perform worse than low investment firms, whereas the SEO sample fails to validate the investment explanation. The SEOs as well as bond issues BHAR classified by industry demonstrate that the long-run performance varies per industry. In the SEO sample, nearly all industries showed wealth relatives below one, depicting that the underperformance is present in most industries. In the bond issues sample, only a few industries showed underperformance including telecommunications, energy & power, and materials. The BHAR categorized by year of issuance reveal that the long-run underperformance of issuing firms is not a general phenomenon. More specifically, abnormal returns tend to decay over time, supporting the findings of Huang and Ritter (2020). The BHAR of both the bond and SEO sample categorized by size of the issue show that the larger the issue size, the greater the underperformance in the subsequent year. The SEO sample only shows this pattern when considering the relative size of the issue. The calendar time portfolio approach is used as a robustness check for the event-time results. The negative significant alphas of the SEO portfolio provide evidence that the underperformance also exists when another approach is taken. Nonetheless, the bond sample alphas are not significant except for the five factor model alpha, which is not in line with the investment hypothesis of Carlson et al. (2006). The investment explanation remains questionable since the long-run underperformance of firms which issue bonds with the purpose of investment is not as substantial as SEO underperformance. Future studies on the current topic are therefore required in order to verify if the theory holds when using a different methodology.

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# Appendix

**A: Cumulative average abnormal returns for SEOs in the United States, 2007-2017**
Cumulative average abnormal returns ($CAAR_{1,t}$), matched on size and BE/ME, in percent and Johnson's skewness adjusted *t*-statistics for the 36 months after the issuance are presented.

| Month of seasoning | Number of firms trading | CAAR1,t | t-stat |
|---|---|---|---|
| 1 | 2517 | 0.10 | 0.313 |
| 2 | 2515 | -0.29 | -0.608 |
| 3 | 2516 | 0.03 | 0.044 |
| 4 | 2507 | 0.06 | 0.090 |
| 5 | 2505 | -0.17 | -0.205 |
| 6 | 2497 | -1.55 | -1.715 |
| 7 | 2485 | -2.15 | -2.165 |
| 8 | 2460 | -2.43 | -2.322 |
| 9 | 2460 | -2.04 | -1.810 |
| 10 | 2442 | -2.09 | -1.845 |
| 11 | 2421 | -3.22 | -2.709 |
| 12 | 2420 | -3.56 | -2.848 |
| 13 | 2405 | -3.96 | -3.084 |
| 14 | 2381 | -3.99 | -3.000 |
| 15 | 2376 | -4.56 | -3.333 |
| 16 | 2349 | -4.22 | -3.026 |
| 17 | 2339 | -4.75 | -3.323 |
| 18 | 2323 | -5.25 | -3.539 |
| 19 | 2299 | -5.92 | -3.873 |
| 20 | 2283 | -6.03 | -3.829 |
| 21 | 2271 | -6.13 | -3.815 |
| 22 | 2252 | -6.85 | -4.179 |
| 23 | 2239 | -7.50 | -4.471 |
| 24 | 2223 | -7.56 | -4.422 |
| 25 | 2208 | -8.29 | -4.811 |
| 26 | 2187 | -8.16 | -3.988 |
| 27 | 2160 | -8.40 | -4.699 |
| 28 | 2146 | -8.13 | -4.031 |
| 29 | 2124 | -7.63 | -3.957 |
| 30 | 2113 | -8.25 | -4.226 |
| 31 | 2101 | -9.20 | -4.642 |
| 32 | 2076 | -9.73 | -4.817 |
| 33 | 2061 | -10.12 | -4.926 |
| 34 | 2045 | -10.92 | -5.282 |
| 35 | 2029 | -12.21 | -5.808 |
| 36 | 2014 | -12.34 | -5.791 |

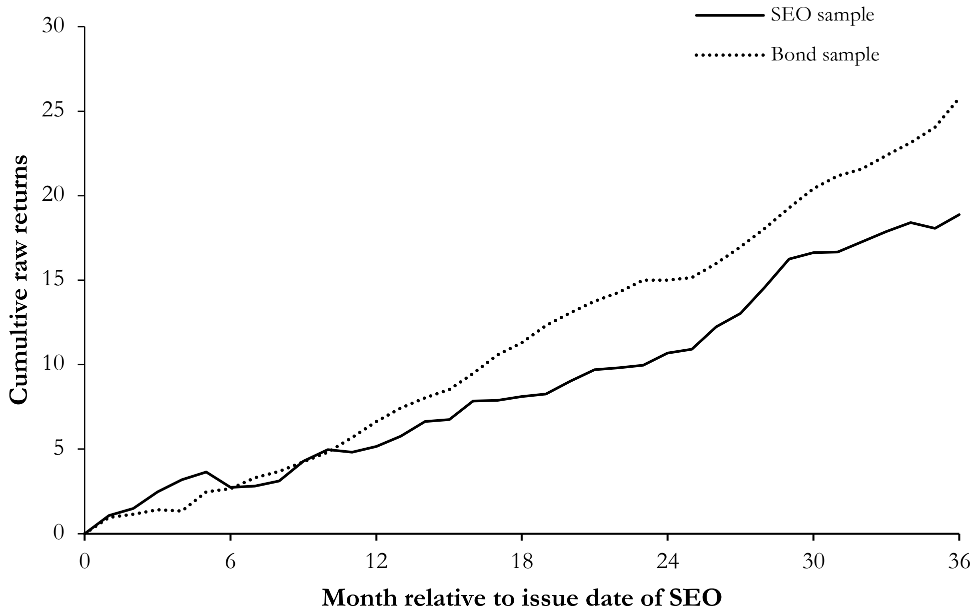
**B: Cumulative average abnormal returns for bond issues in the United States 2007-2017**

Cumulative average abnormal returns ($CAAR_{1,t}$), matched on size and BE/ME, in percent and Johnson's skewness adjusted *t*-statistics for the 36 months after the issuance are presented.

| Month of seasoning | Number of firms trading | CAAR1,t | t-stat |
|---|---|---|---|
| 1 | 1566 | 0.24 | 1.113 |
| 2 | 1562 | -0.23 | -0.698 |
| 3 | 1560 | -0.66 | -1.663 |
| 4 | 1559 | -1.24 | -2.654 |
| 5 | 1555 | -0.86 | -1.656 |
| 6 | 1552 | -1.19 | -2.070 |
| 7 | 1546 | -1.17 | -1.852 |
| 8 | 1542 | -1.42 | -2.086 |
| 9 | 1536 | -1.28 | -1.844 |
| 10 | 1528 | -1.46 | -1.973 |
| 11 | 1527 | -1.23 | -1.568 |
| 12 | 1525 | -1.14 | -1.426 |
| 13 | 1518 | -1.27 | -1.532 |
| 14 | 1512 | -1.49 | -1.721 |
| 15 | 1509 | -1.84 | -2.034 |
| 16 | 1503 | -1.75 | -1.825 |
| 17 | 1499 | -1.59 | -1.627 |
| 18 | 1498 | -1.72 | -1.693 |
| 19 | 1494 | -1.66 | -1.599 |
| 20 | 1483 | -2.02 | -1.873 |
| 21 | 1479 | -2.19 | -1.971 |
| 22 | 1478 | -2.55 | -2.258 |
| 23 | 1469 | -2.79 | -2.500 |
| 24 | 1466 | -3.55 | -3.058 |
| 25 | 1460 | -4.18 | -3.482 |
| 26 | 1456 | -4.36 | -3.567 |
| 27 | 1453 | -4.56 | -3.640 |
| 28 | 1446 | -4.61 | -3.570 |
| 29 | 1445 | -4.52 | -3.444 |
| 30 | 1439 | -4.50 | -3.386 |
| 31 | 1439 | -4.68 | -3.421 |
| 32 | 1428 | -5.23 | -3.732 |
| 33 | 1416 | -5.40 | -3.881 |
| 34 | 1413 | -5.49 | -3.903 |
| 35 | 1406 | -5.74 | -4.003 |
| 36 | 1402 | -5.05 | -3.605 |

**C: Cumulative raw returns for equally weighted portfolios of SEOs and bond issues in the United States, 2007-2017**

Two cumulative raw return series are plotted for the 36 months after the issue date: 1) SEO sample, 2) bond issue sample




**D: Performance categorized by industry, 2007-2017, using matching on industry**

Panel A reports the 36-months buy-and-hold returns of the 2564 SEOs, Panel B includes the 36-months buy-and-hold returns of the 1578 bond issues. The wealth relative is the ratio of (1+ average issuing firm holding period total return) divided by (1+ average matched portfolio holding period total return), returns are not in percent. Firms are categorized based on the given macro description by SDC.

| | | Average holding period total returns | | |
|---|---|---|---|---|
| | No. of | Event firms | Matched portfolios | |
| Industry | offerings | % | % | *Wealth relative* |
| Panel A: SEO sample buy-and-hold returns | | | | |
| Media and Entertainment | 65 | 5.77 | 29.73 | 0.82 |
| Healthcare | 1049 | 17.45 | 34.71 | 0.87 |
| Consumer Staples | 58 | -2.81 | 22.33 | 0.79 |
| Energy and Power | 256 | 9.49 | 1.61 | 1.08 |
| High Technology | 380 | 22.02 | 38.75 | 0.88 |
| Industrials | 206 | 10.09 | 27.75 | 0.86 |
| Retail | 134 | 25.26 | 42.26 | 0.88 |
| Materials | 167 | -2.55 | 13.77 | 0.86 |
| Telecommunications | 64 | -23.00 | 24.00 | 0.62 |
| Consumer Products and Services | 178 | 24.04 | 45.65 | 0.85 |
| Financials* | 7 | 108.35 | 53.91 | 1.35 |
| All firms | 2564 | 14.79 | 30.62 | 0.88 |
| Panel B: Bond issues samples buy-and-hold returns | | | | |
| Media and Entertainment | 124 | 54.67 | 36.46 | 1.13 |
| Healthcare | 148 | 37.98 | 35.06 | 1.02 |
| Consumer Staples | 180 | 35.53 | 26.50 | 1.07 |
| Energy and Power | 246 | -11.20 | 9.11 | 0.81 |
| High Technology | 159 | 32.41 | 44.05 | 0.92 |
| Industrials | 240 | 43.19 | 36.81 | 1.05 |
| Retail | 136 | 38.62 | 46.45 | 0.95 |
| Materials | 143 | 9.64 | 13.25 | 0.97 |
| Telecommunications | 75 | 6.08 | 35.15 | 0.78 |
| Consumer Products and Services | 120 | 32.90 | 39.95 | 0.95 |
| Financials* | 7 | 55.41 | 60.63 | 0.97 |
| All firms | 1578 | 27.24 | 30.81 | 0.97 |

## E: Performance categorized by year of issuance, 2007-2017, using matching on industry

Panel A reports the 36-months buy-and-hold returns of the 2564 SEOs, Panel B includes the 36-months buy-and-hold returns of the 1578 bond issues. The wealth relative is the ratio of (1+ average issuing firm holding period total return) divided by (1+ average matched portfolio holding period total return), returns are not in percent.

| Year of issuance | Number of offerings | Average holding period total returns: Event firms % | Matched portfolios % | *Wealth relative* |
|---|---|---|---|---|
| Panel A: SEO sample buy-and-hold returns | | | | |
| 2007 | 159 | -25.51 | -12.71 | 0.85 |
| 2008 | 54 | 21.88 | 12.59 | 1.08 |
| 2009 | 200 | 24.95 | 40.61 | 0.89 |
| 2010 | 236 | 38.35 | 43.02 | 0.97 |
| 2011 | 222 | 35.04 | 48.83 | 0.91 |
| 2012 | 256 | 47.46 | 58.18 | 0.93 |
| 2013 | 392 | 3.84 | 26.65 | 0.82 |
| 2014 | 335 | 4.03 | 20.63 | 0.86 |
| 2015 | 387 | -7.56 | 22.82 | 0.75 |
| 2016 | 323 | 21.32 | 29.86 | 0.93 |
| All firms | 2564 | 14.79 | 30.62 | 0.88 |
| Panel B: Bond issues samples buy-and-hold returns | | | | |
| 2007 | 70 | -10.36 | -10.65 | 1.00 |
| 2008 | 54 | 22.13 | 14.80 | 1.06 |
| 2009 | 128 | 53.42 | 53.22 | 1.00 |
| 2010 | 138 | 64.44 | 50.45 | 1.09 |
| 2011 | 159 | 44.00 | 42.78 | 1.01 |
| 2012 | 174 | 44.50 | 39.40 | 1.04 |
| 2013 | 203 | 12.74 | 19.90 | 0.94 |
| 2014 | 207 | 7.71 | 16.56 | 0.92 |
| 2015 | 270 | 14.84 | 28.00 | 0.90 |
| 2016 | 175 | 22.02 | 34.93 | 0.90 |
| All firms | 1578 | 27.24 | 30.81 | 0.97 |

## F: Performance categorized by size of the issue, 2007-2017, using matching on size and BE/ME

Panel A reports the 36-months buy-and-hold returns of the 2564 SEOs, Panel B includes the 36-months buy-and-hold returns of the 1578 bond issues. The wealth relative is the ratio of (1+ average issuing firm holding period total return) divided by (1+ average matched portfolio holding period total return) where returns are not in percent.

| Size of the issue tertile ($ mil) | Average holding period total returns: Event firms % | Matched portfolios % | *Wealth relative* |
|---|---|---|---|
| Panel A: SEO sample buy-and-hold returns | | | |
| 0.1 - 32.6 | -7.52 | 32.43 | 0.70 |
| 32.6 - 126.3 | 22.27 | 28.72 | 0.95 |
| 126.3 - 6,500 | 29.62 | 31.97 | 0.98 |
| All firms | 14.79 | 31.04 | 0.88 |
| Panel B: Bond issues samples buy-and-hold returns | | | |
| 2.8 - 349.5 | 30.52 | 31.33 | 0.99 |
| 349.5 - 598.8 | 29.96 | 32.89 | 0.98 |
| 598.8 - 3,967.8 | 21.23 | 32.76 | 0.91 |
| All firms | 27.24 | 32.33 | 0.96 |

**G: Performance categorized by size of the issue, 2007-2017, using matching on industry**

Panel A reports the 36-months buy-and-hold returns of the 2564 SEOs, Panel B includes the 36-months buy-and-hold returns of the 1578 bond issues. The wealth relative is the ratio of (1+ average issuing firm holding period total return) divided by (1+ average matched portfolio holding period total return), returns are not in percent.

| Size of the issue tertile ($ mil) | Average holding period total returns | | |
|---|---|---|---|
| | Event firms % | Matched portfolios % | *Wealth relative* |
| Panel A: SEO sample buy-and-hold returns | | | |
| 0.1 - 32.6 | -7.52 | 33.64 | 0.69 |
| 32.6 - 126.3 | 22.27 | 31.24 | 0.93 |
| 126.3 - 6,500 | 29.62 | 26.97 | 1.02 |
| All firms | 14.79 | 30.62 | 0.88 |
| Panel B: Bond issues samples buy-and-hold returns | | | |
| 2.8 - 349.5 | 30.52 | 30.24 | 1.00 |
| 349.5 - 598.8 | 29.96 | 31.93 | 0.99 |
| 598.8 - 3,967.8 | 21.23 | 30.27 | 0.93 |
| All firms | 27.24 | 30.81 | 0.97 |

**H: Performance categorized by relative size of the issue, 2007-2017, using matching on industry**

Panel A reports the 36-months buy-and-hold returns of the 2564 SEOs, Panel B includes the 36-months buy-and-hold returns of the 1578 bond issues. The wealth relative is the ratio of (1+ average issuing firm holding period total return) divided by (1+ average matched portfolio holding period total return), returns are not in percent. Relative size is calculated as: size of the issue / market capitalization. The sample is split in tertiles based on the relative size.

| Relative size of the issue tertile | Average holding period total returns | | |
|---|---|---|---|
| | Event firms % | Matched portfolios % | *Wealth relative* |
| Panel A: SEO sample buy-and-hold returns | | | |
| Small | 24.21 | 32.92 | 0.93 |
| Medium | 15.32 | 30.82 | 0.88 |
| Large | 4.83 | 28.10 | 0.82 |
| All firms | 14.79 | 30.62 | 0.88 |
| Panel B: Bond issues samples buy-and-hold returns | | | |
| Small | 30.59 | 32.17 | 0.99 |
| Medium | 31.57 | 32.19 | 1.00 |
| Large | 19.55 | 28.08 | 0.93 |
| All firms | 27.24 | 30.81 | 0.97 |

**I: Performance categorized by investment level, 2007-2017, matching on industry**

Panel A reports the 36-months buy-and-hold returns of 1977 SEOs, Panel B includes the 36-months buy-and-hold returns of the 1244 bond issues. The wealth relative is the ratio of (1+ average issuing firm holding period total return) divided by (1+ average matched portfolio holding period total return) where returns are not in percent. Investment level is calculated as the average CAPEX/total assets in the year of issuance and the year post issuance. The sample is split in tertiles based on the investment level.

| | Average holding period total returns | | |
|---|---|---|---|
| | Event firms | Matched portfolios | |
| CAPEX/TA tertile | % | % | *Wealth relative* |
| Panel A: SEO sample buy-and-hold returns | | | |
| Small | 24.34 | 36.79 | 0.91 |
| Medium | 26.43 | 37.44 | 0.92 |
| Large | 22.23 | 25.29 | 0.98 |
| All firms | 24.34 | 33.17 | 0.93 |
| Panel B: Bond issues samples buy-and-hold returns | | | |
| Small | 43.86 | 41.83 | 1.01 |
| Medium | 35.82 | 30.48 | 1.04 |
| Large | 17.64 | 28.33 | 0.92 |
| All firms | 32.34 | 33.50 | 0.99 |